AFOTEC OT&E Guide

20 May 2004

AFOTECPAM 99-103

FOREWORD

This AFOTEC OT&E Guide captures the best practices and corporate wisdom of how to efficiently and effectively conduct AFOTEC's core mission. We've harmonized this revision with the new DoD 5000, the new JCS capability requirements process, and the latest approaches to AF Requirements, Acquisition, and Testing: Agile Acquisition and Seamless Verification.

The key tenets of this guide are:

- It supplements mandatory guidance contained in higher HQ directives and AFOTECI 99 – 103.
- The accompanying "Anatomy of an OT&E Program" is your "roadmap/flight plan for success."
- The processes, procedures, checklists, techniques, and recommendations outlined in the following chapters are a collection of lessons learned and best practices for conducting an OT&E program.
- The core teams will assist test teams in determining the best use of applicable guidance within this pamphlet.
- The Commanders and Directors are expecting that the guidelines contained in this pamphlet be followed unless XO approves deviation.

Our management approach continues emphasis on eliminating the seams between contractors, developmental and operational testers, and users. Creating a seamless process will increase collaboration, partnering, and information sharing between MAJCOMs, the acquisition community, and AFOTEC; resulting in accelerated delivery of combat systems to warfighters. Our aim is to push the envelope and compress our processes into a single, integrated DT-OT plan. In addition, I expect to see an increased role for AFOTEC in response to emerging Homeland Defense initiatives. These process improvements along with the increased demand for AFOTEC services will create new challenges and opportunities. I can think of no better time than now to be a part of AFOTEC.

When combatant commanders go to war, they'll want maximum combat capability delivered as fast as possible. This underscores the need to ensure that every assessment and test is combat-focused and reflects the latest operational employment concepts. Every AFOTEC assessment and evaluation must be operationally realistic and reflect the way we fight. Our job is to provide decision-makers the info they need to make the right call (i.e., to field or not to field a new capability). We must

never forget that warfighters, armed with AFOTEC reports, might use these conclusions in deciding whether or not to accelerate fielding of a new system. Therefore, it is imperative for us to accurately characterize the combat capability of a system under test. Our reports must present a balanced picture of how the system performs, to include its limitations, risks, and operational impact on the larger system-of-systems battlespace.

Continue your tremendous focus on safety as we become more agile and increase the push to bring needed capabilities to the warfighter faster. Do not let up. AFOTEC is a benchmark of how to successfully weave Operational Risk Management into our processes and procedures. Your sound professional judgment has resulted in zero Class - A, Class - B, or OT&E related mishaps in over 10 years of test and evaluation…phenomenal!

I encourage you to make every briefing, meeting, and interface with our customers a "marketing opportunity" to tell the AFOTEC story and share our test approach, success stories, and the value we bring to the fight.

We will periodically update this guide to ensure documented processes remain harmonized with the way we actually do business. Approved changes to this guide and its companion instruction will be posted on the MIN to allow you to keep your printed copies current.

Finally, this is your workbook. Use it. Refer to it frequently. Mark it up with personal notes and reminders. Then, pass on the best of your ideas to your Chain of Command and your PRB representative so we can incorporate them to make this guide better.

Maj Gen Felix Dupré

Record of Changes

Change #	Date of Change	Title of Change

SUMMARY OF CHANGES:

Guidance on the following areas has been added/updated to this document and the anatomy updated as appropriate: DoD 5000 evolutionary acquisition model, CJCSI 3170 joint capability-based requirements process, Air Force T&E process changes, seamless verification approach, initial test design process, updated software evaluation approach, modeling and simulation information updated, technical information consolidated, evaluation framework information updated, OIA examples revised, unit inactivation information updated, consolidation of coordination information into a single attachment, consolidation of MIN references into a single attachment, and updating the MIN information structure. This revision fully incorporates all previous publication change notices.

FUTURE CHANGES TO THIS PAMPHLET:

Any recommendations for future changes to this document can be submitted via the Det/Dir Policy Review Board (PRB) representative, via the Product Evaluation Process (PEP), or via an e-mail to the AFOTEC Policy Forum account (policy@afotec.af.mil).

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Chapter 1 Introduction

1.1 How to Use This Pamphlet

The intent of this pamphlet is to provide AFOTEC program managers, test directors (TD), core teams and test teams with "how to" guidance when accomplishing OT&E as specified in the AFOTEC Instruction 99-103. The processes, procedures, checklists, techniques, and recommendations outlined in the following chapters are a collection of lessons learned and best practices for conducting an OT&E program. The Commanders and Directors are expecting that the guidelines contained in this pamphlet be followed unless XO approves deviation. Using processes not addressed in this pamphlet may generate questions during process or product reviews. Except for those areas where specific information addresses non-traditional assessments (NTA), the procedures in this pamphlet do not apply to NTAs.

Each chapter of this pamphlet starts with a figure depicting the chapter contents. These figures are a compartmentalized version of the AFOTEC Anatomy of a Program and, in addition to providing a visual reference to where you are in the pamphlet, are used for easy navigation in the electronic version of this document.

This pamphlet is designed to be used in conjunction with other AFOTEC produced references, such as instructions, technical papers/notes, and formats/templates. These additional references will provide the reader with further details of a specific process or procedure, as required. Where possible, direct links and/or references to these documents have been provided in the electronic version of this pamphlet. Additionally, the Plans and Policy Tab on the AFOTEC Management Information Network (MIN) homepage or the Analyst Training and Technical Information Center (ATTIC) (see attachment 4) will contain direct links or electronic copies of these references. Throughout the pamphlet, you will find references to documents located on the MIN. Attachment 4 contains an index of all referenced documents and their actual location on the MIN. See paragraph 1.11.7 for more information on the MIN, including the test director's program information updating responsibilities.

1.2 How to Use the Anatomy of an OT&E Program

The Anatomy of an AFOTEC OT&E Program is a depiction of the typical process employed throughout a traditional OT&E program. It represents the nominal set of actions that may be required to carry out an operational test program, as verified by veteran core team and test management personnel. The Anatomy was developed as a tool to provide operational testers insight into the scope and depth of effort an

operational test may require; testers should use the Anatomy as a baseline to trigger their thought process and design their test activities accordingly. The Anatomy contains information on the timing for both internal and external products; use this information to ensure that you have adequate lead-time to produce the product. It is important to note that the testing process is tailored for each operational test and the process as depicted represents all steps that COULD be performed, but not necessarily NEED to be performed.

1.3 DoDI 5000.2 Acquisition Model

The recent SECDEF transformation of the DoD's acquisition practices to better support the fielding of operational capability to the warfighter has resulted in a new acquisition approach. Figure 1.1 is a graphical representation of the transformed DoD acquisition model. A key tenet of this model is that an acquisition program can enter the process at any one of the milestones depending on the maturity of the technology and program being acquired. AFOTEC activities for the new milestones do not change; the low-rate initial production (LRIP) decision (milestone C) may be supported by an operational assessment (OA) and the full-rate production (FRP)/Initial Operational Capability (IOC)/Fielding decision will still be supported by completed Initial/Qualification/Multiservice OT&E (I/Q/MOT&E). *The Interim Defense Acquisition Guidebook*, provides supporting information to DoDI 5000.2. This guidebook provides best practices, lessons learned, and expectations in executing the defense acquisition process. This guidebook can be accessed on the MIN (see attachment 4).

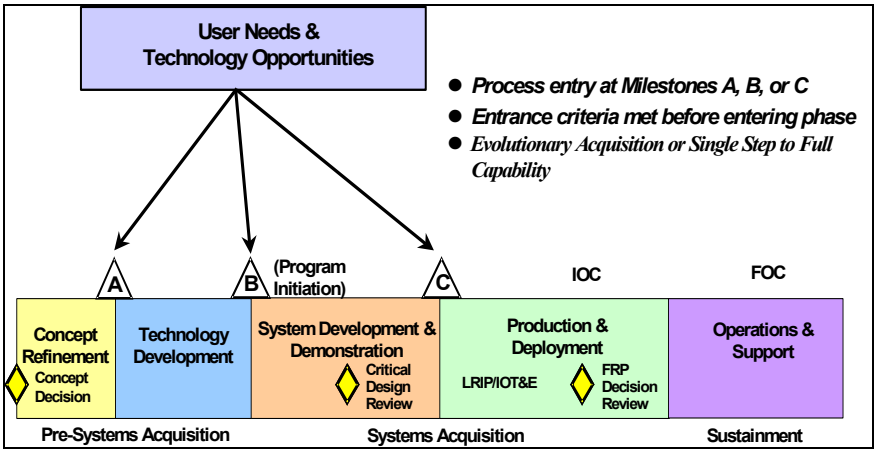

Figure 1.1. DoDD 5000.2 Model

1.4 National Security Space Acquisition Model

Acquisition of space major defense acquisition programs, granted a waiver to the DoD 5000 requirements, follows procedures contained in National Security Space Acquisition Policy 03-01 (NSS 03-01). Figure 1.2 depicts the acquisition process for space programs under NSS 03-01. AFOTEC activities for space programs should be tailored to support the respective acquisition key decision points (KDP).

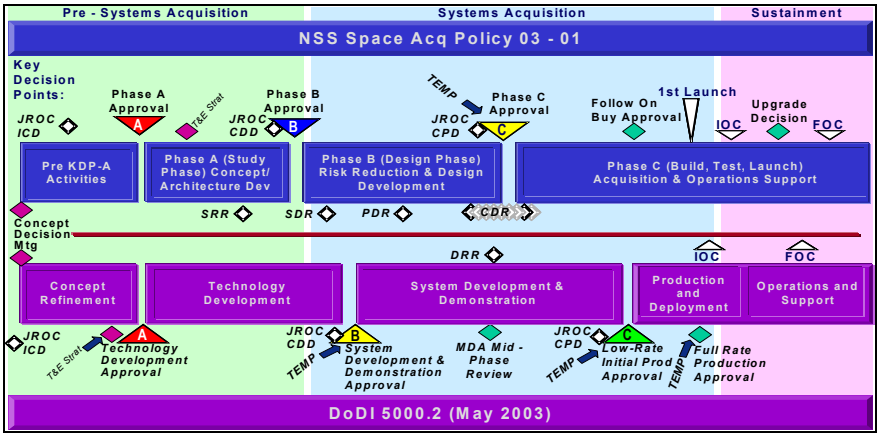

Figure 1.2. NSS 03-01 Comparison

1.5 Evolutionary Acquisition

Evolutionary acquisition is DoD's preferred strategy for rapid acquisition of mature technology for the user (see figure 1.3). An evolutionary approach delivers capability in increments, recognizing, up front, the need for future capability improvements. The approaches to achieve evolutionary acquisition require collaboration between the user, developer, and tester. They include the following:

- Spiral Development. In this process, a desired capability is identified, but the end-state requirements are not known at program initiation. Those requirements are refined through demonstration and risk management; there is continuous user feedback; and each increment provides the user the best possible capability. The requirements for future increments depend on feedback from users and technology maturation.
- Incremental Development. In this process, a desired capability is identified, an end-state requirement is known, and that requirement is met over time by development of several increments, each dependent on available mature technology. A viable evolutionary acquisition approach is to use a "single-step-to-full-capability" strategy.

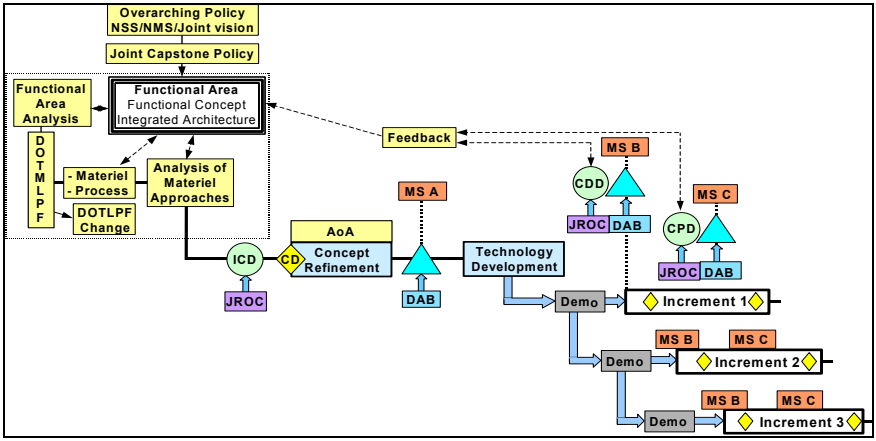

Figure 1.3. The DoD Requirements and Acquisition Process

1.5.1 Evolutionary Acquisition Characteristics.

The success of the strategy depends on the consistent and continuous definition of capabilities-based requirements and the maturation of technologies that lead to disciplined development and production of systems that provide increasing capability. Evolutionary acquisition programs should:

- Provide for early involvement of the Service OTA/JITC in DT&E and test planning.
- Conduct adequate DT&E, LFT&E, and IOT&E of each new incremental capability.
- Integrate, as appropriate, and without compromising the specific requirements of the different types of testing, successive periods of DT&E, LFT&E, and IOT&E.
- Tailor test content and reporting against earlier test results, evaluating at a minimum the increment of mission accomplishment and survivability required of the new increment, plus whether or not performance previously demonstrated by the previous increment has been degraded.
- For programs under OSD T&E oversight, support DOT&E's schedule for reporting to the Secretary of Defense and Congressional defense committees, whether through phased submittal of dedicated reports or through DOT&E annual reports to the Congress.

1.5.2 Test Management in Evolutionary Acquisition

Programs acquired under evolutionary acquisition may employ an incremental structure as depicted in figure 1.3. In these types of programs, each increment will have its own set of acquisition decisions

and requisite operational testing. In the case of a single-step-to-full-capability, there will only be one increment and one set of acquisition decisions. Spirals within an increment are not intended to be fielded, but there are times when the decision maker may accept the risk associated with fielding a spiral. Spiral fielding is not supported by IOT&E; OAs may be done to report on capability achievement, but will not rate effectiveness and suitability (E&S). Increments contain the supportable, warfighting capability and are what the requirements documents are written for.

Within AFOTEC, the approach taken to test planning will depend upon the amount of information known about the program when the various decisions are made. When sufficient information is known about the acquisition program, an involvement decision can be made for the program. Normally, only a single involvement decision will be made for each program.

The methodology applied for the scope/cost process, however, is slightly different. If enough information is known at the outset, complete program scoping and costing can take place; if not, the first increment can be scoped and costed and future increments can be scoped/costed later. The AFOTEC Executive Council has determined that the core team/test team should recommend an approach to future increment scoping/costing during the first Initial Test Design (ITD) review. For software intensive systems, DOT&E's memo titled *Guidelines for Conducting OT&E for Software-Intensive System Increments*, can be consulted for information on the DOT&E perspective on OT&E requirements. The DOT&E memo is available on the MIN (see attachment 4).

The Risk Analysis/Level of Test Tool (RALOTT) is a tool used to determine the level of test for a given increment of a program developed using incremental development. RALOTT uses industrial standards, best practices, and specific OT interests to divide risk for an increment into six areas: Development, Implementation, Technical, Safety, Security, and System Specific. The weights of the areas of risk are adjustable for each program and increment. A full explanation of risk concerns and rating instructions are available within the application. RALOTT graphically displays the level of test required in two parts: Level of Mission Impact and Likelihood of Risk Occurrence. A word document captures all RALOTT input and rationale to be used for level of test justification. TSE is the POC for this tool.

The single Initial Capabilities Document (ICD) and incremental Capability Development Document (CDD) and Capability Production Document

(CPD) approach to operational capability requirements development brings with it a new approach to AFOTEC involvement in the requirements process. The ICD will normally be developed while the program is still in Discovery and forms the foundation for the evaluation framework (EF) and initial test design. The CDD and CPD for each increment will normally be developed following issuance of the tasking order (TO). For additional information on updating and annexing capability documents, see AFI 10-601. High Performance Teams (HPT) will be formed to develop each of these documents. AFOTEC representation on these HPTs will transition from AS, for the ICD, to the Detachments, for the CDD and CPD.

1.6 Seamless Verification

Seamless Verification (SV) is the Air Force process to transform test and evaluation in support of the new acquisition process. The SV concept centers around the effort between the DT and OT for a given program to leverage the testing requirements of all concerned into a process that streamlines and integrates test activity (see figure 1.4). Seamless verification facilitates the sharing of common data along with achieving an overall reduction in time and resources expended on actual test activities. AFOTEC has historically been a leader in this area, understanding that early and aggressive entry into an acquisition program provides the thrust for an integrated test planning effort between the contractor, developmental tester, and operational tester. AFI 99-103 outlines the SV process for the T&E community and discusses the concepts of tester support of HPTs for requirements documents, the Integrated Test Team, and integrated test planning and collaboration.

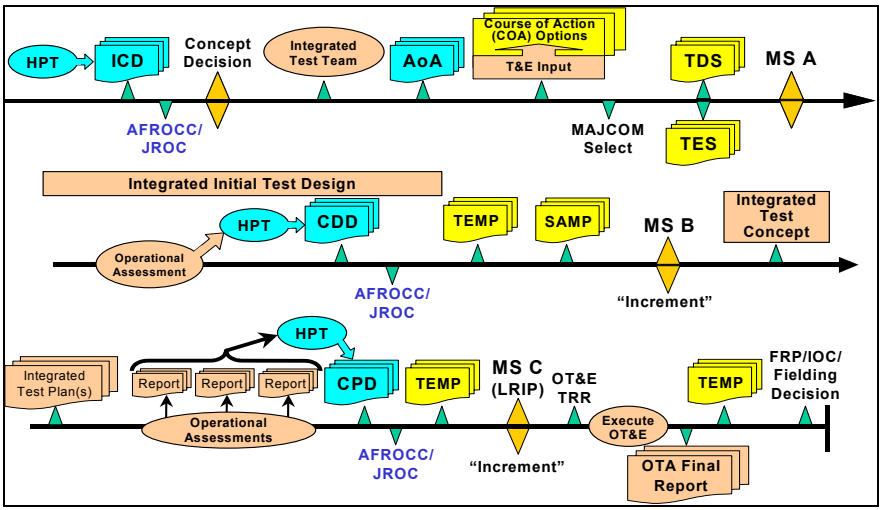

Figure 1.4. The Seamless Verification Process

1.6.1 Integrated Test Teams (ITT)

The ITT is established to involve all T&E stakeholders in a program as early as possible and to facilitate coordinated and integrated test planning. The ITT replaces the Test Plan Working Group (TPWG) and may also be referred to as a T&E Working-Level Integrated Product Team (WIPT). The ITT is the body that develops the required T&E documentation for the program (T&E Strategy, T&E Master Plan (TEMP), etc.) and continues through integrated test execution and reporting. ITT charter development follows the procedures outlined in this document for Support Agreements (see paragraph 4.6). Typically, the AFOTEC single face to the customer (SFTC) is the OT&E representative on the ITT following issuance of the involvement order.

