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Test and Evaluation

CAPABILITIES-BASED TEST AND EVALUATION

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This publication implements Air Force Policy Directive (AFPD) 99-1, *Test and Evaluation Process.* It describes the planning, conduct, and reporting of cost effective test and evaluation (T&E) programs as an efficient continuum of integrated testing throughout the system life cycle. This AFI implements the policies in Department of Defense Directive (DoDD) 5000.01, *The Defense Acquisition System*, and DoD Instruction (DoDI) 5000.02, *Operation of the Defense Acquisition System* (collectively called the DoD 5000-series); and Chairman of the Joint Chiefs of Staff (JCS) Instruction (CJCSI) 3170.01, *Joint Capabilities Integration and Development System.* This AFI must be used in conjunction with AFI 10-601, *Operational Capability Requirements Development,* AFI 63-101/20-101, *Integrated Life Cycle Management,* and AFI 33-210, *Air Force Certification and Accreditation (C&A) Program (AFCAP).* The *Defense Acquisition Guidebook (DAG)* contains non-mandatory guidance. This instruction applies to all Air Force organizations, including the Air National Guard, Air Force Reserve Command, major commands (MAJCOM), direct reporting units (DRU), and field operating agencies (FOA). This instruction applies to all Air Force acquisition projects and programs regardless of acquisition category (ACAT). Requests for waivers must be submitted to the appropriate Tier waiver approval authority or, if a non-Tiered requirement, to the publication OPR for consideration. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using AF Form 847, *Recommendation for Change of Publication*, routed through the functional chain of command. Any organization conducting T&E may supplement this instruction in accordance with (IAW) AFI 33-360, *Publications and Forms Management*. Any organization supplementing this instruction must send the proposed document to AF/TEP (mailto:**aftep.workflow@pentagon.af.mil**) for review prior to publication. Ensure that all records created as a result of processes prescribed in this publication are maintained IAW Air

Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of IAW Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS).

SUMMARY OF CHANGES

This document has been extensively rewritten and should be read in its entirety. It incorporates all changes resulting from the cancellation of *National Security Space Acquisition Policy 03-01*, and Secretary of the Air Force-directed changes to HQ Air Force Space Management and Organization. All areas of the AFI were updated, the most important of which are:

Areas added: reference to the Office of the Deputy Assistant Secretary of Defense for Developmental Test and Evaluation (DASD(DT&E)); integrated testing policy and definition; distinctions between Test and Evaluation Master Plan (TEMP) changes versus administrative updates; direction for implementing MAJCOM T&E focal points; testing of training devices; scientific test and analysis techniques (STAT) initiatives; reliability growth planning; testing rapid acquisition and urgent operational needs; references and direction for unified capabilities (UC) testing, emissions security (EMSEC) assessments; direction for platform information technology (PIT) systems; tier waiver authority annotations for compliance items; and Chief Developmental Tester (CDT) responsibilities.

Areas deleted: all of Chapter 8 on space system testing; the terms seamless verification and key decision point (KDP); all references to the Program Management Directive (PMD); and the USAF range precedence rating system.

Areas modified: many subjects are moved to new locations that align better with the acquisition timeline; the phrase "strategy for T&E" replaces "T&E strategy" when describing the overarching plan for program testing; the integrated test concept (ITC) is more fully described; new flexibility is added for using TEMP alternatives; the term "Lead Developmental Test and Evaluation Organization (LDTO)" universally replaces "Responsible Test Organization (RTO)" to reflect new statutory language; references and direction are expanded for interoperability, information assurance (IA), security testing, and system certification and accreditation (C&A); strategies for archiving T&E data and information are expanded; and due dates for Multi-Service Operational Test and Evaluation (MOT&E) final reports are clarified.

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Chapter 1

TEST AND EVALUATION CONCEPTS

1.1. Purpose of Test and Evaluation (T&E). The overarching functions of T&E are to mature system designs, manage risks, identify and help resolve deficiencies as early as possible, assist in reducing unintended cost increases during development, operations, and throughout the system life cycle, and ensure systems are operationally mission capable (i.e., effective, suitable, survivable, and safe). T&E provides knowledge of system design, capabilities, and limitations to the acquisition community to improve system performance before production and deployment, and to the user community for optimizing system operations and sustainment after production and deployment. The T&E community will:

1.1.1. Collaborate with capability requirements sponsors and system developers to field effective and suitable systems that meet program baseline goals for cost, schedule, and performance.

1.1.2. Provide timely, accurate, and affordable information to decision makers to support production and fielding decisions.

1.1.3. Provide data and information in support of managing risks during acquisition, fielding, and sustainment by accurately characterizing system technical and operational performance throughout the system life cycle.

1.1.4. Help the acquisition and sustainment communities acquire and maintain operationally mission capable systems for Air Force users.

1.1.5. Provide information to users to assess mission impacts, develop policy, improve requirements, and refine tactics, techniques, and procedures (TTP).

1.2. The Acquisition Environment. The Integrated Life Cycle Management (ILCM) Framework is the overarching system of concepts, methods, and practices the Air Force uses to effectively manage systems from capability gap identification through final system disposal. The goals of ILCM are to recapitalize Air Force capabilities through maximum acquisition cycle time efficiency, provide agile support that will optimize fielded capabilities and the supply chain, minimize the logistics footprint, and reduce total ownership cost. ILCM begins with capabilities-based requirements development and continues with capability-based acquisition, T&E, expeditious fielding, sustainment, and demilitarization. See AFI 63-101/20-101 for details.

1.2.1. **Evolutionary Acquisition (EA).** EA is the preferred DoD strategy for rapid acquisition of mature technology for the user IAW DoDI 5000.02. An evolutionary approach delivers capability in increments, recognizing up front the need for future capability improvements. The objective is to balance needs and available capability with resources, and to put capability into the hands of the user quickly. The success of the strategy depends on phased definition of capability needs and system requirements, maturation of technologies, and disciplined development and production of systems with increased capability. For software development, an incremental approach is similar to the EA strategy, but does not repeat every phase and decision point for each increment.

1.2.2. **Collaborative Concepts and Processes.** ILCM is based on concepts and processes described in AFI 10-601, AFI 63-101/20-101, AFI 33-210, and this AFI. **Figure 1.1** shows the acquisition process as the "master clock" for the integration of requirements, acquisition, information assurance (IA) activities, and T&E events. Sections of **Figure 1.1** are used at the beginning of Chapters 4, 5, and 6 to illustrate key events during each acquisition phase. These diagrams represent the full spectrum of processes and events. DoD and AF guidance provides program managers (PM) with the flexibility to tailor programs, within certain limits, to meet specific program requirements.

1.2.3. **Integrated Warfighting/Cross-Domain Test and Evaluation.** The ability to successfully conduct a mission may require the integration of activities and products from a combination of primary weapon systems, support systems, and enabling systems (e.g., air, space, land, sea, cyberspace, and operations centers). Comprehensive testing of interoperable systems is essential in validating expected mission performance, identifying vulnerabilities, and developing and validating effective employment TTP.

1.2.4. **Capabilities-Based Testing.** Capabilities-based testing evaluates the capability of the system to effectively accomplish its intended mission in a realistic mission environment rather than simply meet individual technical specifications. The current emphasis on joint military operations in an information-intensive environment means that Air Force systems will seldom operate in combat as completely independent entities. Air Force systems are expected to fully integrate with systems, activities, and products from all Services and National agencies. Capabilities-based testing requires a full understanding of joint operational concepts in order to develop test scenarios that will provide meaningful results.

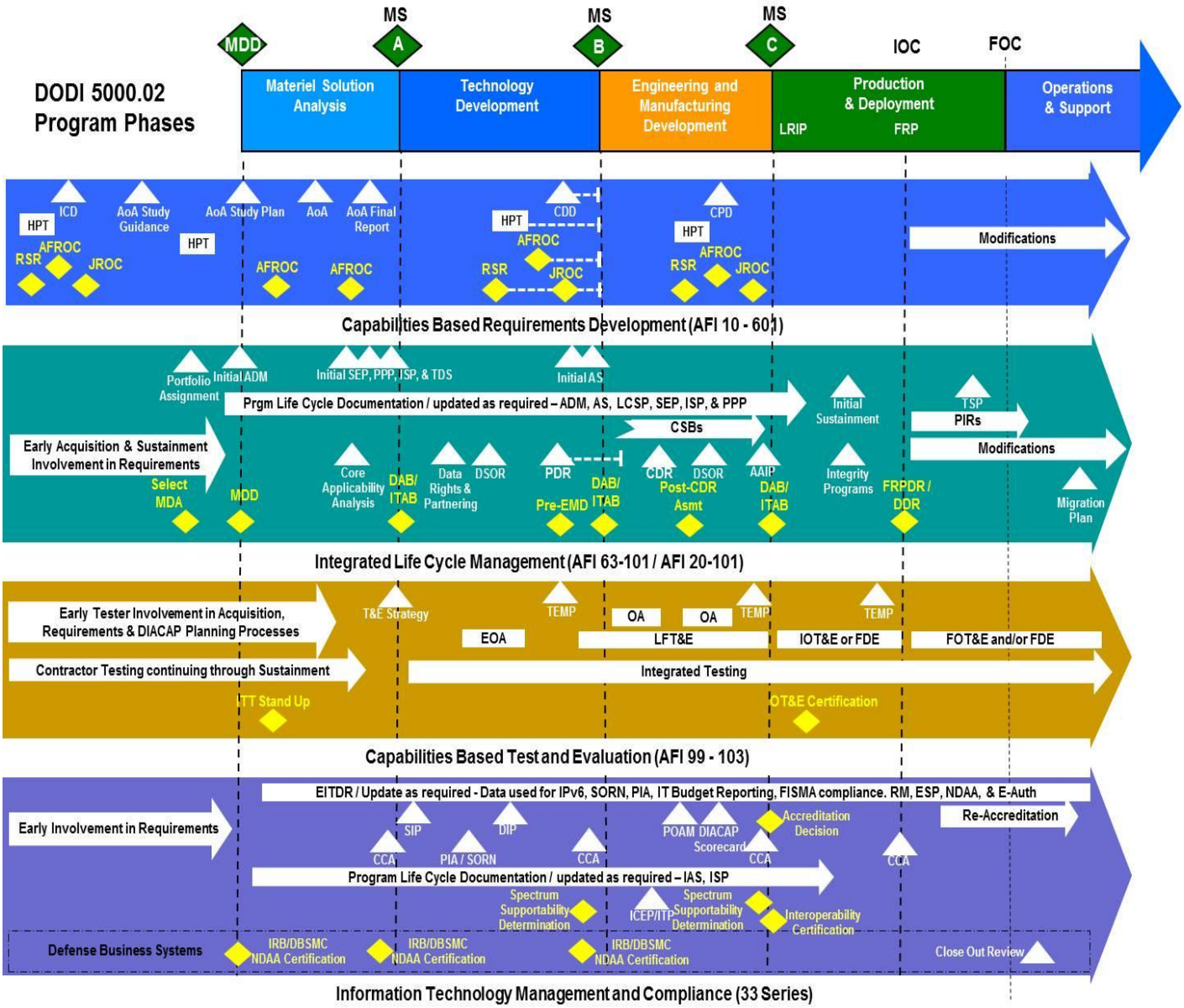
1.2.5. **Information Technology (IT) and Agile Software Development (ASD).** Nearly all systems today have IT content and require some level of IA, interoperability, and security testing. The lower bar in **Figure 1.1** shows additional requirements from the 33-series AFIs for IT and software-intensive systems as they are integrated with the requirements, acquisition, and T&E processes.

1.2.5.1. Some IT and business systems may use ASD methodologies based on rapid incremental development and fielding. The requirements and solutions for these systems evolve quickly via continuous collaboration between small, self-organizing, cross-functional teams. Agile methods break tasks into small increments of proven capability, use minimal documentation, are tolerant of changing requirements, and have iterations typically lasting from a few weeks to a few months. The emphasis is on software that works as the primary measure of progress. Agile concepts and practices are being embraced by segments of the DoD as a potentially effective approach for software development under the right circumstances for some categories of software-intensive systems. DoD testing for agile development will evolve as more experience is gained with the process, and this AFI will be updated to reflect those changes as they occur.

1.2.5.2. Iterative, incremental development (IID) applies ASD processes and is gaining acceptance as an acquisition strategy for DoD IT systems. IID is used when no science and technology development is needed. Top level operational requirements may not be defined in sufficient detail up front and must be determined and verified based on authoritative feedback from users. Increments in IID are intended to provide the basis for this requirements refinement. Users must interact with actual systems capabilities during

development, often in real-world environments, in order to provide useful feedback. The IID strategy instills a test-driven development methodology in every agile release.

Figure 1.1. Integration of the Requirements, Acquisition, IA, and T&E Processes.



Notes:
1. Represents a notional flow and is not all inclusive. Programs may be tailored with approval of the MDA. See AFI 63-101/20-101.
2. All acronyms in this figure are listed in **Attachment 1**.

1.3. General T&E Principles. The following T&E principles are IAW DoD 5000-series documents and lessons learned. The unifying theme is that all testers must collaborate to the

fullest extent possible to effectively evaluate programs and systems regardless of organizational affiliation. Because the acquisition process is fluid, testers must ensure the intent of this AFI is implemented at all times.

1.3.1. **Tailoring.** The Integrated Test Team (ITT) ensures that all strategies for T&E, concepts, plans, briefings, and reports are flexible and tailored to fit the specific needs of acquisition programs consistent with sound systems engineering practices, program risk, statutory and regulatory guidelines, the time-sensitive nature of users' requirements, and common sense. If a project or program is authorized to enter the acquisition process at other than the beginning (e.g., entry at Milestone (MS) B), the ITT reviews all activities that would normally be accomplished prior to that point and ensure that any mandatory prerequisites are accomplished. T&E planning, execution, and reporting must also be tailored for emerging contingencies.

1.3.2. **Pre-MS A Tester Involvement.** The early provision of T&E expertise and technical and operational insight to acquisition professionals and requirements developers, preferably before the Technology Development phase, is a key to successful initiation of new programs. The earlier the involvement, the greater the opportunity to reduce unintended increases to development, operations, and life cycle costs. Candidate materiel solution approaches are better understood and risks reduced when T&E practitioners make technical contributions to early acquisition planning activities.

1.3.3. **Early Deficiency Identification.** Deficiencies must be identified as early as possible to enable resolution, increase program efficiency and economy of effort.

1.3.4. **Event-Driven Schedules and Exit Criteria.** Adequate time and resources must be planned and provided for all T&E activities IAW DoDD 5000.01. T&E activities must demonstrate the system meets established engineering objectives, operational capability requirements, and exit criteria before moving to the next phase of development. The PM must ensure the system is stable and mature before it is certified ready for dedicated operational testing.

1.3.5. **Integrated Testing.** Integrated testing is the collaborative planning and collaborative execution of test phases and events to provide shared data in support of independent analysis, evaluation, and reporting by all stakeholders, particularly the developmental (both contractor and government) and operational test and evaluation communities. Effective ITTs plan and execute testing that is integrated across the entire program lifecycle; that integrates with the program's requirements generation and system engineering processes; that evaluates system interoperability of a system of systems or family of systems, as applicable; and that integrates developmental and operational test. Integrated testing is a concept for test management and design, not a new type of T&E. It structures T&E to reduce the time needed to field effective and suitable systems by providing qualitative and quantitative information to decision makers throughout the program's life cycle. Integrated testing minimizes the gaps between contractor, developmental, and operational testing by implementing integrated testing techniques and objectives to the maximum extent possible.

1.3.5.1. Integrated testing must be intentionally designed into the earliest program strategies, plans, documentation, and test plans, preferably starting before MS A. From the start, test planning must consider the entire lifecycle of program activities from technology development through disposal, including testing relevant to manufacturing

and sustainment. The earlier integrated testing strategies are developed and adopted, the greater the opportunities and benefits. If done correctly, integrated testing will identify system design improvements early in developmental test and evaluation (DT&E), reduce the amount of T&E resources needed for operational test and evaluation (OT&E), and help PMs control unintended increases to development, operations, and life cycle costs.

1.3.5.2. Test planning must be integrated with the requirements generation process and the system engineering process, yielding requirements that are testable and achievable, and test plans that provide actionable capabilities-oriented test results. Integrated testing orients government T&E of materiel solutions toward a capabilities-based approach to requirements and operational mission needs rather than pass-fail measurements of specification-like requirements. Capability-based testing ensures strategies and plans for T&E are derived from the operational environment and functionality specified in validated operational capabilities requirements. It requires an understanding of how systems will be employed in operational environments and mandates that strategies for T&E and plans be designed to determine whether a new capability solution merits fielding. Furthermore, in light of the joint operational environment, effective test planning and execution integrates with testing of other systems to evaluate interoperability.

1.3.5.3. Integrated testing may include all types of test activities such as modeling and simulation (M&S), contractor testing, developmental and operational testing, interoperability testing of a system of systems or family of systems, as appropriate, IA testing, and certification testing as described in **Chapter 2**. All types of testing, regardless of the source, should be considered, including tests from other Services for multi-Service programs. Tests will be integrated to the maximum extent possible as described in **Chapters 4** through **7**. Software intensive and information technology (IT) systems will use the reciprocity principle as much as possible, i.e., "Test by one, use by all." **Note:** This AFI will use the term “integrated testing” to capture this broad intent. “Integrated DT&E/OT&E” is the most common combination, but many other combinations are possible.

1.3.5.4. All testers collaborate as an ITT to generate an overarching strategy for T&E and test plans that are integrated. These plans must leverage all available test activities and resources while minimizing redundant testing and waste. The result is an integrated test approach with harmonized test plans that efficiently work together throughout the acquisition program, and not necessarily a single test plan. An integrated test concept (ITC) must be developed as part of the Test and Evaluation Strategy (TES) and the Test and Evaluation Master Plan (TEMP) when initiating test planning as described in paragraphs **4.11**, **6.2**, **6.3** and **6.4**

1.3.5.5. Integrated testing must provide shared data in support of independent analyses for all stakeholders. Shared data provides continuous written feedback from test organizations to the PM and other stakeholders on all aspects of program development. For each program, a common T&E database is required according to paragraph **5.16** that includes descriptions of the test environments and conditions to ensure commonality and usability by other testers. Integrated testing must plan for and provide T&E data for separate, independent initial OT&E (IOT&E) according to 10 United States Code (U.S.C.) § 2399, DoDI 5000.02, and the *Defense Acquisition Guidebook (DAG)*, Chapter

9. It does not necessarily include the earliest engineering design or data from early prototypes which may not be relevant.

1.3.6. **Objectivity.** All Air Force T&E activities must be objective, unbiased, and free from outside influences to ensure the integrity of evaluation results IAW AFPD 99-1. Air Force programs ensure objective DT&E by designating a lead developmental test and evaluation organization (LDTO) that is separate from the program office. An independent operational test organization (OTO) is assigned to ensure objective OT&E for all programs.

1.4. Integrated Test Team (ITT). The PM establishes an ITT as soon as possible after the Materiel Development Decision (MDD) as shown in **Figure 1.1** to create and manage the strategy for T&E for the life of each program. The ITT construct is central to carrying out integrated testing and is equivalent to the T&E Working-level Integrated Product Team (T&E WIPT) described in the DAG, Chapter 9. The PM and the lead OTO co-chair the ITT using the general T&E principles outlined in paragraph **1.3**. ITT membership includes all organizations needed to implement a comprehensive and integrated test strategy for as long as T&E is needed. Typical ITT member organizations are described in paragraph **4.4.4**. Also see the *Air Force Test and Evaluation Guidebook* for details about ITT structure, responsibilities, charters, and functions. The Guidebook is available on the AF/TE portion of the Air Force Portal (**https://www.my.af.mil**).

1.5. How this Document is Organized. This AFI follows the acquisition process phases in DoDI 5000.02 as shown in **Figure 1.1**. **Chapters 4**, **5**, and **6** contain direction most pertinent to achieving the goals of MS A, B, and C respectively. Each chapter's activities typically support that particular MS or phase, but depending on program needs, may be partially completed or even deferred to the next phase. The sequence of activities presented generally follows the flow of **Figure 1.1**, but in all cases, planning for each area should be started as early as practical. **Note:** Programs that enter the acquisition process after MS A must accomplish the necessary "stage-setting" activities specified for the preceding milestones in **Chapters 4** and **5**.

1.6. Applicability and Authority. The policies and processes in this AFI are for use by all Air Force T&E organizations and acquisition programs, modification and sustainment programs, MAJCOM-directed acquisition programs, and projects regardless of ACAT, unless otherwise noted. See DoDI 5000.02, Enclosure 3, for details about ACATs. Air Force Special Access Programs (SAP) and other sensitive programs (e.g., BIG SAFARI projects) will follow the intent of this AFI to the extent that security considerations allow. Exceptions to policy will be coordinated with SAF/AAZ, Security and Special Program Oversight, SAF/AQL, Special Programs, SAF/AQI, Information Dominance, or AF/TE, Test and Evaluation, as applicable. **Note:** In this AFI, guidance provided for "MAJCOM" test activities shall be understood to apply also to FOA and DRU test activities (except the Air Force Operational Test and Evaluation Center (AFOTEC)).

1.6.1. **Hierarchy of Authority.** Authority for this AFI flows from congressional statute through DoD-level issuances, and AFPD 99-1, *Test and Evaluation*. Specific details for implementing this policy are delegated to and more appropriately developed by Air Force MAJCOMs, FOAs, and DRUs, and their subordinate designated T&E organizations based on specific mission areas and needs.

1.6.2. **Hierarchy of Knowledge Management.** It is not possible for this AFI to prescribe detailed T&E policy and TTP for each of the Air Force's many mission areas, programs, and

T&E activities. Therefore, all T&E organizations must establish tailored, disciplined, and collaborative processes for planning, executing, and reporting T&E activities.

1.6.3. **Qualification of Test Personnel.** In order to apply the T&E principles in paragraph **1.3**, a highly trained and qualified T&E workforce is required. Supervisors and commanders at all levels are expected to enforce applicable qualification standards in accordance with this and other applicable DoD and Air Force policy.

1.7. Areas Not Covered by this AFI. The systems, programs, and activities listed in the sub-paragraphs below are not within the purview of this AFI.

1.7.1. Nuclear weapons systems. Joint T&E of nuclear weapons systems is governed by joint DoD-Department of Energy agreements. Nuclear and non-nuclear components, sub-systems, and associated product support elements that require testing and nuclear certification throughout the system life cycle remain covered as described in AFI 63-103, *Joint Air Force National Nuclear Security Administration (AF-NNSA) Nuclear Weapons Life Cycle Management*, and AFI 63-125, *Nuclear Certification Program*.

1.7.2. Industrial maintenance inspections.

1.7.3. Activities associated with the space experimentation program described in AFI 10-1202, *Space Test Program (STP) Management.*

1.8. Compliance Items. Each unit (wing or equivalent, and below, DRU, FOA) compliance item is identified with a Tier waiver authority number. A "T-0" denotes a requirement external to the USAF; requests for waivers must be processed through command channels to AF/TEP for consideration. For "T-1" items, the waiver authority is the MAJCOM/CC (delegable no lower than the MAJCOM Director), with the concurrence of AF/TE.

1.8.1. The AFOTEC/CC is delegated waiver authority for AFOTEC "T-1" compliance items with concurrence of AF/TE.

1.8.2. In accordance with the acquisition chain of authority specified in AFI63-101/20-101, mandates to the acquisition execution chain are not considered Wing level mandates and tiering does not apply.

Chapter 2

TYPES OF TEST AND EVALUATION

2.1. Major Categories of Testing. Air Force testing falls into two overarching categories, developmental testing and operational testing. If a specific T&E requirement does not fall precisely into one of the following discrete categories of testing, consult with AF/TEP to select and tailor the type of testing that best fits the need.

2.2. Developmental Testing. Developmental testing is conducted throughout the acquisition and sustainment processes to assist engineering design and development, and verify that critical technical parameters (CTP) have been achieved. DT&E supports the development and demonstration of new materiel solutions or operational capabilities as early as possible in the acquisition life cycle. After full-rate production (FRP) or fielding, DT&E supports the sustainment and modernization of systems. To support integrated testing, as many test activities as practical are conducted in operationally relevant environments without compromising engineering integrity, safety, or security. Developmental testing leads to and supports a certification that the system is ready for dedicated operational testing IAW DoDI 5000.02, Enclosure 6, and AFMAN 63-119, *Certification of System Readiness for Dedicated Operational Testing.* In addition, developmental testing:

2.2.1. Assesses the technological capabilities of systems or concepts in support of requirements activities described in AFI 10-601 (e.g., courses of action (COA)). Conducts research, development, test, and evaluation (RDT&E) to investigate new concepts and technologies and collect basic scientific and engineering data.

2.2.2. Provides empirical data for cost, schedule, and performance trade-offs.

2.2.3. Uses M&S tools and digital system models (DSM); evaluates M&S tools for applicability; and performs verification and validation with actual test data to support accreditation of M&S tools.

2.2.4. Identifies and helps resolve deficiencies and vulnerabilities as early as possible.

2.2.5. Verifies the extent to which design risks have been minimized.

2.2.6. Verifies compliance with specifications, standards, and contracts.

2.2.7. Characterizes system performance and military utility.

2.2.8. Assesses quality and reliability of systems. Quantifies manufacturing quality and contract technical performance.

2.2.9. Ensures fielded systems continue to perform as required in the face of changing operational requirements and threats.

2.2.10. Ensures all new developments, modifications, and upgrades address operational safety, suitability, and effectiveness (OSS&E); security; information assurance; environment, safety, and occupational health integration; and human systems integration IAW AFI 63-101/20-101.

2.2.11. Supports aging and surveillance programs, value engineering projects, productivity, reliability, availability and maintainability projects, technology insertions, and other

modifications IAW AFI 63-131, *Modification Program Management*, and Air Force Pamphlet (AFPAM) 63-128, *Guide to Acquisition and Sustainment Life Cycle Management*.

2.2.12. Uses various kinds of funding depending on the nature and purpose of the work and the type of testing required. For specific funding guidance, see DoD 7000.14-R, *Department of Defense Financial Management Regulation (FMR)*, Vol 2A, Chapter 1, and AFI 65-601, *Budget Guidance and Procedures*, Vol 1, Chapter 14.

2.3. Types of Developmental Testing. This AFI does not attempt to prescribe an all-inclusive list of developmental test types. The potential exists for several developmental testing types to overlap. The types of DT&E must be described in the TES, TEMP, and test plans to facilitate planning and coordination for integrated testing. The following general DT&E types exist for many acquisition programs:

2.3.1. **Qualification Test and Evaluation (QT&E).** QT&E is a tailored type of DT&E conducted primarily for commercial-off-the-shelf (COTS) items, non-developmental items (NDI), and government furnished equipment (GFE). Depending on user requirements, these and other items may require little or no government funded research and development (R&D), engineering, design, or integration efforts. PMs plan for and conduct T&E of COTS, NDI, and GFE even when these items come from pre-established sources. See paragraph **5.12** for more information on COTS, NDI, and GFE. **Note:** QT&E generally uses procurement (e.g., 3010 [aircraft], 3020 [missiles], or 3080 [other]), or operations and maintenance (O&M) funds (i.e., 3400) IAW DoD 7000.14-R, Vol 2A, and AFI 65-601, Vol I, Chapter 14.

2.3.2. **Production-Related Testing.** The PM ensures T&E is conducted on production items to demonstrate that specifications and performance-based requirements of the procuring contracts have been fulfilled. Defense Contract Management Agency personnel normally oversee this testing at the contractor's facility. Typical tests (defined in **Attachment 1**) include: first article tests (FAT); lot acceptance tests (LAT); pre-production qualification tests (PPQT); production qualification tests (PQT); and production acceptance test and evaluation (PAT&E). Developmental and operational testers may observe, collect data, or participate during these tests as needed.

2.3.3. **Live Fire Test and Evaluation (LFT&E).** LFT&E is a type of DT&E that provides timely, rigorous, and credible vulnerability or lethality test and evaluation of "covered" systems as they progress through the Engineering and Manufacturing Development (EMD) Phase and early Production and Deployment Phase prior to FRP, or a major system modification that affects survivability. Survivability consists of susceptibility, vulnerability, and recoverability information derived from the firing of actual weapons (or surrogates if actual threat weapons are not available) at components, sub-systems, sub-assemblies, and/or full up, system-level targets. Modeling, simulation, and analysis must be an integral part of the LFT&E process. The Air Force must initiate LFT&E programs sufficiently early to allow test results to impact system design prior to FRP or major modification decisions. See paragraph **5.8** for more information; **Attachment 1** for key definitions; and 10 U.S.C.§ 2366. The Air Force accomplishes LFT&E to:

2.3.3.1. Provide information to decision makers on potential user casualties, system vulnerabilities, lethality, and system recoverability while taking into equal consideration the susceptibility to attack and combat performance of the system.