1.6.2 Integrated Test Planning and Collaboration

Seamless verification is founded on the principle of integrated testing. This integration starts with the initial formation of the ITT to support integrated planning and continues throughout the program. Integrated test execution can make use of a combined test force (CTF). The only limiting factor to the integration is the statutorily-required dedicated phase of OT&E conducted to support FRP, IOC, or fielding decisions. Early and frequent collaboration among all T&E stakeholders will help ensure that common testing requirements can be satisfied and that the data collected is useable by all concerned. In the best of cases, a significant amount of data from the integrated testing can be used to resolve OT&E requirements such that the remaining dedicated OT&E consists only of those events not conducted in an integrated environment. The development of an Integrated Test Concept (ITC) followed by an Integrated Test Plan (ITP) is one approach to integrated testing.

1.7 AFOTEC Processes

The AFOTEC approach to carrying out its OT&E responsibilities is organized as shown in figure 1.5. These processes support the acquisition transformation, evolutionary acquisition, and seamless verification concepts discussed above. The primary path that a program takes through AFOTEC is: Discovery, Scope/Cost, Test Planning, Test Execution, Test Reporting, and Closeout. The business management processes (BMP) of planning and programming, resource management, and personnel management support the primary path as required. The structured and disciplined approach to business management, product delivery, and product evaluation at AFOTEC uses the Theory of Constraints (TOC) management approach. TOC provides AFOTEC leadership with the tools that support decision-making including test program or functional process networks, strategic planning, and logical

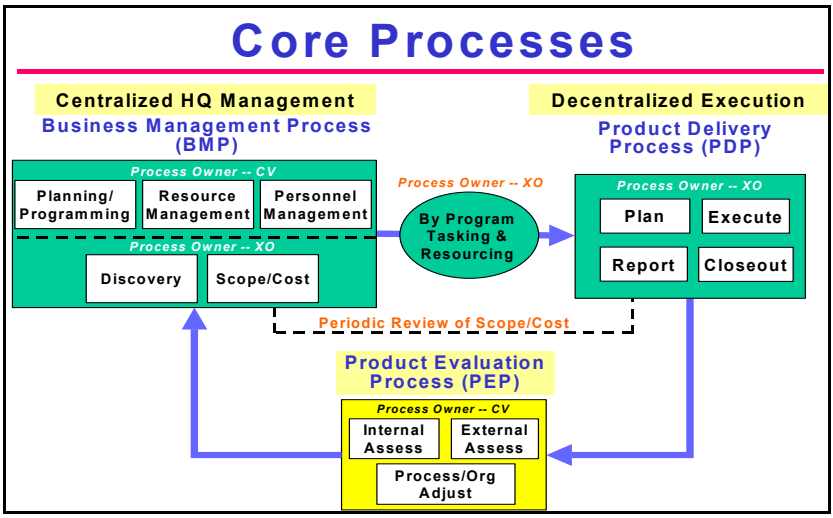

Figure 1.5. AFOTEC Core Processes

analysis. AFOTEC implements TOC using the Operational Test Program Management (OTPM) methodology. Each tool considers the realities of constrained resources and their impact in the decision-making process. Specific actions take place that move a program along the primary path; these actions are:

- The issuance of an Involvement Order (IO) (moves from discovery to scope/cost and establishes the projected gaining Detachment as the AFOTEC SFTC for the program).
- Initial Test Design (ITD) Briefing (approval of ITD authorizes issuance of a TO).
- The issuance of a TO (move from scope/cost to Test Planning).
- Technical Review Briefing(s).
- Test Concept Briefing (successful briefing authorizes proceeding to test plan development).
- Test Plan Review Briefing (successful briefing authorizes proceeding to Test Readiness Review).
- The completion of the Test Readiness Review (TRR) (move from Test Planning to Test Execution).
- The completion of the Last Test Event (move from Test Execution to Test Reporting).
- The publication of the Test Report (move from Test Reporting to Closeout). When this report is not the final AFOTEC activity, return to the appropriate portion of the process.

- The publication of the Closeout Order (move the program to Completed and subsequently the MIN archive).

Figure 1.6 presents another way to look at the AFOTEC processes within a single increment of a program. This figure shows the AFOTEC activities arrayed against the typical acquisition timeline. Of note in this figure is that the various types of OT&E activities can be carried out several times during the life of an program and there may be test planning and test execution activities going on simultaneously for different increments. Additional program increments with like activities may overlap the activities shown.

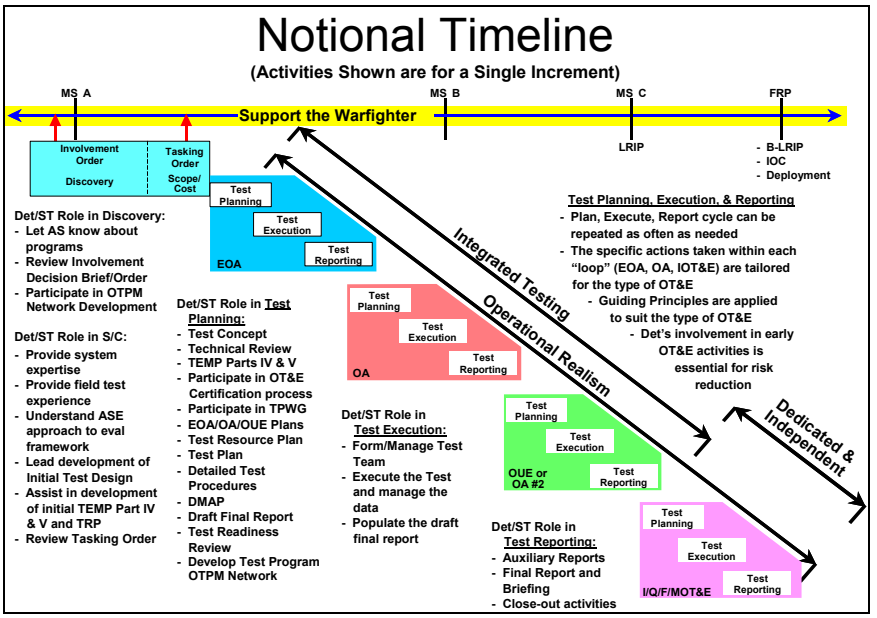

Figure 1.6. Notional Timeline of AFOTEC Detachment Activities

1.8 Non-Traditional Assessment (NTA)

NTAs are assessment activities that fall outside the traditional (DoDI 5000.2) acquisition process and are not governed by specific DoD guidance. Within AFOTEC, NTAs are traditionally conducted by Det 1. Flexible in nature, NTAs can include:

- pre-acquisition activities such as Advanced Concept Technology Demonstration (ACTD), Advanced Technology Demonstration (ATD), Foreign Comparative Test (FCT), warfighter assessments (battlelab and Combatant Commander initiatives, joint and service experiments).
- doctrine and tactics, techniques, procedures (TTP) development.

- exercise activities (JCS, Combatant Commander, Service, federal).
- federal activities (homeland security, Federal Bureau of Investigation (FBI), Customs, Federal Emergency Management Agency (FEMA), National Guard).

NTAs are typically client funded, heavily leveraged using contractor support, use a mobile test infrastructure and capabilities, conducted using a rapid response approach, and like all AFOTEC activities have a warfighter focus.

Critical pieces to NTA success are: (1) the capability to provide a rapid response (frequency management, mobile instrumentation and data collection assets) to a short time frame requirement, and (2) "on-demand" test areas (e.g., Fort Sumner) and the capability to go anywhere in the world to test under operationally realistic conditions. Both of these are achieved through resources which AFOTEC has readily available.

Marketing is also very important, as none of the NTA clients are required to use AFOTEC for test/assessment support. AFOTEC has built a reputation as a center of excellence in executing NTAs, and is recognized across DoD as the Military Utility Provider of choice for the War Fighting Combatant Commanders. A key element to NTA success is non-intrusive insertion into exercises to capture as much operational realism as possible at very low cost. This is very early operational tester involvement and provides a venue to influence design while the system is in the experimental phase. Often the TTPs, requirements document, and concept of operations (CONOPS) do not yet exist or are crafted in a rudimentary form; therefore AFOTEC becomes the conduit for the users to build a capabilities based requirement document as the NTA becomes the foundation for future OT&E.

The NTA business management process parallels the AFOTEC traditional process and consists of seven related functions: Strategic Planning, Marketing, Requirements Definition, Planning, Execution, Reporting, and Closeout.

- **Strategic planning** translates the NTA mission into organizational and business goals. The NTA senior management team establishes organizational and business goals and gives guidance for accomplishing those goals. The goals are consistent with the NTA mission approved by the AFOTEC commander.
- **Marketing** seeks to identify those business opportunities that are more closely aligned with the goals established during the

strategic planning phase. These business opportunities are then provided with AFOTEC NTA capabilities for consideration.

- **Requirements definition** formalizes the agreement with the NTA client in the form of a Client Requirements Document (CRD). This document defines the client's requirements, the necessary support, and the associated costs.
- **Planning** starts upon receipt of a funding document from the NTA client, and continues through test plan development and the test readiness review.
- **Execution** encompasses all of the activities associated with the actual program deployment, site setup, practice tests, training, test execution, data collection and analysis, hotwash, and equipment recovery.
- **Reporting** produces appropriate reports according to the customer's requirements as established in the CRD.
- **Closeout** begins once the final product or report is produced and delivered to the client. Closeout formally ends AFOTEC involvement in the program.

For additional information on NTAs, see the NTA Anatomy included in this pamphlet, or contact Det 1, the AFOTEC office of primary responsibility (OPR) for NTA programs.

1.9 Operational Risk Management (ORM)

AFOTEC also uses Operational Risk Management throughout a program. As defined in AFPD 90-9, Operational Risk Management, ORM is a decision-making process to systematically evaluate possible courses of action, identify risks and benefits, and determine the best course of action for any given situation. ORM enables all personnel to maximize operational capabilities while limiting all dimensions of risk by applying a simple, systematic process appropriate for all personnel and functions. Appropriate use of ORM increases both our organizational and individual ability to accomplish the mission, whether planning a test, collecting data, executing test activities, or reviewing test data. Application of the ORM process ensures more consistent results. Figure 1.7 shows the ORM process chart with its six steps.

- **Step 1**. **Identify the Hazard**. A hazard can be defined as any real or potential condition that can cause mission degradation, injury, illness, death to personnel, or damage to or loss of equipment or property. Experience, common sense, and specific risk management tools help identify real or potential hazards.
- **Step 2. Assess the Risk.** Risk is the probability and severity of loss from exposure to the hazard. The assessment step is the application of quantitative or qualitative measures to determine

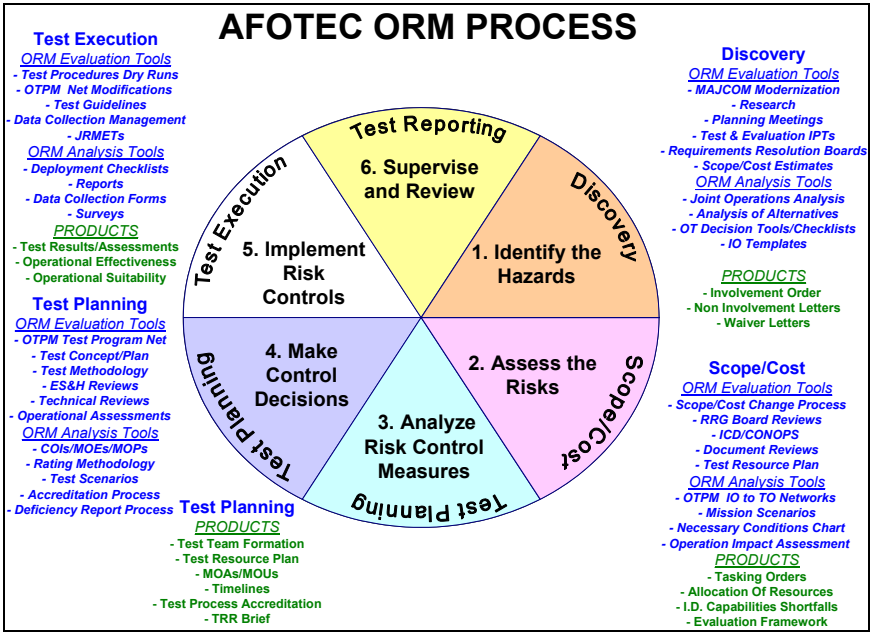

Figure 1.7. ORM Relationship to the AFOTEC Process

the level of risk associated with a specific hazard. This process defines the probability and severity of a mishap that could result from the hazard based upon the exposure of personnel or assets to that hazard.

- **Step 3**. **Analyze Risk Control Measures**. Investigate specific strategies and tools that reduce, mitigate, or eliminate the risk. Effective control measures reduce or eliminate one of the three components (probability, severity, or exposure) of risk.
- **Step 4. Make Control Decisions.** Decision makers at the appropriate level choose the best control or combination of controls based on the analysis of overall costs and benefits.
- **Step 5. Implement Risk Controls**. Once control strategies have been selected, an implementation strategy needs to be developed and then applied by management and the work force. Implementation requires commitment of time and resources.
- **Step 6**. **Supervise and Review**. Risk management is a process that continues throughout the life cycle of the system, mission, or activity. Leaders at every level fulfill their respective roles in assuring controls are sustained over time. Once controls are in place, the process is periodically reevaluated to ensure their effectiveness.

ORM Integration. A key objective is to accomplish the ORM process as an integrated aspect of mainstream mission processes. When ORM is effectively integrated, it quickly ceases to be consciously identifiable as a separate process. To effectively apply risk management, test directors should dedicate time and resources to incorporate risk management principles into the planning processes. Risks are more easily assessed and managed in the planning stages of an operation. Integrating risk management into planning as early as possible provides the decision maker the greatest opportunity to control risk.

1.10 Purpose of the Core Team

The core team is chartered by the involvement order and remains active through scope/cost and into the planning, execution, and reporting of the test. The TD and core team are responsible for ensuring an ORM analysis has been conducted for each phase, process, and sub-process of OT&E. AFOTEC/AS (ST for Special Access Programs (SAPs)) is responsible for executing scope/cost and facilitates the core team through the process. The key to success will be the early and continued involvement of the support offices within AFOTEC. These are the experts in their respective fields; they are the ones who will advise the TD on what's needed. Some core team members will be more actively involved than others, depending on the program. Once a program is transferred to the detachment via a tasking order, this doesn't dissolve the core team function. Even though not as heavily involved, the core team is still in place to meet any test team needs. Functional areas of expertise available to the test team are shown in Table 1.1.

Table 1.1. Functional Areas of Expertise

- Test Management/Execution (Det/ST)
- Final Report (Det(ST)/XO/AS/CA-CN/RM/TS/XP)
- Test Support (TSD/TSN)
- OT Technical Advice (CA/CN/Det)
- Mission/Operations (AS/Det(ST))
- Operational Effectiveness & Suitability (Det(ST)/XO/AS/TS/CA-CN)
- Operational Impact Analysis (Det(ST)/XO/AS/TS/CA-CN)
- Ranges/Facilities (TS, OL-NN, OL-HU)
- NTTR infrastructure improvement and instrumentation (XP)
- OT EF Development (XO/AS/TS Det(ST)/CA-CN)
- Personnel/Manpower (DP)
- Threat Definition/Intelligence (TS)
- Policy/Procedures/Lessons Learned (XP)
- Human Factors (TS)
- Records Management/FOIA (SC)
- RAM & Software Analysts (TS/Det)
- Modeling/Simulation (TS/Det/CN)
- Nuclear Effects/Survivability (TS/Det)
- Foreign Military Programs (TS)
- Training (XOT)
- Resource Management/Contracting (RM)
- Security (SF)
- Environmental Management (SE)
- Safety (SE)
- Weather and Space Environment Analysts (TS)
- Legal (LC)
- Special Access Programs (ST)
- History Office (HO)
- Directed Energy (CN/TS)
- Joint Test & Evaluation (CN)
- Science & Technology (CN)
- Joint Force Testing (CN)
- Information Operations (CN/AS)
- Communications and Information (SC)

1.11 Ongoing Activities

During the life of an OT&E program, several activities are done repeatedly. Some of these activities include reviewing and commenting on various documents, developing and updating Test and Evaluation Master Plans (TEMPs) and Single Acquisition Management Plans (SAMPs), attending meetings, maintaining the AFOTEC MIN, tracking system certification and readiness status, inputting lessons learned via the Product Evaluation Process (PEP), obtaining contractor technical support, and presenting briefings.

1.11.1 Document Reviews

AFOTEC helps prepare key acquisition documents so that OT concerns are incorporated into the acquisition process. AFOTEC participation will vary depending on the situation. The document review process is managed by AFOTEC/XO (see Attachment 1 for detailed information). Some of the key acquisition documents are:

1.11.1.1 Mission Need Statement (MNS)

Effective with the new CJCS guidance, 3170.01C, a Mission Need Statement is replaced by an Initial Capabilities Document (ICD). The ICD is discussed in paragraph 1.11.1.6. No new MNS will be accepted for staffing, but a MNS may still exist for a program (ref CJCSI 3170.01C, paragraph 4.f.(2)). The MNS defines projected needs in generic operational terms without referring to a specific system, and contributes to the initial identification of OT Critical Operational Issues (COIs).

1.11.1.2 Analysis of Alternatives (AoA)

An AoA is conducted following a Concept Decision and validation of the ICD. The focus of the AoA is to refine the selected concept documented in the validated ICD. The AoA will assess the critical technologies associated with these concepts, including technology maturity, technology risk, and, if necessary, technology maturation and demonstration needs. The analysis aids decision-makers in judging whether or not any of the alternatives offer sufficient benefit that is worth the cost. AoAs can be used to understand the critical areas that affect accomplishment of an operational task. Thus, participation in the AoA process for a program can allow AFOTEC to play a key role in the early life of a program by gaining insight into the CONOPS, mission tasks, and model scenarios. AFOTEC can leverage information from participation in the "AoA Mission Effectiveness Working Group" for early planning and scope/cost activities. AS is currently tasked to provide necessary condition charts (NCC) in support of AF/XORD High Performance Team development of ICDs; this could extend to support AoAs as well. The designated SFTC or AS may periodically provide input to the Office of

Aerospace Studies (OAS) AoA Study Plan Assessment Area 6 (AoA linkage to the requirements document and Test plan) that is provided to the Air Force Requirements Oversight Council (AFROC). CA approves the input prior to it being sent to OAS. See AFI 10-601 and the AFMC/OAS website for more information on AoAs.

1.11.1.3 Course of Action (COA)

The COA is a planning and decision process that culminates in a MAJCOM Commander decision. The COA includes a series of alternative program choices developed by the Milestone Decision Authority (MDA) or a designate, presented to a MAJCOM commander. Once a specific COA is selected, it becomes a formal agreement between the MDA and the MAJCOM Commander that clearly articulates the performance, schedule, and cost expectations of the program. The COA provides the basis for the Technology Development Strategy (TDS) during the Technology Development Phase. The COA becomes the basis for the SAMP. The COA is designed to address differences in expectations up front and to develop a common understanding and agreement on program expectations. Approval at the MAJCOM Commander/MDA level of the selected COA ensures agreement among leadership on program expectations – performance (or incremental performance) at the specified cost and schedule. For each alternative program choice, the testers (developmental and operational) provide a preliminary T&E Strategy for the alternative. The preliminary T&E Strategy for the selected alternative serves as the basis for the final T&E Strategy, the TEMP, or the SAMP, as applicable in support of the milestone decision.

1.11.1.4 Program Management Directive (PMD)

The PMD provides HQ USAF program direction and guidance to the appropriate commands. It also designates the implementing, participating, supporting commands, and OTAs and their program responsibilities/relationships. It is important to know what the mandatory support obligations are for all listed agencies. If required, a Memorandum of Agreement (MOA) can be written to further clarify responsibilities (see paragraph 4.6). When reviewing the PMD the AFOTEC OPR should:

- Understand Air Staff recommendation for AFOTEC involvement in the OT&E related activities.
- Understand AFOTEC support requirements from/to the system program office (SPO) and other commands or agencies.

- Understand if the direction it proposes for AFOTEC (and/or the MAJCOMs) is correct and reflects AFOTEC's intentions. If not, then submit proposed changes to correct these deficiencies.

Note: See AF headquarters operating instruction (HOI) 63-1 *HQ USAF Guidance for Preparing Program Management Directives* for information on PMDs.

1.11.1.5 Operational Requirements Document (ORD)

Effective with the new CJCS guidance, 3170.01C, an ORD will be replaced with a Capability Development Document (CDD) or a Capability Production Document (CPD). The CDD and CPD are discussed in paragraph 1.11.1.6. An ORD may still exist for a program (ref CJCSI 3170.01C, paragraph 4.f.(3)). The ORD documents how users will operate, deploy, and support a system, and provides initial guidance for all acquisition agencies. An attachment to the ORD is the Requirements Correlation Matrix (RCM). The RCM provides an audit trail of the system's required capabilities and characteristics. It provides a summary of user needs and requirements. Key Performance Parameters (KPP) for the system are identified in the RCM. Close coordination with the MAJCOM during ORD creation will ensure requirements are developed sufficiently early to ensure complete OT&E planning, especially for evolutionary and incremental acquisitions. The AFOTEC reviewer analyzes the ORD requirements to ensure they are clear, operationally oriented, performance based, and evaluatable, and recommends changes, as appropriate. Of special concern are ORD requirements that are stated for a time period beyond the test (e.g., MTBF at IOC + 1 year or MC Rate at 10,000 hours). Reviewers highlight these areas of concern during early ORD reviews and work with the User to develop an interim ORD with capabilities-based requirements that would apply during the operational test.

1.11.1.6 Capability-Based Requirements Documents

Effective with the new CJCS guidance, 3170.01C, three new requirements documents will be used to document the capabilities required for a system. These are the ICD, CDD, and CPD. Each of these documents is developed at a particular point in a program's acquisition timeline by an HPT, supported by AFOTEC. Reference CJCSI 3170.01C for detailed information on each of these documents.

- The ICD documents the need of a materiel solution. The ICD replaces the MNS, and supports the AoA, the TDS, the Milestone A acquisition decision, and subsequent technology development activities. The ICD defines the capability gap in terms of the functional area, the relevant range of military

operations, desired effects, and time. When programs proceed directly to Milestone B or C, an ICD is generated, validated, approved, and forwarded with the associated draft of a CDD or CPD.

- The CDD captures the information necessary to develop a proposed program, normally using an evolutionary acquisition strategy. The CDD outlines an affordable increment of militarily useful and technically mature capability. The CDD supports the Milestone B acquisition decision. The CDD provides the operational performance attributes necessary for the acquisition community to design the proposed system, including KPPs that will guide the development and demonstration of the current increment. The performance attributes, including the KPPs, are expressed as thresholds and objectives. Performance attributes have previously been referred to as performance parameters or performance requirements.
- The CPD addresses the production elements specific to a single increment of an acquisition program. A CPD is developed after critical design review and is required prior to the Milestone C decision review. The CPD must be approved prior to LRIP and IOT&E.
- A threshold attribute is defined as the minimum acceptable operational value below which the utility of the system becomes questionable.
- An objective attribute is defined as 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.

1.11.1.7 System Maturity Matrix (SMM)

The SMM is a SPO-developed acquisition management tool used to aid management in tracking a program's technical progress and risks. The SMM links user requirements and system specifications with anticipated T&E results. It provides a metric for program monitoring and reporting so true progress toward verification of capabilities and requirements can be assessed. The SMM is coordinated with the user and OTA, and approved by the program executive officer (PEO) or designated acquisition commander (DAC). Though a useful acquisition tool, probably most important to the TD is that the SMM is not a substitute for a valid capability requirements document. The SMM is most useful for review in early operational assessment (EOAs), OAs, and certification template reviews.

1.11.1.8 System Threat Assessment Report (STAR)

The STAR is a document prepared by the intelligence community (AF/IN initiates the review process(es) and the Defense Intelligence Agency (DIA) validates the product) that serves as the single authoritative reference for threat data regarding an acquisition category (ACAT) I program. It describes the lethal and non-lethal threats against the proposed system and the threat environment in which the system will operate. For ACAT II and ACAT III programs, the document is known as the System Threat Assessment (STA). OT planners consider the threats identified in the STAR or STA. OT planners use the most current versions of these documents when defining realistic test and threat environments. These documents are key sources for developing the TEMP and are typically a key element in determining if a new program meets the user's requirements. AFOTEC/TSI is the headquarters point of contact (POC) for this information. As such, TSI represents AFOTEC in the threat assessment process and is a standing member of STAR development (Threat Steering Group) teams to represent an OT position. TSI also works with closely with the TD/core team to assure that realistic threat environments are used as a basis for test.

1.11.1.9 Acquisition Decision Memorandum (ADM)

The ADM documents the decisions made and exit criteria established for milestone decision reviews or in-process reviews. It specifies what must be done in the next acquisition phase. Operational testers need to be cognizant of and implement the decisions documented in the ADM. Of key concern to the reviewer is that the ADM will document if FOT&E is required after the FRP decision, the issues or questions to be answered, the funding, and the OTA that will conduct the FOT&E.

1.11.1.10 Concept of Operations (CONOPS)

A CONOPS is a statement about intended employment of forces and systems that provides guidance for posturing and supporting combat forces. Standards are specified for deployment, organization, command and control, basing, and support from which detailed resource requirements and implementing programs can be derived. When reviewing the CONOPS the reviewer should:

- Use it to gain an understanding of how the user plans to employ the system (which will provide operational realism for the test).
- Use it to help develop OT scenarios.

1.11.1.11 Security Classification Guide (SCG)

The SCG provides security instructions for all military and civilian personnel working on a system. It is available from the SPO and should

be read and understood by all test team members to avoid security violations. Working papers, test reports and briefings, computer operations, telephone conversations, mailing, courier deliveries, and meetings are governed by the SCG.

1.11.1.12 Request for Proposal (RFP)

RFPs are used in negotiated acquisitions to communicate Government requirements to prospective contractors and to solicit proposals. RFPs for competitive acquisitions shall, at a minimum, describe the Government's requirement; anticipated terms and conditions that will apply to the contract; information required to be in the offeror's proposal; and factors and significant subfactors that will be used to evaluate the proposal and their relative importance.

- Review the RFP, particularly Section H (Special Contract Requirements) to ensure it contains any special clauses necessary for executing the OT test concept and plan.
- Review Section L (instructions, conditions, and notices to offerors/bidders) to ensure test program requirements are properly addressed. If the T&E concept requires a integrated DT&E/OT&E approach, provisions must be included for protecting the quality and integrity of contractor test data for later use during IOT&E. If AFOTEC requires modeling and simulation (M&S) from the program, the RFP should include those models and simulations.
- Review Section M (Evaluation Factors for Award) to ensure it contains evaluation criteria necessary to select a contractor to support the T&E requirement.

1.11.1.13 Integrated Logistics Support Plan (ILSP)

The ILSP is an Air Force management plan for the integrated logistics support (ILS) process as documented in the program's logistics support analysis (LSA) report. This plan includes ILS elements that are integrated with each other and also with program planning, engineering, designing, testing, and evaluation during production and operation. It integrates the 10 ILS elements with the mission elements of a system throughout its life cycle. Some key points about the ILSP are as follows (refer to AFOTECPAM 99-104, *Operational Suitability Test and Evaluation,* for additional information):

- The ILSP and the LSA process are the basic management tools of the ILS program used to integrate logistic support elements and achieve program objectives.

- The ILSP defines the government's approach to achieve the ILS objectives for a specific weapon system acquisition or modification program. The ILSP describes the concepts, resource requirements, tasks, schedules, and subordinate plans associated with each ILS element. See *Defense Systems Management College (DSMC) Handbook, Integrated Logistics Support Guide*, for more information on the ILSP.

1.11.1.14 Modeling and Simulation Support Plan (M&S Support Plan)

The M&S Support Plan, developed by the program office, captures all the M&S requirements over the life cycle of an acquisition program including those for test and evaluation (DT and OT). TDs need to be aware of this document and ensure OT M&S requirements identified by the TD are included in this document as early as possible in order to be a part of the program office's M&S funding strategy (the PM is responsible for funding required M&S resources). Reference DoDI 5000.2 and AFI 16-1002.

1.11.1.15 Information Support Plans (ISP)

According to CJCSI 6212.01C, the ISP replaced the C4ISP. CJCSI 6212.01C, enclosure 1, has a complete description of the ISP. An ISP is developed for all ACAT and non-ACAT acquisitions and procurements to document Information Technology (IT) and National Security Systems (NSS) needs, dependencies, interface requirements, and the Net-Ready Key Performance Requirement (NR-KPP). The plan describes system dependencies and interface requirements in sufficient detail to enable testing and verification of IT and NSS interoperability and supportability requirements. The ISP also includes IT and NSS systems interface descriptions, infrastructure and support requirements, standards profiles, measures of performance, and interoperability shortfalls. The scope of the ISP is scaled to the relative size and funding profile for the program. The sponsoring or cognizant authority reviews, assesses, and approves the ISP for non-ACAT acquisitions and procurements, and forwards any critical interoperability or supportability issues to the ASD(NII)/DOD Chief Information Officer (CIO) and the applicable FCB for review.

- A ISP identifies needs, dependencies, and interfaces focusing attention on interoperability, supportability, and sufficiency concerns. It describes the link between operational processes and the supporting information systems architecture.
- ISPs describe operational, system, and technical architectures; intelligence, spectrum, security, connectivity, and interoperability requirements; communications and information manpower, training, and logistics requirements; shortfalls and solutions.

- Both the TD or the AS PM and the Battlespace Employment representative (AFOTEC/ASE) should pay particular attention to the ISP development because of the system-of-systems approach required to be described by the plan. This document is an excellent source of material for gaining knowledge of the larger picture into which the system under review fits.
- The core team and applicable AS POCs should pay particular attention to how the plan addresses DOT&E special interest items (SII) of information assurance and interoperability. They should ensure the Mission Assurance Category (MAC) code is identified (see DoDD 8500.1).

1.11.1.16 Other Useful Documents

There may be other documents that are valuable to the core team. These documents should be placed on the MIN for easy access by all core team members. If any AFOTEC member discovers documents that would have been useful during the discovery process, provide them to the TD and/or the AS PM for integration into training for new PMs.

1.11.2 DOT&E Special Interest items

See AFOTECI 99-103, paragraph 1.8.
DOT&E has policy letters on special interest items (e.g., interoperability, information assurance, and electromagnetic environmental effects (E3)). These policy letters are available on the MIN (see attachment 4). AFOTEC/AS has POCs who have SME contacts for each of these areas and they should be consulted, as necessary, during core team meetings.

1.11.3 Test and Evaluation Strategy

Programs that undergo a Milestone A decision have a test and evaluation strategy. Immediately upon forming, the ITT crafts a test and evaluation strategy to support pre-acquisition and early acquisition process activities. The T&E strategy primarily addresses M&S, including identifying and managing the associated risk, and early strategies to evaluate system concepts against mission requirements. The T&E strategy may be a precursor to a formal TEMP and may be in the same format as a TEMP.

1.11.4 Test and Evaluation Master Plan (TEMP)

Major Defense Acquisition Programs (MDAP) and Oversight programs require a TEMP to support Milestones B and C and the FRP decision. When required, the TEMP shall document the overall structure and objectives of the T&E program. It provides the framework within which to generate detailed T&E plans. It documents schedule and resource implications associated with the T&E program. It contains many of the

agreements among participants and specifies the levels of funding for the test. The criteria to be used to determine IOT&E readiness should be documented in the TEMP. When changes occur, it is critical the TEMP be updated to reflect the requirements of the newly designed OT. The TD submits updates to the TEMP as situations change and as required periodically by the SPO or OSD. Appendix 2 of the *Interim Defense Acquisition Guidebook* contains information on the contents of a TEMP. DOT&E is expecting the contents described in this appendix to be included in the TEMP, however the format is flexible. AFOTEC responsibilities include:

- Coordinate with the SPO to develop an integrated, seamless DT-OT plan to minimize test event duplication and streamline the process. For applicable programs, ensure the DOT&E Special Interest Items (interoperability, information assurance, and electromagnetic environmental effects) are properly addressed.
- Prepare Part IV (OT Outline).
- Review Part V (T&E Resource Summary).
- Ensure understanding of the T&E responsibilities of all participating organizations.
- The XO approves draft TEMP inputs prior to submission to the SPO.
- The AFOTEC Commander approves all final TEMP documents, regardless of ACAT level, including any significant or major changes to previously signed documents. TEMP signature authority may be delegated to the CV, XO, Det CC, or Director if the situation warrants (e.g., annex to previously approved TEMP, ACAT III program, match ranks of signatories).
- TEMPs for MOT&Es are signed by each of the OTAs. For multiservice TEMPs with AFOTEC as the lead OTA, the signatures of the other OTA commanders are obtained prior to submitting for AFOTEC/CC signature.

1.11.5 Single Acquisition Management Plans (SAMP)

The SAMP is a comprehensive, integrated plan that discusses all relevant aspects of a program. The SAMP should be written at a strategic level. Properly prepared, the SAMP meets the program oversight and statutory requirements contained in all other management plans for all levels above the PEO or DAC. If there will not be a TEMP for the program, then the SAMP must contain all of the information that would have been contained in the TEMP to provide an integrated, seamless DT-OT plan and minimize test event duplication and streamline the process. If there will be both a SAMP and a TEMP for the

program, then the SAMP can contain a summary of the test program as documented in the TEMP.

1.11.6 Meeting Attendance

OT planners attend various acquisition meetings either in person, via teleconference, or via video teleconference. Typical meetings are: Integrated Product Team (IPT) meetings, integrated T&E working group meetings, AoA meetings, etc. Depending on the program, the titles of these meetings may change. The common thread is that they are usually called by the SPO director or staff, or a contractor. When attending meetings, remember you are representing the AFOTEC Commander; give the most current AFOTEC marketing briefing (see attachment 4), when appropriate, and be prepared to ask questions and to give answers as a full participant on the program team. If in doubt about an answer or topic, take an action item to get back with the team at a later date.

1.11.7 Management Information Network (MIN) Requirements

The MIN provides AFOTEC with value-added information and features to assist in the daily test management and reporting functions of OT&E. The MIN is a web-based application that integrates a variety of data sources and applications into a centralized information portal. This information is stratified into general support information, specialized directorate information, and program specific data.