2.3.3.2. Ensure system fielding decisions include an evaluation of vulnerability and lethality data under conditions that are as realistic as possible.

2.3.3.3. Assess battle damage repair capabilities and issues. While assessment of battle damage repair is not a statutory requirement of LFT&E, test officials should exploit opportunities to assess such capabilities whenever prudent and affordable.

2.4. Operational Testing. Operational testing determines the operational effectiveness and suitability of the systems under test. It determines if operational capability requirements have been satisfied and assesses system impacts to both peacetime and combat operations. It identifies and helps resolve deficiencies as early as possible, identifies enhancements, and evaluates changes in system configurations that alter system performance. Operational testing includes a determination of the operational impacts of fielding and/or employing a system across the full spectrum of military operations and may be conducted throughout the system life cycle. Operational testing may also evaluate or assess doctrine, organization, training, materiel, leadership and education, personnel, facilities and policy (DOTMLPF-P).

2.5. Types of OT&E. OT&E is the formal field test, under realistic combat conditions, of any item of (or key component of) weapons, equipment, or munitions for the purpose of determining the effectiveness and suitability of that system for use in combat by typical military users, and the evaluation of the results of such test. The types of operational testing listed below afford operational testers a range of options for completing their mission. "Evaluations" collect, analyze, and report data against stated criteria with a high degree of analytical rigor and are used to inform FRP or fielding decisions. "Assessments" usually collect and analyze data with less analytical rigor, need not report against stated criteria, and cannot be the sole source of T&E data for FRP or fielding decisions. **All programs that result in a FRP or fielding decision (full or partial capability) require an appropriate type of operational testing supported by sufficient independent evaluation to inform that decision.** The OTO, in conjunction with the user and Office of the Secretary of Defense (OSD) oversight organizations (if applicable), determines the appropriate level of operational testing required. Operational testing of COTS, NDI, and GFE cannot be omitted simply because these items came from pre-established sources. Acquisitions that support sustainment, to include acquisition of support equipment and form, fit, function, and interface (F3I) replacements, require FRP or fielding decisions and an appropriate type of operational testing. Operational testing must be based on approved operational requirements documents specifically for the capabilities being fielded; however, the OTO has the authority to test against expanded operational requirements based on real-world developments. See the definition of OT&E in **Attachment 1** for further information.

2.5.1. **Initial Operational Test and Evaluation (IOT&E).** IOT&E is the primary dedicated OT&E of a system before FRP or fielding as directed by DoDI 5000.02. IOT&E determines if operational requirements and critical operational issues (COI) have been satisfied and assesses system impacts to peacetime and combat operations. Tests are conducted under operational conditions, including combat mission scenarios that are as operationally realistic as possible. A dedicated phase of IOT&E is required for new ACAT I and II programs, as well as for all OSD OT&E Oversight programs IAW DoDI 5000.02. The determination of appropriate types of operational testing for subsequent modifications and upgrades, as well as applicability to other types of programs, will be accomplished according to paragraph **4.6**. IOT&E shall be conducted only by AFOTEC. AFOTEC determines the operational effectiveness and operational suitability of the items under test using production

or production-representative articles with stabilized performance and operationally representative personnel.

2.5.2. **Qualification Operational Test and Evaluation (QOT&E).** QOT&E is a tailored type of IOT&E performed on systems for which there is little to no RDT&E-funded development effort. Conducted only by AFOTEC, QOT&E is used to evaluate military-unique portions and applications of COTS, NDI, and GFE for military use in an operational environment. QOT&E supports the same kinds of decisions as IOT&E. See paragraph **5.12** for more information on COTS, NDI, and GFE.

2.5.3. **Follow-on Operational Test and Evaluation (FOT&E).** FOT&E is the continuation of OT&E after IOT&E, QOT&E, or Multi-Service OT&E (MOT&E) and is conducted only by AFOTEC. It answers specific questions about unresolved COIs and test issues; verifies the resolution of deficiencies or shortfalls determined to have substantial or severe impact(s) on mission operations; or completes T&E of those areas not finished during OT&E. AFOTEC reports will document known requirements for FOT&E. More than one FOT&E may be required. **Note:** FOT&E that follows a QOT&E as described in paragraph **2.5.2** is funded with procurement (3010, 3020, or 3080) or O&M (3400) funds, not RDT&E 3600 funds. See paragraph **5.2** for T&E funding sources, and paragraph **5.20** for test deferrals, limitations, and waivers.

2.5.4. **Force Development Evaluation (FDE).** FDE is a type of dedicated OT&E performed by MAJCOM OTOs in support of MAJCOM-managed system acquisition-related decisions and milestones prior to initial fielding, or for subsequent system sustainment or upgrade activities. An FDE may be used for multiple purposes to include:

2.5.4.1. Evaluate and verify the resolution of previously identified deficiencies or shortfalls, including those rated in AFOTEC reports as not having a substantial or severe impact on mission operations.

2.5.4.2. Evaluate routine software modifications (e.g., operational flight programs (OFP)), subsequent increments, upgrades, and other improvements or changes made to sustain or enhance the system.

2.5.4.3. Evaluate and verify correction of new performance shortfalls discovered after fielding of the system.

2.5.4.4. Evaluate operational systems against foreign equipment.

2.5.4.5. Evaluate operational systems against new or modified threats.

2.5.4.6. Evaluate military-unique portions and applications of COTS, NDI, and GFE for military use.

2.5.5. **Multi-Service Operational Test and Evaluation (MOT&E).** MOT&E is OT&E (IOT&E, QOT&E, FOT&E, or FDE) conducted by two or more Service OTOs for systems acquired by more than one Service. MOT&E is conducted IAW the T&E directives of the lead OTO, or as agreed in a memorandum of agreement between the participants. See the *Memorandum of Agreement (MOA) on MultiService Operational Test and Evaluation (MOT&E) and Joint Test and Evaluation (JT&E),* and the *MOA on Operational Suitability Terminology and Definitions to be used in Operational Test and Evaluation* (**http://www.dote.osd.mil/policy.html**). Also see paragraphs **4.6.6.4**, **4.8** and **7.4.4** of this

Instruction. If MAJCOMs are involved in multi-Service testing without AFOTEC, they should use this MOA as a guide.

2.5.6. **Tactics Development and Evaluation (TD&E).** TD&E is a tailored type of FDE conducted by MAJCOMs to refine doctrine, system capabilities, and TTP throughout a system's life cycle IAW AFI 11-260, *Tactics Development Program*. TD&Es normally identify non-materiel solutions to problems or evaluate better ways to use new or existing systems.

2.5.7. **Weapons System Evaluation Program (WSEP).** WSEP is a MAJCOM-conducted test program to provide an end-to-end tailored evaluation of fielded weapons systems and their support systems using realistic combat scenarios. WSEP also conducts investigative firings to revalidate capabilities or better understand munitions malfunctions.

2.5.8. **Operational Utility Evaluation (OUE).** An OUE is an operational test which may be conducted by AFOTEC or MAJCOMs whenever a dedicated OT&E event is required, but the full scope and rigor of a formal IOT&E, QOT&E, FOT&E, or FDE is not appropriate or required IAW this AFI. OUEs may be used to support operational decisions (e.g., fielding a system with less than full capability, to include but not limited to integrated testing of releases and increments of IT capabilities) or acquisition-related decisions (e.g., low-rate initial production (LRIP)) when appropriate throughout the system lifecycle. OTOs may establish their supplemental internal guidance on when and how to use OUEs. Use of OUE or FDE to support MAJCOM-managed acquisition decisions is at the discretion of the appropriate MAJCOM staff or test organization.

2.5.9. **Operational Assessment (OA).** OAs are conducted by AFOTEC or MAJCOMs in preparation for dedicated operational testing and typically support MS C or LRIP decisions. They are designed to be progress reports and not intended to determine the overall effectiveness or suitability of a system. They provide early operational data and feedback from actual testing to developers, users, and decision makers. OAs also provide a progress report on the system's readiness for IOT&E or FDE, or support the assessment of new technologies. OAs will <u>not</u> be used as substitutes for IOT&E, QOT&E, FOT&E, FDE, or OUE. OAs are integrated with DT&E to:

2.5.9.1. Assess and report on a system's maturity and potential to meet operational requirements during dedicated operational testing.

2.5.9.2. Support long-lead, LRIP, or increments of acquisition programs.

2.5.9.3. Identify deficiencies or design problems that can impact system capability to meet concepts of employment, concepts of operation or operational requirements.

2.5.9.4. Uncover potential system changes needed which in turn may impact operational requirements, COIs, or the Acquisition Strategy.

2.5.9.5. Support the demonstration of prototypes, new technologies, or new applications of existing technologies, and demonstrate how well these systems meet mission needs or satisfy operational capability requirements.

2.5.9.6. Support proof of concept initiatives.

2.5.9.7. Augment or reduce the scope of dedicated operational testing.

2.5.10. **Early Operational Assessment (EOA).** EOAs are similar to OAs, except they are performed prior to MS B to provide very early assessments of system capabilities and programmatic risks. Most EOAs are reviews of existing documentation, but some may require hands-on involvement with prototype hardware and/or software.

2.5.11. **Sufficiency of Operational Test Review (SOTR).** For some programs of limited scope and complexity, system development testing or integrated developmental and operational test events may provide adequate test data to support MAJCOM production or fielding decisions. In these situations, the lowest appropriate level of required operational testing may consist of a review of existing data rather than a separate, dedicated operational test event. The ITT should recommend a SOTR when appropriate.

2.5.11.1. The SOTR will only be accomplished when directed by MAJCOM T&E staff, and the reviewing OTO must document that decision. The SOTR may be used as the source of operational test information for supporting fielding, acquisition milestone, or production decisions. See also paragraph **4.6.6.3**. The SOTR may not be used for milestone decisions associated with OSD OT&E Oversight programs unless approved by the Director, Operational Test and Evaluation (DOT&E).

2.5.11.2. See paragraph **7.4.5** for reporting SOTR results, and the *Air Force T&E Guidebook* for a comparison with the Capabilities and Limitations (C&L) report.

2.5.12. **Summary of Operational Testing.** The key distinctions between types of operational testing and the decisions they support are shown in **Table 2.1**. **Note: Table 2.1** is intended as a summary and may not cover all possible T&E situations; refer to the descriptions in paragraph **2.5** or consult with AF/TEP for final guidance of any issues.

Table 2.1. Summary of Operational Testing Options.

Types of Operational Tests	Decisions Supported	Who Conducts	Types of Programs
Assessments			
EOA	MS B	AFOTEC or MAJCOM OTO	All *Note 1*
OA	MS C/LRIP		
Evaluations			
IOT&E	FRP, Fielding	AFOTEC	ACAT I, IA, II, OSD T&E Oversight
QOT&E			
FOT&E			

MOT&E	FRP, Fielding	AFOTEC or MAJCOM OTO	All
FDE	FRP, Fielding	MAJCOM OTO	All *Note 2*
OUE	FRP, Fielding	AFOTEC or MAJCOM OTO	All *Note 3*
SOTR	FRP, Fielding	MAJCOM OTO	Non-Oversight *Note 3*
TD&E	As required	MAJCOM OTO	All

Notes:
1. Cannot be substituted for I/Q/FOT&E, FDE, or OUE.
2. Do not use when I/Q/FOT&E are more appropriate.
3. Do not use when I/Q/FOT&E or FDE are more appropriate.

2.6. Testing of Training Devices. To ensure crew training devices provide accurate and credible training throughout their life cycles, AFI 36-2251, *Management of Air Force Training Systems*, gives direction and guidance for using the simulator certification (SIMCERT) and simulator validation (SIMVAL) processes. Specifically, SIMCERT and SIMVAL are assessments of training device effectiveness in accomplishing allocated tasks and provide a comparison of crew training device performance with the prime mission system. In addition, PMs must include training system concepts and requirements in all acquisition strategies. They must ensure training systems are fielded concurrently with initial prime mission system fielding, and remain current throughout the weapon system life cycle IAW AFI 63-101/20-101. See definitions in **Attachment 1**.

2.7. Specialized Types of Test and Evaluation. Certain types of T&E require test organizations to use specialized processes, techniques, requirements, and formats in addition to those prescribed in this AFI. These specialized types of T&E must be integrated with other T&E activities as early as possible. These tests often occur during DT&E and OT&E and may have the characteristics of both. They are often done concurrently with other testing to conserve resources and shorten schedules, but may also be conducted as stand-alone test activities if necessary. These tests are usually conducted in operationally relevant environments which include end-to-end scenarios. **Table 2.2** identifies guidance for the PM to use in planning, conducting, and reporting these specialized types of T&E.

Table 2.2. Specialized Types of T&E.

Type of Testing	Description	References
Advanced Technology Demonstration (ATD) (*Note 1*)	Air Force Research Laboratory-funded, MAJCOM-sponsored development efforts that demonstrate the maturity and potential of advanced technologies for enhancing military operational capabilities.	DoDI 5000.02, *Operation of the Defense Acquisition System* AFI 61-101, *Applied Technology Council*
Computer Network Attack	Evaluates systems with network capabilities against CNA technical assurance standards.	DoDI O-3600.03, *Technical Assurance Standard for Computer Network Attack (CNA)*

(CNA) Testing		*Capabilities* DOT&E memo, *Procedures for Operational Test and Evaluation of Information Assurance in Acquisition Programs*, Jan 21, 2009
Electronic Warfare Integrated Reprogramming (EWIR)	Process intended to produce and deliver software/hardware changes to electronic equipment used to provide awareness and response capability within the EM spectrum. May require changes in TTP, equipment employment guidance, aircrew training and training devices (threat simulators and emitters). Provides guidance for test / fielding of mission data (MD) changes, OFP changes, or minor hardware changes that comply with the guidance in AFI 63-131 concerning modifications.	AFI 10-703, *Electronic Warfare Integrated Reprogramming*
Emission Security (EMSEC) Assessment	Assesses against the requirement to control the compromise of classified electronic emissions.	AFSSI 7700, *Emissions Security*, AFSSI 7702, *EMSEC Countermeasures Reviews*
Foreign Comparative Testing (FCT) (*Note 1*)	FCT is an OSD-sponsored program for T&E of foreign nations' systems, equipment, and technologies to determine their potential to satisfy validated United States operational requirements.	10 U.S.C. § 2350a(g) OSD Comparative Technology Office Handbook (https://cto.acqcenter.com/)
Information Assurance (IA) Testing	Measures designed to protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation. These measures include providing for restoration of information systems by incorporating protection, detection, and reaction capabilities.	DoDD 8500.01E, *Information Assurance* DoDI 8500.2, *Information Assurance (IA) Implementation* DoDI 8510.01, *DoD Information Assurance Certification and Accreditation Process* (DIACAP) AFI 33-210, *Air Force Certification and Accreditation (C&A) Program (AFCAP)* AFI 33-200, *Information Assurance (IA) Management* JAFAN 6/3, *Protecting Special Access Program Information Within Information Systems*
Joint Capability Technology	Exploits maturing technologies to solve important military problems and to concurrently develop the associated	DoDI 5000.02, *Operation of the Defense Acquisition System* AFI 63-101/20-101, *Integrated*

Demonstrations (JCTD) (*Note 1*)	concepts of operation (CONOPS) to permit the technologies to be fully exploited. Emphasis is on tech assessment and integration rather than development.	*Life Cycle Management*
Joint Interoperability Test and Certification	Required certification for net-readiness prior to a system being placed into operation. Must be preceded by Air Force System Interoperability Testing (AFSIT), formal service-level testing to determine the degree to which AF systems which employ tactical data links conform to appropriate DoD MIL-STDs.	CJCSI 6212.01F, *Net Ready Key Performance Parameter (NR KPP)* DoD CIO Memo, *Interim Guidance for Interoperability of Information Technology (IT) and National Security Systems (NSS)*
Joint Test & Evaluation (JT&E) (*Note 1*)	Evaluates non-materiel capabilities and potential options for increasing joint military effectiveness. Focus is on evaluating current equipment, organizations, threats, and doctrine in realistic environments. JT&E projects are not acquisition programs.	DoDI 5010.41, *Joint Test and Evaluation (JT&E) Program* AFI 99-106, *Joint Test and Evaluation Program*
Testing of Training Systems	Use of SIMCERT and SIMVAL processes to evaluate training system effectiveness. Testing and fielding of training systems concurrently with the prime mission system.	AFI 36-2251, *Management of Air Force Training Systems* AFI 63-101, *Integrated Life Cycle Management*
Testing of Urgent Needs *(Note 1)*	Quick reaction capability for satisfying near-term urgent warfighter needs.	AFI 63-114, *Quick Reaction Capability Process*
Unified Capabilities (UC) Certification	Certifies interoperability and information assurance for Unified Capabilities (defined as integration of voice, video, and/or data services delivered ubiquitously across a secure and highly available network infrastructure, independent of technology). AFSPC appoints the Air Force UC test organization responsible for testing technologies meeting the definition.	DoDI 8100.04, *DoD Unified Capabilities* AFMAN 33-145, *Collaboration Services and Voice Systems Management*

Notes:

1. Activity falls outside the traditional acquisition process; however, Air Force testers may be required to support the activity by providing T&E expertise in assessing the military utility of new technologies.

Chapter 3

RESPONSIBILITIES

3.1. Overview of Responsibilities. All Air Force testers will follow the T&E principles articulated in **Chapter 1** of this AFI using the types of tests described in **Chapter 2**. Testers must collaborate with each other, the broader acquisition community, and requirements sponsors using the ITT as the T&E focal point for each program.

3.2. Director, Operational Test and Evaluation (DOT&E). DOT&E responsibilities are described in DoDD 5141.02, *Director of Operational Test and Evaluation (DOT&E)*.

3.3. Deputy Assistant Secretary of Defense for Developmental Test and Evaluation (DASD(DT&E)). DASD(DT&E) responsibilities are described in DoDI 5134.17, *Deputy Assistant Secretary of Defense for Developmental Test and Evaluation (DASD(DT&E))*.

3.4. Headquarters, U. S. Air Force, Director of Test and Evaluation (AF/TE). AF/TE will:

3.4.1. Function as the chief T&E advisor to Air Force senior leadership IAW Headquarters Air Force Mission Directive (HAFMD) 1-52, *Director of Test and Evaluation*. Be responsible to the Chief of Staff of the Air Force (CSAF) for establishing Air Force T&E policy, advocating for T&E resources required to support weapons system development, and resolving T&E issues.

3.4.2. Act as the final Air Staff T&E review authority and signatory for TEMPs prior to Service Acquisition Executive (SAE) approval and signature. **Note:** The term Service Acquisition Executive (SAE) is equivalent to the term Component Acquisition Executive (CAE) used in DoD directives and instructions.

3.4.3. Collaborate with requirements sponsors and system developers to improve the development, testing, and fielding of Air Force systems or subsystems. Participate in high performance teams (HPT), ITTs, and test integrated product teams (TIPT) as necessary to help ensure program success.

3.4.4. Respond to and mediate T&E issues between HQ USAF principals, MAJCOMs, Air Force testers, the Services, OSD, and Congress.

3.4.5. Review and/or prepare T&E information for release to OSD and ensure timely availability of T&E results to decision makers.

3.4.6. Oversee the Air Force T&E infrastructure and ensure adequate facilities are available to support Air Force T&E activities. Administer various T&E resource processes and chair or serve on various committees, boards, and groups listed in HAFMD 1-52.

3.4.7. Act as the Air Force Foreign Materiel Program (FMP) Executive Agent and point of contact for the Air Staff and other governmental agencies and organizations IAW AFI 99-114, *Foreign Materiel Program (S)*.

3.4.8. Serve as the Functional Authority for T&E personnel managed in accordance with the Air Force Acquisition Professional Development Program (APDP) and in accordance with DoDI 5000.66 and 10 USC Chapter 87, Defense Acquisition Workforce Improvement Act. AF/TE, in collaboration with SAF/AQ and other functional authorities, functional managers

and career field managers, will manage the development of a pool of qualified T&E personnel to fill Critical Acquisition Positions, including Key Leadership Positions.

3.4.9. Provide advice on ITT charter development and membership requirements. Review ITT charters for programs where AF/TE participation is necessary.

3.4.10. Manage the Air Force JT&E Program IAW DoDI 5010.41 and AFI 99-106.

3.4.11. Perform other duties listed in HAFMD 1-52.

3.5. Assistant Secretary of the Air Force for Acquisition (SAF/AQ). SAF/AQ is the Air Force SAE, and is responsible for all acquisition functions within the Air Force. SAF/AQ will:

3.5.1. Ensure systems are certified ready for dedicated operational testing according to paragraph **6.5** and AFMAN 63-119. Although DoDI 5000.02 requires the SAE to evaluate and determine system readiness for IOT&E, the SAE may delegate this authority in writing to a lower milestone decision authority (MDA), such as a Program Executive Officer (PEO).

3.5.2. Ensure T&E responsibilities are documented as appropriate in TEMPs, Acquisition Strategies, System Engineering Plans (SEP), Life Cycle Sustainment Plans (LCSP), Program Protection Plans (PPP), and other program documentation.

3.5.3. Regarding LFT&E, SAF/AQ or designated representatives will:

3.5.3.1. Recommend candidate systems to DOT&E for compliance with LFT&E legislation after coordinating the proposed nominations with AF/TE.

3.5.3.2. Approve LFT&E strategies and Air Force resources required to accomplish LFT&E plans and forward to DOT&E. Forward LFT&E waivers (and legislative relief requests, if appropriate) to DOT&E, if required. See paragraph **5.8.4** for details.

3.5.4. Approve and sign TEMPs for all ACAT I, IA, and other programs on OSD T&E Oversight. Forward these Air Force-approved TEMPs to DOT&E and DASD(DT&E) for final OSD approval.

3.5.5. Implement policies that ensure qualified T&E leadership is selected for Major Defense Acquisition Programs (MDAP) and Major Automated Information System (MAIS) programs. SAF/AQ or a designated representative will:

3.5.5.1. Ensure that a Chief Developmental Tester (CDT) is designated for each MDAP and MAIS program as required by 10 U.S.C. §139b. For non-MDAP and non-MAIS programs the term "Test Manager" will be used consistent with AFI 63-101/20-101. CDTs and/or Test Managers will advise the PM and the ITT.

3.5.5.2. Ensure that CDT positions for MDAP and MAIS programs are designated as Key Leadership Positions (KLP) IAW the Under Secretary of Defense (Acquisition, Technology, and Logistics) (USD(AT&L)) KLP policy including DoDI 5000.66.. The occupant of these CDT positions must be appropriately qualified IAW AFI 63-101/20-101, AFI 36-1301, *Management of Acquisition Key Leadership Positions (KLP)* and current OSD(AT&L) and AF/TE policy and guidance.

3.5.5.3. Ensure that a lead developmental test and evaluation organization (LDTO) is designated for each program. **Note:** The term "lead developmental test and evaluation

organization (LDTO)" replaces the term "responsible test organization (RTO)," which will no longer be used.

3.5.6. Develop and implement plans to ensure the Air Force has provided appropriate resources for developmental testing organizations with adequate numbers of trained personnel IAW the Weapon Systems Acquisition Reform Act of 2009, Public Law (P.L.) 111-23 § 102(b)(1).

3.6. Headquarters, U. S. Air Force, Deputy Chief of Staff for Operations, Plans, & Requirements (AF/A3/5). AF/A3/5 will:

3.6.1. Support ITTs and participate in development of strategies for T&E.

3.6.2. Ensure operational requirements documents are developed and approved IAW CJCSI 3170.01, *Joint Capabilities Integration and Development System* (JCIDS), and kept current IAW applicable guidance.

3.6.3. Support new or on-going acquisition programs and warfighters by providing operating and enabling concepts in conjunction with the ICD, CDD, and CPD.

3.6.4. Ensure appropriate DT&E and OT&E personnel participate in HPTs and AoA meetings.

3.7. Secretary of the Air Force, Office of Information Dominance and Chief Information Officer (SAF/CIO A6). SAF/CIO A6 will:

3.7.1. Participate early in ITTs and TIPTs as soon as they are formed for acquisition and sustainment programs with IT and National Security System (NSS) capabilities.

3.7.2. Develop and implement security and IA policies that include adequate and recurring T&E of IT and NSS IAW DoDD 8500.01, *Information Assurance (IA)*, DoDI 8500.2, *Information Assurance (IA) Implementation*, and AFI 63-101/20-101.

3.7.3. Partner with the requirements, acquisition, and T&E communities to ensure planned capabilities are tested to satisfy net-centric, security, and IA requirements as shown in Figure **1.1** and Table 2.2. Working with AF/TE, advocate for funding for identified T&E infrastructure.

3.7.4. Review T&E-related documentation to ensure interoperability certification testing, security testing, and IA testing fully support system acquisition, fielding, and sustainment according to paragraphs **4.14**, **5.5**, and **Table 2.2**

3.7.5. Implement measures to ensure net-ready key performance parameters (NR-KPP), including the associated key interface profiles (KIP), are clearly defined in the system architecture, and are interoperable, resourced, tested, and evaluated according to the Air Force Enterprise Architecture, AFI 33-401, *Implementing Air Force Architectures*, CJCSI 6212.01F, and OSD, JCS, and Joint Interoperability Test Command (JITC) policies.

3.7.6. Facilitate security, net-readiness, and interoperability certifications as early as practical. Assist in the certification of readiness for operational testing IAW AFMAN 63-119.

3.7.7. Provide net-worthiness recommendations for test and evaluation of IT systems.

3.7.8. Provide policy, guidance, and oversight of all Air Force M&S in support of T&E.

3.7.9. Identify certified organizations for planning and conducting penetration testing.

3.7.10. Develop and implement IA oversight policy for certification and accreditation authorities to support unique infrastructure requirements.

3.8. Headquarters, Air Force Materiel Command (AFMC). HQ AFMC will:

3.8.1. Develop AFMC DT&E guidance, procedures, and MOAs for non-space programs in assigned mission areas to supplement this AFI. Forward draft copies to AF/TEP Workflow (**aftep.workflow@pentagon.af.mil**) and SAF/AQXA workflow (**SAFAQXA@Pentagon.af.mil**) for review prior to publication.

3.8.2. Ensure nuclear weapon system T&E policies and issues are managed IAW AFI 63-103 and AFI 63-125. Assist with development and approval of nuclear weapon subsystem test plans.

3.8.3. Establish and provide for DT&E training, organization, and T&E infrastructure resources.

3.8.4. Assist the PM and ITT in identifying key government DT&E organizations, to include selection of LDTO candidates and CDTs, as soon as possible after MDD according to paragraphs **4.4**. and **4.5** Participate in ITTs and TIPTs as necessary.

3.8.5. Establish policy for and maintain T&E focal points (e.g., on-site test authority or equivalent office) that provide T&E support and advice to acquisition and T&E practitioners at centers and complexes. These T&E focal points will address T&E needs at all program management reviews.

3.8.6. Conduct long-range planning to ensure T&E infrastructure and processes are in place to support required testing.

3.8.7. Ensure centers and complexes participate in T&E resource investment planning processes.

3.8.8. Ensure centers and complexes appoint a qualified CDT or Test Manager, as appropriate, for each program. The CDT or Test Manager is responsible to the PM for all issues regarding T&E, to include the planning and conduct of DT&E, and support to operational testing of fielded systems throughout the life cycle of each system. This position must be a KLP for MDAPs, MAIS programs and other programs as directed, and the appointee must be qualified according to paragraph **3.5.5**.

3.8.9. Review and coordinate on test plans, test reports, and test-related correspondence for programs on OSD T&E Oversight.

3.8.10. Develop and maintain a qualified DT&E workforce.

3.8.11. Oversee and inspect AFMC compliance with this instruction.

3.9. Headquarters, Air Force Space Command (AFSPC). HQ AFSPC will:

3.9.1. Develop HQ AFSPC T&E guidance, procedures, and MOAs for space and cyberspace programs to supplement this AFI. Forward draft copies to AF/TEP Workflow and SAF/AQXA Workflow for review prior to publication.

3.9.2. In conjunction with SAF/AQS, serve as a focal point for T&E of satellite, space command and control, space launch acquisition programs, and technology projects.

3.9.3. Establish and provide for DT&E training, organization, and T&E infrastructure resources.

3.9.4. Assist the PM and ITT in identifying key government DT&E organizations, to include selection of LDTO candidates and CDTs, as soon as possible after MDD according to paragraphs **4.4**. and **4.5** Participate in ITTs and TIPTs as necessary.

3.9.5. Establish policy for and maintain a T&E focal point (e.g., test authority or equivalent office) that provides T&E support and advice to acquisition and T&E practitioners at the command's product center. These T&E focal points will address T&E needs at all program management reviews.

3.9.6. Conduct long-range planning to ensure T&E infrastructure and processes are in place to support required testing.

3.9.7. Ensure HQ AFSPC and Space and Missile Systems Center (SMC) participation in T&E resource investment planning processes. Advocate for and procure space and cyberspace T&E infrastructure, resources, and requirements.