- The MIN allows program managers, test teams, and deployed test personnel to submit reports and documents throughout the life of the program.
- MIN information allows commanders to have greater insight to upcoming events and prompt notification of significant occurrences, to include safety and mishap issues involving AFOTEC programs, personnel, or resources. A MIN training manual is available to assist MIN users (see attachment 4).

For each program on the MIN, the test team is required to post program information in the test management area under the “documentation” tab. By keeping this area continually updated, an accurate documentation trail is available. The documentation area of a test program is broken down into several categories:

- Schedules.
- Test Orders.
- Agreements/Charters.
- Briefings.

- Test Plans.
- Test Reports.
- Program/Requirements Documents.
- Certification Documents.
- Meeting Minutes.
- Safety.
- Modeling and Simulation (M&S).
- Studies/Analysis.
- Multimedia/Graphics.
- Miscellaneous.

When a category is selected, a screen which explains what type of documents are included in the category will appear, along with applicable disposition requirements for each. Contact AFOTEC/SCSI for more information.

1.11.8 Air Force Manual (AFMAN) 63-119 Responsibilities

AFMAN 63-119 presents a structured mechanism or "process" to identify problems and risks associated with transitioning from DT&E to dedicated OT&E. It establishes a disciplined review and "certification process" beginning in the early stages of acquisition programs and culminating in certifications that lead to more successful OT&E outcomes. The certification process is a tool to help acquisition managers at all levels identify risks, reach negotiated agreements on issues, and render more accurate assessments of a system's readiness to begin dedicated OT&E. The process shall include a review of DT&E results; an assessment of the system's progress against critical technical parameters documented in the TEMP; an analysis of identified technical risks to verify that those risks have been retired during developmental testing; and a review of the IOT&E entrance criteria specified in the TEMP. Programs provide copies of the DT&E report and the progress assessment to USD(AT&L) and DOT&E. There are 63-119 templates that address interoperability, information assurance, and electromagnetic environmental effects (E3).

1.11.8.1 AFOTEC Implementation of AFMAN 63-119

TDs have the full backing of the AFOTEC leadership to clearly explain AFOTEC certification expectations to the program office. Since these expectations are already clearly defined in AFMAN 63-119, AFOTEC needs to encourage the SPO and developmental testers to comply. AFMAN 63-119 requires the developer to demonstrate stabilized system performance in an operational (stressed) environment with a production representative article. AFOTEC certification requirements should be documented in the program's TEMP.

1.11.8.2 Flexibility

The templates are flexible, and allow for application to any acquisition program. While all the attachments in AFMAN 63-119 are considered (and some are specifically required for OTA action), attachments 8, 15, and 19 are critical to successful OT&E and apply to all programs. Attachment 8 specifies that the system must "demonstrate readiness for dedicated OT&E in its intended operational environment" using CONOPS strategies and plans. Attachment 15 specifies that "sufficient operationally relevant DT&E must be done" before dedicated OT&E begins. Attachment 19 is the foundation which defines (for each program) what the production-representative article means. The SFTC, needs to have early and continuous dialogue with the SPO and the DT community to accomplish the requirements addressed in the templates. Any deviations from a true production-representative article should be scrutinized for potential limitations to the OT&E. When applicable and properly coordinated among test IPT members, the templates may be tailored or new ones added to assist in achieving the objective(s) of the certification process.

1.11.8.3 Communication

In order to avoid surprises to the SPO, DT community, or the AFOTEC/CC, to help the SPO produce a quality system, and to reduce the number of "stop test" actions, test team members need to continuously remind the SPO and DT community that AFOTEC expects compliance with, and completion of, the AFMAN 63-119 templates described here.

1.11.9 Product Evaluation Process (PEP)

Continuous improvement of AFOTEC's products and processes is done through the last of AFOTEC's three core processes, PEP. The PEP website on the MIN contains the following activities and reviews:

- Policy Review Board.
- Lessons Learned.*
- Product/Process Improvements.*
- Strategic Planning.

* The test team is strongly encouraged to submit inputs through these on-line databases for any improvements to AFOTEC's products and processes, or when lessons learned have been uncovered during test planning, reporting and execution.

Submissions are tracked from the input stage through resolution with continual feedback to the submitter. The PEP process owner is AFOTEC/CV.

1.11.10 Technical and Scientific Support

1.11.10.1 Determining the Need for Technical & Scientific Support

OT planners may identify technical needs required to perform specific tasks and should become aware of any test support shortfalls that may exist as the first test resource plan (TRP) is being developed. OT planners should explore the availability of technical support from TS and the Det/ST technical advisor, and other external military organizations or government agencies. TS provides technical and scientific support in the areas of evaluation, human factors, intelligence, test infrastructure, and meteorology. TSE ensures technically-feasible test concepts, analytically-sound measures and methods, and supportable conclusions for OT&E. TSH ensures human factors and system training issues are adequately addressed in OT&E, as well as provides technical expertise in assessments using questionnaires. TSI is responsible for ensuring the test program threat list and the test threat environment are adequately addressed, ensuring appropriate intelligence is used to support the test planning, developing the threat portions of AFOTEC test documents, and providing special security office (SSO) support. TST identifies, advocates, and develops test capabilities (open air range, ground test facilities, instrumentation, targets, and modeling and simulation) to support test teams. TSW ensures atmospheric and space environmental issues are adequately addressed during the OT&E process.

1.11.10.2 Determining the Need for Contractor Support

OT planners should make every effort to use in house support before turning to contractor support. This review is accomplished before obtaining contractor technical support and is documented in the delivery order (DO) file. OT planners should have a good idea of the technical expertise required and a level of support estimate needed before preparing the DO statement of work (SOW) or beginning discussions with any contractors. To this point no charges have incurred because discussions have been informal. Once firm requirements are determined, a request for a rough order of magnitude (ROM) cost estimate from a contractor(s) is made through the procuring contracting officer (PCO). Since these estimates are charged against the contract's program management delivery order, OT planners should ensure they are ready before requesting additional information from the contractors. Only the PCO can formally direct the contractor to conduct "new" work.

1.11.10.3 Technical Support Contracts

AFOTEC/RMC (contracting office) administers several long-term technical support contracts with different companies supporting the AFOTEC mission (see table 1.2). The contracts are "level of effort" type contracts with DO provisions. Complete instructions for planning technical support and preparing required DO SOWs are available electronically on the MIN (see attachment 4). A PCO in RMC manages these contracts. A Contracting Officer's Technical Representative (COTR) manages the contractor performance on a specific DO. The COTR resides where the work is being performed (Dir/Det/ST). The COTR should clearly understand the tasks and associated technical work and products being produced by the contractor.

Table 1.2. AFOTEC Contract Technical Areas

General Operations Support Contracts (GOS) (Small Business)	**Operational Test Support (OTS) Contracts**	**Rapid Test Support (RTS) Contracts**
Analytical Support	Early Involvement/Test Concept Development	Engineering and Technology Support
- Operations Research	Test Plan Development	Evaluation Support
- Computer Modeling and Simulation	Test Execution	Field Support
- Scientific/Engineering Support	Test Evaluation	Client Program Protection Support
OT&E Support	Test Reporting	
- Early Involvement/Test Concept Development	Test Capability Activities	
- Test Planning	Analytical Techniques	
- Test Execution	OT&E Investigations and Analyses	
- Test Evaluation	Advanced Technology Weapons Assessments	
- Test Reporting	Training Course Development	
Analytical Support		
- Operations Research		
- Computer Modeling and Simulation		
Information Technology Services Contract (ITS)	**General Management Support (GMS) Contract**	**Data Analysis System (DAS) Design, Analysis, and Support**
IT Solutions Support	Strategic Planning	Tool Design and Requirements Definition
- Website Services	Business Process Support	Implementation and Support, which includes:
- Database Services	Contracting Administration	- Implementation of Tool Design
- Programming Languages	Special Interest Studies and Technical Research	- Documentation of Tools
Network Support		- Training
Systems Support		- Test Support
IT Multimedia Support		- Data Analysis Support
		- Test Reporting

1.11.10.4 Selecting a Contractor

Test teams that require technical support from the existing contracts prepare DO SOWs so the contractors may prepare technical approaches and cost estimates for evaluation by a technical team. A technical team evaluates the technical and cost approaches to determine which contractor offers the best technical approach and the best value proposal. The PCO will award to the contractor offering the best value to the government. In cases where only one contractor has the expertise or the DO is a follow-on to a previous effort, a sole source justification to award directly to the contractor is approved by the PCO prior to contacting the contractor. Test teams should work closely with PCOs and Contract Specialists in RMC for contractual support. Information can be found on the RMC MIN page (see attachment 4).

1.11.10.5 Delivery Order

The DO SOW describes the specific work to be done, deliverables, schedules, and travel requirements. The DO SOW should be provided to the contract specialist in electronic format. DO format and award processes are available in RMC and are on the MIN for reference (see attachment 4). The resource section of the DO is normally left blank to be completed by the contractor with the full-cost proposal. The contractor may not begin any work on a DO until it is issued to the contractor by RMC. Depending on the complexity of the DO, the entire review and award process may take up to four weeks after a final DO is received. OT planners need to consider their overall contractor needs early in the program, just as any other resource requirements.

1.11.10.6 Delivery Order Management

The COTR may communicate directly with the contractor on matters directly relating to approved DOs. The COTR may not change the scope of the technical effort or the costs unless a change is processed through the PCO. COTR responsibilities are described in AFOTECI 64-101, *Subtask Statements*, Attachment 6. Personnel are trained by RMC before they can act as a COTR. RMC provides this training on a periodic basis as required.

1.11.10.7 Release of Intelligence Information to Contractors

There are restrictions on releasing intelligence information to government contractors. AFOTECI 14-303, *Release of Intelligence Material to US Contractors*, governs such releases, and TSI manages AFOTEC's intelligence release program. The purpose of these restrictions is to prevent the intelligence material from giving proprietary advantage to the contractor as well as to prevent inadvertent compromise of the information. The DD Form 254, *DoD Contract Security Classification*

Specification, on each contract specifies whether the release of intelligence is authorized for that contract. The COTR requests intelligence release on behalf of the contractor. Work with TSI to ensure that all intelligence data necessary for the contractor to complete his/her obligations is released.

1.11.11 Program Support by AFOTEC Dets/Operating Locations (OL)

Dets/OLs can greatly benefit AFOTEC by engaging with SPOs, product and logistics centers, MAJCOMs, and other key agencies early in the requirements, alternatives, and acquisition processes. Time permitting, the Dets/OLs should support early program support activities by discovering emerging requirements and new acquisition programs, and by obtaining key program documentation. By providing program support engagement, Dets/OLs will ensure AFOTEC's planning considerations are addressed, educate external offices about the benefits of AFOTEC's involvement, and enhance other organizations' communications with AFOTEC.

1.11.11.1 Establish a working relationship with SPOs

Dets/OLs collocated at Air Force Materiel Command product and logistics centers, if they have not already done so, are encouraged to establish a working relationship with the centers' SPOs. In support of the SV concept and integrated planning, each Det/OL should be prepared to actively participate in the Product Center's acquisition plan process and test strategy formulation as directed via an involvement/tasking order (IO/TO) or by XO. These Dets/OLs should actively look for the following: information to support AS (ST for SAPs) IO/TO preparation, new program basics (such as program name description and acquisition strategies), responsible test organization (RTO), and other POCs, related program documentation, program reviews and forecasts, and other information that may be helpful to establish collaborative DT-OT planning efforts.

1.11.11.2 Obtain program information

Dets/OLs collocated at MAJCOMs and similar key agencies should obtain program information such as program priorities, requirements documents, CONOPS, operating plans, ISPs and TTPs as requested. For example, Det 4's OL-LC at the Space and Missile Center (SMC) could become an integral member of the AFSPC and SMC modernization planning process (MPP) group, thereby providing AFOTEC early programmatic insight on new programs still in early concept phases. Whenever possible, the Dets/OLs should attend meetings that are in their geographical areas. Any such information obtained should be shared with the appropriate AFOTEC lead office (AS

or Det). Dets/OLs are also encouraged to make telephone contact with the division chiefs for ASA (Aircraft and Combat Support Division), ASC (C4ISR, Space and Missiles Division), ASE (Battlespace Employment Division) and/or the AS Technical Advisor for Program Management (ASN). In turn, AS will inform the Dets/OLs of any additional information requirements, programmatic concerns, and status of OT&E early planning efforts.

Chapter 2 Discovery

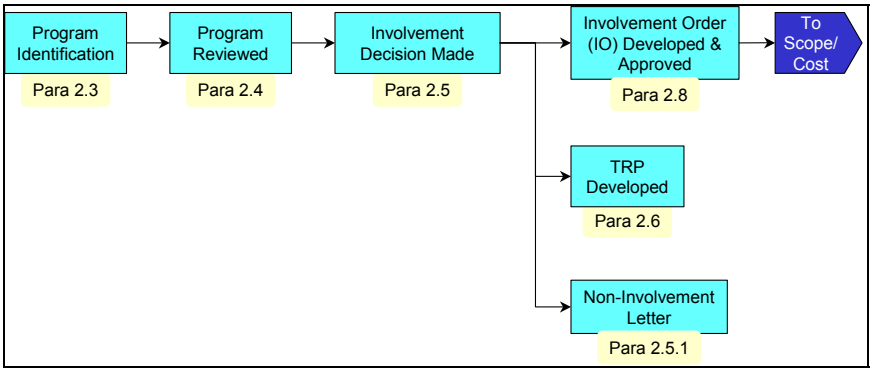

Figure 2.1. Discovery Overview

2.1 Introduction

This chapter addresses the phase of AFOTEC program participation known as discovery (see figure 2.1). Discovery is a continuous activity with AFOTEC/AS (ST for SAPs) personnel establishing relationships with Combatant Commanders, MAJCOMs and the Air Staff/Joint Staff in order to develop a clear understanding of theater operations. Discovery includes AS PMs investigating potential programs through involvement in MAJCOM MPPs, visits to AFMC product centers, conferences, and periodical reviews. The program identification phase of discovery also begins when AFOTEC personnel notify AS of any programs they become aware of. The discovery phase concludes with an IO (proceed to scope/cost) or a non-involvement letter/memorandum (terminate AFOTEC involvement. IOs and non-involvement letters are signed by AFOTEC/XO. Depending on the direction of the lead OTA, some or all of the discovery process may not apply. If AFOTEC is not the lead OTA, tailor the process to support the AFOTEC involvement in the program. AFOTEC ORM tools are used throughout the Discovery phase (see figure 1.7).

2.2 Continuous Discovery Activities

2.2.1 Understanding Global/Theater/CONUS Operations

Understanding global, theatre, and CONUS operations is a continuous ASE activity where relationships are established with Combatant Commanders, MAJCOMs and the Joint Staff in order to develop a clear understanding of all types of operations. The broad knowledge gained during discovery is applied in more detail during the scope/cost process while developing each program's NCC and Evaluation Framework (further defined in the *Develop NCC and Evaluation Framework* area,

paragraph 3.3). The NCC and Evaluation Framework forms the foundation for AFOTEC's OT&E efforts. It provides a balanced approach to evaluate or assess operational requirements (Effectiveness and Suitability) and operational impacts (Operational Impact Assessment (OIA) topics).

2.2.2 Exercise Involvement

AFOTEC senior leadership has placed increased emphasis on AFOTEC's participation in exercises. With sufficient, non-intrusive instrumentation, participation in exercises provides the most operationally representative and robust environment available to execute OT&E. Users will also benefit by receiving training, exposure, and an ability to comment on new systems much sooner in the acquisition process. AS is the focal point for this effort. This will provide the foundation of knowledge that will allow the exercise experts in AS to provide the core team with exercise information at initial core team meetings. They will work with the core team/test team to determine if exercise involvement is relevant to a program and which individual exercises, wargames, and experiments will be the most practical and beneficial for test team participation. Remember, AFOTEC involvement in exercises is intended to provide more realistic environments for the system under test; AFOTEC is NOT there to evaluate the exercise or its participants. AFOTEC works hard to cultivate relationships with exercise conductors and our participation needs to be on a non-intrusive, value-added basis.

2.3 Program Identification

Potential OT programs are identified by AFOTEC through participation in, and research of, MAJCOM modernization planning processes, joint operations (exercises/ACTDs), conferences and periodic reviews. Once a candidate program is identified for potential AFOTEC involvement, AFOTEC representatives advocate for AFOTEC concerns early. By participating in early planning meetings, AoAs, test and evaluation IPTs, and requirements resolution boards, AFOTEC will ensure that operational testing needs are met, operational realism is included as early as possible in testing, requirements are measurable, testable and achievable, and test capability shortfalls are identified with sufficient lead time for acquisition. AS reviews programs on a periodic basis with the potential gaining detachment to determine when programs will be submitted to XO for an involvement decision. As contacts and focal points are identified, the AS program manager should post these names to the MIN on the program's "team" page. This establishes a contact list for test teams to use once they get the program.

2.4 Program Review

A Program Review is a briefing by a PM to the AS Director. Programs are reviewed regularly for knowledge-sharing, maturity assessment, and readiness for an involvement decision. Content of the information briefing matches program information found on the MIN.

2.5 Involvement Decision

A PM schedules an involvement decision brief to the AS Director who makes a decision to: keep the program in Discovery; cancel through a non-involvement letter; recommend AFOTEC involvement (e.g., via an involvement order) to XO, or simply close out the program and archive the data on the MIN. To prepare for the involvement decision briefing, the PM responsible for a discovery program looks for various triggers that would indicate the direction a program is headed (e.g., funding, upcoming milestone decisions, documentation, user and SPO requests). OT decision tools, such as the AFOTEC Involvement Determination Process used by AS, provide a list of factors for PMs to consider when preparing a recommendation. Value-added factors based on reducing program risk and providing relevant information to the warfighter, potential costs, oversight, congressional interest, are just a few of the items PMs consider in the decision for AFOTEC involvement. The involvement decision brief and results are published on the MIN. The PM should estimate the cost of completing the scope/cost activities in the TRP. See the IO Template, and instructions for details on the preparation and coordination of the IO. Should the recommendation be to terminate involvement in the program, the PM follows the AS procedures for obtaining the XO signature on a non-involvement letter to the user/SPO.

2.5.1 Non-Involvement Letter

If the involvement decision results in a determination that AFOTEC involvement is not appropriate or warranted, then a non-involvement letter is prepared by AS PM, coordinated with user (MAJCOM requirements and MAJCOM tester) and SPO, staffed through AFOTEC Electronic Coordination System (AECS) 2Ltr (Det/ST, XP, XO) then staffed for XO signature. The letter is sent to HQ AF/TEP with copies to the user and developer. Send a copy of the signed letter to Det 1 for possible NTA considerations. The non-involvement letter states:

- AFOTEC will not be involved in the [name of system].
- Justification for AFOTEC non-involvement [state reason].
- Recommendation for MAJCOM [name of MAJCOM] testing, if any is needed and if needed, a negotiated position on who will fund the testing if within 12 months of test start (unless the program is client funded).

- Restate the position of the user and SPO and identify offices/individuals and their phone number.

2.6 Initial Test Resource Plan (TRP)

The TRP is the basic tool for test program resource planning. It is the resource management document for AFOTEC-conducted IOT&E, QOT&E, FOT&E, OUE, ACTD, and battle lab demonstrations. The TRP is used to program all resource requirements to support OT&E requests and is the source document for all OT&E inputs to the Air Force Program Objectives Memorandum (POM) and budgeting processes. TRPs are written agreements between AFOTEC and various MAJCOMs, agencies, or organizations (e.g., AF Information Warfare Center (AFIWC), JITC) that agree to provide resources necessary for testing, and they are required throughout the test (Discovery through Reporting). Early coordination is necessary to ensure that all resource requirements can be met, including the possible need for an MOA. Only the focal points between AFOTEC and the MAJCOM can work these issues. TDs need to work with the test resource manager (TRM) to understand the process before initiating contact with MAJCOM. For POM purposes, AS will maintain umbrella TRPs for programs expected to have multiple increments requiring a series of tests over a long period of time.

Prior to an IO, the AS TRM prepares an initial TRP at the request of the AS PM. During the discovery stage, the AS PM provides TRP updates to the AS TRM. The detachment TRM consolidates detachment comments and provides to the AS PM for review and incorporation into the TRP. While in AS, the TRP will be reviewed and revised every six months IAW the standard TRP review procedures. TRP cost must be updated to the dollar level being coordinated in the IO prior to final approval of IO. When a program has an AFOTEC involvement decision, the AS program manager and the detachment test team will work together to revise and update the TRP. Once the IO is signed, the TRP will be turned over to the detachment.

TRP REVISONS: TRP management is a continuous process, not a one-time event. TRPs are revised on 6-month cycles throughout the life of test programs and whenever test resource requirements change outside the cycle. The TRP must be reviewed at the involvement decision. If it is determined that AFOTEC will not be involved in the program, then the TRM will remove dollar estimates from the TRP database, and leave all other TRP data intact in case the program is revived at a later date.

2.7 Initial OTPM Network Development in AS

The Involvement Order (IO) to Tasking Order (TO) network will normally be the first project network to be developed. It will serve to guide the AS

program manager from the involvement order through the required actions necessary to develop and coordinate the tasking order. The key delivery date driving this network is normally the TO need date. The TO need date will be an estimate of the goal for transferring program responsibility and authority from AS to the test team. Since the TO need date is an estimate, developed early in a program, the TO need date will normally shift as more refined project information comes available or as the acquisition baseline is solidified.

2.8 Involvement Order

The IO is drafted and coordinated through the staff by AS (except for NTAs). The program transfer date will be an XO decision based primarily on knowledge and confidence that an OT&E effort will be executed for this program and the schedule for the development effort. AFOTEC/Det 1 is responsible for the involvement recommendation on NTAs. The IO directs the following:

- Change the phase of the program from "discovery" to "scope/cost" and record the change in the MIN.
- Assign an AFOTEC detachment to be the SFTC and manage funding for the program within AFOTEC guidelines. The SFTC is also the lead spokesperson for AFOTEC when dealing with external organizations. In some instances the test may involve more than one detachment. If such a case arises, early in the scope/cost process the core team should propose to the XO which detachment will be the lead OT&E organization.
- AS maintains responsibility for managing the scope/cost process and will schedule core team activities as requested by the detachment, acts as process lead for those meetings, and shares responsibility for updating the MIN in coordination with the detachment. Any required interface with the developer in support of the scope/cost process or other activities is a SFTC (detachment) responsibility.
- A TRP for the OT Program. This TRP covers the *most likely* OT resources and costs associated with the program to cover the time period from the IO to the final report. In many cases, this TRP will be a modification to an existing TRP created earlier in the discovery phase. In some cases the specifics of a program will not be available and only the experience of the team representatives will make it possible to give XPP an initial POM estimate that can stand the test of time. Since this process takes place early in a program's life, initial test design could range widely; therefore, final approval of the initial test design generated comes during scope/cost.
- Test program description.

- Scope/cost process activities to include a timetable for the process to develop an NCC and evaluation framework and initial test design.
- Specify what other type of involvement the core team should have for the program in question.

2.9 Expedited Approval Process

The expedited approval process applies specifically to client-funded OT activities (non-traditional assessments and traditional OT&E). Detachment commanders and directors may request the expedited approval process when the normal coordination and approval timelines would not meet the needs of the test schedule. This situation may occur as a result of a tight execution timeline or when AFOTEC involvement is requested late in the planning phase. The expedited approval process for client-funded NTAs and traditional OT&Es differ slightly. The unit POC should ensure all documents coordinated using the expedited approval process are marked "EXPEDITE" at the top of the document. E-mails should be sent as high-importance.

2.9.1 Non-Traditional Assessments

The expedited approval process for NTAs proceeds as follows (see figure 2.2):

- Client requests AFOTEC support.
- Detachment commander contacts XO via e-mail (preferred method) to document the request for approval to provide AFOTEC support and use the expedited approval process. With XO concurrence, detachment commander contacts AFOTEC/CV to request approval to provide AFOTEC support. If either XO or AFOTEC/CV disapproves support request, Detachment commander informs client of AFOTEC non-involvement.

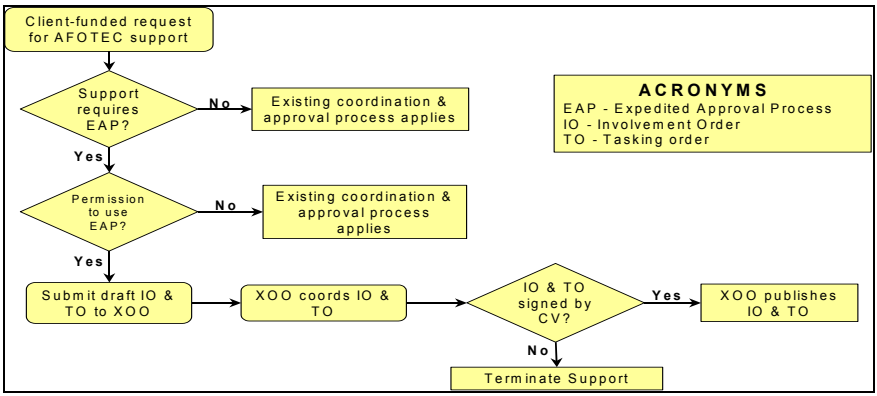

Figure 2.2. Non-traditional assessments

- If XO approves the request to use the expedited approval process, the Det CC identifies a unit POC who begins concurrently drafting both the IO and TO. If XO disapproves the request to use the expedited approval process, the detachment uses the existing coordination and approval process.
- Using the IO and TO templates, the detachment POC submits the draft IO and TO to the XOO corporate account within two duty days of XO approval to use the expedited approval process.
- XOO packages and distributes the IO and TO to the corporate accounts of AS, XP, TS, LC, RM and CA. Comments are returned to XOO corporate account the following duty day.
- XOO consolidates the responses and coordinates the recommended changes with the unit POC over the next two duty days. Any significant changes are recoordinated with the 2-ltrs.
- XOO forwards the revised IO/TO package with recommendation for signature to AFOTEC/XO. If the package is approved by AFOTEC/CV, XOO e-mails the unit POC and the affected Det/Dir corporate accounts and places the program on the MIN.

2.9.2 Client-Funded Traditional OT&E

The expedited approval process may be used for client-funded traditional OT&Es and may result in eliminating the normal scope/cost process. The approval process is the same as for NTAs, but adds additional AS coordination in the following steps (see figure 2.3):

- Using the IO and TO templates provided by XOO, the unit POC submits the draft IO and TO to AS corporate account within two duty days of XO approval to use the expedited approval process.
- AS coordinates the draft IO/TO as identified above for an NTA and then submits a staff package to XOO the following duty day.

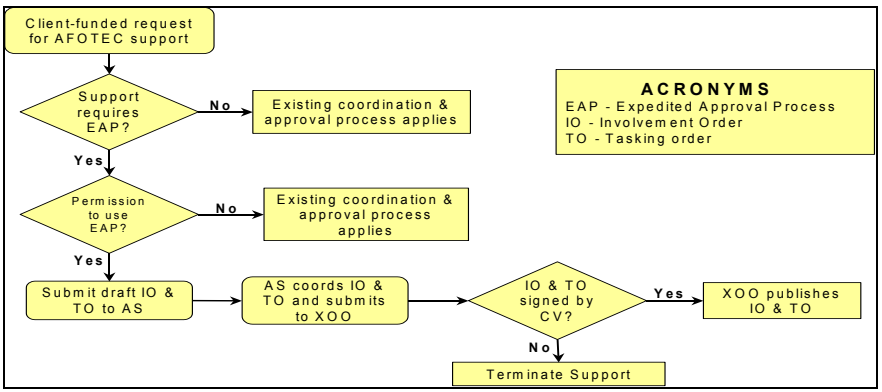

Figure 2.3. Client-Funded OT&E

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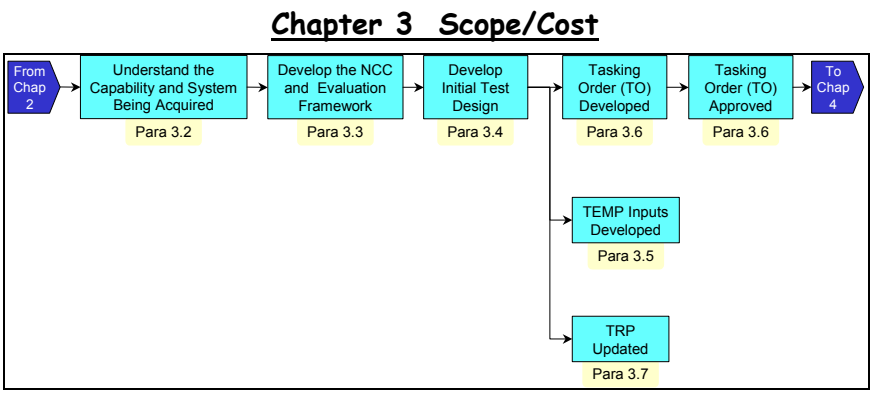

Figure 3.1. Scope/Cost Overview

3.1 Introduction

The scope/cost process is an element of the AFOTEC centralized BMP and is initiated by an IO that authorizes the expenditure of resources to support scope and resource allocation planning for a specified program (see figure 3.1). The goal of the scope/cost process is to provide a standardized approach for the corporate allocation of resources among all of the programs conducted by AFOTEC and to identify major test capability requirements and shortfalls. Even after a TO is issued, corporate review of scope or resource changes occur throughout the life of the program (see figure 1.5). The OTPM IO to TO network reflects the tasks required to move a program through the scope/cost process. Depending on the direction of the lead OTA, some or all of the scope/cost process may not apply for non-AFOTEC led MOT&E.

The CC has assigned XO as the owner of the scope/cost process within the BMP. XO has assigned AS responsibility for executing this process and XOO responsibility for methodology and standardization. The approval to proceed with work on a program is made by XO and documented in an IO. Following that, the output of the scope/cost process is a TO that documents commander's broad guidance regarding scope of the program's evaluation, allocation of resources, and responsibilities. The TO provides the foundation for detailed planning during the decentralized PDP. XO recommends the direction to be provided in the TO and CV approves the order. Deviations from the TO (scope, cost, or responsibilities) or changes driven by corporate considerations (e.g., budget cuts) require review through the scope/cost process for possible revision of the TO. A possible outcome of the scope/cost process is a recommendation to not be involved in the program. In this case, the procedures for non-involvement in paragraph 2.5.1 are followed.

Since AFOTEC's product is "information," the allocation of resources is driven primarily by the "operational value of the information" provided by AFOTEC, however, the allocation of resources also takes into account other corporate constraints (e.g., oversight programs). So, considering all of AFOTEC's programs, the goal is to maximize the "operational value of OT&E information" within the bounds of overall budget constraints and within the constraints imposed by higher-level policy. This is best handled as a centralized corporate process, called scope/cost, using a standardized approach to develop "value of information," "cost," and "allocation methodologies."

Another consideration driving the scope/cost process is AFOTEC's goal to move programs from the headquarters centralized BMP to the decentralized PDP executed by the detachments and ST at an appropriate time based on program requirements and resource constraints. The transformed evolutionary acquisition process used by program offices dictates that the scope/cost process be executed early, during the formative program stages, and that it be done quickly so that the program can move from the headquarters to the field.

3.1.1 Core Team Members and Activities

Core team members for traditional programs include staff from AS, TS, XO, SC, XP, SE and the Det/ST test team. External participation such as the system program office, developer, and user is also highly encouraged. An initial core team meeting is held, either virtually or in person, to introduce the core team members, assign responsibilities, and address programmatics. Following this initial core team meeting, the core team begins to develop the NCC and populate the evaluation framework (EF). Finally, the core team develops the initial test design. Frequent core team meetings are encouraged and should be held as necessary to complete Scope/Cost activities. The core-team makeup and level of expertise are key to successful outcomes. Core team members also participate in ITT meetings as required by the AFOTEC SFTC. The AFOTEC Technical Director (CA), the Chief Scientist (CN) and their staff are not considered members of the core team, however, they will provide necessary assistance and guidance to ensure the technical sufficiency, adequacy, and credibility of all programs. The core team should refer to the ATTIC (see attachment 4) and use the CA Question Set to review the various products developed throughout the scope/cost process.

3.1.2 Core Team Member Responsibilities

- Det/ST test team: Will be the SFTC, manage funding, share responsibility for updating the MIN in coordination with the AS

PM, update the ITD portion of the EF provided by ASE following the ITD core team meeting, and prepare, coordinate and present the initial test design and associated briefing. Following TO publication, with core team support, manage the program and execute all activities.

- AS Program Manager: Manage the scope/cost process, schedule core team activities and share responsibility for updating the MIN in coordination with the Det/ST test team. Provide draft TRP. Develop an OTPM Network for the test project. Following initial test design approval, prepare, coordinate, and publish the TO. Following TO publication, in coordination with the Det test team, maintain cognizance of the program throughout AFOTEC's participation.
- ASE Staff: Facilitate core team meetings, develop the NCC, draft evaluation frameworks, support development of initial test design, and provide an updated EF to the core team following the ITD core team meeting to facilitate further ITD development.
- AS SII POC: Provide consultation on special interest items.
- TS Staff: Assist AS with facilitation of core team meetings dealing with test design. Facilitate operational test design methodologies, lead identification of major test capability requirements and shortfalls, provide assistance with development of realistic threat scenarios, support development of technical sufficiency, credibility, and adequacy, recommend whether analysis support can be provided in-house or externally, and ensure additional tools are available as necessary in addition to supporting core team activities as required. TS has responsibility to provide support to the core team in the areas of effectiveness analysis, suitability analysis, modeling and simulation expertise, ITD expertise, weather, intelligence, human factors, and test infrastructure. After the first core team meeting, TS will determine which of these areas of expertise are necessary for the given program and will inform AS and the Det of the necessary TS core team members.
- XOO Staff: Provide oversight of all scope/cost processes on behalf of the XO.
- SC/RM Staff: Provide computer/resource support.
- XP Staff: Provide policy guidance.
- SE Staff: Provide environmental, safety, and health guidance.

3.1.3 The Scope/Cost Process Steps

Major steps in the scope/cost process include:

- Understanding the capability and system being acquired.
- Developing the NCC and EF.

- Developing the OT&E initial test design.
- Tasking.

This chapter will explain the details involved with each of these steps. AS works with the detachment TD to ensure external expertise is brought in as required to support the scope/cost process. XO ensures standardization of the process across all OT programs. The OTPM IO to TO network should be maintained to reflect the latest status of the tasks required to be performed in order to generate the tasking order.

3.2 Understand the Capability and System Being Acquired

The core team researches and collects capability-based requirements and system information from various sources to include requirements documents and associated architectures, CONOPS, ISPs, TTPs, SPO documentation/discussions, etc. This is accomplished to understand where the system fits into battlespace operations and to understand the system's operational capabilities and limitations. The operational significance of the required capabilities needs to be sufficiently understood in order to properly scope the overall evaluation. The core team needs to know as much information as is available to begin to determine how this new or modified system will fit into the battlespace to support development of a meaningful NCC/EF. The core team should consider the following areas:

- Describe the system that is to be acquired – capabilities and operating limitations.
- Identify functions that are performed within the operational task that the system will directly affect.
- Define the bounds of the "system" to support the acquisition and the T&E processes (to what extent do other systems, beyond the system being acquired, need to be considered to support the acquisition and T&E processes?).
- Describe issues that must be resolved to support the acquisition and T&E processes (technical as well as operational).