3.9.8. Ensure SMC appoints a qualified CDT or Test Manager, as appropriate, for each program. The CDT or Test Manager is responsible to the PM for all issues regarding T&E, to include the planning and conduct of DT&E, and support to operational testing of fielded systems throughout the life cycle of each system. This position must be a KLP for MDAPs, MAIS programs and other programs as directed, and the appointee must be qualified IAW paragraph **3.5.5**.

3.9.9. Review and coordinate on test plans, test reports, and test-related correspondence for programs on OSD T&E Oversight. Coordinate on OT&E documents IAW agreements with ACC.

3.9.10. Develop and maintain a qualified DT&E and OT&E workforce.

3.9.11. Establish and maintain capability to conduct operational test of network warfare capabilities, network operations capabilities, and elevated level of assurance (ELA) testing.

3.9.12. Oversee and inspect AFSPC compliance with this instruction.

3.9.13. Implement the T&E policies in DoDI S-3100.15, *Space Control*, for space control systems, and lead test activities associated with the implementation of DoDI 8100.04, *DoD Unified Capabilities (UC)*, for the Air Force.

3.10. Operational MAJCOMs, DRUs, and FOAs. MAJCOMs, DRUs, and FOAs will:

3.10.1. Develop T&E guidance, procedures, and MOAs to supplement this AFI. Forward draft copies to AF/TEP and SAF/AQXA Workflow addresses for review prior to publication. The lead command will advocate for and carry out T&E responsibilities for assigned weapon systems during their life cycle IAW AFPD 10-9, *Lead Command Designation and Responsibilities for Weapon Systems.* (T-1)

3.10.2. Perform the responsibilities in paragraphs **3.10.3** through **3.10.16** when designated the OTO according to paragraph **4.6**. (T-1)

3.10.3. Collaborate with requirements sponsors and system developers to execute the development, testing, and fielding of Air Force systems and subsystems. Develop clear and testable operational requirements and approved enabling and operating concepts prior to MS B. Keep these documents current to support the most current phases of T&E. See paragraph **3.6.3**. Participate in HPTs, ITTs, and TIPTs as necessary to help ensure program success. (T-1)

3.10.4. Participate in pre-MS B ITTs to develop test plans that are integrated in support of acquisition and sustainment programs. (T-1)

3.10.5. Review and coordinate on T&E-related documentation impacting MAJCOM systems under test. (T-1)

3.10.6. Oversee the T&E policies and activities of assigned T&E organizations to ensure compliance with HQ USAF, OSD, and MAJCOM T&E policies. (T-1)

3.10.7. Advocate for test resources. (T-1)

3.10.8. Ensure appropriate and adequate T&E training is provided for personnel involved in T&E activities. (T-1)

3.10.9. Provide support for the OSD-sponsored JT&E Program and joint test projects IAW AFI 99-106 and the approved TRP. (T-1)

3.10.10. Ensure operational testing (e.g., OAs, OUEs, and FDEs) is planned, conducted, and results reported for assigned systems and programs when AFOTEC is not involved according to paragraphs **4.4.7** and **4.6**. (T-1)

3.10.11. Support AFOTEC-conducted OT&E as agreed by the ITT, TIPTs, and documented in TRPs and TEMPs. (T-1)

3.10.12. Continue operational testing of acquisition programs according to paragraphs **2.5.4** through **2.5.11,** and **4.6**. Provide information to DOT&E according to paragraphs **4.7**, **5.14.2**, **6.6**, **6.7**, **7.4**, and **Attachment 2,** *Information Requirements for OSD T&E Oversight Programs*. (T-0)

3.10.13. Support the certification of systems ready for dedicated operational testing IAW AFMAN 63-119. (T-1)

3.10.14. Identify and report DRs IAW TO 00-35D-54, Chapter 2. Monitor open DRs from earlier testing. (T-0)

3.10.15. Conduct TD&Es and WSEPs to characterize and/or enhance operational capabilities. (T-1)

3.10.16. Request AFOTEC assistance and/or involvement as needed. (T-1)

3.11. Air Force Operational Test and Evaluation Center (AFOTEC). AFOTEC will:

3.11.1. Develop AFOTEC guidance, procedures, and MOAs for operational testing to supplement this AFI. Forward draft copies to AF/TEP Workflow and SAF/AQXA Workflow prior to publication. (T-1)

3.11.2. Carry out the responsibilities of the Air Force independent operational test agency (OTA) described in Air Force Mission Directive (AFMD) 14, *Air Force Operational Test and Evaluation Center (AFOTEC)*, and DoDD 5000.01, paragraph E1.1.8. (T-0)

3.11.3. Function as the Air Force OTA for programs as determined in paragraph **4.6**. Monitor Air Force acquisition programs for operational test applicability, and provide formal notice of AFOTEC involvement to program stakeholders when warranted. Provide timely responses and inputs to support program schedules. Function as the lead OTA for multi-Service programs when designated. (T-1)

3.11.4. Program for AFOTEC-conducted T&E activities and list costs, schedules, and resources in test resource plans (TRP). Coordinate TRPs with supporting organizations in sufficient time for funds and personnel to be budgeted during the program objective memorandum (POM) cycle. See paragraph **4.6.7**. (T-1)

3.12. United States Air Force Warfare Center (USAFWC). The USAFWC will exercise "coordinating authority" for operational testing as defined in the *USAFWC Charter* as follows:

3.12.1. Initiate dialogue and close collaboration with MAJCOMs to ensure priorities for operational testing are synchronized and candidates for collaborative testing are identified.

3.12.2. Coordinate with and support AFOTEC-conducted operational testing for weapon systems' initial acquisition and fielding decisions as requested.

3.12.3. Identify and help eliminate redundant operational test activities.

3.12.4. Sponsor, oversee, and execute comprehensive Integrated Warfighting/Cross Domain T&E activities to enhance operational capabilities.

3.13. Operational Test Organizations (OTO). AFOTEC and other OTOs as determined in paragraph **4.6** will:

3.13.1. Help form and co-chair (with the PM) ITTs for programs as determined in paragraph **4.6**. The ITT must be formed as early as possible, preferably at or just after MDD according to paragraphs **3.15.3** and **4.4**. (T-1)

3.13.2. Participate in HPTs as necessary to ensure testability of operational capability requirements (i.e., Initial Capabilities Document (ICD), Capability Development Document (CDD), and Capability Production Document (CPD)). Assist in development of operational requirements documents and enabling and operating concepts, technology development strategies (TDS), COAs, and analyses of alternatives (AoA). (T-1)

3.13.3. Participate in preparation of strategies for T&E and test plans that are integrated. Prepare the OT&E portions of the TES and TEMP. (T-0)

3.13.4. Collaborate with other OTOs and AF/TEP to ensure operational testing is conducted by the appropriate test organization(s) according to paragraph **4.6**. (T-1)

3.13.5. Provide independent operational testing expertise and level of support to FDEs as negotiated. (T-1)

3.13.6. Plan and conduct operational testing in support of Air Force-approved rapid acquisition programs, QRCs, and UONs as directed by AFI 63-114. See paragraph **2.7**. (T-1)

3.13.7. Use operational capability requirements as the primary source of evaluation criteria. Report results as directed in **Chapter 7**. (T-1)

3.13.8. For programs not on the OSD T&E Oversight List, determine the quantity of test articles required for OT&E in consultation with the MAJCOM and the PM. (T-0)

3.13.9. Participate in the certification of readiness for dedicated operational testing IAW AFMAN 63-119. (T-1)

3.13.10. Identify, validate, submit, track, and prioritize system deficiencies and enhancements IAW TO 00-35D-54. (T-0)

3.13.11. Maintain a qualified OT&E workforce. (T-1)

3.13.12. Ensure T&E training is provided for personnel involved in operational test activities. (T-1)

3.14. Program Executive Officer (PEO). The PEO will:

3.14.1. Ensure RDT&E representation at pre-MDD activities to assist in early development of operational requirements and enabling or operating concepts, early development of the strategy for T&E, IA strategy, and early acquisition planning IAW AFI 10-601, AFI 63-101/20-101, and this AFI. Participate in HPTs. Identify organizations responsible for these activities.

3.14.2. Assist the PM and ITT in identifying key government DT&E organizations and personnel, to include LDTO candidates and CDTs as soon as possible after MDD according to paragraphs **4.4** and **4.5**. Participate in ITTs and TIPTs as necessary.

3.14.3. Act as final field-level approval authority prior to forwarding TESs and TEMPs to SAF/AQ and AF/TE for final Air Force coordination and approval. See paragraph **5.14.2**.

3.14.4. Act as the OT&E Certification Official for delegated programs according to AFMAN 63-119 and paragraph **6.5** of this AFI.

3.15. Program Managers (PM). The PM (or designated T&E representative) will:

3.15.1. Ensure a CDT or Test Manager is responsible for managing all DT&E for the program office. This person must be appropriately qualified IAW AFI 63-101/20-101, AFI 36-1301, and OSD(AT&L) KLP qualification standards. For MDAPs and MAIS programs, this person will be the CDT as described in paragraph **3.16**.

3.15.2. Determine whether the assigned program is on the OSD T&E Oversight List and plan for T&E accordingly.

3.15.3. Form and co-chair an ITT with the selected lead OTO immediately after a materiel development decision, according to paragraphs **1.4** and **4.4**.

3.15.4. Lead the development of the ITT charter and coordinate with stakeholder organizations.

3.15.5. Ensure an LDTO is selected and designated as early as possible (i.e., at or before MS A) according to paragraphs **4.4** and **4.5**. Determine the scope of DT&E needed throughout the project or program life cycle IAW **Chapters 4** and **5.**

3.15.6. Ensure timely government access to contractor T&E data, deficiency reporting processes, and all program T&E results through a common T&E database (described in paragraph **5.16**) available to program stakeholders with a need to know.

3.15.7. Direct the development of a strategy for T&E, TES, TEMP, and developmental/integrated test plans in support of the requirements, acquisition, and IA strategies and the PPP.

3.15.8. Regarding LFT&E, the PM or designated representative will:

3.15.8.1. Ensure systems are screened and correctly designated as "covered systems," "major munitions programs," or "covered product improvement programs" if required by 10 U.S.C. § 2366. **Note:** these three terms are encompassed by the single term "covered system" in the DAG. Coordinate the proposed nominations with AF/TEP and the PEO before obtaining SAF/AQ approval. Forward approved nominations to DOT&E.

3.15.8.2. Plan, program, and budget for LFT&E resources if the system is a "covered system" or "major munitions program" to include test articles, facilities, manpower, instrumented threats, and realistic targets

3.15.8.3. Identify critical LFT&E issues. Prepare and coordinate required LFT&E documentation to include the TES, TEMP, and LFT&E strategy, plans, and reports. Review briefings pertaining to the system under test before forwarding to AF/TEP Workflow.

3.15.8.4. Prepare LFT&E waiver requests and legislative relief requests, if required, to include an alternative plan for evaluating system vulnerability or lethality.

3.15.9. Develop, document, and maintain the Modeling and Simulation Support Plan IAW AFI 63-101/20-101.

3.15.10. Plan, integrate, document and implement an IA strategy IAW AFI 63-101/20-101 and DoDI 8580.01, *Information Assurance (IA) in the Defense Acquisition System,* for pre-MS A through acquisition; and requirements for certification and accreditation (C&A) IAW DoDI 8510.01, AFI 33-210, and AFI 63-101/20-101 as early as practical.

3.15.11. Ensure all DT&E (both contractor and government) is conducted according to approved test plans and other program documentation. Ensure the TES, TEMP, Acquisition Strategy, SEP, Information Support Plan (ISP), and PPP are synchronized and mutually supporting.

3.15.12. Assist OTOs in determining the resources and schedule for operational testing and reporting.

3.15.13. Ensure operational test and evaluation is conducted for all acquisition or sustainment programs requiring an FRP or fielding decision (full or partial capability) according to paragraph **2.5**.

3.15.14. Plan for test and evaluation of product support elements throughout the system life cycle IAW AFI 63-101/20-101.

3.15.15. Ensure formation of TIPTs, such as the Material Improvement Program Review Board (MIPRB) and the Joint Reliability and Maintainability Evaluation Team (JRMET), to track and resolve deficiencies. See paragraph **5.17**.

3.15.16. Ensure all stores are certified IAW AFI 63-104, *The SEEK EAGLE Program*. If assistance is needed, contact the Air Force SEEK EAGLE Office. Hazards of Electromagnetic Radiation to Ordnance (HERO) criteria must be considered IAW AFMAN 91-201, *Explosives Safety Standards*.

3.15.17. Resource and support development of the TES and TEMP IAW AFI 65-601, Vol 1, Chapter 14.

3.15.18. Track, evaluate, and take appropriate actions on deficiency reports (DR) IAW Chapter 2 of Technical Order (TO) 00-35D-54, *USAF Deficiency Reporting, Investigation, and Resolution,* DoDI 8510.01, and AFI 63-501, *Air Force Acquisition Quality Program*. Continue supporting DR evaluation and resolution during operational testing and system sustainment.

3.15.19. Implement an effective system certification process for operational testing as early as practical. Inform the OT&E Certifying Official that the system is ready for dedicated operational testing according to paragraph **6.5** and AFMAN 63-119.

3.15.20. Secure specialized T&E capabilities, resources, and instrumentation, as required, to support T&E throughout the system life cycle. See DASD(DT&E)'s guide, *Incorporating Test and Evaluation into Department of Defense Acquisition Contracts*, on how to secure contractor support in requests for proposal (RFP), statements of objectives (SOO), and statements of work (SOW).

3.16. Chief Developmental Tester (CDT). All MDAPs and MAIS programs are required to have a CDT IAW 10 U.S.C. § 139b and the USD(AT&L) memo *Government Performance of Critical Acquisition Functions,* August 25, 2010. The CDT works for the Program Manager (PM). For non-MDAP or MAIS programs, the CDT may be called the Test Manager. **Note:** When this AFI refers to the CDT, it also includes the Test Manager. While Test Managers perform essentially the same functions as the CDT, they do not need to meet the more stringent workforce qualifications of the CDT referenced in paragraph **3.5.5.2**. The CDT will:

3.16.1. Coordinate the planning, management, and oversight of all DT&E activities for the program. (T-0)

3.16.2. Maintain oversight of program contractor T&E activities and the T&E activities of PTOs supporting the program. (T-0)

3.16.3. Advise the PM on test issues, and help the PM make technically informed, objective judgments about contractor DT&E results. (T-0)

3.16.4. Provide program guidance to the LDTO and the ITT. (T-1)

3.16.5. Inform the PM if the program is placed on the OSD T&E Oversight List. (T-1)

3.17. Lead Developmental Test and Evaluation Organization (LDTO). The LDTO (formerly called the RTO) functions as the lead integrator for a program's DT&E activities. The LDTO is separate from the program office, but supports the PM and ITT in a provider-customer relationship with regard to the scope, type, and conduct of required DT&E. **Exception:** Due to the long established structure and limited pool of highly specialized technical knowledge in space systems acquisition, a different LDTO construct is authorized. The PEO for Space may approve the use of an internal LDTO, provided it is within a separate three-letter division from the segment three-letter program offices.

The LDTO will: (**Note:** Paragraphs **3.17.1** through **3.17.3** implement 10 U.S.C. §139b and USD(AT&L) guidance specifically for MDAPs and MAIS programs.)

3.17.1. Provide technical expertise on DT&E matters to the program's CDT or Test Manager as appropriate. (T-0)

3.17.2. Conduct DT&E activities as coordinated with the program's CDT. (T-0)

3.17.3. Assist the CDT in providing oversight of program contractors and in reaching technically informed and objective judgments about contractor DT&E results. (T-0)

3.17.4. As required, work collaboratively to help the CDT establish, coordinate, and oversee a confederation of government DT&E organizations that plan and conduct DT&E according to the integrated testing strategy in the TES and TEMP. (T-1)

3.17.5. Assist the requirements, acquisition, IA communities, and the CDT in developing studies, analyses, and program documentation IAW AFI 10-601, AFI 63-101/20-101, and AFI 33-210. (T-1)

3.17.6. Plan, manage, and conduct government DT&E, LFT&E, and integrated testing according to the strategy for T&E, TES, TEMP, and DT&E and LFT&E strategies and plans. (T-1)

3.17.7. Participate in ITTs as they are being formed and assist TIPTs as required. (T-1)

3.17.8. Provide government DT&E results and final reports to the PM, PEO, and other stakeholders in support of decision reviews and certification of readiness for dedicated operational testing. Provide results and reports to the program's common T&E database (see paragraph **5.16**). (T-0)

3.17.9. Report, validate, and initially prioritize DRs IAW TO 00-35D-54, Chapter 2. (T-1)

3.18. Participating Test Organizations (PTO). PTOs will:

3.18.1. Participate in ITTs and TIPTs as requested by the LDTO, OTO, and other ITT members. (T-1)

3.18.2. Assist other test organizations as described in TESs, TEMPs, test plans, and other program documentation. (T-1)

3.19. Integrated Test Team (ITT). The ITT will:

3.19.1. Develop and manage the strategy for T&E and test plans that are integrated to effectively support the requirements, acquisition, IA, and sustainment strategies. A single ITT may cover multiple related programs such as systems of systems. Program managers should not have multiple project-level ITTs within a program, but should create subgroups (e.g., TIPTs or working-level groups) that report to the ITT. New programs should consider using an existing ITT's expertise to ensure more efficient start up.

3.19.2. Develop and implement an ITT charter according to paragraph **4.4**. Recommended member organizations are listed in paragraph **4.4.4**. Coordinate updates to the charter as program changes warrant. **Note:** During the MS A phase or pre MS-A, provisional or temporary ITT representatives may be required to initiate the processes cited in paragraph **4.4**.

3.19.3. Initiate selection of an LDTO to the PEO for approval according to paragraph **4.5**.

3.19.4. Direct formation of subgroups (e.g., integrated product teams (IPT)) as needed to address T&E data analysis, problem solving, test planning, and to coordinate test, execution, and reporting.

3.19.5. Assist in establishing test teams to conduct integrated testing, to include integrated warfighting and cross-domain T&E.

3.19.6. Develop the TES or strategy for T&E, TEMP, LCSP, and other T&E documentation IAW the DoD 5000-series, this AFI, and AFI 63-101/20-101.

3.19.7. Assist the requirements community in developing applicable requirements documents, enabling and operating concepts, and architectures as described in AFI 10-601, CJCSI 3170.01, the JCIDS Manual, and AFI 33-401, *Implementing Air Force Architectures*. For DBS programs, also reference Directive-Type Memorandum (DTM) 11-009, *Acquisition Policy for Defense Business Systems (DBS)*.

3.19.8. Ensure IA testing is planned IAW DoDI 8510.01, *DoD Information Assurance Certification and Accreditation Process (DIACAP)*, and AFI 33-210, *Air Force Certification and Accreditation (C&A) Program (AFCAP)*. For information systems containing SAP information, refer to JAFAN 6/3.

3.19.9. Ensure interoperability testing is planned IAW DoDI 4830.8, CJCSI 6212.01F, and DoD Chief Information Officer (CIO) memo, *Interim Guidance for Interoperability of Information Technology (IT) and National Security Systems (NSS)*.

3.19.10. Plan for a common T&E database for the program according to paragraph **5.16**

3.19.11. Assist the acquisition community in developing studies, analyses, documentation, strategies, contracting documents, and plans.

3.19.12. Participate in integrated technical and safety reviews according to paragraph **5.19**.

3.19.13. Ensure test teams report, validate, and prioritize DRs IAW TO 00-35D-54, Chapter 2, AFI 63-501, DoDI 8510.01, and AFIs 33-210 and 63-101/20-101. See paragraphs **5.17** and **5.18**

3.19.14. Review and provide inputs to contractual documents to ensure they address government testing needs according to paragraph **5.3**; additional information can be found in DASD(DT&E)'s guide, *Incorporating Test and Evaluation into Department of Defense Acquisition Contracts.* Monitor contractor DT&E and the activities of all T&E members.

3.19.15. Identify T&E resource requirements, including acquisition of test items, necessary facility upgrades, and personnel.

3.19.16. Ensure that all T&E activities comply with AFPD 16-6, *International Arms Control and Non-Proliferation Agreements and the DoD Foreign Clearance Program*. If required, coordinate with SAF/GCI and AF/A3S.

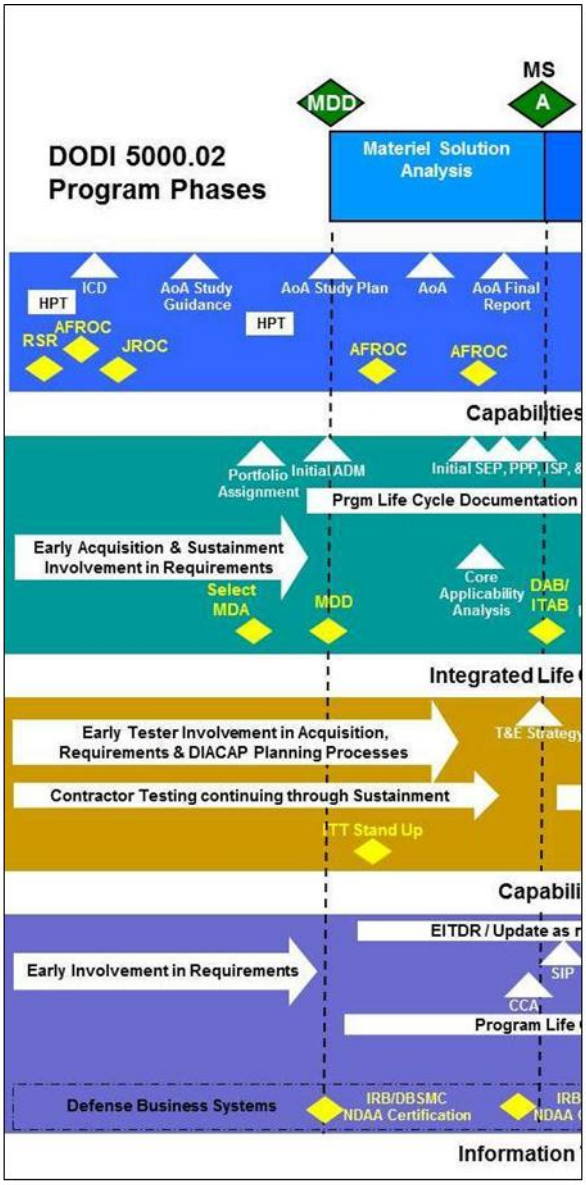
3.19.17. Outline which T&E-related records will be retained and/or forwarded to the Defense Technical Information Center (DTIC) and other repositories according to paragraph **5.16.9**, AFMAN 33-363, and AFRIMS.

Chapter 4

T&E ACTIVITIES SUPPORTING MILESTONE A DECISIONS

4.1. Pre-MS A Tester Involvement. The most important activities prior to and during Materiel Solution Analysis that support a MS A decision are shown in **Figure 4.1**. This chapter describes testers' roles in these activities. Testers need to be involved in multidisciplinary teams performing developmental planning activities. They must ensure that appropriate T&E information is provided in a timely manner to support the requirements, acquisition, and IA processes. This chapter focuses on early team building, strategy development, and establishing baselines for managing T&E activities in this phase and beyond.

Figure 4.1. Integration of Requirements, Acquisition, IA, and T&E Events Prior to MS A.



4.2. Pre-MS A Tester Involvement in Requirements Development. Tester involvement starts with participation in the requirements process described in AFI 10-601, CJCSI 3170.01, the *Manual for the Operation of the Integration and Development System*, and CJCSI 6212.01F. As HPT members, developmental and operational testers support development of the Requirements Strategy and appropriate requirements documents with technical and operational expertise. HPT member organizations and procedures are identified at AF/A5RP's website hosted on the Air Force Portal (**https://www.my.af.mil**). Air Force T&E organizations provide support to HPTs. Testers review Air Force operating and enabling concepts to fully understand how new systems will be employed and supported. Testers use these documents to support the development of a strategy for T&E and development of test inputs to RFPs. They also ensure that operational capability requirements are testable. AF/TE, AFOTEC, and MAJCOM representatives participate in the Air Force Requirements Oversight Council (AFROC).

4.3. Pre-MS A Tester Involvement in the Acquisition Process. The MDD review is the official entry into the acquisition process substantiating the need for a materiel solution based on a validated capability gap. The MDA may authorize entry into the acquisition process at any point consistent with phase-specific entrance criteria. The strategy for T&E will be consistent with this entry point. At this time, a PM should be assigned to lead and fund early study and collaborative efforts. Early tester involvement helps identify planning and other shortfalls that could result in increased development, operations, and life cycle costs. Developmental and operational testers must be involved in the collaborative work that produces the ICD, AoA Study Plan, MDD, COAs, AoA Final Report, PPP, Acquisition Strategy, Technology Development Strategy (TDS), TES or strategy for T&E, TEMP or LCSP, and the definition of entrance and exit criteria for developmental and operational testing. Pre-MS A project or program documentation must address which test organizations will conduct DT&E and operational testing as determined from paragraphs **4.4**, **4.5**, and **4.6**.

4.4. Formation of the ITT. An ITT must be formed immediately after MDD so it can help shape the requirements, acquisition, IA, and strategies for T&E as depicted in **Figure 4.1**. The ITT is a decision making body and its members must be empowered to speak for their organizations. The ITT works together as a cross-functional team to map out the strategy for testing and evaluating a system. All programs must have an ITT, but a single ITT can cover a number of closely related programs, such as the modifications and upgrades embedded in a legacy aircraft program.

4.4.1. **ITT Quick Start.** Identifying appropriate ITT organizational membership is critical to ensure program stability. During early program phases (e.g., immediately after MDD), ITT member organizations must send empowered representatives to assist with requirements development, designing the strategy for T&E, selecting the LDTO and OTO, reviewing early documentation, developing an initial T&E resources estimate, and other appropriate test planning activities as required.

4.4.2. **ITT Leadership.** The program office (or the program's initial cadre) takes the lead in forming an ITT with representatives from all needed disciplines. As the program office forms, the PM or designated T&E representative is assigned to co-chair the ITT with the lead OTO. Testers should be proactive in supporting ITT initial formation and goals even though they may not be formally tasked before the initial MDD ADM is signed. Testers who contributed to the AoA plan or participated in the HPT should form the nucleus of the initial ITT.

4.4.3. **ITT Charter.** The PM produces a formal, signed ITT charter that describes ITT membership, responsibilities, ITT resources, and the products for which the ITT is responsible. ITTs may function at two levels: an Executive Level consisting of O-6s and GS-15s from key organizations; and a Working Group Level consisting of organizations needed to fulfill specific ITT tasks. Organizational representatives no higher than O-6 or GS-15 coordinate on and sign the ITT charter. See the recommended ITT charter outline and guidance in the *Air Force T&E Guidebook*.

4.4.4. **ITT Membership.** The ITT leadership tailors the membership, structure, and protocols as necessary to help ensure program success. ITT membership (at the Executive Level and Working Group Level) may vary depending on program needs. The ITT should include expertise from organizations such as the program office (or the program's initial cadre), AFOTEC and/or MAJCOM OTO as appropriate, LDTO and other DT&E organizations, the Center or Complex level T&E focal point and engineering function, AF/TEP, AF/A3/5, SAF/A6, JITC, OSD, organizations responsible for IA and interoperability testing, system and support contractors, developers, lab and S&T organizations, intelligence, requirements sponsors, test facilities, and other stakeholders as needed during various test program phases. Include representatives from the other Services if testing a multi-Service program. Also include the implementing command headquarters and Air Education and Training Command, if required.

4.4.5. **ITTs for Interoperable Systems.** If a system is dependent on the outcome of other acquisition programs, or must provide capabilities to other systems, those dependencies must be detailed in the acquisition strategy and other program documentation. The ITT charter should reflect those dependencies by including representatives from the other programs as needed who can address interoperability testing requirements.

4.4.6. **Subgroups.** The ITT charter should direct the formation of subgroups (e.g., TIPTs, study groups, review boards) to write test plans and handle specific test issues as needed. These subgroups would not require full ITT participation. A “test team” is a group of testers and other experts who are responsible for specific test issues or carry out integrated testing according to specific test plans. There may be multiple TIPTs and test teams associated with an ITT.

4.4.7. **Operational MAJCOM Roles.** MAJCOM operational testers are required to participate in the ITT at program inception if AFOTEC is not the lead OTO according to paragraph **4.6**. In these cases, MAJCOM operational testers must assume the ITT co-chair position and conduct required operational testing. When AFOTEC is the lead OTO, MAJCOM operational testers should participate in the ITT and plan for transition of these responsibilities according to paragraph **4.6**. TEMPs must reflect this transition.

4.4.8. **Charter Updates.** ITT charters are reviewed and updated after each major decision review to ensure testing is integrated as much as possible within statutory and regulatory guidelines. Changes in membership should reflect the skills required for each phase of the program. The ITT’s responsibilities are described in paragraph **3.19**

4.4.9. **Integrated Testing.** The ITT must begin integrating all T&E activities after MDD, to include contractor testing. The TES and TEMP must outline how all testing will be integrated, addressing the overall evaluation approach, key evaluation measures, and the major risks or limitations to completing the evaluations. State justification for any testing

that is not integrated. The TES and TEMP will also include the interfaces and interoperability with all other supporting/supported systems described in the system enabling and operating concepts, and operational architectures. T&E planners must develop strategies for embedded and stand-alone IT sub-systems as well as all IA and security testing. Refer to the DAG, Chapter 9, for the recommended TEMP format (**https://dag.dau.mil/**).

4.5. Determining the LDTO. The LDTO is the lead government DT&E organization responsible for a program's DT&E IAW paragraph **3.17** For complex programs, the LDTO may build a confederation of DT&E organizations with appropriate skill mixes by enlisting the support of other PTOs as needed. The LDTO serves as the lead integrator and "single-face-to-the-customer," working closely with the program's CDT for purposes of planning, executing and reporting DT&E. For less complex programs, the LDTO may be solely responsible for overseeing and/or conducting all or most of the relevant DT&E. In accordance with 10 U.S.C. §139b and DoDI 5000.02, all MDAPs and MAIS programs will be supported by a government DT&E organization serving as LDTO. All other Air Force programs will select an LDTO unless a "no-LDTO" option (only possible for low risk ACAT III programs) is determined to be the best course of action and is approved in writing by the PEO IAW paragraph **4.5.4**.

4.5.1. **LDTO Selection.** The ITT initiates selection of an LDTO when building the strategy for T&E prior to MS A if possible. LDTO selection must be based on a thorough review of required DT&E skill sets and human and capital resources that are best suited and available for each program.

4.5.2. **Appropriate LDTO Organizations.** HQ AFMC/A3 and HQ AFSPC/A5 will jointly develop lists of LDTO qualifications and candidate LDTO organizations. LDTO candidates should have experience with the relevant system domain(s) and in leading other organizations. During system development, the skills of several developmental test organizations may be needed, but only one will be designated as the LDTO. In all cases, the confederation of DT&E organizations must be qualified to oversee and/or conduct the required DT&E, and be capable of providing objective analysis and judgment. The designation as an LDTO does not require all associated DT&E activities to be conducted by the LDTO itself or at a single geographic location.

4.5.3. **LDTO Selection Process.** The ITT submits their selection to the PM along with a capabilities and resource analysis. LDTO nominations will be coordinated with HQ AFMC/A3 and/or HQ AFSPC/A5, as appropriate, before submission to the PEO. After the PEO approves the selection, the PM notifies HQ AFMC/A3 and/or HQ AFSPC/A5, as appropriate, and the program element monitor (PEM) within 30 days. **Note**: The PEM is the person from the Secretariat or Air Staff who has overall responsibility for the program element and who harmonizes program documentation.

4.5.4. **No-LDTO Option.** An alternate organization may be designated in lieu of an LDTO to perform and/or oversee the functions described in paragraph **3.17**. The "no-LDTO" option will be staffed and coordinated following the same process described in paragraph **4.5.3**. The "no-LDTO" option is by exception and only authorized for low-risk ACAT III programs.

4.6. Determining the OTO. The OTO for all programs and projects will be determined using the three-column flow chart in **Figure 4.2** The flow chart identifies the responsible (default) OTO for Air Force acquisition programs based on program ACAT, OSD OT&E Oversight status, and multi-Service applicability. The flow chart also identifies a process to transfer

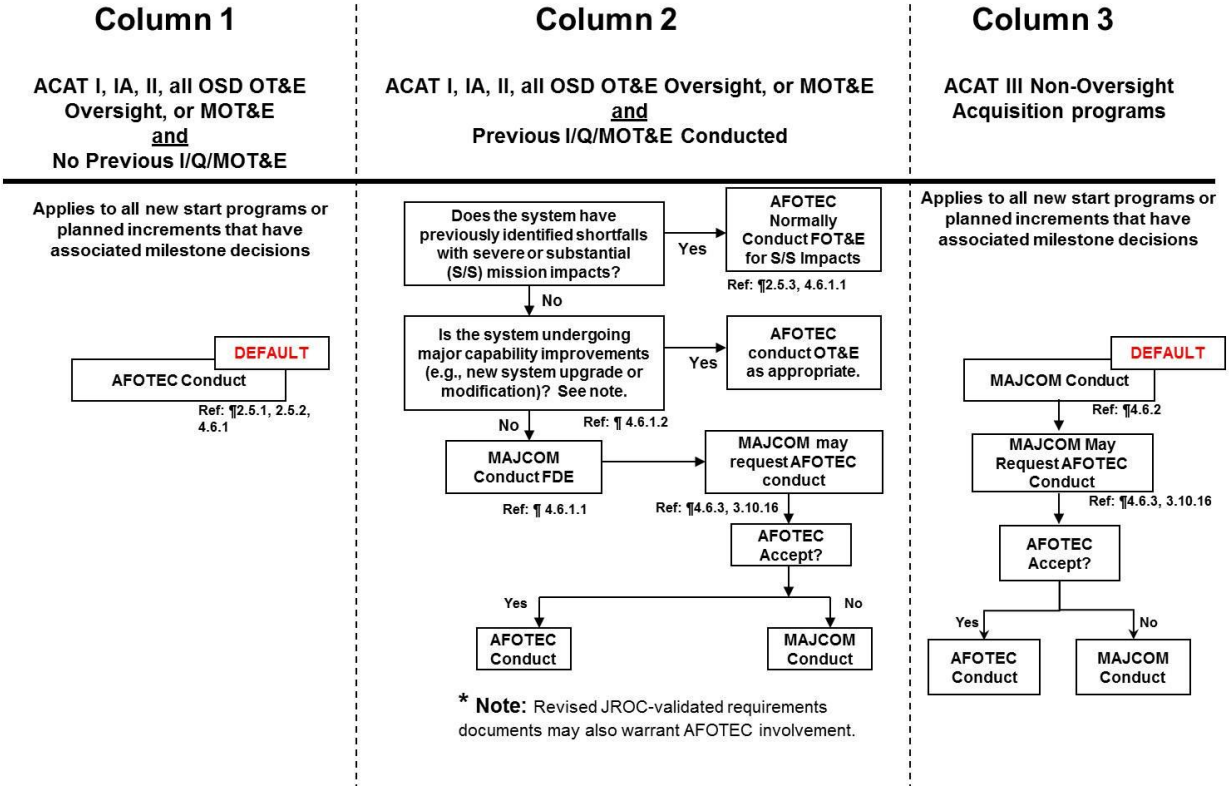
operational test responsibilities from MAJCOM test organizations to AFOTEC when requested by the MAJCOM and accepted by AFOTEC. Any such change must be coordinated with the PM. The flow chart will be used according to the following paragraphs (references cited in **Figure 4.2**).

4.6.1. **Programs Requiring AFOTEC Conduct.** As the Air Force OTA, AFOTEC conducts operational testing for ACAT I, IA, II, OSD OT&E Oversight, and multi-Service acquisition programs as shown in Column 1 of **Figure 4.2**. AFOTEC also conducts FOT&E for programs as described in paragraph **2.5.3** and as shown in Column 2. AFOTEC involvement will end at the completion of FOT&E (or I/Q/MOT&E if no FOT&E is required) unless AFOTEC and the user MAJCOM otherwise mutually agree and document in the TES, TEMP, or other program documentation.

4.6.1.1. If a program has completed I/Q/MOT&E with deficiencies or shortfalls having severe or substantial mission impacts, as identified in the AFOTEC final report, AFOTEC normally conducts FOT&E for those deficiencies as shown at the top of Column 2. AFOTEC and the appropriate MAJCOM may mutually agree to allow the MAJCOM to conduct further testing for mission impacts rated substantial. When these post-I/Q/MOT&E programs have no deficiencies with severe or substantial mission impacts, the MAJCOM is responsible for continued operational testing.

4.6.1.2. If a program has modifications, upgrades, etc., that are large enough to be considered new acquisition programs, required operational testing will be conducted for the new program by the appropriate OTO in accordance with Figure 4.2. In these instances, systems normally re-enter the acquisition process at a milestone commensurate with the Acquisition Strategy. An additional indicator that a program may warrant AFOTEC involvement is the presence of new or revised operational requirements documentation validated by the Joint Requirements Oversight Council (JROC) or AFROC. Multi-Service FDE may be assigned to a MAJCOM by mutual agreement with AFOTEC.

Figure 4.2. Determining the Operational Test Organization.



4.6.2. **Programs Requiring MAJCOM Conduct.** As shown in Column 3, MAJCOM OTOs conduct required operational testing for ACAT III programs. MAJCOMs continue conducting operational testing for all routine post-I/Q/F/MOT&E fielded system upgrades, deficiency corrections, and sustainment programs as required. See paragraph **3.10.1** for lead command designation. MAJCOMs may request AFOTEC to assume responsibility for operational testing (see paragraph **4.6.3**) and/or may request support according to paragraphs **3.10.16** and **4.6.6.1**

4.6.3. **MAJCOM Requests for AFOTEC Re-Involvement.** Post-I/Q/MOT&E and -FOT&E, MAJCOMs may request that AFOTEC remain involved (or become re-involved) in programs that are normally a MAJCOM responsibility (see right side of Column 2). These requests must include required documentation (i.e., JCIDS documents, enabling and operating concepts, and Acquisition Strategy) needed for AFOTEC to make an informed involvement decision. AFOTEC uses a repeatable, documented process with clearly defined criteria to determine post-I/Q/MOT&E or post-FOT&E involvement. AFOTEC documents their decision and provide timely notification to the HQ MAJCOM T&E OPR and AF/TEP. If the response time exceeds 30 days, AFOTEC informs the MAJCOM on the reason for delay. Acceptance of test responsibility also means providing funds for test execution according to operational test funding guidance in AFI 65-601, Vol I, Chapter 14.

4.6.4. Some acquisition program schedules may require MAJCOM testing of follow-on modifications, preplanned product improvements, and upgrades simultaneously with planned AFOTEC FOT&E. In these instances, AFOTEC and operational MAJCOM testers coordinate through the ITT on the most efficient strategy for completing the required testing.

4.6.5. AFOTEC Requests to Transfer OT&E Responsibilities.

4.6.5.1. AFOTEC requests to transfer any operational test responsibilities should be coordinated and resolved not later than 18 months prior to the first scheduled or required operational test event. Transfer of operational test responsibilities less than 18 months prior to test start may only be done by mutual agreement of all parties and AF/TE concurrence.

4.6.5.2. In some cases, operational testing for an AFOTEC-supported program in **Figure 4.2**, Column 1, may be more appropriately executed by a MAJCOM OTO. If both AFOTEC and the MAJCOM(s) mutually agree, AFOTEC requests an exception to policy from AF/TEP. The request must include whether the program is on OSD OT&E Oversight, the ACAT level, phase of program development, rationale for the change, any special conditions, and written MAJCOM concurrence.

4.6.6. Miscellaneous Provisions.

4.6.6.1. Despite having a designated lead command per AFPD 10-9, some ACAT III, non-OSD Oversight programs support multiple users with differing requirements across an entire AF-wide enterprise area. The lead MAJCOM and AFOTEC will negotiate an OT&E involvement role per Column 3 of **Figure 4.2**, or coordinate with appropriate HQ MAJCOM T&E OPR for a multi-MAJCOM/AFOTEC test approach.

4.6.6.2. Some programs may not be clearly "owned" by a MAJCOM or sponsor with an organic operational test function. In these cases, the program's sponsor coordinates with AFOTEC to identify an appropriate OTO, with respective MAJCOM concurrence, to complete any required operational testing. If an appropriate OTO cannot be identified, the sponsor contacts AF/TE for guidance.

4.6.6.3. If the OTO and lead HQ MAJCOM T&E OPR jointly agree that no operational testing is necessary, the LDTO provides relevant DT&E data that supports the option to not conduct operational testing. The OTO reviews the LDTO's work, assess the risk of accepting that work, and document their assessment with a SOTR according to paragraphs **2.5.11** and **7.4.5**.

4.6.6.4. **Multiple OTOs.** If multiple OTOs within the Air Force are tasked to conduct testing concurrently, the ITT must be notified before planning begins and a lead OTO is designated. All operational test plans must be reviewed by, and reports coordinated with, the lead OTO to ensure continuity of effort. This information must be updated in the TEMP, test plans, and other documentation when appropriate. For OSD OT&E Oversight programs, the lead OTO complies with all Oversight requirements according to **Attachment 2**.

4.6.7. **Operational Test Coordination Meeting.** AF/TEP chairs an AFOTEC-MAJCOM operational test coordination meeting prior to annual POM development and submission to establish clear test leadership and resourcing responsibilities. When necessary, these meetings should occur in the August to September timeframe in the year before the POM is finalized. Operational test schedules projected five years ahead for all MAJCOM weapons systems will be reviewed. Program ITTs are expected to resolve as many issues and disconnects as possible before this meeting. Expected lead OTOs should be identified at

least 18-24 months prior to projected test start dates to ensure that responsible organizations plan for adequate test resources.

4.7. OSD T&E Oversight and Approval. DOT&E and DASD(DT&E) jointly publish a list of acquisition and sustainment programs requiring OSD T&E Oversight and monitoring. The master list has sub-parts for DT&E, LFT&E, and OT&E. Programs may appear in one or more sub-parts. PMs and CDTs must determine as early as possible if their program is on this list due to additional workload and reporting requirements.

4.7.1. **Additional Workload and Reporting.** Continuous coordination with the assigned DASD(DT&E) and DOT&E action officers is required for programs on OSD T&E Oversight. ITTs should invite OSD action officers to ITT meetings and decision reviews, and coordinate draft TEMPs, test plans, and other program-related documentation as the program unfolds. **Attachment 2** contains a succinct summary of information requirements.

4.7.1.1. Selected DT&E plans and acquisition documents for programs on OSD DT&E Oversight may require DASD(DT&E) review and/or approval. DASD(DT&E) may require a test concept briefing for selected test programs. PMs and LDTOs will respond promptly to requests for DT&E plans, test concept briefings, or other T&E documentation.

4.7.1.2. When LFT&E is required for "covered systems" IAW 10 U.S.C. § 2366, these programs are placed on the LFT&E part of the OSD T&E Oversight list. PEOs must continually review their portfolios for any programs "covered" under 10 U.S.C. § 2366. The PM is responsible to help identify these programs. DOT&E approval of the LFT&E plan is required before commencing tests. In certain cases, LFT&E waivers are appropriate and must be obtained before MS B. See details in paragraph **5.8.4**.

4.7.1.3. Operational testing for programs on OSD OT&E Oversight may not start until DOT&E approves the adequacy of the test plans in writing. DOT&E requires approval of EOAs, OAs, OUEs, and OT&E plans, and requires a test concept briefing 180 days prior to test start for each of these plans. For test plans that are integrated, DOT&E approval is only required on the operational test portions prior to the start of operational testing. See paragraphs **6.6** and **6.7** for more details about DOT&E's requirements.

4.7.2. **Coordination Prior to Approval.** Program offices and OTOs (as appropriate) will route DT&E, LFT&E, operational test plans (e.g., EOA, OA, and IOT&E), and test concepts requiring OSD approval through AF/TEP before submission to OSD. AF/TEP will assist with the review, coordination, and submission of these documents.

4.7.3. **OSD Oversight Programs with Multiple Subparts.** Some T&E Oversight programs, although listed as a single entity, have multiple subparts, each with its own set of test planning and reporting requirements to satisfy OSD's statutory obligations. OSD representatives to the ITT should identify which subparts are relieved of these requirements. In addition, some OSD Oversight programs may use or consist of components from non-OSD Oversight programs. As a result, these components may be subject to OSD test plan approval and reporting. The ITT co-chairs document the subcomponents that should be under OSD Oversight and notify AF/TEP and the PEO.

4.7.4. **OSD Oversight List Updates.** The most current lists are maintained at **https://extranet.dote.osd.mil/pub/oversight.html**. They are frequently updated and new

programs are added without official notice. Contact AF/TEP for more information about the most current list. All test organizations should forward recommended additions or deletions to AF/TEP.

4.7.5. **Interoperability Watch List.** The Joint Staff Command, Control, Communications, & Computers/Cyber (JCS/J6) may track and place any IT or NSS with significant interoperability deficiencies, or that is not making significant progress toward achieving Joint Interoperability Test Certification, on the Interoperability Watch List. Listed programs may transition to the OSD T&E Oversight List.

4.8. Lead Service Considerations. When the Air Force is designated the lead Service for multi-Service T&E, the ITT will document the other Services' T&E responsibilities, resources, and methods to eliminate conflicts and duplication. When the Air Force is not the lead Service, Air Force testers follow the lead Service's T&E policies. See the *DAG* and the *MOA on MOT&E and JTE* (**http://www.dote.osd.mil/policy.html**) for more information.

4.9. Tester Inputs During Materiel Solution Analysis (MSA). Developmental and operational testers must assist requirements sponsors, acquisition planners, and systems engineers in developing AoAs, COAs, and TDSs. Testers provide T&E inputs for each alternative developed. Criteria, issues, COIs, CTPs, measures of effectiveness (MOE), and measures of suitability (MOS) developed for these documents are later used for developing the strategy for T&E and subsequent T&E plans.

4.10. Developing Test Measures. During the MSA phase, developmental and operational testers should begin drafting clear, realistic, and testable measures to support the strategy for T&E or TES, the MS A decision, and future test plans. These measures are refined and evolve as more information becomes available during and after the MSA phase. DT&E practitioners assist systems engineers in developing critical system characteristics (i.e., CTPs) that when achieved, allow the attainment of operational performance requirements. Operational testers draft COIs, MOEs, MOSs for operational testing purposes. The goal is to ensure all measures are traceable to key system requirements and architectures, and correlate to the KPPs and Key System Attributes (KSA). These measures guide the PM when writing system specifications for contractual purposes. The best way to ensure complete coverage and correlation is to list them in an Evaluation Framework Matrix that becomes part of the first TEMP.

4.11. Test and Evaluation Strategy (TES) Development. The TES documents the overall structure and objectives of the program's T&E activities in support of MS A. It provides a framework within which to generate future T&E plans, and begin scheduling key resources associated with the T&E program.

4.11.1. ITT members develop the TES to support MS A in accordance with the DAG, Chapter 9, and DoDI 5000.02, Enclosure 6. DASD(DT&E) and DOT&E approve the TES at MS A for OSD T&E Oversight programs; the designated MDA is the approval authority for all other programs. Although minimal detail is available early in new programs, the TES must contain an overarching "strategy for T&E" and an initial ITC. TES development and coordination follow the same process as the TEMP as described in paragraph **5.14**.

4.11.2. While a TES is mandatory for MDAP and MAIS programs, other programs not using a TES must articulate a "strategy for T&E" at MS A. The strategy for T&E is a high-level conceptual outline of all T&E required to support development and sustainment of an

acquisition program. Programs that do not develop a TES may use an LCSP in lieu of a TES as described in paragraph **5.15**. The TES and LCSP may use best-available estimates and projections of the program's T&E requirements.

4.11.3. The ITC outlines the flow of all T&E activities and requirements, and integrates them for the next acquisition phases. Feasible test approaches that support the requirements, acquisition, and IA strategies, and to a limited extent, the production and sustainment strategy, must be projected. The TES (or strategy for T&E) and the ITC must plan to take maximum advantage of existing investments in DoD ranges and facilities. Paragraph **1.3.5** describes additional topics for inclusion.

4.11.4. The TES must describe feasible test approaches for the selected COA option(s) based on the ICD, PPP, and enabling and operating concepts. It outlines initial T&E designs, objectives, and T&E resource requirements. Developmental testers assist systems engineers in drafting CTPs that are testable. Operational testers, in conjunction with MAJCOM requirements and T&E offices, develop COIs in the form of questions to be answered during evaluation of a system's overall effectiveness and suitability. They also draft the MOEs and MOSs. A series of OAs should be integrated into the T&E continuum to reduce program risk and minimize the overall number of test events.

4.11.5. The CDT functions as the "lead DT&E integrator" for contracting matters, and interfacing as needed with all other representatives on the ITT. The CDT ensures all necessary organizations with specialized skills contribute to TES development. The integrated test planning process culminates in a TES or LCSP that includes an initial description of test scenarios, test measures (e.g., CTPs, MOEs, and MOSs), test locations, exercises, T&E methodologies, operational impacts and issues, contractor contributions, and projections for future capabilities.

4.11.6. The MS A-approved TES becomes the foundation for the TEMP which is described throughout **Chapter 5** and paragraph **6.2**

4.12. Reliability Growth Planning. Planning for reliability starts with testers participating in HPTs to help ensure operational reliability requirements are correctly written, reflect realistic conditions, and are testable. Testers work with the program's systems engineers in the allocation of reliability among critical components, determining the amount of testing and resources required, and developing the plan for improving reliability as development progresses. These items, among others, are necessary when designing the system and the test program. They are outlined in the TEMP, SEP, and LCSP. Also see AFI 63-101/20-101; the *DoD Guide for Achieving Reliability, Availability, and Maintainability*; and DOT&E memo, *Procedure for Assessment of Reliability Programs by DOT&E Action Officers*, 29 May 09.

4.13. Pre-Milestone A Planning for T&E Resources.

4.13.1. **Securing T&E Ranges and Facilities.** Test planners must contact potential test sites early to obtain estimates of costs, availability, and test priority. Test planners should ascertain how each range or site establishes priorities among programs on that range, and what to submit to gain access. HQ AFMC/A3, HQ AFSPC/A3/5, or HQ ACC/A3 and the range or facility points of contact (POC) will provide information and assistance on using the Major Range and Test Facility Base (MRTFB) and other government test facilities. See AFI 99-109, *Major Range and Test Facility Base (MRTFB) Test and Evaluation Resource*

Planning. See AFI 13-212, *Range Planning and Operations*, for information on the use of test and training ranges. The USAF T&E Organizations and Facilities Database on the AF/TEP page of the Air Force Portal (**https://www.my.af.mil**) provides information about the capabilities of available Air Force test facilities, capabilities, and other resources.

4.13.2. **Use of Government Test Facilities.** The ITT will plan to take full advantage of existing investments in DoD ranges, facilities, and other resources, including the use of embedded instrumentation. For Air Force programs, test teams should plan to use Air Force test capabilities first, followed by other MRTFB facilities, followed by other military Service and non-DoD government facilities (including Federally Funded Research and Development Corporation (FFRDC) test resources), and finally contractor facilities. This hierarchy does not mean that all T&E facilities used by a program must be from a single category; combinations of contractor and government facilities may provide the best business case and should be considered.

4.13.3. **Use of Non-Government Facilities.** During test planning development, the ITT should consider contractor test facilities only when government facilities are not available, cannot be modified, or are too expensive. If the strategy for T&E calls for testing at non-government facilities, the PM must conduct a business case analysis that includes facility life cycle sustainment costs for all COAs. Analyze COAs that include teaming arrangements with other programs using the same facilities on a cost-sharing basis. Include these facility requirements in the EMD RFP and document the final choice with rationale in the TEMP. The T&E resource strategy must be cost-efficient as well as flexible.

4.13.4. **Use of Exercises and Experiments.** To the maximum practical extent, the USAFWC assists Air Force test organizations in gaining access to exercises and experiments to take advantage of operationally realistic environments, high threat densities, massed forces, and other efficiencies. Test organizations should plan to participate in joint and Service experiments and war games as appropriate. The goals of the exercise, experiment, or T&E activity must be compatible; some tailoring may be required to ensure all stakeholders benefit from the activity.

4.13.5. **Planning for Testing in a Joint Environment.** All planning for testing must be structured to reflect the joint environment and missions in which the system will operate. ITT members should consider use of distributed test methodologies with live, virtual, and constructive simulation resources such as Air Force Integrated Collaborative Environment (AF ICE) sites, Joint Mission Environment Test Capability (JMETC), and the Joint Information Operations Range. See DoD's *Testing in a Joint Environment Roadmap* at **https://acc.dau.mil/t&e**.

4.13.6. **Planning for Target and Instrumented Munitions Expenditures.** Test organizations, in consultation with PMs, will plan for aerial target requirements IAW AFI 99-108, *Programming and Reporting Aerial Target and Missile Expenditures in Test and Evaluation*. Test organizations and PMs must forecast their requirements for munitions flight termination and telemetry kits IAW AFI 99-120, *Forecasting and Programming Munitions Telemetry and Flight Termination Systems.*

4.13.7. **Planning for Foreign Materiel Resources.** ITT members should consult with requirements, acquisition, and intelligence organizations to determine the need for foreign materiel resources.

4.14. Testing IT and Defense Business Systems (DBS). Testing of IT and DBS programs presents many unique challenges not common to hardware intensive systems**.** The PM must ensure that any specialized tests (e.g., IA and interoperability), and correction of any deficiencies with mission impacts, are addressed as early as possible prior to IA and interoperability certification decision milestone dates. AF/A3/5 must ensure current operational requirements and operating or enabling concepts are available to support the applicable phases of T&E. The following memos contain further guidance and apply to all IT and DBS programs:

4.14.1. DOT&E memo, *Guidelines for Operational Test and Evaluation of Information and Business Systems*, Sept 14, 2010.

4.14.2. USD(AT&L) memo, *Interim Acquisition Guidance for Defense Business Systems (DBS)*, Nov 15, 2010.

4.14.3. DOT&E memo, *Procedures for Operational Test and Evaluation of Information Assurance in Acquisition Programs*, Jan 21, 2009.

4.14.4. DTM 11-009, *Acquisition Policy for Defense Business Systems (DBS) incorporating Change 2*, 10 Jan 2013.

4.15. Testing of Urgent Needs. Expedited testing and reporting is required for urgent needs (e.g., Urgent Operational Need (UON), Joint Emergent Operational Need (JEON), or Joint Urgent Operational Need (JUON)) using the Quick Reaction Capability (QRC) process in AFI 63-114. A QRC-IPT is created for and manages these systems. OSD-managed Rapid Reaction Fund (RRF) and Quick Reaction Fund (QRF) programs also accelerate fielding of rapidly emerging capabilities and concepts. Levels of risk acceptance will be higher and timelines much shorter than normal in order to satisfy urgent needs. Therefore, testers must be very familiar with the processes in AFI 63-114 due to the extensive amount of tailoring and streamlining required. T&E results are generally reported with a Capabilities and Limitations (C&L) Report according to paragraph **7.5**. After initial system fielding, if the QRC will be further developed as an enduring program, the PEO may require the program to complete the traditional acquisition, requirements, T&E, and C&A processes for any unfinished areas.

4.16. Additional Early Planning Considerations. PMs and T&E practitioners need toconsider the topics in **Table 4.1** prior to MS A during development of the strategy for T&E or TES. Although details are not required until after MS A, early strategic planning for these items streamlines later activities. The ITT should locate qualified personnel to develop and manage these future topics. **Chapter 5** contains the details.

Table 4.1. Topics for Early Test Planning Consideration.