3.3 Develop the Necessary Condition Chart and Evaluation Framework

Development of the NCC and EF begins following the publishing of the IO. AFOTEC/ASE is responsible for developing the NCC and EF, with support from the core teams and other subject matter experts. The steps involved in NCC and EF development are shown in figure 3.2. Each of these steps is discussed in the following paragraphs.

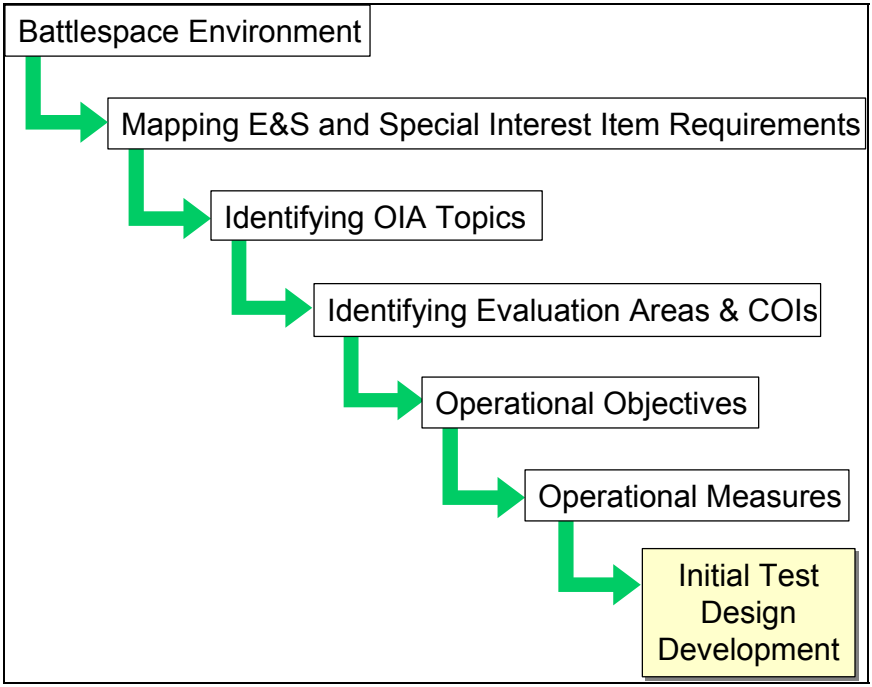

Figure 3.2. NCC and EF Development Roadmap

An initial NCC, referred to as “Chart 1,” is developed by ASE. The NCC (see figure 3.3) is a pictorial depiction, from a "system of systems" view, of the Joint and/or Air Force Doctrine Mission Area and Mission Scenario that a new program is intended to support when fielded. This is developed using the information provided in the involvement decision briefing, the broad knowledge gained during the "Understanding Global, Theater, and CONUS Operations" portion of the discovery phase, Joint and Air Force doctrine, and all available program documentation (AoA, system CONOPS, ICD, CDD, TEMP, T&E Strategy, Air Force CONOPS, associated architectures, etc.).

Once depicted with a NCC, the Mission Areas/Scenarios are described as the Battlespace Environment. The Battlespace Environment consists of primary nodes and major phases that are identified for a typical operation linked together with necessary conditions methodology. Primary nodes are significant elements of the operation. Major phases are logical groupings of primary nodes and are used to add clarity and understanding to differing pieces of the battlespace. Major phases of the operation typically become apparent after the primary nodes are linked, and they are further differentiated using different colors to associate the primary nodes with their respective major phase.

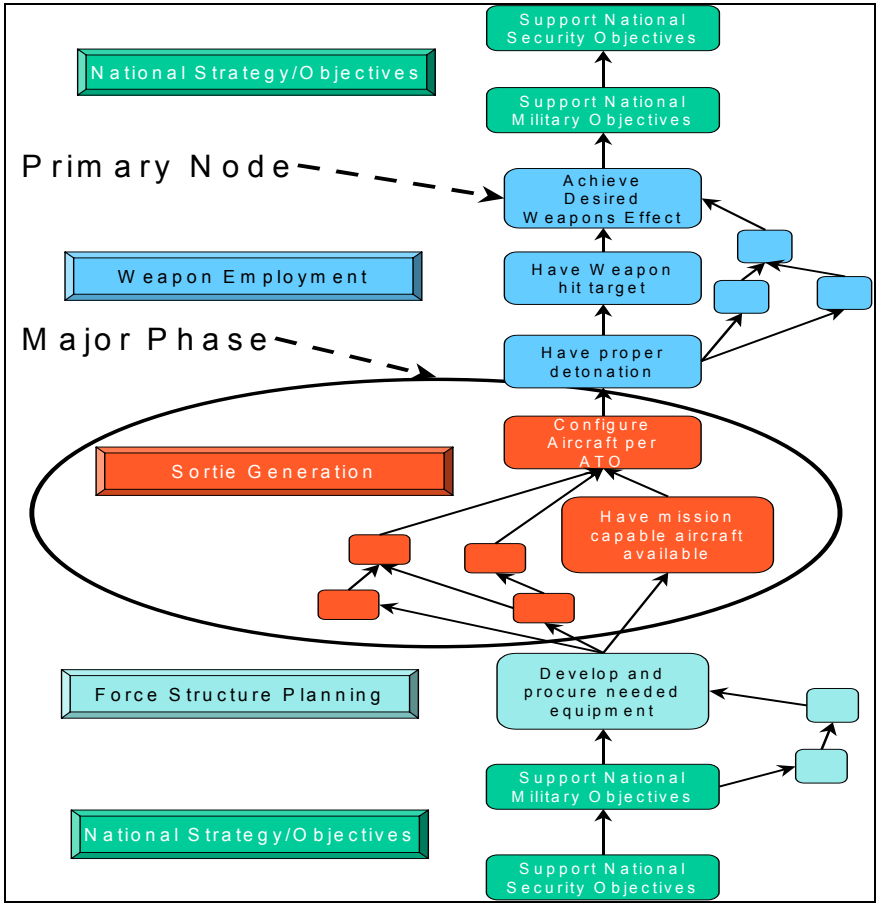

Figure 3.3. NCC Battlespace Environment

For every NCC depiction, the top two primary nodes and bottom two primary nodes are always the same: Support National Security Objectives and Support National Military Objectives. This depicts how national strategy (top) determines what new systems are acquired (bottom), and how these systems ultimately support national strategy (at the top again). These top and bottom nodes also reflect the chart's usefulness when tying the battlespace together from thinking up a needed capability (bottom of chart), based on national strategies, to fielding (or exercising) the capability that ultimately supports the same national strategy (top of chart). The major phases, Combat Support Planning and Force Structure Planning and Deployment, are also very similar on most charts because systems are acquired and fielded in basically the same manner. The remaining major phases and primary

nodes will be tailored to each system to reflect the relevant operational battlespace environment.

3.3.1 Review of "Chart 1"

A review of the Chart 1 is done to give everyone an understanding of the Mission Areas/Scenarios depicted. The team discusses the nodes and linkages between them and proposes changes (add/delete nodes, modify linkages, modify wording in nodes). The goal at this point is to understand and validate the draft battlespace depiction. Later mapping of operational capabilities to the appropriate nodes will lead to further discussions and potential for more modifications to the structure or wording on the chart.

3.3.2 Mapping E&S Capability Requirements

After the Chart 1 has been reviewed and/or revised by the core team, creation of Chart 2 begins. Chart 2 builds upon the Battlespace Environment depicted on Chart 1 by adding operational capabilities, special interest items, and OIA topics "mapped into" the operation (see figure 3.4). Operational capabilities can be found in a variety of documents such as the ICD, CDD, CONOPs, ISP, etc. Operational capabilities are linked to the primary nodes in the depiction where data would most likely be generated during a typical operation. While mapping requirements, keep in mind that teams will likely identify additional requirements, such as special interest items like IA, interoperability, and E3. Also, certain requirements, such as interoperability requirements, may be inherent to the entire depiction. When this occurs, map the requirements to the fewest nodes possible, without sacrificing the requirement's relationship with the depicted environment.

In the operational environment, interoperability needs are defined during the development of capabilities based operational requirements. The old method of addressing an Information Exchange Key Performance Parameter has changed to addressing the new Net-Ready KPP IAW CJCSI 6212.01C. The Net Ready KPP levies interoperability and Information Assurance requirements for IT and NSS systems (Global Information Grid). The Net Ready KPP does not apply to non-GIG systems. For non-GIG systems, the existing Interoperability SII applies but as an SII and not a KPP. During the development of the NCC and EF, interoperability between systems or issues associated with multinational or joint operations and the Net-Ready KPP should be identified and mapped into the NCC.

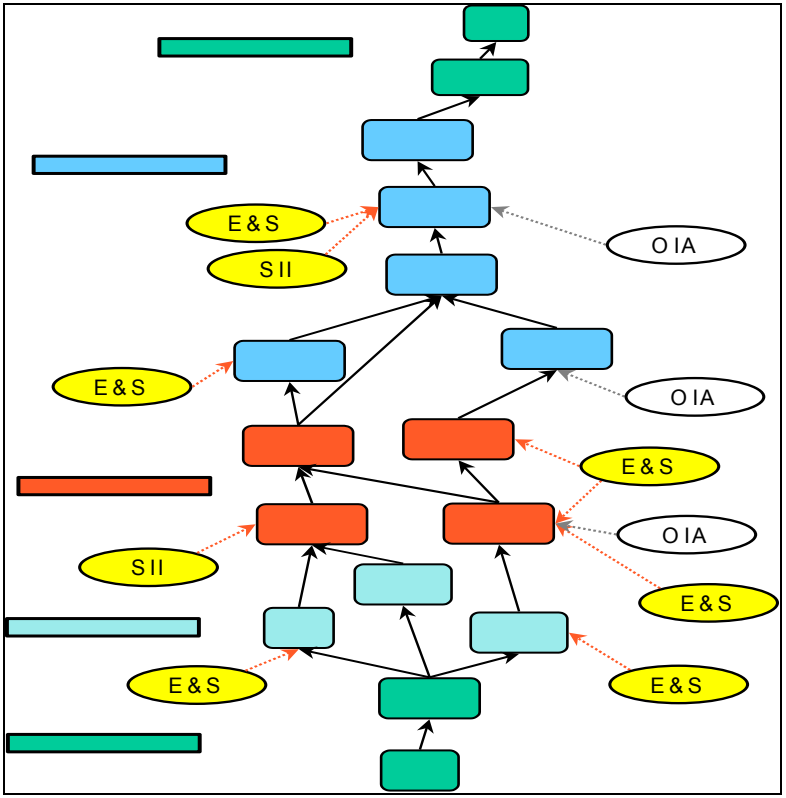

Figure 3.4. Mapping E&S, SII, and OIA

- Net-Ready Key Performance Parameter (NR-KPP). The centerpiece of the new interoperability and supportability certification process is a new, NR-KPP, which replaces the previous Interoperability Key Performance Parameter.
- The NR-KPP assesses net-readiness; information assurance requirements; and both the technical exchange of information and the end-to-end operational effectiveness of that exchange. The NR-KPP consists of measurable and testable characteristics and/or performance metrics required for the timely, accurate, and complete exchange and use of information to satisfy information needs for a given capability. The NR-KPP, documented in CDDs and CPDs, shall be used in analyzing, identifying, and describing IT and NSS interoperability needs in the Information Support Plan (ISP); and test strategies in the TEMP. The NR-KPP is comprised of the following elements:
  - Information Assurance. Compliance with Information assurance accreditation.

- Compliance with the Net-Centric Operations and Warfare Reference Model (NCOW RM). The NCOW RM describes the activities required to establish, use, operate, and manage the net-centric enterprise information environment to include: the generic user-interface, the intelligent-assistant capabilities, the net-centric service capabilities (core services, Community of Interest services, and environment control services), and the enterprise management components. It also describes a selected set of key standards that will be needed as the NCOW RM capabilities of the Global Information Grid (GIG) are realized.
- Compliance with Applicable GIG Key Interface Profiles (KIPs). GIG KIPs provide a net-centric oriented approach for managing interoperability across the GIG based on the configuration control of key interfaces. A KIP is the set of documentation produced as a result of interface analysis which: designates an interface as key; analyzes it to understand its architectural, interoperability, test and configuration management characteristics; and documents those characteristics in conjunction with solution sets for issues identified during the analysis. Relevant GIG KIPs, for a given capability, shall be documented in the CDD and CPD. Compliance with identified GIG KIPs shall be analyzed during the development of the ISP and TEMP, and assessed during Defense Information System Agency (DISA) (JITC) joint interoperability certification testing.

3.3.3 Mapping Special Interest Items (SII)

In the Evaluation Framework (EF), list any special interest items that may come from the AFOTEC Commander or are higher headquarters-directed that affect the system in development, related system, or support equipment in the intended operational environment. Examples are interoperability, information assurance, E3, and global positioning system (GPS) signal loss. These SIIs may be the subject of developer/program office certification for dedicated OT&E and require AFOTEC assessment. (NOTE: Test directors should review current policy letters and instructions for an updated list of AFOTEC Commander and higher headquarters special interest items.) DOT&E policy letters on special interest items (e.g., interoperability, information assurance, and environmental electromagnetic effects) are available on the MIN (see attachment 4). GPS signal loss is an AFOTEC/CC SII. AFOTEC/AS has appointed POCs for each of these areas and they should be consulted during evaluation framework development. The HQ AF/XI website has additional information on these SIIs.

3.3.3.1 Interoperability

Interoperability is defined as: The ability of systems, units, or forces to provide services to and accept services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together. Interoperability is also the condition achieved among communications-electronics systems or items of communications-electronics equipment when information or services can be exchanged directly and satisfactorily between them and/or their users. The degree of interoperability should be defined when referring to specific cases.

3.3.3.2 Information Assurance

According to AFDD 2-5, *Information Operations*," information assurance comprises those measures to protect and defend information and information systems by ensuring their availability, integrity, authenticity, confidentiality, and nonrepudiation (ability to prove sender's identity and prove delivery to recipient). IA includes the protection of information systems against unauthorized access or information corruption. IA includes the ability to restore information systems by incorporating protection, detection, and reaction capabilities. The test team continues to evolve the concept/methodology for addressing Information Assurance in accordance with the broad guidance provided in the approved test design. Refer to the IA template on the MIN (see attachment 4) for additional information on planning for IA evaluations. Additional IA-related information is available via the AS MIN page (see attachment 4). Contact the AS POC for IA for additional assistance on planning IA assessments or evaluations. The test team should ensure availability of the ISP and Continuity of Operations Plans (COOP). They should understand Network Risk Assessment (NetRA), certificate of networthiness (CoN), and SECRET and Below Interoperability (SABI) activities. The IA methodology should be articulated during CA-requested technical reviews to include identification of any IA-related waivers obtained by the SPO. TDs should refer to DoDI 5200.40, *DoD Information Technology Security Certification and Accreditation Process (DITSCAP)*, for information on DITSCAP requirements. During DT/OT, the test team should monitor/assist with AFIWC activities. Consider the need for a penetration test event, and/or an "IA demonstration" test event using standard scenario(s) based on real procedures, real operators, and production representative equipment. If viable, plan accordingly and reflect the plan in the TEMP and other test planning documentation. The CDD/CPD and system CONOPS (as they evolve) must be incorporated. The test team must also develop a detailed understanding of the information threats and risks. This will require research of the STAR and other related threat documents. Contact HQ AFOTEC/TSI for access to all current threat documents. Work with the intelligence analyst assigned to the program, other appropriate agencies, and users to further define

the specific nature of the threats and the means to counter those threats. Specifically, the TSI threat analysts will research applicable threat documents such as capstone threat assessments and system threat assessments, coordinate with other appropriate agencies, and user threat representatives to define the specific nature of the threats and the means to counter those threats. Based on the information gained above and from interactions with the user, program office, and certification and accreditation organizations, the test team may modify any aspect of a COI, objective, or methodology related to IA. As appropriate, any significant changes in scope or resources are coordinated with XO and CA. As detailed knowledge of the system becomes available, the detachment should develop a working knowledge of the connectivity of the system, the system interfaces, the information exchange requirements, COMSEC, COMPUSEC, INFOSEC, and other details of the system and operational architectures needed to refine the test concept.

3.3.3.3 Electromagnetic Environmental Effects (E3)

List any considerations concerning E3 between systems or issues associated with multinational or joint operations. Identify aspects that may be the subject of certification for dedicated OT&E. Reference: E3 and Spectrum Management (SM) Guide, on AS MIN Page, JP 3-51, and AFMAN 63-119 Template #20. E3 is defined as the impact of the electromagnetic environment upon the operational capability of military forces, equipment, systems, and platforms. It encompasses all electromagnetic disciplines, including electromagnetic compatibility (EMC)/electromagnetic interference (EMI); electromagnetic vulnerability (EMV); electromagnetic pulse (EMP); electronic protection (EP); hazards of electromagnetic radiation to personnel (HERP), ordnance (HERO), and volatile materials (HERF); and natural phenomenon effects of lightning and precipitation static (PStatic). SM is defined as planning, coordinating, and managing the use of the electromagnetic spectrum through operational, engineering, and administrative procedures, with the objective of enabling electronic systems to perform their functions in the intended environment without causing or suffering unacceptable interference. The major components of SM are spectrum certification and frequency assignment.

3.3.3.4 *GPS Signal Loss*

GPS signal loss is an AFOTEC Commander special interest item for operational testing. List any considerations concerning the loss of GPS signal on the system, any related systems, or support equipment.

GPS interference and jamming are two means that could produce signal loss and encompass any man-made or physical phenomena that denies

or degrades the GPS navigation and timing service to the intended user. Test teams should consider all possible causes of signal loss during test planning.