Topic	Description	For More Information
Common T&E Database	Single repository for all T&E data for the system under test	Para 5.16
Critical Technical Parameters (CTP)	Measurable, critical system characteristics that, when achieved, allow the attainment of operational performance requirements.	Para 5.11
Data Archiving	Retention of test plans, analyses, annexes and related studies to maintain historical perspective	Para 5.16.9
Deficiency Reporting	Processes and procedures established by the PM to	Para 5.17

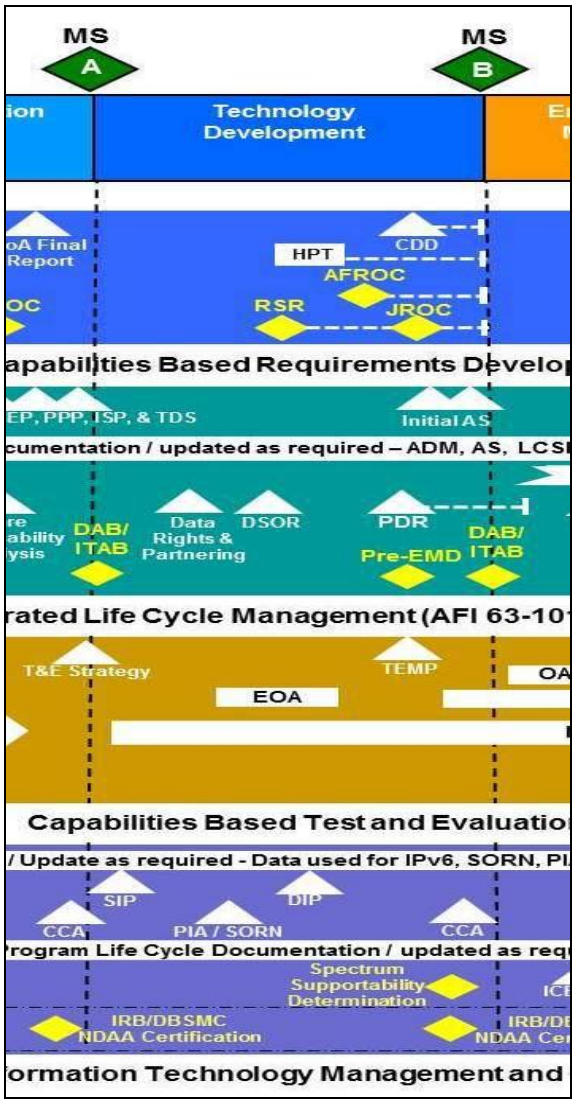
	report, screen, validate, evaluate, track, prioritize, and resolve deficiencies	
Foreign Disclosure	Recommending test data or materials for release to foreign nationals	Para 5.16.8
Integrated Technical and Safety Reviews	Procedures established by the PM for scheduling and conducting technical and safety reviews	Para 5.19
Joint Reliability and Maintainability Evaluation Team (JRMET)	Collects, analyzes, verifies, and categorizes reliability, availability, and maintainability (RAM) data	Para 5.16.5
Scientific Test and Analysis Techniques (STAT)	Scientifically-based test and analysis techniques and methodologies for designing and executing tests	Para 5.13

Chapter 5

T&E ACTIVITIES SUPPORTING MILESTONE B DECISIONS

5.1. Post MS A. The most important activities after the MS A decision and during the Technology Development phase are shown in **Figure 5.1**. Sustained, high quality tester involvement and collaboration with requirements sponsors and system developers must continue throughout the Technology Development phase in preparation for the next phase, EMD. T&E practitioners continue expanding and developing the topics described in **Chapter 4**. They must address new topics added in this chapter, continue refining the strategy for T&E, and begin building specific, executable T&E plans that support the requirements, acquisition, and IA processes.

Figure 5.1. Integration of Requirements, Acquisition, IA, and T&E Events Prior to MS B.



5.2. T&E Funding Sources. The funding sources for T&E depend on the nature and purpose of the work and the type of testing. Funding is not based on the organization conducting the test or the name of the test. Detailed guidance is in DoD 7000.14-R, Vol 2A, Chapter 1, and AFI 65-601, Vol 1, Chapter 14. Test resource advisors must ensure compliance with these documents before requesting and committing funds. Direct assistance is available from SAF/FMBI, SAF/AQXR, and AF/TEP/TER.

5.3. Formal Contractual Documents. Developmental testers review the System Requirements Document (SRD) to ensure it correctly links and translates the CDD (draft or final, as appropriate) into system specifications that can be put on contract. MIL-HDBK-520, *Systems Requirements Document Guidance*, provides guidance on translating capability based requirements into system requirements. ITT members review the RFP and SOW for EMD to ensure contractor support to government T&E is included and properly described. For guidance, use DASD(DT&E)'s guide, *Incorporating Test and Evaluation into Department of Defense Acquisition Contracts*. The ITT reviews the Contract Data Requirements List (CDRL) to ensure it describes the content, format, delivery instructions, and approval and acceptance criteria for all deliverable T&E data. The ITT confirms that sufficient funding is provided for all T&E-related resources. The ITT also reviews these drafts to ensure user-defined capabilities have been accurately translated into system specifications and provisions are made for the following:

5.3.1. Government review and approval of contractor test plans and procedures before tests commence.

5.3.2. Government insight into contractor testing to ensure systems are maturing as planned, to include government observation of contractor testing.

5.3.3. Proper interface of the contractor's DR system with the government's DR system, including T.O. 00-35D-54 compliant processes and methodologies, and portability of data into government information management systems.

5.3.4. Contractor T&E support such as failure analyses, T&E data collection and management, operation of unique test equipment, provision of product support, and test reports.

5.3.5. Contractor participation in government test planning forums such as the ITT.

5.3.6. Contractor provision of training to testers and provision of long-lead items.

5.4. Limitations on Contractor Involvement in Operational Testing. DoDI 5000.02 places limits on contractor involvement in IOT&E of MDAPs. Air Force policy applies these limitations to all OT&E programs regardless of ACAT.

5.4.1. **System Contractors.** Operational testers must strictly avoid situations where system contractors could reduce the credibility of operational test results or compromise the realistic accomplishment of operational test scenarios. Contractor personnel may only participate in OT&E of Air Force programs to the extent they are planned to be involved in the operation, maintenance, and other support of the system when deployed in combat.

5.4.2. **System Contractor Support to Operational Testing.** System contractors may be beneficial in providing logistic support and training, test failure analyses, test data, and unique software and instrumentation support that could increase the value of operational test

data. Explanations of how this contractor support will be used and the mitigation of possible adverse effects must be described in the TEMP and developmental and operational test plans.

5.4.3. **Support Contractors.** According to DoDI 5000.02 and Air Force policy, support contractors may not be involved in the establishment of criteria for data collection, performance assessment, or evaluation activities for operational testing. This limitation does not apply to a support contractor that has participated in such development, production, or testing solely in test or test support on behalf of the government.

5.5. Testing IT and DBS. As Agile Development concepts and methods are incorporated into DoD policy, the ITT must tailor the strategy for T&E to suit program needs. Agile methods break tasks into small increments, use minimal documentation, are tolerant of changing requirements, and have iterations typically lasting from a few weeks to a few months. The emphasis is on software that works as the primary measure of progress. The strategy for developmental T&E on ASD systems should likewise test small increments, consolidating test planning into an overarching test plan of the entire capability, with focused annexes for tests of incremental capability. Testers must maintain early and recurring involvement with the program office, developer, and users to manage requirements, and should minimize reporting to focus on the incremental progress. While efforts should be made during developmental testing to approximate an operational environment, no formal operational testing should be performed until the final increment is complete to deliver a usable capability to the operational environment.

5.5.1. The ITT ensures the IT tests described in **Table 2.2** are integrated into the ISP, SEP, TEMP, contracts, and relevant test plans where and when appropriate.

5.5.2. Use the DOT&E and USD(AT&L) memos cited in paragraph **4.14** to determine the risk assessment level of test (RALOT) in these systems**.**

5.6. Modeling and Simulation (M&S) in Support of T&E. Plan to use verified, validated, accredited, and reusable M&S tools and DSMs from the Air Force Modeling and Simulation Resource Repository (AFMSRR) before building new M&S resources. Early definition of M&S requirements helps ensure supporting intelligence and modeling efforts have sufficient time to gather information, allocate assets for threat modeling, and check concurrent efforts in existing programs. Check the Air Force Agency for Modeling and Simulation (AFAMS) website at **http://www.afams.af.mil**/. The PM documents how M&S supports integrated testing in the Modeling and Simulation Support Plan and the TEMP. For additional policies on using M&S, see AFI 16-1001, *Verification, Validation, and Accreditation (VV&A),* and AFI 63-101/20-101.

5.7. Pre-MS B DT&E Planning.

5.7.1. **Planning for Integrated Testing.** Integrated testing is the preferred approach unless it can be shown that it adds unacceptable costs, delays, or technical risks. The ITT and test teams continue refining the ITC initially developed in the TES prior to MS A. The ITC supports development of test plans that are integrated and that cover as many developmental, operational, and IA test objectives as possible prior to dedicated operational testing. The ITT integrates operational test events throughout DT&E to provide additional test realism, decrease overall duplication of effort, increase test efficiency, and identify performance shortfalls that could result in increased development costs. Multiple sets of test objectives will be accomplished together within statutory and regulatory guidelines. DT&E activities

can overlap and share T&E resources with OAs to conserve resources and extract maximum amounts of data.

5.7.1.1. Use the systems engineering approach in the SEP to break down, identify, and integrate the COIs, CTPs, test objectives, MOEs, MOSs, measures of performance (MOP), resources, and schedules, which are documented as part of the ITC. When appropriate, scientific test and analysis techniques (STAT) and methodologies (as described in paragraph **5.13)** will also be used. Existing safety review processes will not be compromised. See paragraphs **1.3** and **6.2** through **6.4**.

5.7.1.2. Test approaches must be flexible and efficient, especially in areas long held to require rigid structural control. Traditional limits such as frozen baselines for the duration of OT&E, concurrent development, data merging, using other testers' validated data, and statistical confidence when using small sample sizes should be carefully reviewed so they do not become impediments. However, the overarching goals of any test should not be compromised. After thorough analysis, test planners may conclude that some test activities (e.g., the dedicated portions of OT&E) should not be combined.

5.7.1.3. While planning for integrated testing, both operational suitability and operational effectiveness should be given commensurate consideration. See AFPAM 63-128, Attachment 6, and *DoD Guide for Achieving Reliability, Availability, and Maintainability*.

5.7.1.4. Any test limitations or deferrals resulting from integrating test events must be explained in test plans and the TEMP. See paragraph **5.20**.

5.7.2. **Requesting Operational MAJCOM Support for DT&E.** Requests for operational MAJCOM test support for DT&E must be vetted through the appropriate MAJCOM headquarters T&E office before they may be accepted. Operational and/or implementing MAJCOM headquarters' review and approval is required depending on the nature of the request.

5.7.2.1. Air Force program offices and/or developmental test organizations may request operational MAJCOM (i.e., non-test coded unit) support for DT&E activities only after obtaining concurrence from that organization's MAJCOM headquarters T&E office. Such test support will be restricted to low-risk military/operational utility evaluations under the direct supervision of an LDTO. These activities will be called "DT&E Assists" to indicate they are not operational testing.

5.7.2.2. Air Force program offices and developmental test organizations may request MAJCOM OTO support for DT&E activities (including acquisition/sustainment programs or proof-of-concept activities where no formal DT&E is planned) only after obtaining concurrence from the operational MAJCOM headquarters T&E office. Such test support should normally be restricted to low-risk DT&E activities. The requesting office must ensure that all applicable technical and safety reviews are completed and accepted by the appropriate implementing MAJCOM test approval authorities. The technical and safety review and approval documentation will be provided to the OTO before test execution may commence.

5.7.2.3. Requests for operational MAJCOM test support from non-Air Force organizations (e.g., Defense Advanced Research Projects Agency) must first be

forwarded to the implementing MAJCOM headquarters T&E office (AFMC/A3 or AFSPC/A5 as appropriate) for review, approval, and assignment of an LDTO. All applicable technical and safety reviews must be completed and documentation provided before such requests may be accepted by the operational MAJCOM. Only OTO units may conduct operational MAJCOM test support for non-Air Force organizations. The implementing MAJCOM's technical and safety reviews may determine that the risk level requires testing be conducted by a developmental test organization.

5.7.2.4. The USAF T&E Organizations and Facilities Database on the AF/TEP portion of the AF Portal (**https://www.my.af.mil**) provides information to PMs on the capabilities of available AF test resources.

5.8. LFT&E Planning. The following paragraphs supplement statutory direction in 10 U.S.C. § 2366. The *DAG,* Chapter 9, provides additional guidance for implementing LFT&E legislation and OSD requirements.

5.8.1. **Implementation.** LFT&E results must support system design and production decisions for covered systems. The focus and funding for LFT&E should be on the system components immediately related to the development or modification program, but the resultant evaluation must be at the system level. PMs should contact the appropriate LFT&E test organization in the 96 Test Wing (i.e., 780 Test Squadron for munitions and 96 Test Group/OL-AC for survivability of covered systems) for assistance with development of LFT&E strategies, plans, waivers, and alternative plans.

5.8.2. **Determining Covered System or Major Munitions Program Status.** The PM and ITT must first determine if their system is a "covered system," "major munitions program," or "covered product improvement program." PEOs must continually review their portfolios for any programs "covered" under 10 U.S.C. § 2366. When a potential LFT&E candidate is identified, the ITT, PM, appropriate LFT&E organization, and AF/TEP must be notified as early as possible. The appropriate LFT&E organization can facilitate discussions to help determine a corporate Air Force position and develop a recommendation to DOT&E.

5.8.3. **LFT&E Strategy Approval.** As soon as an affirmative determination of covered status is made, the PM develops a LFT&E strategy with the assistance of the appropriate LFT&E organization. The PM is responsible for communicating and coordinating the LFT&E strategy with DOT&E and determining the appropriate method. The strategy must be structured so design deficiencies uncovered during EMD may be corrected before proceeding beyond LRIP. Technology projects meeting the statutory criteria are also required to undergo LFT&E. The ITT describes the LFT&E strategy and plans in the TEMP. LFT&E must be fully integrated into the continuum of testing. SAF/AQ will approve the LFT&E strategy before it is forwarded to DOT&E for final approval.

5.8.4. **Requests for LFT&E Waivers.** The Secretary of Defense may waive the application of the survivability and lethality tests of this section to a covered system, munitions program, missile program, or covered product improvement program if the Secretary determines that live-fire testing of such system or program would be "unreasonably expensive and impractical" and submits a certification of that determination to Congress either (a) before MS B approval for the system or program; or (b) in the case of a system or program initiated at (i) MS B, as soon as is practicable after the MS B approval; or (ii) MS C, as soon as is practicable after the MS C approval. To support this determination, the ITT and/or PM will

submit the LFT&E waiver request and alternative strategy to SAF/AQ for Service-level approval. After SAF/AQ approval, the LFT&E waiver request and alternative strategy are forwarded to DOT&E for alternative strategy approval, and then together to USD(AT&L) for waiver approval. Upon final OSD approval, DOT&E issues a report and formal certification to Congress. Document the LFT&E waiver and alternative LFT&E strategy in an annex to the TEMP.

5.8.5. **Alternative LFT&E Strategy.** The alternative strategy does not alleviate the statutory requirement for survivability or lethality testing. The alternative strategy must include LFT&E of components, subassemblies, and/or subsystems which, when combined with M&S and combat data analysis, will result in confidence in the survivability (or lethality) of the system.

5.8.6. **Alternative Strategy and Testing for Major Modifications.** In the case of major modifications or new production variants, the alternative LFT&E strategy and detailed plans must focus on configuration changes that could significantly affect survivability or lethality. Potential interactions between portions of the configuration that are changed and those that are not changed must be assessed. The assessment results must include a whole system analysis of the survivability and vulnerability impacts on the total system. Alternative LFT&E are not required on components or subsystems unrelated to the modification program.

5.8.7. **Detailed LFT&E Plans.** DOT&E reviews and approves all LFT&E plans prior to commencement of LFT&E. All LFT&E must be completed and test reports submitted 45 calendar days before the beyond-LRIP decision review. The *DAG* lists the mandatory contents of LFT&E plans.

5.8.8. **Warfighter Survivability.** An assessment of force protection equipment and warfighter survivability will also be conducted as required IAW 10 U.S.C. § 139(b)(3), Public Law (P.L.) 108-375 § 141, and DoDI 5000.02.

5.9. Early Operational Assessment (EOA) Planning and Execution. During the Technology Development phase, EOAs are conducted as required to provide operational inputs to requirements and system developers prior to MS B. The EOA supports development of the Capability Development Document (CDD), test concepts and plans, and the MS B decision. The scope and content of EOAs should be tailored to ascertain if the program is on track using any available data. For programs on DOT&E oversight, EOAs will require DOT&E approval before they can start. EOAs can be collaborative efforts conducted concurrently with DT&E, and need not be independently conducted; however, results must be independently assessed.

5.10. Tester Involvement in Requirements Documentation. Testers must continue assisting requirements sponsors in refining operational capability requirements (e.g., CDD, CPD) and enabling and operating concepts IAW AFI 10-601. Developmental and operational testers participate in HPTs by providing technical and operational expertise, lessons learned, and data from EOAs, prototypes, and integrated testing. Testers help ensure system KPPs, KSAs, and CTPs are attainable, testable, and accurately expressed in SRDs, RFPs, and SOWs.

5.11. Critical Technical Parameters (CTP). Systems engineers, assisted by DT&E practitioners, are responsible for developing CTPs. CTPs are measurable, critical system characteristics that, when achieved, allow the attainment of operational performance

requirements. They are selected from the technical performance measures (TPM) on the critical path to achieving the system's technical goals. Failure to achieve a CTP during DT&E should be considered a reliable indicator that the system is behind in the planned development schedule, or will likely not achieve an operational requirement.

5.11.1. Developmental testers must help ensure CTPs are measurable and testable, traceable to key system requirements and architectures, and help the PM translate them into system specifications for contractual purposes.

5.11.2. CTPs must reflect the system's definition and design for all elements such as hardware components, software, architectures, information assurance, personnel, facilities, support equipment, reliability and maintainability, and data. CTPs will be correlated to COIs and OT&E test objectives (i.e., MOEs and MOSs) in the TEMP. The best way to ensure complete coverage and correlation is to list them in the Evaluation Framework Matrix in the TEMP.

5.12. Testing COTS, NDI, and GFE. PMs plan for and conduct T&E of COTS, NDI, and GFE even when these items come from pre-established sources. The operational effectiveness and suitability, of these items and any military-unique applications must be tested and evaluated before a FRP or fielding decision. The ITT should plan to take maximum advantage of pre-existing T&E data to reduce the scope and cost of government testing. More information is available in USD(AT&L)'s handbook SD-2, *Buying Commercial & Non-developmental Items: A Handbook*, available at **http://www.dsp.dla.mil**/. IT and NSS should be tested IAW DoDI 8500.2,CJCSI 6212.01F, and JAFAN 6/3 (if applicable).

5.13. Scientific Test and Analysis Techniques (STAT). Whenever feasible and consistent with available resources, STAT should be used for designing and executing tests, and for analyzing the subsequent test data. The top-level approach must be described in the first issuance of the TEMP and the SEP at Milestone B, and in more detail in subsequent test plans as appropriate. The conceptual test designs themselves need not be part of the TEMP or the SEP, but shall be available for review during coordination of those documents. The ITT should consult a STAT practitioner whenever test designs are considered.

5.13.1. The selected approach must address the following areas as a minimum:

5.13.1.1. Define the objective(s) of the test (or series of tests, when appropriate).

5.13.1.2. Identify the information required from the test to meet the test objective(s).

5.13.1.3. Identify the important variables that must be measured to obtain the data required for analysis. Identify how those variables will be measured and controlled. Identify the analysis technique(s) to be used.

5.13.1.4. Identify the test points required and justify their placement in the test space to maximize the information obtained from the test.

5.13.1.5. If using a traditional hypothesis test for data analysis, calculate statistical measures of merit (power and confidence level) for the relevant response variables for the selected number of test events. If using another statistical analysis technique, indicate what statistical measures of merit will be used. If a statistical analysis technique is not being used, discuss the analysis technique that is being used and provide rationale.

5.13.2. The selected test design(s) should help ensure smoother, more efficient integration of all types of testing up to and including FOT&E. In all cases, the PM is responsible for the adequacy of the planned series of tests and reports on the expected decision risk remaining after test completion.

5.14. Test and Evaluation Master Plan (TEMP). The TEMP integrates the requirements, acquisition, T&E, systems engineering, and LCSP sustainment strategies with all T&E schedules, funding, and resources into an efficient continuum of integrated testing. The PM, working through the ITT, is responsible for preparing a TES prior to MS A, a draft TEMP to support the pre-EMD review, and formal TEMPs to support MS B and C for all assigned ACAT I, IA, II, and other programs on OSD T&E Oversight IAW DoDI 5000.02, Enclosure 4, Table 3, and Enclosure 6. PMs may tailor the content of the TEMP within regulatory guidelines to fit individual program needs and satisfy MDA requirements. For programs on the OSD T&E Oversight List, a stand-alone TEMP is required. For all other programs, the PM either produces a stand-alone TEMP or incorporates essential T&E planning information into a tailored, integrated program document per paragraph **5.15**.

5.14.1. **TEMP Organization.** The TEMP will be written following the format in the *DAG*, Chapter 9. Any type of testing (as described in **Chapter 2**) used by the program will be integrated into Part III ("Test and Evaluation Strategy") of the TEMP. For non-OSD Oversight programs, the TEMP format may be modified to facilitate program accomplishment per paragraph **5.15**. The completed TEMP conveys such information as:

5.14.1.1. The linkage between the requirements, acquisition, T&E, and sustainment strategies.

5.14.1.2. The linkage between operating and enabling concepts, the SEP, operational requirements and architectures, system characteristics, threat documents, test design information, CTPs, COIs, MOEs, MOSs, and increments of capability.

5.14.1.3. Organizational responsibilities for the contractor(s), PM, LDTO, PTO(s), and operational testers.

5.14.1.4. Integrated test methodologies and designs.

5.14.1.5. Test resources.

5.14.1.6. Test limitations and test deferrals (see paragraphs **5.20** and **6.4.3**).

5.14.1.7. The LFT&E strategy and plans, and the strategy for system certification of readiness for dedicated operational testing.

5.14.1.8. MAJCOM testing, to include operational testing for follow-on increments.

5.14.2. **TEMP Submittal and Coordination.** Obtain the required TEMP signatures as shown in the TEMP Signature Page Format in the *DAG*, Chapter 9. All Air Force TEMPs will include a signature block for the LDTO next to the OTO.

5.14.2.1. The ITT forwards a TEMP final draft "in parallel" to all stakeholder organizations represented on the ITT for pre-coordination review. ITT representatives are expected to verify concurrence or identify outstanding issues within 30 days. Dissenting organizations must provide a position statement, to include alternatives, or formal non-concurrence on the draft TEMP within this timeframe. Following this pre-

coordination period, the PM signs the TEMP and staff in parallel to all required "concurrence signature" organizations below the Air Staff level. After "concurrence signatures" are obtained, the TEMP will be forwarded to the Air Staff, through the PEM, for Air Force and OSD coordination and approval.

5.14.2.2. For all OSD T&E Oversight programs, the PEO will submit the TEMP to SAF/AQ Workflow (**safaq.workflow@pentagon.af.mil**) for PEM staffing. The PEM will coordinate through required Air Staff offices (to include AF/TE and the SAE, in that order) for formal Service-level approval. After SAE signature, the PEM will submit the TEMP to DASD(DT&E) and DOT&E via OSD's TEMP Workflow (RSS dd - OSD-ATL TEMP, or **temp@osd.mil**).

5.14.2.3. For all other programs not requiring OSD approval, the PEM will ensure the SAE (or designated representative) signs as the final Service approval authority. AF/TE will sign prior to the SAE as the "DoD Component Test and Evaluation Director." If the SAE is not a signatory, no signature is required for the "DoD Component Test and Evaluation Director."

5.14.3. **Schedule.** TEMPs requiring OSD approval should be submitted to the PEO for review and signature 120 days prior to the decision review. After the PEO signs, the TEMP goes to the PEM via SAF/AQ Workflow not later than 90 days prior to the decision review for HQ USAF (i.e., Service-level) coordination and AF/TE and SAE approval. Not later than 45 days prior to the decision review, the SAE sends the TEMP to OSD for review and approval. If OSD has issues, they may send the TEMP back to the PEM for changes. After OSD's changes are incorporated, the SAE submits the final Service-approved TEMP 10 days prior to the decision review for final OSD approval. See **Attachment 2** for a summary of coordination requirements.

5.14.4. **Multi-Service TEMPs.** The lead Service is responsible for coordinating multi-Service TEMPs. Signatures from the "concurrence signature" organizations in the other participating Services must be obtained before TEMP submission to the PEM, who submits in turn to the Service T&E executives, the SAEs (or MDA if appropriate), and OSD. Due to the extra signatures required, add 30 days to the PEO and SAE signature times cited in paragraph **5.14.3,** and 15 days to the times required for OSD approval.

5.14.5. TEMP Updates and Administrative Changes. The PM and ITT will:

5.14.5.1. Make updates to the TEMP whenever significant revisions impact the program or T&E execution as defined by the PM, DOT&E, DASD(DT&E), or AF/TE. Updates are required prior to major milestones IAW DoDI 5000.02, and will be staffed as described in paragraphs **5.14.2** through **5.14.4**. **Note:** Updates are any revisions that alter the substantive basis of the MDA certification or otherwise cause the program to deviate significantly from the material previously presented, or if the conditions that formed the basis for the original agreement have changed. (DoDI 5000.02, Enclosure 4, Table 2-1, Note 4 contains general guidance from 10 U.S.C. § 2445(c) about what constitutes an update.)

5.14.5.2. Make administrative changes for small corrections or modifications to the TEMP. Administrative changes do not impact T&E execution and do not require full

coordination as described in paragraphs **5.14.2** through **5.14.4** Provide an errata page listing these changes.

5.14.6. **When a TEMP Is No Longer Required.** Once a program's acquisition is complete and COIs satisfactorily resolved, a TEMP may no longer be required. For programs on OSD T&E Oversight, the ITT should initiate requests to cancel the TEMP. Submit such requests and justification through AF/TE to OSD. For non-oversight programs, TEMP cancellation is at the discretion of the ITT.

5.15. Tailored Integrated Documentation. AFI 63-101/20-101 and AFPAM 63-128 encourage the PM to tailor, combine, and streamline program documentation to meet program needs as long as specified document content, formats, and templates are followed.

5.15.1. The Air Force tailoring concept permits consolidation of multiple documents (e.g., the Acquisition Strategy and acquisition plan, TES, TEMP, and SEP) into fewer documents, perhaps a single document if justifiable. The MDA retains the authority to tailor and make the final determination of what information is covered.

5.15.2. For ACAT programs not on the OSD T&E Oversight List that do not develop a stand-alone TEMP, the PM uses the TEMP outline in the DAG, Chapter 9. Include critical T&E planning information from Parts II, III, and IV of the TEMP format. The PM must include all ITT members when preparing the T&E portions of this document. MDAs may use attachments, annexes, or a web-based site to ensure all information is covered. See AFI 63-101/20-101 and AFPAM 63-128 for details.

5.16. Management of T&E Data. Accurate and efficient data collection is essential in all T&E efforts and must be planned before any testing starts. Integrated testing requires use of common test parameters across test boundaries for uniform data collection, scoring, analysis, and reporting purposes. Testers must have a clear understanding of their actual data needs because data collection can be a major expense. The PM must establish a common T&E database for the program**.**

5.16.1. **Common T&E Data Management.** The PM will establish a common T&E database as early as practical for all T&E data for the system under test. The goal is to leverage all available T&E knowledge about the system. A statement about data validity and a point of contact must be attached to each data batch. All program stakeholders will have access to T&E data on a need-to-know basis. Classified, proprietary, competition sensitive, and government-only data require restricted access. The ITT will ensure that any RFP or SOW supports inclusion of contractor T&E data as part of this database, as well as all T&E data from previous increments and real world operations. All testers must allow open data sharing and non-interference observation by other testers, the system developer, contractor, users, DOT&E, DASD(DT&E), and the PM.

5.16.2. **Tracking T&E Data.** All test teams establish rigorous data collection, control, accountability, and security procedures for T&E data. To avoid using questionable test data, test teams must verify the origin and integrity of any data used in final reports, i.e., whether the data came from contractors, DT&E, integrated testing, other Service OTAs, deployed assets used in real world operations, or dedicated Air Force operational tests. T&E data from deployed early prototypes used and evaluated in real world operations should be properly archived. See paragraphs **5.16.9**, **5.17**, **5.18**, and **6.9** for more information.

5.16.3. **Contractor T&E Data.** Test teams and TIPTs should use as much contractor T&E data as possible if its accuracy can be verified. Contractor T&E data should be visible in the common T&E database.

5.16.4. **Operational Testers.** Operational testers may use data from sources such as DT&E, integrated testing, and OAs to augment or reduce the scope of dedicated operational testing if the data can be verified as accurate and applicable. DOT&E review and approval of data sources is standard procedure for programs on Oversight.

5.16.5. **Joint Reliability and Maintainability Evaluation Team (JRMET).** The PM will establish a JRMET (or similar TIPT) to assist in the collection, analysis, verification, and categorization of reliability, availability, and maintainability (RAM) data. The JRMET may also review applicable DRs and recommend whether or not they should be closed. The PM or designated representative chairs the JRMET during DT&E; an operational test representative chairs during dedicated operational testing. **Note:** A Deficiency Review Board (DRB) is better for scoring software deficiencies than a JRMET. See paragraph **5.17.4** and TO 00-35D-54, Chapter 2.

5.16.6. **Periodic Review of Test Data.** The PM and testers describe in the TEMP how they will jointly review T&E data during the system development and sustainment phases. These should be periodic government-only reviews. For programs where AFOTEC is the lead operational tester, a Test Data Scoring Board may also be used.

5.16.7. **Timely Release of T&E Data.** All test teams will release validated test data and factual information according to paragraphs **7.3**, **7.4**, and **7.5** as soon as practical to other testers and stakeholders. Preliminary data may also be released, but must be clearly identified as such.

5.16.8. **Disclosing Test Data to Foreign Nationals.** The PM is responsible for recommending what test data or materials may be disclosed to foreign nationals. Use AFPD 16-2, *Operations Support, Disclosure of Military Information to Foreign Governments and International Organizations*, and AFI 61-204, *Disseminating Scientific and Technical Information*. See paragraphs **7.9** and **7.10** about the release and protection of test information.

5.16.9. **Data Archiving Strategy.** The ITT must develop a strategy for archiving key T&E information and data that have significant record value for permanent retention. Consider the system's importance and potential for future inquiries into test design, conduct, and how results were determined. Retain test plans, TEMPs, analyses, annexes, and related studies, in addition to final reports, to maintain a complete historical picture. DTIC is the normal repository for archived records.

5.17. Deficiency Reporting (DR) Process. All testers must plan for identifying deficiencies and enhancements and submitting DRs IAW AFI 63-501, *Air Force Acquisition Quality Program*. All Government testers will use the Joint Deficiency Reporting System (JDRS) described in TO 00-35D-54, Chapter 2, unless a waiver is approved IAW 1.15 of that TO. Directions for technical data deficiencies are in TO 00-5-1, *Air Force Technical Order System*. See additional information in paragraphs **6.8** and **6.9**

5.17.1. **Responsible Agent.** The PM has overall responsibility for establishing and administering a DR process and tailored procedures for reporting, screening, validating,

evaluating, tracking, prioritizing, and resolving DRs originating from all sources. A waiver must be obtained from HQ AFMC/A4UE if the required DR system is not used. If a contractor-based DR system is planned, the RFP and SOW must require the contractor's DR system to interface with the government's DR system.

5.17.2. **When to Start Reporting DRs.** The ITT determines the optimum time to begin submitting DRs to the government DR system, but not later than critical design review (CDR). DRs should be promptly reported once formal reporting begins; however, a Watch Item (WIT) tracking system may be used to ensure sufficient data are collected for accurate reporting. The contractor-based DR system may suffice for the early stages of development, but the government-based DR system must become the primary method of reporting and tracking DRs during government-conducted T&E.

5.17.3. **Accurate Categorization of DRs.** When submitting or screening DRs, all testers must ensure the DR's severity is accurately represented by assigning the proper category as defined in TO 00-35D-54. Government testers must clearly distinguish between DRs for deficiencies versus "nice-to-have" enhancements going beyond the scope of the system's operational requirements.

5.17.4. **DR Tracking and Management.** DT&E and OT&E test directors periodically convene a local DRB to review the prioritization, resolution, and tracking of all open DRs and WITs. The DT&E test director chairs the DRB during DT&E phases, and the OT&E test director chairs the DRB during OT&E phases. Both test directors, plus representatives from the PTOs and using MAJCOMs are members of the PM's MIPRB which provides final resolution of all DRs. The ITT periodically convenes a JRMET to review DRs focused on reliability, maintainability, and availability.

5.17.5. **Prioritizing DRs.** Prioritized DRs are used in preparation for certification of readiness for dedicated operational testing. If the PM cannot correct or resolve all Category I and II DRs before dedicated operational testing begins, or defers fixes for these DRs, operational testers and users must assess the impacts. The PM and ITT must reach agreement prior to certification of readiness for operational testing and develop a plan for resolution and subsequent testing.

5.17.6. **Classified DRs.** Since JDRS lacks capability to handle classified DRs, an alternative DR system may be necessary. The PM will establish and maintain procedures to manage classified or sensitive DRs IAW AFI 31-401, *Information Security Program Management.* Coordinate with the applicable program office representative before handling. Produce, handle, store, transmit and destroy classified documents according to the applicable program security classification guide.

5.18. DRs for Information Assurance Vulnerabilities. When addressing IA vulnerabilities for IT systems, use the impact codes and severity categories in DoDI 8510.01. Severity categories expressed as category (CAT) I, CAT II, and CAT III indicate the risk level associated with each security weakness and the urgency of completing corrective action. They are assigned after considering all possible mitigation measures that have been implemented within system design and architecture limitations (Residual Risk). Also see DoDI 8500.2 for details about selecting and implementing security requirements, controls, protection mechanisms, and standards.

5.18.1. DoDI 8510.01 assumes vulnerabilities (i.e., deficiencies) will be present and addressed on a continuing basis. These items are addressed via the IA Vulnerability Management Process (VMP) which is defined and tailored to the system as documented in the system C&A. These vulnerabilities are not necessarily reported using the TO 00-35D-54 reporting system.

5.18.2. Systems defined as platform information technology (PIT) are not required to follow DoDI 8510.01, but must still use DoDI 8500.2 or National Institute of Standards and Technology (NIST) Special Publication (SP) 800-53 rev 4, *Security and Privacy Controls for Federal Information Systems and Organizations*, as a basis for IA C&A. As with DIACAP, these C&A activities are a form of DR process for IA vulnerabilities as authorized according to AFI 33-210.

5.18.2.1. When a PIT system requires connection to a non-PIT system or network (i.e., system requiring DIACAP) in order to exchange information as part of the mission of the special purpose system, the IA requirements for the exchange must be explicitly addressed as part of the interconnection. This technical interconnection for network access to PIT is defined as a PITI. These interconnections are subject to DIACAP and AFCAP, focusing on the interconnection(s), not the PIT itself.

5.18.3. When assessing IA vulnerabilities as potential DRs, a separate DR is not needed for every identified control, shortfall, or finding. Depending on the severity, IA vulnerabilities should be logically grouped (e.g., protect, detect, respond, restore, confidentiality, integrity, or availability). A standard way of reporting vulnerabilities and when they qualify as a DR should be developed and described in the TEMP. One way of doing this is described in AFPAM 63-128, *Guide to Acquisition and Sustainment Life Cycle Management*, Section A6F, Table A6F.1, Software Severity Levels and Weights. Alternatively, use the following documents to assess risk for proper DR and vulnerability categorization: Committee on National Security Systems Instruction (CNSSI) 1253, *Security Categorization and Control Selection for National Security Systems*; NIST SP 800-30 rev 1, *Guide for Conducting Risk Assessments;* NIST SP 800-39, *Managing Information Security Risk*; and NIST SP 800-53A rev 1, *Guide for Assessing the Security Controls in Federal Information Systems and Organizations*.

5.18.4. IA vulnerabilities identified during DT&E and OT&E will be reported as observed potential vulnerabilities to the confidentiality, availability, integrity, authentication, and non-repudiation of a system. Some IA control vulnerabilities that rise to the level of a deficiency will equate to materiel solution defects (design and/or documentation) when they demonstrate or have potential for definitive mission impact. Ensure these vulnerabilities are documented, vetted, and tracked as a DR according to TO 00-35D-54, Chapter 2, as well as in the Plan of Actions and Milestones (POA&M).

5.19. Integrated Technical and Safety Reviews. Independent government technical and safety personnel examine the technical and safety aspects of T&E plans that involve government resources prior to commencement of test activities. All test organizations must establish procedures for when and how these reviews are accomplished. These groups function as necessary throughout the acquisition process until the system is demilitarized.

5.19.1. **Technical Reviews.** Technical reviews assess the soundness of system designs and test plans to reduce test risk. Technically qualified personnel with test management

experience, but who are independent of the test program, will perform these reviews. As a minimum, technical reviews will assess test requirements, techniques, approaches, and objectives. These reviews also ensure that environmental analyses have been completed as required by AFI 32-7061, *The Environmental Impact Analysis Process*, and 32 Code of Federal Regulations (CFR) Part 989. Appropriate parts should be referenced in the test plan.

5.19.2. **Safety Reviews.** Safety reviews assess whether the T&E project's safety plan has identified and mitigated all health and safety risks. Safety review members must be technically qualified and independent of the test program. Test organizations will eliminate or mitigate identified risks. All test organizations will set up procedures for controlling and supervising tests consistent with the risk involved and according to local range safety criteria. In addition, the PM will provide a Safety Release to the LDTO or OTO prior to any testing involving personnel IAW DoDI 5000.02, Enclosure 6. Also see AFI 91-202, *The US Air Force Mishap Prevention Program*. Mishap accountability must be clearly established IAW AFI 91-204, *Safety Investigations and Reports,* prior to conducting tests.

5.19.3. **Nonnuclear Munitions Safety Board (NNMSB).** The NNMSB reviews and approve all newly developed live, uncertified munitions, fuses, and initiating devices prior to airborne testing or release IAW AFI 91-205, *Nonnuclear Munitions Safety Board*.

5.19.4. **Directed Energy Weapons Certification Board (DEWCB).** The DEWCB reviews and certifies all directed energy weapons prior to operational, test and training use IAW AFI 91-401, *Directed Energy Weapons Safety*.

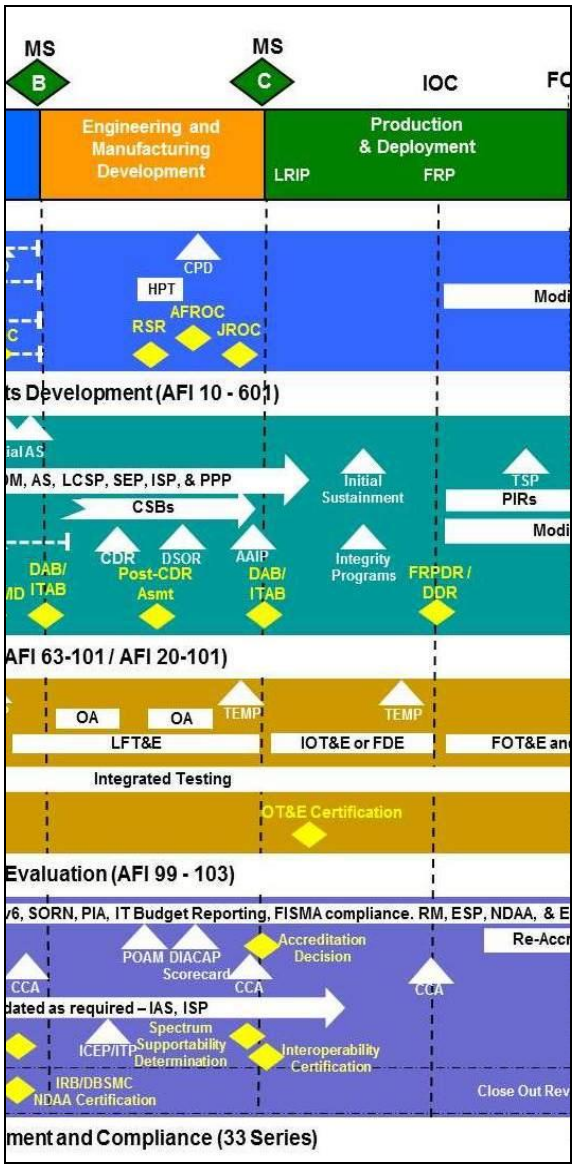
5.20. Test Deferrals, Limitations, and Waivers. A test deferral is the movement of testing and/or evaluation of a specific CTP, operational requirement, or COI to a follow-on increment or test activity (e.g., FOT&E). A test limitation is any condition that hampers but does not preclude adequate test and/or evaluation of a CTP, operational requirement, or COI during a T&E program. The ITT documents test deferrals and test limitations in the TEMP and test plans. Test limitations and test deferrals do not require waivers, but must be described in the TEMP and test plans, to include, in the case of a deferral, a revised timeline for decisions and reports. These test limitations and deferrals are considered approved when the TEMP or test plan is approved. Waivers are the deletion of specific mandatory items; waivers for not conducting OT&E will not be approved when OT&E is mandated by statute or this AFI. See Attachment 1 for definitions and paragraph **6.4.3** for more details.

Chapter 6

T&E ACTIVITIES IN SUPPORT OF MILESTONE C AND BEYOND

6.1. Post MS B. The most important activities after the MS B decision and during the EMD and Production and Deployment phases are shown in **Figure 6.1**. This chapter focuses on test execution supporting the MS C, FRP, and fielding decisions. Sustained, high quality tester activity and collaboration with all program stakeholders must continue. The ITT and individual test teams implement integrated test plans and activities and report T&E results to decision makers.

Figure 6.1. Integration of Requirements, Acquisition, IA, and T&E Events Supporting MS C and Beyond.



6.2. Refining the ITC in the TEMP. The ITT should continue refining the ITC within the TEMP to support the development of test plans that are integrated. Building on the work done in previous TES and TEMP documents, continue refining the COIs, CTPs, test objectives, MOEs, MOSs, MOPs, resources, and schedules as necessary. Test teams continue planning for execution of test plans that are integrated, covering as many DT&E, operational, and IA test objectives as possible prior to dedicated operational testing. A series of OAs should be integrated into the test program to reduce program risk. T&E and systems engineering practitioners use STAT methodologies to optimize the overall number of test events and test articles without compromising test objectives. Tester activities during the EMD phase and beyond help identify performance shortfalls and other areas that could cause unintended increases in development, operations, and life cycle costs. The ITC should describe M&S tools and DSMs for test design, systems engineering, and data evaluation, and how these supplement, augment, and extrapolate empirical T&E data wherever practical.

6.3. Developing Test Plans That Are Integrated. The ITC integrates all individual contractor and government test plans into a linked series of evaluations compatible in objectives, schedule, and resources. These plans are focused on the current increment, with follow-on increments described in lesser detail. A single program test plan is not required. The ITT must plan for OAs intermingled with operationally relevant DT&E to produce increasing amounts of operationally relevant data within each increment.

6.3.1. **Operational Assessments.** One or more OAs should be planned and conducted early enough in the EMD phase to provide operational inputs to requirements and system development prior to MS C. OAs must be tailored to emphasize an integrated testing approach for assessing system capabilities in preparation for dedicated operational testing.

6.3.2. **Integrated Testing.** Test plans that are integrated should support each increment with DT&E and one or more OAs if appropriate. OAs should be planned to assess and describe system maturity, and system capabilities and limitations with respect to the operational requirements and enabling and operating concepts for that increment. Timely, credible, and continuous feedback must be provided to developers, users, and decision makers. These plans should address as many of the COIs, MOEs, and MOSs as possible before dedicated operational testing begins.

6.3.3. **Specialized Testing.** Any required specialized types of T&E described in **Table 2.2** should be completed by MS C. These tests should be designed to support dedicated operational testing that concentrates on mission impacts and unanswered COIs, MOEs, MOSs, and MOPs. The dedicated operational test plan may use operationally relevant data collected during previous testing to verify system capabilities in the approved CPD for the fielded item.

6.4. Realistic Testing. This AFI implements DoDI 5000.02 and 10 U.S.C. § 2399 which require the conduct of realistic operational tests in a realistic operational environment, using production representative articles, to evaluate a system's overall effectiveness and suitability, and to assess impacts to wartime and peacetime operations. See descriptions of operational testing in paragraph **2.5** and the *DAG*, Chapter 9.

6.4.1. **Limitations on Use of M&S.** Dedicated OT&E will not be based solely on computer modeling, simulation, or an analysis of system requirements, engineering proposals, design specifications, or any other information contained in program documents. M&S tools and DSMs must receive sufficient VV&A IAW AFI 16-1001, AFI 63-101/20-101, and AFI 14-206, *Modeling and Simulation*.

6.4.2. **Virtual Test Environment**. Systems with large IT content and DBS should use a "virtual" environment whenever possible that emulates real-world networks and threats.

6.4.3. **Deferment of Operational Testing.** Operational testers will not defer testing of any KPPs, COIs, or operational requirements to future increments unless planned for in the Acquisition Strategy and ITC portion of the TEMP. If an unplanned deferral is unavoidable at the MS C or FRP decision, the PM will consult with the using command and requirements authorities to decide on the best strategy for completing the deferred testing. The decision is documented in an approved ADM and TEMP, and an OT&E waiver is not required. See paragraphs **5.14** and **5.20**.

6.4.4. **Support of AFOTEC-Conducted Operational Testing.** MAJCOM operational units, test centers, complexes, and other DT&E organizations may be requested to support AFOTEC-conducted operational testing. This support is documented in TEMPs, TRPs, ITT charters, test plans, MOAs, and directed in MAJCOM test project orders. AFOTEC prepares TRPs in time to budget during the POM cycle.

6.4.5. **Tests Involving Personnel.** If personnel are used as test subjects, the level of risk to the person must be documented IAW DoDI 3216.02, *Protection of Human Subjects and Adherence to Ethical Standards in DoD-Supported Research*. The PM will provide a Safety Release to the LDTO and/or OTO prior to any testing involving personnel. See DoDI 5000.02, Enclosures 6 and 12, and AFMAN 63-119, Attachment 25, for additional information.

6.5. Certification of System Readiness for Dedicated Operational Testing. The PM will implement the Certification of System Readiness for Dedicated Operational Test review process described in AFMAN 63-119 as early as practical during the EMD phase. Developmental and operational testers participate and assist the PM in preparation for OT&E, and carrying out responsibilities as agreed. The readiness certification is mandatory for reviewing all programs on the OSD T&E Oversight List, and all programs on the Air Force Acquisition Master List (AML). Sustainment programs and other acquisition projects falling below the AML threshold are highly encouraged to follow this process; however, the OT&E certification can be tailored to suit the scope and criticality of the program. The process and reporting of results may be tailored to suit program objectives as long as they comply with the requirements of AFMAN 63-119. See DoDI 5000.02, Enclosure 6, for additional requirements.

6.5.1. **The OT&E Certification Official.** For programs on the OSD T&E Oversight List, DoDI 5000.02 requires the SAE to determine system readiness for IOT&E. For other programs, the MDA is the OT&E Certification official. The SAE or MDA may delegate this authority (via Acquisition Decision Memorandum) to the responsible PEO. OT&E Certification Officials for smaller programs originating at MAJCOM or Center levels may be delegated to a subordinate level as appropriate. Under no circumstance shall a PM be the OT&E Certification Official for his/her own program. The OT&E Certification Official determines the overall scope and schedule for the operational test readiness review and

certification process IAW AFMAN 63-119, Chapter 1. The Certification Official and the planned implementation of the certification process will be identified in the TEMP.

6.5.2. **The Readiness Certification Process.** To be certified ready for dedicated operational testing, the system must be mature, production and operationally representative; demonstrate stabilized performance in an operationally relevant environment; and all necessary test support must be available as planned. The certification process must be a continuous effort, not a single event in time. Multiple reviews at logical waypoints in a program are strongly encouraged such as prior to each OA and milestone decision point. COIs, MOEs, MOPs, and MOSs must be reviewed for relevance and achievability before entering dedicated OT&E. The system must have a high likelihood of a successful operational test. Identified shortfalls will be remedied before dedicated operational testing starts or work-around solutions will be developed, negotiated and documented between the PM, user, and operational testers. An automated certification process tracking tool for all templates is available on the AF/TE portion of the Air Force Portal. Modify this tool as needed to match any changes made to the templates.

6.5.3. **Assessment of Operational Test Readiness (AOTR).** DASD(DT&E) conducts an AOTR for programs on the OSD DT&E Oversight List. The PM should work with the DASD(DT&E) representative on the ITT to synchronize conduct of the final AFMAN 63-119 certification review and AOTR to avoid duplication of effort.

6.5.4. **Final Certification of Readiness for Dedicated Operational Testing.** Final certification review and briefing of system readiness must be completed approximately 45 calendar days prior to the planned start of dedicated operational testing to allow time for last minute program adjustments or deficiency corrections. This time may be shorter if the PM and operational testers mutually agree. Certification requires a formal briefing to the OT&E Certification Official. The briefing shall address DT&E results, conclusions, recommendations, identified deficiencies and workarounds, and an assessment of the system's capability to meet operational requirements. AFMAN 63-119 will be used as a guide to structure the briefing and demonstrate readiness. Both operational testers and developmental testers are represented at the briefing. The briefing shall inform the OT&E Certification Official of any outstanding disagreements between the OTO, user, and the PM. The OT&E Certification Official forwards a certification of readiness memo to the OTO commander at least 15 days prior to the start of dedicated operational testing, or as agreed.

6.5.5. **OT&E Readiness Agreement.** The PM, user, and operational testers must coordinate regularly throughout the system's development to address OT&E readiness shortfalls. PMs, jointly with their OT&E counterparts, shall provide the OT&E Certification Official detailed mitigation strategies for open shortfalls found during DT&E, and will identify outstanding disagreements on OT&E readiness between the OTO, user, and the program office prior to the formal certification briefing. The OT&E Certification Official is responsible for weighing all factors before certifying readiness, and it is the PM's responsibility to ensure the OT&E Certification Official is made fully aware of all areas of OTO, user, and program office concern. In all cases, identified shortfalls must be either remedied before dedicated operational testing starts, or mitigated via agreement or workarounds negotiated between the PM, user, and operational testers. If necessary, the OT&E Certification Official and OTO equivalent counterpart shall negotiate and plan the OT&E way forward before formalizing the certification of readiness memo. If agreement

cannot be reached at this point, outstanding issues may be elevated to SAF/AQ and AF/TE for final resolution.

6.5.6. **Considerations for Early Deployment of Prototypes**. Use the applicable certification templates in AFMAN 63-119 to review the system's capabilities and limitations prior to early operational deployment of prototypes, UONs, JEONs, QRCs, and JCTDs.

6.5.7. **Certification for Systems with Multiple Increments or Releases.** If a system is fielded in multiple releases or increments (common with IT and software intensive systems), then the PM ensures the OT&E Certification Official provides a certification of readiness to the OTO commander prior to the decision to go to each independent operational test event. The certification should be tailored to and pertain specifically to the planned release of capability. For example, IT systems using rapid release methodologies may substantially compress their certification schedule and reduce the number of certifications and templates reviewed. Releases may require substantially less time and effort than an increment.

6.6. Plans and Briefings for Operational Testing. DOT&E requires operational testers (i.e., the OTA) to submit written plans and present briefings as discussed below for programs on OSD OT&E Oversight. The information requirements below apply in full to AFOTEC and MAJCOMs unless DOT&E relief is documented. See **Attachment 2** for a summary.

6.6.1. **Operational Test Concept Briefings.** DOT&E requires a test concept briefing a minimum of 180 days before the start of dedicated operational tests for programs on OSD OT&E Oversight IAW DoDI 5000.02. AF/TEP will arrange for corporate Air Force-level reviews of test concept briefings. User and developer representatives are required to attend these briefings. For multi-Service programs, the other Services will also be invited. A pre-brief to the Air Staff is required before going to DOT&E and should be coordinated through AF/TEP. DOT&E may elect to defer this requirement and accept a later briefing of the final operational test plan in lieu of the test concept briefing. Operational test concept briefings for OAs should be presented a minimum of 180 days before test start for programs on OSD T&E Oversight. No briefings are required to OSD for non-Oversight programs.

6.6.2. **Operational Test Plans and Test Plan Briefings.** An operational test plan is due to DOT&E a minimum of 60 days prior to test start. DOT&E may request, or the OTO may elect, to present a briefing to accompany the final test plan. This briefing will be coordinated the same way as an operational test concept briefing.

6.7. OSD Involvement. Programs on DT&E, LFT&E, and/or OT&E Oversight remain under continuous OSD surveillance through fielding and into sustainment until removal from the OSD T&E Oversight List. The ITT must be prepared for additional briefings to OSD and test plan approvals as described in paragraph **4.7**. Additional briefings requested by DOT&E should be routed through AF/TEP before submission to OSD. The information required for OSD T&E Oversight programs is summarized in **Attachment 2**.

6.8. Operational Tester DR Responsibilities. Prior to the FRP decision review, operational testers and users complete a final prioritization of all open DRs for resolution and funding. The MAJCOM's priorities must be used for rank-ordering these DRs. The final priorities are forwarded to the PM to help direct corrective actions and will be listed in the final report.

6.9. Tracking and Closing DRs. Not all open DRs may receive funding or be corrected after a system is accepted for operational use. The database of open DRs may provide the only

documentation of unsatisfactory conditions or worthwhile system enhancements. At no time will the program office unilaterally close or downgrade DRs without formal consultation with the originating test organization and MAJCOM project officer. MAJCOM project officers must continue to track open DRs until they are corrected, or the MAJCOM concurs with closing them.

6.10. Integrated Testing During Sustainment and Follow-on Increments. Follow-on increments and modifications continue in parallel with and subsequent to acquisition of the first increment. OT&E is required for each increment of capability prior to release to the user. This testing is structured according to the program's Acquisition Strategy, TEMP, and updated requirements documents.

6.10.1. The existing ITT should continue functioning to ensure continuity of acquisition and T&E operations. All areas of the ITT charter should be carefully reviewed and modified as necessary.

6.10.2. The T&E activities described in **Chapters 4**, **5**, and **6** must be tailored for risk, new or revised JCIDS requirements, and other factors, and repeated as needed during the Operations and Support phase. Testers should capitalize on previously completed work products, TTP, analyses, results, and lessons learned, thus eliminating redundant testing and work. Sustainment acquisitions, to include support equipment and Form, Fit, Function, and Interface (F3I) replacements, require FRP or fielding decisions and an appropriate type of operational testing.

6.11. Disposing of Test Assets. Test assets (e.g., instrumentation and test articles) from canceled or completed tests are catalogued and returned to government T&E organizations or acquisition or sustainment programs, or refurbished and reassigned to owning MAJCOMs. Surplus or unusable items are sent to the applicable Defense Reutilization Management Office.

6.12. OT Reporting on Fielding of Prototypes or Pre-Production Systems. Warfighter operational needs may require rapid and/or early fielding of new capabilities. This may result in early operational use of prototypes, technology demonstration systems, test articles, or pre-production systems prior to the completion of required dedicated operational testing and formal production decisions. In these situations, the OTO (as determined in paragraph **4.6**) may opt to produce a C&L Report to inform the warfighter and fielding decision authorities. The C&L Report provides the most current operational test perspective on developmental system capabilities and limitations based on testing done to date. See paragraph **7.5** for more information about C&L Reports.

Chapter 7

TEST AND EVALUATION REPORTING

7.1. General Reporting Policy. Test reports must be timely, factual, concise, and tailored to the needs of decision makers. They should be delivered in time to support the designated milestone or decision review. All T&E plans describe which kinds of reports are required, their contents, and when and to whom they are submitted. All test reports contain evaluations of test results and conclusions. Additional findings, considerations, and recommendations are not required but may be included if deemed appropriate. All reports must be properly archived and retrievable for future use. Reporting requirements for programs on OSD T&E Oversight are summarized in **Attachment 2**. All days are "calendar days" unless otherwise stated.

7.2. DT&E Reports. The types and frequency of DT&E reports are tailored to meet decision makers' requirements as documented in the TEMP and test plan. DT&E data and analytic support (i.e., "reports") must be provided to the program decision review process to certify the system ready for dedicated IOT&E. LFT&E reports must be submitted to DOT&E 45 days prior to the beyond-LRIP decision review. The PM documents requirements for contractor test reports in the CDRL. Formal briefings are generally not required.

7.3. DT&E Report Distribution. The ITT will develop a distribution list for all DT&E reports which includes operational testers, PTOs, applicable MAJCOMs, AF/TE, and DTIC. DT&E reports are not releasable to non-government agencies without prior approval and coordination of the PM. Release of contractor test reports may be subject to restrictions in the contract. For OSD T&E Oversight programs, the PEM will send a copy through appropriate channels to DASD(DT&E) and DOT&E if required.

7.4. Operational Test Reports.

7.4.1. **Significant Test Event Reports.** These reports briefly describe the results of significant test events during operational test activities. Operational testers submit these reports to the appropriate agencies (e.g., PM, CDT, LDTO, PTOs, operational MAJCOM, PEM, PEO, AF/TE, and/or DOT&E, depending upon level of interest in the program) within 24 hours of any significant test event as described in the test plan.

7.4.2. **Final Reports.** Final reports should normally be delivered not later than 30 days prior to the supported decision in order to provide adequate time for review. Delivery timelines may be tailored to accommodate accelerated test schedules for specific user needs if coordinated with the decision review authority. Reports must address each of the COIs, the system's operational effectiveness and suitability. These reports must strike the proper balance between system capabilities and limitations while taking into account how well the system performed mission essential tasks. When appropriate, a production or fielding recommendation may be included for IOT&E, QOT&E, FOT&E, OUE, SOTR, and FDE final reports. All Category I DRs and the most important Category II DRs will be listed. Detailed technical information should be published in separate data documents. Final report briefings are provided to HQ USAF staff and OSD as requested.

7.4.3. **Interim Reports.** Decision makers may require written information about T&E results during execution of an ongoing test plan. Use these types of interim reports depending on the need.

7.4.3.1. **Status Reports.** A status report provides updates and important test findings during operational testing. Status report format and content are flexible. Status reports are normally very short (no more than several pages) and should not be written as a mini final report. It may be periodic (monthly, quarterly, or as required), associated with specific (planned test) events, or in response to an external organization or agency request for test status. Status reports may be used to inform fielding decisions associated with each release when an OT&E, OUE, or OA report is not required or applicable. The operational test plan should document the requirements for a status report to include the frequency and distribution for periodic status reports.