GPS interference is typically unintentional. High powered transmitters such as civilian television stations or military EW equipment, can produce harmonics in the GPS frequency band. Additionally, weather effects, such as ionospheric scintillation, can cause GPS signal fading, delays and phase distortions which adversely affect GPS reception and accuracy.

GPS jamming is an intentional act. Our reliance upon GPS is recognized by our adversaries as a "center of gravity." It is expected that in any future conflicts, the enemy will attempt to deny GPS in the battlespace. In addition, the enemy is expected to exploit the GPS Standard Position Service (commercial C/A code receivers) to gain a military advantage. Hence, GPS jamming is the intentional electronic attack performed by hostile or friendly forces to deny or degrade GPS reception.

All AFOTEC test programs need to consider the susceptibility to loss/disruption of GPS and its impact to the weapon system's operational mission. This assessment will use the best available intelligence on GPS jamming threats. If the potential exists that the operational mission will be impacted by GPS interference and/or jamming, TDs will conduct analyses and/or testing to ensure the user understands how the weapon system is affected by GPS denial or degradation. Additionally, TDs are encouraged to identify potential GPS issues early by participating in GPS systems analyses and tests with the contractor, program office, and developmental testers.

Several resources are available to assist core teams and test teams in evaluating GPS signal loss to include interference and jamming effects. The AFOTEC POC is the TS technical advisor who can provide TS resources in the areas of GPS jamming effectiveness analysis, modeling and simulation, range infrastructure, intelligence, and weather support.

3.3.4 Identifying OIA Topics

There is heavy reliance on core team experience and expertise when identifying OIA topics. Typically, topics are identified during the battlespace discussion and while mapping operational capabilities; however, the team may show up with previously identified topics. Regardless of the source, ensure they are clearly written to minimize the potential for later misunderstanding or confusion with E&S requirements (see table 3.1). Topics are mapped into the battlespace where they are most likely to influence the outcome of the operation.

Table 3.1. Identifying OIA Topics

OIA Topics clearly state what you know today, with enough detail to stand on their own.
• Poorly developed Topic: The MQ-9 should effectively disseminate real-time tactical data. - This topic resembles E&S and is concerned with a system level requirement, the ability to transmit data. It does not speak to additional capabilities beyond the system in the Battlespace. • Well developed Topic: The MQ-9 has the capability to disseminate real-time tactical data. Consideration should be given to determine how external users could maximize use of MQ-9 data beyond currently planned operations. - This Topic speaks to an additional capability realized by employment of the system. Utilizing this capability enhances other users in the Battlespace such as fighters and gunships. It could provide significant operational value.
Characterizing OIA Topics
• Topics address important warfighter information beyond the operational requirements. • Recognizing that there is a relationship between the system and the operation, topics may relate to E&S requirements; they are assessed for system-of-system impacts. • Topics go beyond effectiveness and suitability of the system under test and include additional capabilities and limitations that may not be addressed by the system itself. • Topics identify both potentially positive and negative impacts on the warfighter's ability to operate within the Battlespace, including operating environment, policies, and procedures. • Topics identify capabilities and limitations of the system, as it operates with, and among other systems, and examines the full spectrum of military operations and phases. • Topics are potentially outside the purview of system program offices and beyond system-level performance determinations.
OIA Topics are typically NOT
• Another place to capture derived operational capability requirements. • Part of the system design. • Programmatic issues. • Readiness to test issues.

When the core team determines that a Topic(s) requires immediate attention, it should be identified in an AFOTEC position paper. The position paper establishes an official AFOTEC position on a topic that may need immediate attention by the User, SPO, or other agencies. It gives the test team members the ability to address OIA topics earlier in the system development phase, rather than waiting for formal OT activities and mentioning for the first time in the final report. The core team, with the test team in the lead, authors the position paper for

release by the Detco. While considered a very valuable tool, not all OIA topics will warrant a position paper.

3.3.5 Identifying Evaluation Areas, COIs and Operational Objectives

After all requirements and OIA topics are mapped, development of Chart 2 continues by identifying evaluation areas (EA). An EA is a logical grouping of the depicted major phases and primary nodes. They are used to focus the team on a specific area of the battlespace depiction when drafting recommended COIs and operational objectives (see figure 3.5). This is important because not all major phases warrant a dedicated COI. In fact, it's common for some major phases to have no more than a couple of requirements mapped into them, maybe none at all. It is important to retain these phases with few or no requirements as part of an EA, to provide a complete battlespace depiction.

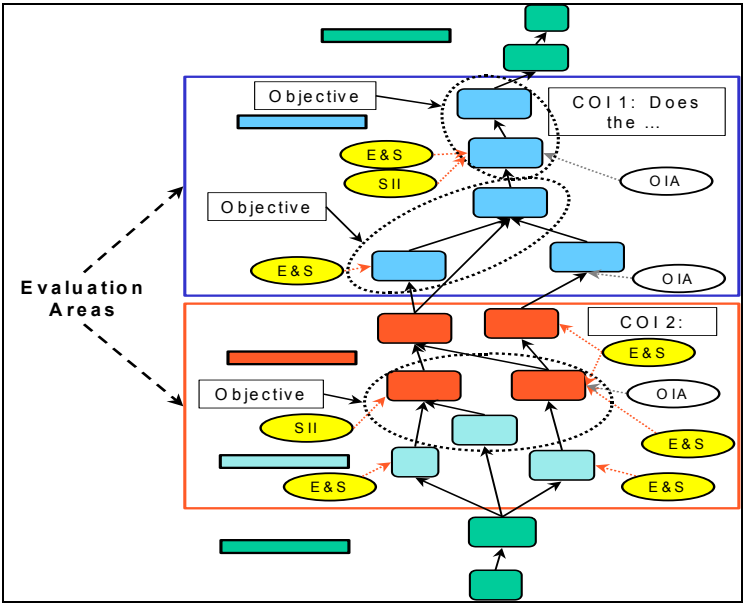

Figure 3.5. Identifying Evaluation Areas, COIs, and Objectives

The critical operational effectiveness and suitability issues that are examined in operational test and evaluation to evaluate/assess the system's capability to perform its mission. A COI is typically phrased as a question that must be answered to properly evaluate a system's operational effectiveness and operational suitability. In some cases, the question is expressed in absolute terms (i.e., yes or no) such as "Does/will system X support task A accomplishment?" In other cases,

the question is expressed in relative terms such as “How well does system X support task B accomplishment?” The latter is used when all system functionality has not been developed or when answering the degree to which the system supports task accomplishment. Tasks are developed/identified/documented using task analysis. Tasks are developed in coordination with the user and can be found in requirements documents (ICD, CDD, CPD (as applicable) and AoA), CONOPS, unit mission documents and AF doctrinal documents. Task analysis includes developing an understanding of the mission, tasks, system and operational environment and the process of documenting this understanding.

COIs are generally highly debated; therefore, it's always best if wording used to draft them coincides with wording from published documents like the ICD, CONOPS, Doctrine, etc. This technique ensures COIs refer to critical pieces of the operation, and they are more easily understood and defendable. While there is not a set number of COIs per EA, less is generally better than more to ensure they are truly "critical" issues. Each EA will have at least one COI and occasionally two or more. If it is determined that an EA needs more than one COI, the EA should be reevaluated to ensure it's been correctly identified. The rationale for this is to provide appropriate focus on the truly critical pieces of the operation; hence COI.

- COIs should not be convoluted (i.e., be conditional, ask two or more questions in one COI).
- Occasionally there is a system characteristic that is so important that failure to meet the associated parameter makes the system unsatisfactory for operational deployment, employment or sustainment. This characteristic and parameter may become a COI.

On occasion, programs that require an NCC have pre-coordinated COIs. For those programs, NCC development is executed the same through identification of EAs. Following identification of EAs, the core team determines if the existing COIs are valid or if new COIs should be developed. If existing COIs are valid, they are mapped into the EAs as appropriate. If new COIs are required they are drafted as described in the previous paragraph. While working with pre-coordinated COIs, it is important to remember the responsibility for re-coordinating them falls upon the test team. Therefore, unless the core team has significant problems with the pre-coordinated COIs, they should defer to the test team’s judgment regarding retaining the pre-coordinated COIs. Refer to paragraph 4.2.3 for additional information on COIs, to include examples.

3.3.6 Operational Objectives

After the COIs are drafted, high-level operational objectives are written. Operational objectives are developed by reviewing primary nodes and major phases in each of the EAs. The team is looking for those nodes with a significant relationship between the capability being acquired and the battlespace depicted (see figure 3.5). To help identify these relationships, the team should ask "who, what, when, where, and why" questions about the warfighter's activities depicted by the nodes within a given piece of the operation. These activities provide the basis for identifying the operational objectives. The emphasis here remains on the operation; however, objectives should be written for operations directly supported by the capability being acquired. Once the relevant nodes have been identified, they are grouped together and characterized with an operational objective title. The title captures the overarching essence of the action being accomplished. Operational objectives will be used to provide a framework and structure to the ITD process. The subsequent ITD steps will build upon the foundation established and lead to development of a test design for each operational objective.

3.3.7 Operational Measures

The operational objectives developed will be reviewed, and high-level operational measures of success will be drafted for each objective. To develop these measures of success, ask the question "what tasks or events define successful accomplishment of each objective?" These are not measures of effectiveness (MOE) or measures of performance (MOP) in the traditional test sense as discussed in Chapter 4; they are high-level warfighter measures of success for each operational objective. They are not necessarily quantifiable nor are they expected to be. At this point they are simply to drive OT rigor for early resource identification. Most of the operational objectives and operational measures will be further defined as test planning proceeds to the next level.

> Operational objectives and operational measures are tools to help facilitate the ITD process - specifically they help focus on the most relevant portions of the battlespace for the capabilities being evaluated. At this point, they are not test objectives or MOEs. However, during test concept development and test plan development, they provide good starting points to help develop test objectives and MOEs. They can provide a foundation for developing quantifiable objectives and measures.

3.3.8 Documentation of the Evaluation Framework

The ASE lead captures core team meeting discussions in the Evaluation Framework (EF). The EF provides the audit trail for the ITD, and

eventually supports development of ITD briefings. The EF is drafted with the latest information. The EF contains COIs, objectives, OIA topics, and all notes and tables resulting from the core team efforts. Additionally, ASE writes assessment statements that correspond to identified OIA topics. The assessment statements capture the intent to examine the impact of a given topic on a piece of the operation (see OIA examples in paragraph 4.2.3.2). It includes optional development of a COI-Objective-Requirements aggregation chart. This aggregation is normally placed in an attachment within the draft EF. The EF is then provided to the test team for limited distribution as the team determines appropriate.

3.4 Develop Initial Test Design (ITD)

The ITD builds upon the foundation depicted in the NCC, and provides the technical adequacy and rationale for the costs of the OT program. The ITD is prepared before detailed test planning. It is understood that not all planning details will be known at the time of the ITD presentation. The ITD fleshes out and documents the details that are known at the time of pre-test planning in order to build a solid basis for a test approach and to communicate that approach with others. This is accomplished by identifying the battlespace conditions and testing constraints, thereby leading to a set of test events. Further discussion leads to a basis of estimate and identifying resources (test articles, personnel, etc.), determining execution methodologies (field test, mod/sim, etc.), identifying test capability requirements and shortfalls, and refine the OT activities and schedule (operational utility evaluation (OUE), operational assessment (OA), OT&E, or combinations) plus level of involvement. The ITD process is facilitated by subject matter experts from ASE and TSE. ITD culminates in a briefing given by the Det/ST TD, which presents the information necessary to issue a Tasking Order. ITD will give the XO a high confidence that the level of involvement is appropriate and the cost is as accurate as available, and the CA can be assured of a technically adequate, sufficient, and credible OT, and the limitations and mitigation plans are clearly identified. Figure 3.6 illustrates the typical activities accomplished by the core team during development of the ITD following development of the NCC and initial EF.

For the purposes of the remaining discussion on ITD, an example will be employed to illustrate the ITD development concepts. The example employed here is not intended to be all inclusive nor complete. This example is not meant to be representative of all types of systems that AFOTEC deals with; it is just used for illustration purposes only. In this

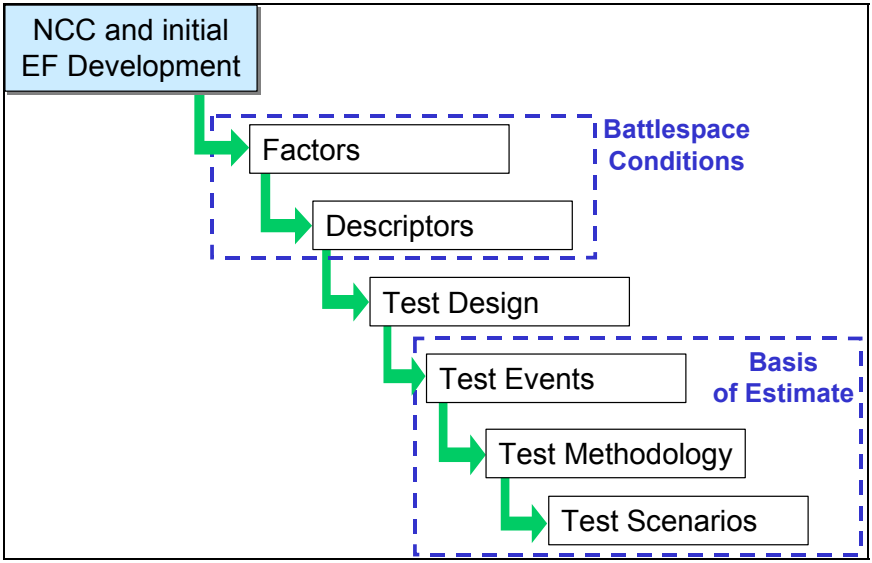

Figure 3.6. The ITD Roadmap

example, it is assumed that the NCC and initial EF has been built and that the following operational objectives and operational measures have been developed:

Operational Objective: Targeting
- Operational Measure: Accurate Target Detection
- Operational Measure: Target Acquisition Time
- Operational Measure: Correct Target Data

Operational Objective: Repair
- Operational Measure: Time to Repair
- Operational Measure: Correctly Repaired

3.4.1 Battlespace Conditions (Factors and Descriptors)

After the operational objectives and measures have been developed, battlespace conditions that significantly influence the operational measures, and thus the outcome of the objectives, are identified. A battlespace condition is defined by a set of factors, each set at a given descriptor level. A factor is a variable of the environment that affects task performance. A descriptor is a set level within the range of the factor. It is important to understand the factors influencing the operations in order to initially capture representative battlespace conditions in the initial test design. The terminology (conditions, factors, and descriptors) is derived from AFDD 1-1. The following two paragraphs are examples of battlespace conditions for the two operational objectives and associated operational measures, of targeting and repair.

The set of all factor and descriptor combinations forms the entire set of battlespace conditions. These battlespace conditions are captured succinctly in a chart (see table 3.2). Weather, terrain, time-of-day, and threat are all factors influencing the outcome of the operation. instrument meteorological conditions (IMC), mountainous, nighttime, and high are one set of descriptors for each. A single battlespace condition for the targeting objective and associated measures can be described by a specific combination of factors and descriptors. For example, weather is IMC, terrain is mountainous, time-of-day is nighttime, and threat is high is one possible combination or single battlespace condition. Another battlespace condition can be described as: weather is visual meteorological conditions (VMC), terrain is plateau, time-of-day is daytime, and threat is low.

Table 3.2. Operational Objective - Targeting

Operational Measures: Accuracy, T ne, Correct		
Factors	Descriptors	
Weather	IMC	VMC
Terrain	Plateau	Mountainous
Time-of-day	Nighttime	Daytime
Threat	High	Low

The set of all factor and descriptor combinations for the Repair operational objective and associated measures is shown in table 3.3. Wind speed, temperature, lighting, and uniform are all factors influencing the outcome of the operation. A single battlespace condition for the repair objective and associated measures can be described by a specific combination of factors and descriptors. For example, wind speed is high, temperature is freezing, lighting is poor, and uniform is Mission Oriented Protective Posture (MOPP) is one possible combination or single battlespace condition. Another battlespace condition can be described as: wind speed is calm, temperature is hot, lighting is good, and uniform is utility.

Table 3.3. Operational Objective - Repair

Operational Measures: Time, Complete			
Factors	Descriptors		
Wind Speed	High	Calm	
Temperature	Freezing	Hot	
Lighting	Poor	Good	
Uniform	MOPP	Utility	Cold Weather

3.4.1.1 Identifying Factors and Descriptors

Factors and descriptors are identified through a number of methods. For example, AFDD 1-1, *Air Force Task List*, provides a list of factors and descriptors. If studies such as an Analysis of Alternatives have been conducted, they may provide insight on potential factors. If requirements have been mapped on the Necessary Conditions Chart, they may provide specific factors of interest (e.g., "the system shall operate day and night," the factor is time-of-day). The core team itself, composed of the users, developers, operators, analysts, etc. brings a great deal of knowledge and expertise to brainstorm ideas on factors.

To identify factors, the team reviews each operational objective and the associated operational measures and asks the question "What factors potentially influence the measures and thus the outcome of the operational objective?" Some of these factors may be an explicit part of the environment in which the system will be employed (e.g., altitude, weather, network load). Other factors may not seem as directly related to the employment environment; such as manning level, technical orders, skill level. While part of the employment environment, will be established at given levels or descriptors by the user CONOPS or CONEMP. Yet others may appear as inherent system factors, which will likely be "as-is" when the system is employed. Examples of this include memory size, number of display screens, seat positions. This list is not intended to be an exhaustive set of factors, however, it is important to document all of the factors identified for future reference. For operational test purposes, attempt to focus on the set potentially having an effect on the outcome of the operation and:

- are likely to vary in the battlespace environment, or
- the user/operator can vary.