7.4.3.2. **Interim Summary Reports.** If the final report cannot be ready in time to support a key decision, the decision authority may instead accept a written interim report or a formal briefing. For oversight programs, AF/TE will help establish a new report due date. If a briefing is used, a separate written interim summary report is not required. Any additional data collected is added to the final report when available.

7.4.4. **MOT&E Final Reports.** The lead OTO prepares a single MOT&E final report aggregating all OT&E information from the participating Services' inputs. Each participating Service has the option of preparing its own supplemental report as an attachment to the single MOT&E report. All significant differences between Service test results should be explained. This guidance also applies to testing with other DoD or Federal agencies. See the *Memorandum of Agreement on Multi-Service Operational Test and Evaluation (MOT&E)*. Final MOT&E reports are required 45 days prior to the decision review. Briefings will be provided to HQ USAF staff and OSD as requested.

7.4.5. **Reporting SOTR Results.** Each MAJCOM may develop its own SOTR report format as needed. All conclusions and related recommendations based on the SOTR will be formally documented. All data and data sources used to conduct the SOTR should be identified. See paragraphs **2.5.11** and **4.6.6.3**.

7.5. Capabilities and Limitations (C&L) Reports. While not mandatory, the C&L report is appropriate when a system or prototype is provided to units for training in preparation for fielding, or when the system is deployed directly to an operational unit. A C&L report may also be appropriate to support MAJCOM UON or JEON requests, combat capability documents (CCD), or WRAP proposals. To ensure maximum flexibility, C&L reports have no prescribed format. The level of detail provided varies depending on the amount of pre-existing information available, the warfighter's need for technical information, and the amount of time and resources available to conduct additional testing before the fielding decision. The C&L report should not make specific recommendations concerning the system fielding decision or release for training purposes. This report may be provided to DOT&E to support their requirement in 10 U.S.C. § 2399 for an early report to Congress.

7.5.1. C&L reports are based on existing, verifiable T&E data (contractor, developmental, and operational) derived from all available system development, ground, and flight test activities. The goal is to help warfighters gain early knowledge of potential operational effectiveness and suitability of systems that have not yet completed dedicated operational testing. Release of a C&L report does not obviate the requirement for dedicated OT&E. Six months after publication of the C&L report, the OTO should review program status to

determine whether an updated C&L report is necessary. C&L reports will not drive new testing requirements for a system.

7.5.2. All relevant data sources used to develop the C&L report should be identified. Include a program description and a summary of the current phase of formal system testing. The report should identify observed system capabilities and limitations and describe any areas of untested or unknown capabilities. Suitability observations, interoperability considerations, and IA issues should also be included. The type and scope of planned, but not yet accomplished, testing should also be described. If time is available for a dedicated operational test event such as an OUE, then that alternative would obviate the need for a C&L report. If an operational test event is in progress or recently completed, a status report or interim summary report may be more appropriate.

7.6. Operational Test Report Distribution. Operational testers send reports to the program stakeholders and DTIC as determined by the ITT. For OSD OT&E Oversight programs, AF/TE will forward copies to DOT&E and DASD(DT&E). A summary of operational test reporting requirements is in **Attachment 2**.

7.7. Electronic Warfare (EW) Programs. All EW programs on OSD T&E Oversight are required to annually report their progress in implementing the DoD T&E Process for EW Systems IAW P.L. 103-160 § 220(a). PMs and test organizations for these programs provide T&E information to AF/TEP according to **Attachment 2**. AF/TEP will consolidate information in coordination with AF/A5RE before submitting to DASD(DT&E).

7.8. Briefing Trail. AF/TE will arrange for Air Force-level review(s) of test report briefings. For multi-Service programs, the other participating Services will be invited to the briefing. The PM must be prepared to address technical questions, program issues, DT&E, and the resolution of deficiencies. Users must be available to answer questions regarding operational requirements and mission impacts of fielding the system.

7.9. Distributing and Safeguarding Test Information.

7.9.1. **Within the DoD.** Test organization commanders determine release authority for data, reports, and information under their control. Classified test information cannot be released except as specified in DoDI 5200.01, *DoD Information Security Program and Protection of Sensitive Compartmented Information*, and associated documents.

7.9.2. **Outside the DoD.** Test directors do not have release authority for test information and communications outside DoD channels. Freedom of Information Act requests should be processed IAW DoD5400.7-R_AFMAN 33-302, *Freedom Of Information Act Program*. Test information released to Congress, the General Accountability Office, the DoD Inspector General, or similar agencies must follow guidance in AFI 90-401, *Air Force Relations With Congress*, and AFI 65-401, *Relations With The Government Accounting* [*sic*] *Office (GAO)*. SAF/IAPD, the Disclosure and Technology Transfer Division, is the designated Air Force disclosure authority for release of classified and controlled unclassified weapons systems, technologies and information to foreign governments and international organizations in support of Air Force, DoD and commercial international programs.

7.10. Information Collection and Records.

7.10.1. No information collections are created by this publication.

7.10.2. Program records created as a result of the processes prescribed in this publication are maintained according to paragraph **5.16.9** and AFMAN 33-363, and disposed of IAW the Air Force Records Disposition Schedule (RDS) located in the Air Force Records Information Management System (AFRIMS).

RANDALL G. WALDEN
Director, Test and Evaluation

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

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Prescribed Forms

No forms are prescribed by this publication.

Adopted Forms

AF Form 847, *Recommendation for Change of Publication*.

Abbreviations and Acronyms

ACAT—Acquisition Category

ADM—Acquisition Decision Memorandum

AF—Air Force

AF/TE—Directorate of Air Force Test and Evaluation

AF—NNSA—Air Force-National Nuclear Security Administration

AFAMS—Air Force Agency for Modeling and Simulation

AFCAP—Air Force Certification and Accreditation Program

AFDD—Air Force Doctrine Document

AFI—Air Force Instruction

AFICE—Air Force Integrated Collaborative Environment

AFMAN—Air Force Manual

AFMC—Air Force Materiel Command

AFMD—Air Force Mission Directive

AFMSRR—Air Force Modeling and Simulation Resource Repository

AFOTEC—Air Force Operational Test and Evaluation Center

AFPAM—Air Force Pamphlet

AFPD—Air Force Policy Directive

AFRIMS RDS—Air Force Information Management System Records Disposition Schedule, https://www.my.af.mil/afrims/afrims/afrims/rims.cfm

AFROC—Air Force Requirements Oversight Council

AFSIT—Air Force System Interoperability Testing

AFSPC—Air Force Space Command

AFSSI—Air Force Systems Security Instruction

AML—Acquisition Master List

Ao—Operational Availability

AoA—Analysis of Alternatives

AOTR—Assessment of Operational Test Readiness

APDP—Acquisition Professional Development Program

ASD—Agile Software Development

ATD—Advanced Technology Demonstration

ATEC—Army Test and Evaluation Command

ATO—Authorization to Operate

C&A—Certification and Accreditation

C&L—Capabilities and Limitations

CAE—Component Acquisition Executive

CAT—Category

CCA—Clinger-Cohen Act

CCD—Combat Capability Document

CDD—Capability Development Document

CDR—Critical Design Review

CDRL—Contract Data Requirements List

CDT—Chief Developmental Tester

CFR—Code of Federal Regulations

CIO—Chief Information Officer

CJCSI—Chairman of the Joint Chiefs of Staff Instruction

CNA—Computer Network Attack

CNSSI—Committee on National Security Systems Instruction

COA—Course of Action

COCOM—Combatant Command

COI—Critical Operational Issue

CONOPS—Concept of Operations

COTS—Commercial-Off-The-Shelf

CPD—Capability Production Document

CSAF—Chief of Staff of the Air Force

CTF—Combined Test Force

CTP—Critical Technical Parameter

DAG—Defense Acquisition Guidebook

DASD(DT&E)—Deputy Assistant Secretary of Defense for Developmental Test and Evaluation

DASD(SE)—Deputy Assistant Secretary of Defense for Systems Engineering

DAU—Defense Acquisition University

DBS—Defense Business Systems

DEWCB—-Directed Energy Weapons Certification Board

DIACAP—DoD Information Assurance Certification and Accreditation Process

DIP—DIACAP Implementation Plan

DoD—Department of Defense

DoDD—Department of Defense Directive

DoDI—Department of Defense Instruction

DOT&E—Director, Operational Test and Evaluation

DOTMLPF—Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities

DR—Deficiency Report or Deficiency Reporting

DRB—Deficiency Review Board

DRU—Direct Reporting Unit

DSM—Digital System Model

DSOR—Depot Source of Repair

DT&E—Developmental Test and Evaluation

DTIC—Defense Technical Information Center

EA—Evolutionary Acquisition

e.g.—for example

etc.—Et cetera (meaning “and so forth” or “and the like”)

ELA—Elevated Level of Assurance

EMD—Engineering and Manufacturing Development

EMSEC—Emission Security

EOA—Early Operational Assessment

EW—Electronic Warfare

EWIR—Electronic Warfare Integrated Reprogramming

FAT—First Article Test

FCT—Foreign Comparative Testing

FDE—Force Development Evaluation

F3I—Form, Fit, Function, and Interface

FMP—Foreign Materiel Program

FMR—Financial Management Regulation

FOA—Field Operating Agency

FOC—Full Operational Capability

FOT&E—Follow-on Operational Test and Evaluation

FRP—Full-Rate Production

FRPDR—Full-Rate Production Decision Review

GAO—Government Accountability Office

GFE—Government Furnished Equipment

HAF—Headquarters Air Force

HAFMD—Headquarters Air Force Mission Directive

HERO—Hazards of Electromagnetic Radiation to Ordnance

HPT—High Performance Team

HQ—Headquarters

IA—Information Assurance

IAW—In Accordance With

ICD—Initial Capabilities Document

ICEP—Information Certification Evaluation Plan

i.e.—that is

ILCM—Integrated Life Cycle Management

IOC—Initial Operational Capability

IOT&E—Initial Operational Test and Evaluation

IPT—Integrated Product Team

IRB—Investment Review Board

ISP—Information Support Plan

IT—Information Technology

ITAB—Information Technology Acquisition Board

ITC—Integrated Test Concept

ITP—Integrated Test Plan

ITT—Integrated Test Team

JCIDS—Joint Capabilities Integration and Development System

JCS—Joint Chiefs of Staff

JCTD—Joint Capability Technology Demonstration

JDRS—Joint Deficiency Reporting System

JEON—Joint Emergent Operational Need

JITC—Joint Interoperability Test Command

JMETC—Joint Mission Environment Test Capability

JP—Joint Publication

JRMET—Joint Reliability and Maintainability Evaluation Team

JROC—Joint Requirements Oversight Council

JUON—Joint Urgent Operational Need

JT&E—Joint Test and Evaluation

KIP—Key Interface Profile

KLP—Key Leadership Position

KPP—Key Performance Parameter

KSA—Key System Attribute

LAT—Lot Acceptance Test

LCSP—Life Cycle Sustainment Plan

LDTO—Lead Developmental Test and Evaluation Organization

LFT&E—Live Fire Test and Evaluation

LRIP—Low-Rate Initial Production

M&S—Modeling and Simulation

MAIS—Major Automated Information System

MAJCOM—Major Command

MCOTEA—Marine Corps Operational Test and Evaluation Agency

MDA—Milestone Decision Authority

MDAP—Major Defense Acquisition Program

MDD—Materiel Development Decision

MIL—HDBK—Military Handbook

MIPRB—Materiel Improvement Program Review Board

MOA—Memorandum of Agreement

MOE—Measure of Effectiveness

MOP—Measure of Performance

MOS—Measure of Suitability

MOT&E—Multi-Service Operational Test and Evaluation

MRTFB—Major Range and Test Facility Base

MS—Milestone

MSA—Materiel Solution Analysis

MUA—Military Utility Assessment

NDAA—National Defense Authorization Act

NDI—Non-Developmental Item

NIST—National Institute of Standards and Technology

NNMSB—Nonnuclear Munitions Safety Board

NR—KPP—Net-Ready Key Performance Parameter

NSS—National Security System

O&M—Operations and Maintenance

OA—Operational Assessment

OCR—Office of Collateral Responsibility

OFP—Operational Flight Program

OPR—Office of Primary Responsibility

OPTEVFOR—Operational Test and Evaluation Force

OSD—Office of the Secretary of Defense

OT&E—Operational Test and Evaluation

OTA—Operational Test Agency

OTO—Operational Test Organization

OUE—Operational Utility Evaluation

PAT&E—Production Acceptance Test and Evaluation

PDR—Preliminary Design Review

PEM—Program Element Monitor

PEO—Program Executive Officer

PIA—Privacy Impact Assessment

PIR—Post-Implementation Review

PIT—Platform Information Technology

P.L.—Public Law

PM—Program Manager

PMD—Program Management Directive (term deleted)

POA&M—Plan of Actions and Milestones

POC—Point of Contact

POM—Program Objective Memorandum

PPP—Program Protection Plan

PPQT—Pre-Production Qualification Test

PQT—Production Qualification Test

PTO—Participating Test Organization

QOT&E—Qualification Operational Test and Evaluation

QRC—Quick Reaction Capability

QRF—Quick Reaction Fund

QT&E—Qualification Test and Evaluation

R&D—Research and Development

RALOT—Risk Assessment Level of Test

RAM—Reliability, Availability, and Maintainability

RDS—Records Disposition Schedule

RDT&E—Research, Development, Test, and Evaluation

RFP—Request for Proposal

RRF—Rapid Reaction Fund

RSR—Requirements Strategy Review

RTO—Responsible Test Organization (now obsolete)

§—section

S&T—Science and Technology

SecDef—Secretary of Defense

SAE—Service Acquisition Executive

SAF/AQ—Assistant Secretary of the Air Force (Acquisition)

SAP—Special Access Program

SEP—Systems Engineering Plan

SF—Standard Form

SIMCERT—Simulator Certification

SIMVAL—Simulator Validation

SIP—System Information Profile

SMC—Space and Missile Systems Center

SOO—Statement of Objectives

SORN—System of Record Notice

SOTR—Sufficiency of Operational Test Review

SOW—Statement of Work

SP—Special Publication

SRD—System Requirements Document

STAT—Scientific Test and Analysis Techniques

STP—Space Test Program

T&E—Test and Evaluation

TD&E—Tactics Development and Evaluation

TDS—Technology Development Strategy

TEMP—Test and Evaluation Master Plan

TES—Test and Evaluation Strategy

TIPT—Test Integrated Product Team

TO—Technical Order

TPM—Technical Performance Measure

TRP—Test Resource Plan

TSP—Transfer Support Plan

TTP—Tactics, Techniques, and Procedures

UC—Unified Capabilities

UID—Unique Identification Number

UON—Urgent Operational Need

USAF—United States Air Force

USAFWC—United States Air Force Warfare Center

U.S.C.—United States Code

USD(AT&L)—Under Secretary of Defense (Acquisition, Technology, and Logistics)

VV&A—Verification, Validation, and Accreditation

VMP—Vulnerability Management Process

WIPT—Working-level Integrated Product Team

WIT—Watch Item

WRAP—Warfighter Rapid Acquisition Process

WSEP—Weapons System Evaluation Program

www—World Wide Web

Terms

Note:—A common understanding of terms is essential to effectively implement this instruction. In some cases, definitions from multiple sources are offered where they may be of value. **"Notes"** and italicized words in brackets at the end of definitions are not an official part of that definition, and are added for clarity for information only.

Note: For additional terms and definitions not listed below, see Joint Publication (JP) 1—02, *Department of Defense Dictionary of Military and Associated Terms,* and Air Force Doctrine Document (AFDD) 1-2, *Air Force Glossary,* which contain standardized terms and definitions for DoD and Air Force use. Also see *Test and Evaluation Management Guide,* 5th edition, Defense Acquisition University (DAU) Press.

Note: See AFI 10—601 and AFI 63-101/20-101 for definitions of terms relating to the requirements and acquisition processes.

Acquisition Category (ACAT)—Acquisition categories determine the level of review, decision authority, and applicable T&E policies and procedures. They facilitate decentralized decision making and execution, and compliance with statutorily imposed requirements. (*See DoDI 5000.02, Enclosure 2 for details.*)

Agile Release—(1) The act of issuing a software version for publication, use, or distribution as a result of agile software development. (2) A new release of a software program.

Agile Software Development (ASD)—(1) A group of software development methodologies based on iterative and incremental development where requirements and solutions evolve through highly collaborative, self-organizing, cross-functional teams. (2) An iterative development approach that focuses on mature technologies, continuous testing, test-driven development, continuous user involvement and requirements definition, and rapid early fielding of working functionality.

Availability (Ao)—A measure of the degree to which an item is in the operable and committable state at the start of a mission when the mission is called for at an unknown (random) time. (*DAG*)

BIG SAFARI—The 645th Aeronautical Systems Group (also known as the BIG SAFARI Program) executes sensitive United States Government and foreign military sales programs in support of high priority, rapid-requirement, and urgent operational needs by direction of the

Assistant Secretary of the Air Force for Acquisition (SAF/AQ). BIG SAFARI is responsible for total life cycle ownership over those assigned programs and projects, and functions as PM with LDTO and OTO responsibilities to support Operational Safety, Suitability, and Effectiveness objectives in coordination with the ultimate end user.

Capabilities and Limitations (C&L) Report—An optional, quick-look report of limited scope that operational testers provide to operational units to support rapid and/or early fielding of developing capabilities before dedicated operational testing is complete and formal production begins. It provides the most current operational test perspectives on system capabilities and limitations based on testing done to date, and describes any untested or unknown areas.

Capability—Based Testing—A mission-focused strategy for T&E for verifying that a capabilities solution will enable operations at an acceptable level of risk. Capabilities-oriented evaluations are the primary T&E methodology throughout system testing, but traditional evaluations of system performance measured against specification-like requirements are also used. Capabilities-based testing requires understanding operational concepts and involves developing strategies for T&E and plans to determine whether a capability solution option merits fielding.

Chief Developmental Tester (CDT)—A designated government T&E professional in an MDAP or MAIS program office selected to coordinate, plan, and manage all DT&E activities, to include contractor testing, and who makes technically informed, objective judgments about DT&E results. For non-MDAP and non-MAIS programs, this person is known as the Test Manager. (*10 U.S.C. § 139b*)

Combined Test Force (CTF)—An integrated team of military, civilian, and contractor T&E professionals empowered to plan and execute tests and report results in a collaborative, effective, and efficient manner over the entire life cycle of a system.

Combined Testing—See Integrated Testing.

Common T&E Database—A repository of all available T&E data for a single acquisition program or system under test that is accessible to all program stakeholders with a need to know.

Covered System—DoD term that is intended to include all categories of systems or programs requiring Live Fire Test and Evaluation. A covered system means a system that the Director, Operational Test and Evaluation, acting for the Secretary of Defense, has designated for LFT&E oversight. These include, but are not limited to, the following categories:

a. Any major system within the meaning of that term in Title 10 U.S.C. § 2302(5) that is user—occupied and designed to provide some degree of protection to its occupants in combat; or

b. A conventional munitions program or missile program; or a conventional munitions program for which more than one million rounds are planned to be acquired (regardless of whether or not it is a major system); or

c. A modification to a covered system that is likely to affect significantly the survivability or lethality of such a system.

Covered Product Improvement Program—See Covered System.

Critical Operational Issue (COI)—1. Operational effectiveness and operational suitability issues (not parameters, objectives, or thresholds) that must be examined during operational

testing to determine the system's capability to perform its mission. (paraphrased from DAU's *Test and Evaluation Management Guide)* **2.** A key question to be answered by operational testers when evaluating a system's overall operational effectiveness, suitability, and operational capabilities.

Critical Technical Parameter (CTP)—Measurable critical system characteristics that, when achieved, allow the attainment of operational performance requirements. They are technical measures derived from user requirements. Failure to achieve a critical technical parameter should be considered a reliable indicator that the system is behind in the planned development schedule or will likely not achieve an operational requirement. (paraphrased from *DAG*)

Dedicated Operational Testing—Operational test and evaluation that is conducted independently from contractors, developers, and operational commands and used to support production or fielding decisions.

Deficiency Report (DR)—The generic term used within the USAF to record, submit, and transmit deficiency data which may include, but is not limited to, a Deficiency Report involving quality, materiel, software, warranty, or informational deficiency data submitted using Standard Form (SF) 368 or equivalent format. (*TO 00-35D-54*)

Category I Deficiency—Those which may cause death, severe injury, or severe occupational illness; may cause loss or major damage to a weapon system; critically restricts the combat readiness capabilities of the using organization; or which would result in a production line stoppage.

Category II Deficiency—Those that impede or constrain successful mission accomplishment (system does not meet minimum operational requirements but does not meet the safety or mission impact criteria of a Category I deficiency). It may also be a condition that complements, but is not absolutely required for, successful mission accomplishment. The recommended enhancement, if incorporated, will improve a system's operational effectiveness or suitability.

Deployment—**1.** The movement of forces within operational areas. **2.** The relocation of forces and materiel to desired operational areas. Deployment encompasses all activities from origin or home station through destination. (*JP 1-02*)

Developmental Test and Evaluation (DT&E)—Test and evaluation conducted to evaluate design approaches, validate analytical models, quantify contract technical performance and manufacturing quality, measure progress in system engineering design and development, minimize design risks, predict integrated system operational performance (effectiveness and suitability) in the intended environment, and identify system problems (or deficiencies) to allow for early and timely resolution. DT&E includes contractor testing and is conducted over the life of the system to support acquisition and sustainment efforts. (*DAG*)

Early Operational Assessment (EOA)—An operational assessment (OA) conducted before MS B. An EOA assesses the design approach sufficiently early in the acquisition process to assure it has the potential to fulfill user requirements. (See Operational Assessment.)

Elevated Level of Assurance (ELA)—A measure of confidence that the security features, practices, procedures, and architecture of an information system accurately mediates and enforces the security policy. On the Common Criteria predefined assurance scale, higher

(elevated) levels indicate the most rigorous, formal criteria for security evaluation. (*CNSS National IA Glossary*)

Enabling Concept—Describes how a particular task or procedure is performed, within the context of a broader functional area, using a particular capability, such as a specific technology, training or education program, organization, facility, etc. An enabling concept describes the accomplishment of a particular task that makes possible the performance of a broader military function or sub-function. (*See AFI 10-2801 for further information on Air Force concepts*.)

Enhancement—A condition that improves or complements successful mission accomplishment but is not absolutely required. The recommendation, if incorporated, will enhance a system's operational safety, suitability and/or effectiveness. An enhancement report should not be designated as such solely due to an "out-of-scope" condition as described in contractual requirements.

Evaluation Criteria—Standards by which the accomplishment of required technical and operational effectiveness and/or suitability characteristics, or resolution of operational issues, may be addressed. (*DAG*)

Evaluation Framework Matrix—A table required in the TEMP that shows the correlation between the COIs, key requirements (KPPs and KSAs), key test measures (CTPs, MOEs and MOS), planned test methods, and test resources, facilities, or infrastructure needs.

Evolutionary Acquisition—Evolutionary acquisition is the preferred DoD strategy for rapid acquisition of mature technology for the user. An evolutionary approach delivers capability in increments, recognizing, up front, the need for future capability improvements. The objective is to balance needs and available capability with resources, and to put capability into the hands of the user quickly. The success of the strategy depends on the phased definition of capability needs and system requirements, and the maturation of technologies that lead to disciplined development and production of systems that provide increasing capability towards a materiel concept. The approaches to achieve evolutionary acquisition require close collaboration between the user, tester, and developer. (*paraphrased from DoDI 5000.02*)

Fielding—The decision to acquire and/or release a system to users in the field.

First Article Test (FAT)—Production testing that is planned, conducted, and monitored by the materiel developer. FAT includes pre-production and initial production testing conducted to ensure that the contractor can furnish a product that meets the established technical criteria. (DAU's *Test and Evaluation Management Guide*)

Follow—on Operational Test and Evaluation (FOT&E)—FOT&E is the continuation of operational test and evaluation (OT&E) after IOT&E, QOT&E, or OUE and is conducted only by AFOTEC. It answers specific questions about unresolved COIs and test issues; verifies the resolution of deficiencies or shortfalls determined to have substantial or severe impact(s) on mission operations; or completes T&E of those areas not finished during IOT&E, QOT&E, or OUE.

Force Development Evaluation (FDE)—A type of OT&E performed by MAJCOM OTOs in support of MAJCOM-managed system acquisition-related decisions prior to initial fielding, or for MAJCOM sustainment or upgrade activities.

Foreign Comparative Test (FCT)— A DoD Test and Evaluation (T&E) program that is prescribed in Title 10 U.S.C. § 2350a(g), and is centrally managed by the Comparative Testing Office, Office of the Assistant Secretary of Defense (Research and Engineering) (ASD(R&E)). It provides funding for U.S. T&E of selected equipment items and technologies developed by allied countries when such items and technologies are identified as having good potential to satisfy valid DoD requirements. (*DAG*)

Full—Up, System-Level Testing—Testing that fully satisfies the statutory requirement for "realistic survivability testing" or "realistic lethality testing" as defined in 10 U.S.C. § 2366. (*DAG*)

Implementing Command—Air Force Materiel Command and Air Force Space Command. The command providing the majority of resources in direct support of the program manager responsible for development, production, and sustainment activities. Such resources include technical assistance, infrastructure, test capabilities, laboratory support, professional education, training and development, management tools, and all other aspects of support, including support for product development and DT&E. (*AFI 63-101/20-101*)

Increment—(JCIDS) A militarily useful and supportable operational capability that can be effectively developed, produced or acquired, deployed, and sustained. Each increment of capability will have its own set of threshold and objective values set by the user. (CJCSI 3170.01 and AFI 10-601) **Note:** Generally, only increments are fielded IAW DoDI 5000.02, CJCSI 3170.01, and AFI 63-101/20-101.

Increment—(Software Development) A new version of software that provides additional capability. In the Iterative, Incremental Development approach, software developers determine user needs and define the overall architecture, but then deliver the system in a series of increments ("software builds"). The first build incorporates a part of the total planned capabilities, the next build adds more capabilities, and so on, until the entire system is complete.

Information Support Plan (ISP)—The identification and documentation of information needs, infrastructure support, IT and NSS interface requirements and dependencies focusing on net-centric, interoperability, supportability and sufficiency concerns. (*DoDI 4630.8*)

Initial Operational Test and Evaluation (IOT&E)—See Operational Test and Evaluation.

Integrated Testing—The collaborative planning and collaborative execution of test phases and events to provide shared data in support of independent analysis, evaluation and reporting by all stakeholders, particularly the developmental (both contractor and government) and operational test and evaluation communities. *(DAG, Chapter 9)*

Integrated Test Concept (ITC)—An outline of an integrated test approach, validated objectives, and known requirements for all testing on a program, to include initial descriptions of test scenarios, test locations, exercises, T&E methodologies, operational impacts and issues, and projections for future capabilities. As part of the TES and TEMP, the ITC supports the development of test plans that are integrated using a systems engineering approach.

Integrated Test Team (ITT)—A cross-functional team of empowered representatives from multiple disciplines and organizations and co-chaired by operational testers and the program manager. The ITT is responsible for developing the strategy for T&E, the TES and TEMP, assisting the acquisition community with T&E matters, and guiding the development of test

plans that are integrated. **Note:** The ITT is the Air Force equivalent to the T&E Working Integrated Product Team (T&E WIPT) described in the *DAG*.

Joint Capability Technology Demonstration (JCTD)—JCTDs fill the gap between science and technology and acquisition for the combatant commands (COCOMs). JCTDs focus on resolving the joint, combined, coalition, and interagency warfighting and operational problems of the COCOMs within a 1- to 3-year timeline. JCTDs resolve problems primarily by conducting technology and operational demonstrations and operational utility assessments of mature technology/solutions (Technology Readiness Level 5-7) and transitioning them to the acquisition community for post-JCTD development, production, fielding, and operation and maintenance. (*DAG*)

Joint Test and Evaluation (JT&E)—An OSD-sponsored T&E program conducted among more than one military Service to provide T&E information on combat operations issues and concepts. JT&E does not support system acquisition. (*DoDI 5010.41*)

Lead Command—The command designated to advocate for a weapon system and respond to issues addressing its status and use. Advocacy includes capabilities-based planning, programming, and budgeting for designated system-wide unique equipment, upgrades/modifications, initial spares and other weapon system-unique logistics issues, and follow-on test and evaluation. Inherent in lead command responsibility is also the responsibility for support systems and equipment directly associated with a particular weapon system. (*AFPD 10-9*)

Lead Developmental Test and Evaluation Organization (LDTO)—The lead government developmental test organization on the ITT that is most qualified to conduct and/or be responsible for overseeing a confederation of DT&E organizations, each with different but necessary skills, in support of an acquisition program.

Lethality—The capability of a munition or directed energy weapon to cause damage that will cause the loss or a degradation in the ability of a target system to complete its designated mission(s). (*DAG*)

Live Fire Test and Evaluation (LFT&E)—The firing of actual weapons (or surrogates if actual weapons are not available) at components, subsystems, sub-assemblies, and/or full-up, system-level targets or systems to examine personnel casualties, system vulnerabilities, or system lethality; and the evaluation of the results of such testing. (*DAG*)

Logistics Supportability—The degree to which the planned product support allows the system to meet its availability and wartime usage requirements. Planned product support includes the following: test, measurement, and diagnostic equipment; spare and repair parts; technical data; support facilities; transportation requirements; training; manpower; and software. (*DAG*) **Note**: In Air Force documents, the term "logistics supportability" is being replaced by the term "product support."

Logistics System Test and Evaluation—The test methodology, criteria, and tools for evaluating and analyzing the logistics support elements (*DAG*) / product support elements (*AFPAM 63-128*) as they apply to a system under test. The objective is to influence system design as early as possible in the acquisition cycle, and verify that the logistics support being developed is capable of meeting peacetime and wartime employment objectives. (paraphrased from DAU's *Test and Evaluation Management Guide*, 5th ed, January 05, Chapter 19)

Lot Acceptance Test (LAT)—A test based on a sampling procedure to ensure that the product retains its quality. No acceptance or installation should be permitted until this test for the lot has been successfully completed. (*Glossary, Defense Acquisition Acronyms and Terms*, and DAU's *Test and Evaluation Management Guide*)

Low—Rate Initial Production (LRIP)—Production of the system in the minimum quantity necessary (1) to provide production-configured or representative articles for operational tests pursuant to § 2399; (2) to establish an initial production base for the system; and (3) to permit an orderly increase in the production rate for the system sufficient to lead to full-rate production upon the successful completion of operational testing. **Note:** The LRIP quantity should not exceed 10 percent of the total number of articles to be produced as determined at the MS B decision. (*10 U.S.C. § 2400*)

Maintainability—The capability of an item to be retained in or restored to a specified condition when maintenance is performed by personnel having specified skill levels, using prescribed procedures and routines, at each prescribed level of maintenance and repair. (*DAG*)

MAJCOM—Directed Acquisition Program—An acquisition program originated by and directed at the MAJCOM level.

Major Munitions Program—See Covered System.

Measurable—Having qualitative or quantitative attributes (e.g., dimensions, velocity, capabilities) that can be ascertained and compared to known standards. (See Testable.)

Measure of Effectiveness (MOE)—(1) The data used to measure the military effect (mission accomplishment) that comes from the use of the system in its expected environment. That environment includes the system under test and all interrelated systems, that is, the planned or expected environment in terms of weapons, sensors, command and control, and platforms, as appropriate, needed to accomplish an end-to-end mission in combat. (DAU Glossary) (2) A criterion used to assess changes in system behavior, capability, or operational environment that is tied to measuring the attainment of an end state, achievement of an objective, or creation of an effect. (*JP 1-02*)

Measure of Performance (MOP)—(1) System-particular performance parameters such as speed, payload, range, time-on-station, frequency, or other distinctly quantifiable performance features. Several MOPs may be related to the achievement of a particular measure of effectiveness. (*DAU Glossary*) (2) A criterion used to assess friendly actions that is tied to measuring task accomplishment. (*JP 1-02*)

Measure of Suitability (MOS)—Measure of an item's ability to be supported in its intended operational environment. MOS's typically relate to readiness or operational availability and, hence, reliability, maintainability, and the item's support structure. (*DAU Glossary*)

Military Utility—The military worth of a system performing its mission in a competitive environment including versatility (or potential) of the system. It is measured against the operational concept, operational effectiveness, safety, security, and cost/worth. Military utility estimates form a rational basis for making management decisions. (*Glossary, Defense Acquisition Acronyms and Terms*)

Military Utility Assessment (MUA)—A determination of how well a capability or system in question responds to a stated military need, to include a determination of its potential

effectiveness and suitability in performing the mission. It is a "characterization" of the capability or system as determined by measures of effectiveness, measures of suitability, measures of performance, and other operational considerations as indicators of military utility, as appropriate, and answers the questions, "What can it do?" and "Can it be operated and maintained by the user?"

Multi—Service—Involving two or more military Services or DoD components.

Multi—Service Operational Test and Evaluation (MOT&E)—OT&E conducted by two or more Service OTAs for systems acquired by more than one Service. MOT&E is conducted according to the T&E directives of the lead OTO, or as agreed in a memorandum of agreement between the participants. **Note:** MAJCOM OTOs may at times be responsible for conducting MOT&E in lieu of AFOTEC.

Objective—An operationally significant increment above the threshold. An objective value may be the same as the threshold when an operationally significant increment above the threshold is not significant or useful. (*AFI 10-601*)

Operating Concept—A description in broad terms of the application of military art and science within a defined set of parameters. In simplest terms, operating concepts articulate how a commander will plan, prepare, deploy, employ or sustain a joint force against potential adversaries within a specified set of conditions. Operating concepts encompass the full scope of military actions required to achieve a specific set of objectives. (See AFI 10-2801 for further information on Air Force concepts.)

Operational Assessment (OA)—An analysis of progress toward operational capabilities made by an OTO, with user support as required, on other than production systems. The focus of an operational assessment is on significant trends noted in development efforts, programmatic voids, areas of risk, adequacy of requirements, and the ability of the program to support adequate operational testing. Operational assessments may be made at any time using technology demonstrators, prototypes, mockups, engineering development models, or simulations, but will not substitute for the dedicated OT&E necessary to support full production decisions.

Operational Command—Air Combat Command, Air Mobility Command, AF Special Operations Command, Air Education and Training Command, Air Force Global Strike Command, and Air Force Space Command. Those commands that will ultimately operate, or are operating, a system, subsystem, or item of equipment. (*AFI 10-601* / *AFI 63-101/20-101*)

Operational Effectiveness—Measure of the overall ability of a system to accomplish a mission when used by representative personnel in the environment planned or expected for operational employment of the system considering organization, doctrine, tactics, supportability, survivability, vulnerability, and threat. (*DAG*)

Operational Environment—A composite of the operational conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander. (*JP 1-02, JP 3-0*)

Operational Suitability—The degree to which a system can be placed and sustained satisfactorily in field use with consideration being given to availability, compatibility, transportability, interoperability, reliability, wartime usage rates, maintainability, safety, human

factors, habitability, manpower, logistics supportability, natural environmental effects and impacts, documentation, and training requirements. (*DAG*)

Operational Test Agency (OTA)—An independent agency reporting directly to the Service Chief that plans and conducts operational tests, reports results, and provides evaluations of overall operational capability of systems as determined by effectiveness, suitability, and other operational considerations. **Note:** DoDD 5000.01 states, "Each Military Department shall establish an independent OTA . . ." Therefore, each Service has one designated OTA which are as follows. The Air Force has the Air Force Operational Test and Evaluation Center (AFOTEC). The Navy has the Operational Test and Evaluation Force (OPTEVFOR). The Army has the Army Test and Evaluation Command (ATEC). The Marine Corps has the Marine Corps Operational Test and Evaluation Agency (MCOTEA).

Operational Test Organization (OTO)—A generic term for any organization that conducts operational testing as stated in its mission directive.

Operational Test and Evaluation (OT&E)—1. The field test, under realistic combat conditions, of any item of (or key component of) weapons, equipment, or munitions for the purpose of determining the effectiveness and suitability of the weapons, equipment, or munitions for use in combat by typical military users; and the evaluation of the results of such test. (10 U.S.C. § 139(a)(2)) **2.** Testing and evaluation conducted in as realistic an operational environment as possible to estimate the prospective system's operational effectiveness, suitability, and operational capabilities. In addition, OT&E provides information on organization, personnel requirements, doctrine, and tactics. It may also provide data to support or verify material in operating instructions, publications, and handbooks. **Note:** The generic term OT&E is often substituted for IOT&E, QOT&E, FOT&E, OUE, FDE, WSEP, and TD&E and depending on the context, can have the same meaning as those terms.

Operational Testing—A generic term encompassing the entire spectrum of operationally oriented test activities, including assessments, tests, and evaluations. Not a preferred term due to its lack of specificity.

Operational Utility Evaluation (OUE)—Evaluations of military capabilities conducted to demonstrate or validate new operational concepts or capabilities, upgrade components, or expand the mission or capabilities of existing or modified systems. AFOTEC or MAJCOMs may conduct OUEs whenever a dedicated operational test and evaluation event is required, but the full scope and rigor of a formal IOT&E, QOT&E, FOT&E, or FDE is not appropriate or required. OUEs may be used to support operational decisions (e.g., fielding a system with less than full capability) or acquisition-related decisions (e.g., low-rate production) when appropriate throughout the system lifecycle. OUEs will not be used when IOT&E, QOT&E, FOT&E or FDE are more appropriate per existing guidance and definitions.

Operator—See "User." Refers to the operating command which is the primary command operating a system, subsystem, or item of equipment. Generally applies to those operational commands or organizations designated by Headquarters, US Air Force to conduct or participate in operations or operational testing, interchangeable with the term "using command" or "user." In other forums the term "warfighter" or "customer" is often used. (*AFI 10-601*) "User" is the preferred term in this AFI.

Oversight—Senior executive-level monitoring and review of programs to ensure compliance with policy and attainment of broad program goals.

Oversight Program—A program on the OSD T&E Oversight List for DT&E, LFT&E, and/or OT&E. The list includes all major defense acquisition programs (MDAP) (e.g., ACAT I), Major Automated Information Systems (MAIS) (e.g., ACAT IA), and any other programs selected for OSD T&E Oversight IAW 10 U.S.C. § 2430(a)(1). These programs require additional documentation and have additional review, reporting, and approval requirements.

Participating Test Organization (PTO)—Any test organization required to support a lead test organization by providing specific T&E data or resources for a T&E program or activity.

Penetration Testing—(1) A live test of the effectiveness of security defenses through mimicking the actions of real-life attackers. (Information Systems Audit and Control Association (ISACA) dictionary) **(2)** A method of evaluating the security of a computer system or network by simulating an attack from malicious outsiders (who have no access) and malicious insiders who have some level of authorized access.

Platform Information Technology (PIT)—A special purpose IT system which employs computing resources (i.e., hardware, firmware, and optionally software) that are physically embedded in, dedicated to, or essential in real time to mission performance [of a host system]. PIT only performs (i.e., is dedicated to) the information processing assigned to it by its hosting special purpose system (this is not for core services). (*AFI 33-210*)

Pre—Production Qualification Test (PPQT)—The formal contractual tests that ensure design integrity over the specified operational and environmental range. These tests usually use prototype or pre-production hardware fabricated to the proposed production design specifications and drawings. Such tests include contractual reliability and maintainability demonstration tests required prior to production release. (*Glossary, Defense Acquisition Acronyms and Terms*, and DAU's *Test and Evaluation Management Guide*)

Product support—A continuous and collaborative set of activities that establishes and maintains readiness and the operational capability of a system, subsystem, or end-item throughout its life cycle. (*AFI63-101/20-101*)

Product Support Elements—A composite of all support considerations necessary to ensure the effective and economical support of a system for its life cycle. It is an integral part of all other aspects of system acquisition and operation. **Note:** The twelve product support elements are: sustaining/systems engineering; design interface; supply support; maintenance planning and management; support equipment/automatic test systems; facilities; packaging, handling, storage, and transportation; technical data management/technical orders; manpower and personnel; training; computer resources; and protection of critical program information and anti-tamper provisions. (*AFPAM 63-128*)

Production Acceptance Test and Evaluation (PAT&E)—Test and evaluation of production items to demonstrate that items procured fulfill requirements and specifications of the procuring contract or agreements. (DAU's *Test and Evaluation Management Guide*)

Production Qualification Test (PQT)—A technical test conducted prior to the full rate production decision to ensure the effectiveness of the manufacturing processes, equipment, and procedures. These tests are conducted on a number of samples taken at random from the first

production lot, and are repeated if the manufacturing process or design is changed significantly, or when a second source is brought on line. (*Glossary, Defense Acquisition Acronyms and Terms*, and DAU's *Test and Evaluation Management Guid*e)

Program Manager (PM)—(1) The designated individual with responsibility for and authority to accomplish program objectives for development, production, and sustainment to meet the user's operational needs. The PM shall be accountable for credible cost, schedule, and performance reporting to the MDA. (DoDD 5000.01) (2) Applies collectively to system program directors, product group managers, single managers, acquisition program managers, and weapon system managers. Operating as the single manager, the PM has total life cycle system management authority. **Note:** This AFI uses the term "PM" for any designated person in charge of acquisition activities, to include those prior to MS A (i.e., before a technology project is officially designated an acquisition program).

Prototype—A model suitable for evaluation of design, performance, and production potential. (JP 1-02) **Note:** The Air Force uses prototypes during development of a technology project or acquisition program for verification or demonstration of technical feasibility. Prototypes are not usually representative of the final production item.

Qualification Operational Test and Evaluation (QOT&E)—A tailored type of IOT&E performed on systems for which there is little to no RDT&E-funded development effort. Commercial-off-the-shelf (COTS), non-developmental items (NDI), and government furnished equipment (GFE) are tested in this manner.

Qualification Test and Evaluation (QT&E)—A tailored type of DT&E for which there is little to no RDT&E-funded development effort. Commercial-off-the-shelf (COTS), non-developmental items (NDI), and government furnished equipment (GFE) are tested in this manner.

Recoverability—Following combat damage, the ability to take emergency action to prevent loss of the system, to reduce personnel casualties, or to regain weapon system combat mission capabilities. (*DAG*)

Relevant Environment—The specific subset of the operational environment that is required to demonstrate critical "at risk" aspects of the final product performance in an operational environment. It is an environment that focuses specifically on stressing the technology in question. Not all systems, subsystems, and/or components need to be operated in the operational environment in order to satisfactorily address performance margin requirements. **Note:** A relevant environment is required for Technology Readiness Levels 5 and 6.

Reliability—The capability of a system and its parts to perform its mission without failure, degradation, or demand on the support system. (*DAG*)

Research, Development, Test, and Evaluation (RDT&E)—The type of funding appropriation (3600) intended for research, development, test, and evaluation efforts. (DoD 7000.14-R, Vol 2A, and AFI 65-601, Vol I) **Note:** The term "research and development" (R&D) broadly covers the work performed by a government agency or the private sector. "Research" is the systematic study directed toward gaining scientific knowledge or understanding of a subject area. "Development" is the systematic use of the knowledge and understanding gained from research for the production of useful materials, devices, systems, or methods. RDT&E includes all supporting test and evaluation activities.

Risk—1. A measure of the inability to achieve program objectives within defined cost and schedule constraints. Risk is associated with all aspects of the program, e.g., threat, technology, design processes, or Work Breakdown Structure elements. It has two components: the probability of failing to achieve a particular outcome, and the consequences of failing to achieve that outcome. (*Glossary, Defense Acquisition Acronyms and Terms*) **2.** Probability and severity of loss linked to hazards. (*JP 1-02*)

Severity Category—The category a certifying authority assigns to an IT system security weakness or shortcoming as part of a certification analysis to indicate the risk level associated with the security weakness and the urgency with which the corrective action must be completed. Severity categories are expressed as "Category (CAT) I, CAT II, or CAT III," with CAT I indicating the greatest risk and urgency. Severity categories are assigned after consideration of all possible mitigation measures that have been taken within system design/architecture limitations for the DoD information system in question. (*DoDI 8510.01*)

CAT I Severity Category—Assigned to findings that allow primary security protections to be bypassed, allowing immediate access by unauthorized personnel or unauthorized assumption of super-user privileges. An Authorization to Operate (ATO) will not be granted while CAT I weaknesses are present.

CAT II Severity Category—Assigned to findings that have a potential to lead to unauthorized system access or activity. CAT II findings that have been satisfactorily mitigated will not prevent an ATO from being granted.

CAT III Severity Category—Assigned findings that may impact IA posture but are not required to be mitigated or corrected in order for an ATO to be granted.

Simulator Certification (SIMCERT)—The process of ensuring through validation of hardware and software baselines that a training system and its components provide accurate and credible training. The process also makes sure the device continues to perform to the delivered specifications, performance criteria, and configuration levels. It will also set up an audit trail regarding specification and baseline data for compliance and subsequent contract solicitation or device modification. (*AFI 36-2251*)

Simulator Validation (SIMVAL)—The process for (1) comparing a training device's operating parameters and performance to the current intelligence assessment of a weapon system, threat, and interaction between the weapon system and threat, and (2) documenting the differences and impacts. This process includes generation and deployment of an intelligence data baseline of the system, comparison of simulator characteristics and performance, support for the modification and upgrade of the simulator, a comparison of simulator and threat operating procedures, and correction of any significant deficiencies. Uncorrected deficiencies are identified and published in validation reports. The process continues throughout the life cycle of the simulator. (*AFI 36-2251*)

Specification—A document intended primarily for use in procurement which clearly and accurately describes the essential technical requirements for items, materials, or services, including the procedures by which it will be determined that the requirements have been met. Specifications may be prepared to cover a group of products, services, or materials, or a single product, service, or material, and are general or detail specifications. (*Glossary, Defense Acquisition Acronyms and Terms*)

Spiral—One subset or iteration of a development program within an increment. Multiple spirals may overlap or occur sequentially within an increment. **Note:** An obsolete term, but may be in older documents. Generally, spirals are not fielded IAW DoDI 5000.02, CJCSI 3170.01, and AFI 63-101/20-101.

Strategy for T&E—A high-level conceptual outline of all T&E required to support development and sustainment of an acquisition program.

Sufficiency of Operational Test Review (SOTR)—An examination by MAJCOM operational testers of all available test data to: 1) determine if adequate testing has been accomplished for programs of limited scope and complexity; and 2) to assess the risk of fielding or production without a dedicated OT&E. An examination of existing test data, not an operational test per se.

Survivability—The capability of a system and crew to avoid or withstand a man-made hostile environment without suffering an abortive impairment of its ability to accomplish its designated mission. Survivability consists of susceptibility, vulnerability, and recoverability. (*DAG*)

Susceptibility—The degree to which a weapon system is open to effective attack due to one or more inherent weaknesses. (Susceptibility is a function of operational tactics, countermeasures, probability of enemy fielding a threat, etc.) Susceptibility is considered a subset of survivability. (*DAG*)

Sustainment—1. The provision of personnel, logistic, and other support required to maintain and prolong operations or combat until successful accomplishment or revision of the mission or of the national objective. (JP 1-02) **2.** The Service's ability to maintain operations once forces are engaged. (AFDD 1-2) **3.** Activities that sustain systems during the operations and support phases of the system life cycle. Such activities include any investigative test and evaluation that extends the useful military life of systems, or expands the current performance envelope or capabilities of fielded systems. Sustainment activities also include T&E for modifications and upgrade programs, and may disclose system or product deficiencies and enhancements that make further acquisitions necessary.

Tactics Development and Evaluation (TD&E)—TD&E is a tailored type of FDE specifically designed to further exploit doctrine, system capabilities, tactics, techniques, and procedures during the sustainment portion of the system life cycle. TD&Es normally identify non-materiel solutions to tactical problems or evaluate better ways to use new or existing systems.

Testable—The attribute of being measurable and repeatable with available test instrumentation and resources. **Note:** Testability is a broader concept indicating whether T&E infrastructure capabilities are available and capable of ***measuring*** the parameter. The difference between testable and measurable may indicate a test limitation. Some requirements may be ***measurable*** but not ***testable*** due to T&E infrastructure shortfalls, insufficient funding, safety, or statutory or regulatory prohibitions.

Test and Evaluation (T&E)—The act of generating empirical data during the research, development or sustainment of systems, and the creation of information through analysis that is useful to technical personnel and decision makers for reducing design and acquisition risks. The process by which systems are measured against requirements and specifications, and the results analyzed so as to gauge progress and provide feedback.

Test and Evaluation Master Plan (TEMP)—Documents the overall structure and objectives of the T&E program. It provides a framework within which to generate detailed T&E plans and it documents schedule and resource implications associated with the T&E program. The TEMP identifies the necessary developmental, operational, and live-fire test activities. It relates program schedule, test management strategy and structure, and required resources to: COIs; critical technical parameters; objectives and thresholds documented in the requirements document; and milestone decision points. (DAU's *Test and Evaluation Management Guide)*

Test and Evaluation Organization—Any organization whose designated mission includes test and evaluation.

Test and Evaluation Strategy (TES)—Describes the concept for tests and evaluations throughout the program life cycle, starting with Technology Development and continuing through Production and Depolyment. The TES evolves into the Test and Evaluation Master Plan at MS B. The TES provides a road map for evaluations, integrated test plans, and resource requirements needed to accomplish the Technology Development phase. (*paraphrased from the DAG, Chap 9*)

Test Deferral—The movement or delay of testing and/or evaluation of a specific critical technical parameter, operational requirement, or critical operational issue to a follow-on increment or later test period. A test deferral does not change the requirement to test a system capability or function.

Test Director——A person responsible for coordinating, leading, and executing a test and reporting the results according to a specific test plan.

Test Integrated Product Team (TIPT)—Any temporary group consisting of testers and other experts who are focused on a specific test issue or problem. There may be multiple TIPTs for each acquisition program.

Test Limitation—Any condition that hampers but does not preclude adequate test and/or evaluation of a critical technical parameter, operational requirement, or critical operational issue during a T&E program.

Test Manager——A designated government T&E professional in a non-MDAP/non-MAIS program office selected to coordinate, plan, and manage all DT&E activities, to include contractor testing, and who makes technically informed, objective judgments about DT&E results. For MDAP or MAIS programs, this responsibility is fulfilled by the Chief Developmental Tester (CDT).

Test Resources—A collective term that encompasses all elements necessary to plan, conduct, and collect/analyze data from a test event or program. Elements include test funding and support manpower (including temporary duty costs), test assets (or units under test, test asset support equipment, technical data, simulation models, test beds, threat simulators, surrogates and replicas, special instrumentation peculiar to a given test asset or test event, targets, tracking and data acquisition, instrumentation, equipment for data reduction, communications, meteorology, utilities, photography, calibration, security, recovery, maintenance and repair, frequency management and control, and base/facility support services. (*DAU's T&E Management Guide*)

Test Resource Plan (TRP)—The single document AFOTEC uses to request personnel and other resource support for operational test and evaluation from MAJCOMs and other agencies.

Test Team—A group of testers and other experts who carry out integrated testing according to a specific test plan. **Note:** A combined test force (CTF) is one way to organize a test team for integrated testing.

Threshold—A minimum acceptable operational value below which the utility of the system becomes questionable.

User—Refers to the operating command which is the primary command operating a system, subsystem, or item of equipment. Generally applies to those operational commands or organizations designated by Headquarters, US Air Force to conduct or participate in operations or operational testing, interchangeable with the term "using command" or "operator." In other forums the term "warfighter" or "customer" is often used. (*AFI 10-601*) Also refers to maintainers. "User" is the preferred term in this AFI.

Validation—The process of evaluating a system or software component during, or at the end of, the development process to determine whether it satisfies specified requirements. (*DAG*)

Verification—Confirms that a system element meets design-to or build-to specifications. Throughout the system's life cycle, design solutions at all levels of the physical architecture are verified through a cost-effective combination of analysis, examination, demonstration, and testing, all of which can be aided by modeling and simulation. (*DAG*)

Verification, Validation and Accreditation (VV&A)—VV&A is a continuous process in the life cycle of a model or simulation as it gets upgraded or is used for different applications. (*AFI 16-1001*)

Verification—Process of determining that M&S accurately represents the developer's conceptual description and specifications.

Validation—Rigorous and structured process of determining the extent to which M&S accurately represents the intended "real world" phenomena from the perspective of the intended M&S use.

Accreditation—The official determination that a model or simulation is acceptable for use for a specific purpose.

Vulnerability—The characteristic of a system that causes it to suffer a definite degradation (loss or reduction of capability to perform its designated mission) as a result of having been subjected to a certain (defined) level of effects in an unnatural (man-made) hostile environment. Vulnerability is considered a subset of survivability. (*DAG*)

Waiver—A decision not to conduct OT&E required by statute or policy.

Weapon System Evaluation Program (WSEP)—A test program conducted by MAJCOMs to provide an end-to-end tailored evaluation of fielded weapon systems and their support systems using realistic combat scenarios. WSEP also conducts investigative firings to revalidate capabilities or better understand munitions malfunctions.

Attachment 2

INFORMATION REQUIREMENTS FOR OSD T&E OVERSIGHT PROGRAMS

A2.1. Information requirements. **Table A2.1** provides details about the information exchanges and interfaces between the Air Force and OSD. The requirements in this table may be modified by direction of, or by specific agreement with, the program action officer(s) in AF/TEP, DASD(DT&E), and DOT&E.

Table A2.1. Information Requirements for OSD T&E Oversight Programs.

Item of Information	HAF OPRs	Due to OSD[2]	Comments
TESs and TEMPs[1] **a.** Draft TES or TEMP[3] **b.** Service-approved TES or TEMP **c.** Newly-designated TES or TEMP	OPR: PEM[6] OCR: AF/TEP	**a.** 90 days prior to milestone **b.** 45 days prior to milestone, and again at 10 days prior if OSD sends back for changes **c.** 120 days after program designation for OSD T&E Oversight	OSD (i.e., DASD(DT&E)) and DOT&E) approval required prior to milestones and major decision reviews. "Updates" required for significant changes. "Administrative changes" required for minor updates.
LFT&E Waivers and Alternate LFT&E Strategies and Plans (if required)	OPR: PEM OCR: AF/TEP	Prior to MS B	DOT&E sends notification to Congress prior to MS B.
Test Concept Briefings for IOT&E, QOT&E, OUE, FOT&E or FDE, to include all types of OAs. See Note 7 for FDEs.	AF/TEP	IOT&E, QOT&E, OUE, or FOT&E Test Concept Briefings (to include all OAs) 180 days prior to test start **unless waived by DOT&E.**[8]	Requirement stated in DoDI 5000.02, Enclosure 2, ¶6.d.(14), and Enclosure 6, ¶5.a.(2).
Test Plans for IOT&E, QOT&E, OUE, or FOT&E, to include all types of OAs (Service-approved)	AF/TEP	Required 60 days prior to start of IOT&E, QOT&E, OUE, FOT&E, to include all OAs. See DoDI 5000.02, ¶6.d.(14) and Enclosure 6, ¶5.a.(2) **Note:** DOT&E **may** request an additional briefing on test plans prior to starting these tests.	DOT&E written approval required before IOT&E, QOT&E, OUE, FOT&E, or OA may start. Report major revisions to DOT&E. **Note:** A briefing **may** be required on these plans at DOT&E's discretion.
FDE Plans[7]	AF/TEP	60 days prior to start of designated FDEs.[4, 7] **Note:** DOT&E **may** request an additional briefing on test plans prior to starting these tests.	DOT&E will direct which subparts of OT&E Oversight programs require approval.
Significant Test Event Reports	a. PEM for DT&E b. AF/TEP for OT&E	24 hours after event	Events and addressees as listed in TEMP and test plans.

Final Reports and Briefings: **a.** For OA, IOT&E, QOT&E, OUE, and FOT&E **b.** For FDE[7]	AF/TEP	**a.** and **b.** Reports due not later than 30 days prior to the decision review according to paragraph **7.4.2**. For multi-Service tests, reports are due 45 days prior to the decision review.	A single report is required for multi-Service programs. Final results briefings will be provided to DOT&E as requested.
LFT&E Reports	OPR: PEM OCR: AF/TEP	45 days prior to the FRP decision review.	Due to DOT&E.
Synopsis Reports of EW Programs	AF/TEP	Due annually by 15 Nov to DASD(DT&E)	Congressionally required.[5]

Notes:

1. All references to TES or TEMP in this table are meant to include the tailored implementing documentation described in paragraph **5.15**, whichever is applicable. Only the T&E portions of tailored implementing documents require AFOTEC/CC, LDTO, and AF/TE coordination, and DASD(DT&E) and DOT&E approval.
2. All days are "calendar" days. Time periods and dates are "Not Later Than" due dates to OSD.
3. "Draft TES and TEMP" means that all signatures **below** HQ USAF level are complete according to paragraphs **5.14.2** through **5.14.4**.
4. Only for programs on OSD OT&E Oversight.
5. Required by P.L. 103-160 § 220(a).
6. The PEM is the person from the Secretariat or Air Staff who has overall responsibility for a program element and who harmonizes program documentation.
7. Selected FDEs require DOT&E Oversight (see paragraph **4.7**) and will follow the same planning, briefing, and reporting guidance in paragraph **6.6**.
8. DOT&E memo, *Timelines for Operational Test and Evaluation (OT&E) Plans*, 24 Jun 2011, to be inserted into next revision to DoDI 5000.02.