Also attempt to identify those factors likely to exist in the battlespace environment, but at a **given level** or **minimally related** to the system. Documenting those factors also provides potential areas to include in early test activities such as OUEs, EOAs, and OAs. During these test activities, some of the factors may not be "fixed" yet and assessments can be made about the impact of changing them.

After the factors are documented, appropriate descriptors are added to each factor. When identifying the descriptors, it is desirable to capture the range of possible descriptors. The decision on exactly which descriptors to test will be made later during test design. At this point, it may be recognized that several of the factors, particularly the inherent system factors, may be "as-is" for the operational test. In the example,

*An example of a factor at a **given level** is Technical Orders (T.O.). During both a test and during operations, you'll have whatever has been published at that date. There is no opportunity either for the battlespace environment to change the T.O.s or for the operators/maintainers to change the T.O.s. T.O.s are a critical part of any operation, and testers need to ensure they are considered as part of the battlespace conditions.*

*An example of a factor **minimally related** to the system can be illustrated with the Joint Tactical Radio System which tactical air control parties (TACP) employ. A factor identified is the type of terrain they're traveling over. If it is a bumpy road, it will take them longer to type in a message than it will if the road is smooth. This is related more to the keyboard on the mission planning computer than the radio, but it is part of the "real" operational environment the TACP must operate within using a JTRS radio.*

these are the factors of technical data, laser power, and field of view. It is not necessary to identify descriptors for those factors (the developer may wish to do this, though). Table 3.4 expands on the targeting operational objective example discussed in paragraph 3.4.1 and table 3.2.

All of the identified factors with their associated descriptors will form the possible battlespace conditions from which are selected a smaller set to test under, i.e. the test environment, to ensure operationally realistic conditions.

Table 3.4. Operational Objective - Targeting

Operational Measures: Accuracy, Ti ne, Correct			
Factors	Descriptors		
Weather	IMC	VMC	
Terrain	Plateau	Mountainous	Littoral
Time-of-day	Nighttime	Daytime	Twilight
Threat	High	Low	
Technical Data[1]	N/A		
Laser Power[2]	N/A		
Field of View[3]	N/A		

1. Will be the final publication.
2. Laser Power will be a single setting when system is delivered.
3. FOV will be whatever the system is technically capable of.

3.4.1.2 Prioritizing Factors

The set of all possible battlespace conditions depicted by the previous table can be quite large, in many cases far exceeding any reasonable capability to execute all them during operational test. The table of factors may also include factors in the battlespace, which:

- may not be related the operational measures for the system; or
- may be indirectly related to the operational measures; or
- may not influence the particular system under test.

Because of this, a prioritization process is used to rank factors based on their impact against each operational measure for each operational objective. This is the initial step in filtering the relatively large set of possible battlespace conditions into a smaller, executable set of test conditions for each operational objective developed. The prioritization process matches factors against the operational measures and the system. Emphasis significantly shifts from an operational focus to a test design focus. The difference between this step and previous steps is that significant consideration is given to the system's role, influence, effects, and capabilities on the outcome of the operational measures. The prioritization process assigns a high, medium, low, or none rating to each factor on a measure-by-measure basis. The rating is based on the potential (High, Med, Low, None) that if a factor is varied between its descriptors, the system's ability to perform the mission is likely to be influenced, leading to a significant change in the outcome (operational measure).

Note the rating is not based on the potential to encounter a particular factor/descriptor in the battlespace (i.e., the probability of targeting from an altitude of 30,000' AGL is high). Rather, it is based on the potential of a change in the descriptors producing a significant change in the system's ability to perform the mission thus impacting the operational measure (i.e. when I target from 30,000' AGL I miss by 100m, but when I target from 20,000' AGL I get a "shack"). Table 3.5 illustrates prioritizing factors for the targeting example.

The last three factors highlight the point of documenting all identified factors. In this example, these particular factors were previously recognized as going to be "given" or "as-is" when the system is delivered. Therefore, they are not prioritized since there is no possibility for them to change in the battlespace. The Technical Data factor is important to document since it is part of the battlespace and will be measured and reported. The last two factors (laser power and field of view) will be at a set value for the OT&E. Also note that the factor "threat" is given a Low rating for all operational measures. The team has

Table 3.5. Factor Prioritization

Targeting			
Factors	Operational Measures		
	Accuracy	*Time*	*Correct*
Weather	High	High	Med
Terrain	High	High	Low
Time-of-day	Low	Med	High
Threat	Low	Low	Low
Technical Data	-	-	-
Laser Power	-	-	-
Field of View	-	-	-

determined this factor is unlikely to have an impact; nonetheless it is documented as part of the set of factors. The last three factors and the factor "threat" are not removed from the list - they are still needed to ensure the test environment is operationally representative. Consideration will need to be given to them in resource planning as well as for test execution.

3.4.2 Type of Test and Test Design

Identifying factors and descriptors creates a refined depiction of the operational battlespace. This depiction covers a large variety of conditions. Prioritizing the factors was an initial step in filtering this entire set of battlespace conditions into a smaller, executable set of test conditions. The ITD process continues by introducing constraints and picking an appropriate design or set of designs. A critical step is to define the type of answers you wish to provide, i.e., the type of question and how you wish to answer it. At a top level, general categorization, there are three types of answers you can provide, 1) an answer that demonstrates something, 2) an answer that compares something, or 3) an answer that characterizes something.

- Demonstrate: To show that "something" is possible or not. There is no intent to provide any assurance or confidence the outcome is repeatable, although this may be implied.
- Compare: To show similarities or differences. Implied in the term is to provide some assurance or confidence that the similarity or difference actually exists (vice a chance event).
- Characterize: To describe and distinguish the elements of something. To show the differing results or outcomes under differing situations.

Given the type of answer you wish to provide, there are several test designs to choose from, some better suited for a specific type of answer than others. Again, as a generalization, there are five test designs discussed here. This is not an all-inclusive list, other designs exist, but these five general categories are well suited to operational testing. The five designs are: 1) Demonstrations, 2) Case Designs, 3) Comparisons, 4) Factorial, and 5) Combinatorial.

Each operational objective and operational measure may have its own test designs. For example, a factorial design may be chosen to describe the capabilities under a wide variety of battlespace conditions. In addition, case designs may be used to look at some very specific battlespace conditions the user is interested in. More than one design may also result because different operational measures may have a different set of operational factors potentially affecting the outcome. In this case, a test design (or designs) should be created for each operational measure. Where the set of factors are common between operational measures, then a common design or set of designs will suffice for those operational measures.

3.4.2.1 Demonstrations

Demonstration test designs are used to demonstrate that something is possible or not. They are generally single events, with no repetitions. There are no criteria to meet (e.g., how long, how easy, etc.), other than whether something is possible. However, measurements are still taken (e.g., it took 5 minutes to replace the line replaceable unit) and reported.

3.4.2.2 Case Designs

Case designs are used to demonstrate the capabilities of a system under a specified set of conditions. The selection of the particular conditions may be done using a variety of methods. One method may be "worst case," where the conditions chosen represent the most stressing conditions. Another method may be "typical case," where the conditions chosen represent the most commonly occurring conditions. Some "special cases" may be of particular interest to someone (to the user, OSD, Congress, etc.). A number of cases may be created using multiple methods. The criteria generally take the form of mission success (either yes or no). If a number of cases are created, many of them similar to each other, and the results compared to a criterion, this can give the unwarranted impression of confidence in the results.

3.4.2.3 Comparison Designs

Comparison designs are used to compare the results against a specific criteria or requirement. Explicit in comparison designs is the desire to

have confidence in the conclusion of passing or failing the criteria. Confidence is defined as the probability of drawing the "right" conclusion and not the "wrong" conclusions (i.e., you fail a criteria when it really does pass, or you pass a criteria when it really fails). Comparison designs require a number of replications of a test event under the same conditions leading to calculations of sample-size. "Fly-offs" and "side-by-side" designs are comparison designs because they take two test articles and test them under the same conditions then compare the results to draw conclusions.

3.4.2.4 Factorial Designs

Factorial designs are used to describe capabilities under a variety of conditions. They use a mathematically structured method to select test conditions from the entire set of battlespace conditions. This structure allows one to use statistical methods to draw conclusions about how the various factors describing the battlespace affect the outcome. These conclusions may be used to describe the varying capabilities of a system under different conditions as well as comparing against specific criteria. Factorial designs explicitly require one to identify the operational factors which will be varied between descriptor levels, those which will be fixed at a specific descriptor, and those that will simply be recorded or logged as is.

3.4.2.5 Combinatorial Designs

Combinatorial designs may be used when 1) constraints only allow for an extremely limited number of test events, and 2) there are a large number of operational factors describing the battlespace which are of interest. Combinatorial designs allow one to efficiently ensure coverage of this large battlespace by creating test events for all two-way pairs of factors at each descriptor (this may be extended to all n-way combinations, but the design becomes very difficult). The criteria for combinatorial designs is successful or unsuccessful, but with the provision that the entire set of battlespace conditions has been sampled in such a way that potential problems (i.e., unsuccessful) have an opportunity to show up.

3.4.3 Test Events

Any single design will result in a set of test events. A single test event is defined as a single execution of a test to collect data with the operational factors set at a single, given descriptor (i.e., a single battlespace condition). For a factorial design, each test event will be a unique combination of factors and descriptors. Continuing the targeting example from before (see table 3.6): the team decided the type of answer they wanted to provide was to characterize the system's behavior. Consequently, a factorial design matches well with this type of

Table 3.6. Operational Objective – Targeting – Test Events

Test Event	Weather	Terrain	Time-of-day	Threat
1	IMC	Plateau	Daytime	Low
2	IMC	Plateau	Nighttime	Low
3	IMC	Mountainous	Daytime	Low
4	IMC	Mountainous	Nighttime	Low
5	IMC	Littoral	Daytime	Low
6	IMC	Littoral	Nighttime	Low
7	VMC	Plateau	Daytime	Low
8	VMC	Plateau	Nighttime	Low
9	VMC	Mountainous	Daytime	Low
10	VMC	Mountainous	Nighttime	Low
11	VMC	Littoral	Daytime	Low
12	VMC	Littoral	Nighttime	Low

answer. Three factors (terrain, weather, and time of day) were chosen for a factorial design. Terrain has three possible descriptors (plateau, mountainous, littoral); weather has two possible descriptors (IMC and VMC); time of day has two possible descriptors (daytime and nighttime); and threat is fixed at one descriptor (low). This results in twelve possible test events (3 x 2 x 2 x 1 = 12). If multiple test designs are created, such as a factorial design supplemented with case designs (possibly including additional factors), the total number of test events increases (see table 3.7).

Table 3.7. Operational Objective – Targeting – Test Events

Test Event	Weather	Terrain	Time-of-day	Threat	Design
1	IMC	Plateau	Daytime	Low	
2	IMC	Plateau	Nighttime	Low	
3	IMC	Mountainous	Daytime	Low	
4	IMC	Mountainous	Nighttime	Low	
5	IMC	Littoral	Daytime	Low	
6	IMC	Littoral	Nighttime	Low	Factorial
7	VMC	Plateau	Daytime	Low	
8	VMC	Plateau	Nighttime	Low	
9	VMC	Mountainous	Daytime	Low	
10	VMC	Mountainous	Nighttime	Low	
11	VMC	Littoral	Daytime	Low	
12	VMC	Littoral	Nighttime	Low	
13	IMC	Mountainous	Nighttime	High	
14	VMC	Mountainous	Nighttime	High	Case
15	IMC	Plateau	Nighttime	High	

Similarly, if any of these test events are replicated, the total number of test events increases accordingly. This might be the case for a comparison design as demonstrated using the repair example from before. The user is very interested in the time to repair under high wind, hot temperatures, good lighting, and MOPP Posture 2. A sample size calculation requires discussions on four parameters, often either unknown or subject to disagreement on what values to use. Significance (α) is the acceptable chance of passing a bad system (alpha or Type I error); power (β) is the acceptable chance of failing a good system (beta or Type II error); error (E) is how much of a difference from the criteria makes an operational impact; and variance (σ) is the inherent, underlying variation in the process. Assuming agreement is reached on these four parameters, computing a sample size, n, (using fictitious values in the equation $n = \left[\left(\sigma\left(Z_{1-\alpha} + Z_{1-\beta}\right)\right)/E\right]^2$ gives n = 13) and results in the following test events shown in table 3.8.

Table 3.8. Operational Objective – Repair – Test Events

Test Event	Wind Speed	Temperature	Lighting	MOPP
1	High	Hot	Good	Posture 2
2	High	Hot	Good	Posture 2
3	High	Hot	Good	Posture 2
4	High	Hot	Good	Posture 2
…	…	…	…	…
11	High	Hot	Good	Posture 2
12	High	Hot	Good	Posture 2
13	High	Hot	Good	Posture 2

3.4.4 Test Methodology

Test events may be executed through a variety of methods. Field testing is a good, initial choice for operational testing. This is viewed as providing the most operationally realistic environment. However, field testing is not always feasible to capture all test events. Modeling and simulation provides another venue for executing test events (Title 10 imposes constraints on the use of M&S). Other methods include studies and analysis, questionnaires, exercises, and training opportunities. Paragraph 4.2.4 discusses several types of test methodologies.

The test methodologies may be a combination of these methods, both during an operational test and leading up to an operational test. For example, early in a program, you might use modeling and simulation to help identify important operational factors to include in an OA. Execution of test events during the OA is followed by some analysis highlighting that some factors may not be important (and possibly identify new factors). The revised set of operational factors is then used in the OT&E.

3.4.5 Test Scenarios

The set of test events are executed within test scenarios. Test scenarios capture the "end-to-end" flow as well as re-introducing the operational factors identified in the battlespace, but not explicitly addressed in the test designs.

When reviewing the operational objectives and the test designs for each objective, the intent is to identify test scenarios that allow for an end-to-end flow from one operational objective to the next as well as for concurrent objectives. Within the test scenarios, factors and descriptors will be set to the appropriate levels called for by each test design within that scenario. It is important to realize that the descriptors may be different or vary from scenario to scenario. For example: an F-16 conducting a combat search and rescue (CSAR) scenario is unlikely to fly at high altitudes; thus the descriptor for altitude will be set to low and another scenario (such as a strike scenario) is used to capture altitude at its high descriptor. Another approach to viewing this is to select a set of test scenarios such that all the test events (described by the factors and descriptors) can be executed within the scenarios.

This will allow for efficient use of test resources as well as presenting an operationally realistic test environment. This also helps avoid testing in independent segments (e.g. operational objectives) when there are actually interactions between these segments. Not all test events are likely to be executable as part of one overall scenario or set of scenarios, however. Expect some test events to require separate, specific portions of a scenario to establish the necessary battlespace conditions.

A consequence of identifying "end-to-end" flow and interaction between operational objectives is that test events will be overlapping and occurring simultaneously. For example, the same F-16 sortie that captures two targeting test events (one in mountainous terrain, the other on a plateau) also captures a mission planning test event and a weapons load time test event. This all takes place within the context of a CSAR scenario where the particular operational factors are set to descriptor levels consistent with a CSAR scenario.

Test scenarios also allow the re-introduction of the operational factors that were set aside earlier. These are the operational factors likely to exist in the battlespace environment, but at a given level or minimally related to the system. These will be included in the test scenarios to ensure operationally realistic conditions.

3.4.6 Basis of Estimate

Together, the set of test events, the test methodologies, and the test scenarios form the basis of estimate. They describe why you are testing, what you are going to do, and how you are going to do it. This provides the basis to estimate the resources required to execute the test. Underlying the basis of estimate is a set of assumptions that are validated to the extent possible and documented in the EF.

Reviewing the test events, methodologies, and scenarios allows one to identify what resources will be required. For the Initial Test Design, particular focus is placed on the high cost (which includes high level-of-effort) and long-lead items. Typical examples of such items are threats, instrumentation, and modeling and simulation efforts. Throughout the preceding steps, some of these items will have been identified. In forming the basis of estimate, these previously identified items are consolidated and test designs reviewed to identify new items. Collectively, there may be overlap between the resources required for each operational objective. These should be identified and a consolidated list of resources provided (with traceability and rationale).

The basis of estimate will include the following information:

- Operational Objectives and Measures – Reviewing the measures provides insight into what resources may be required to collect data and analyze the results. Instrumentation, databases, data extraction tools, and analysis tools are examples of resources that may be required. The operational objectives and measures provide the rationale or basis for these resources.
- Test Events – For the particular test design(s) underlying the test events, a review of the factors and descriptors provides insight into the resources to establish the battlespace conditions. Threats, particular weather conditions, and terrain are examples of factors and descriptors that might drive resources. Threats are often expensive or long-lead to develop. Differing weather conditions and terrain could drive multiple deployments. The battlespace conditions required to execute the test events provide the rationale or basis for these resources.
- Test Methodology – How a set of test events are executed also provides the rationale or basis for resources. Field testing may incur range costs, or possibly even the development of new range capabilities. Modeling and simulation incurs both costs and potentially long-lead development. Reviewing the test methodologies provides insight on what might be needed to execute the test events.
- Test Scenarios – Test scenarios form the operationally realistic environment. Reviewing of all the factors identified (but possibly

not directly used in a test design) provides insight into the additional assets required to build the operationally realistic battlespace conditions. In addition, many of these factors, particularly the "as-is" factors, will need to be measured and resources needed to collect and analyze data.

- Assumptions – Although assumptions may not directly drive resources, they provide indicators of potential risks and disconnects with other organizations.

3.4.7 Documentation of the Updated Evaluation Framework

The Evaluation Framework (EF) captures the rationale for ITD and other pertinent information developed during the scope/cost process. Although the EF does not document all scope/cost information, it does reflect significant core team activities, provide rationale for the basic scope of ITD, and supports ITD briefing development. The EF is a working document that requires no signatures or formal routing, and is not expected to be pristine in format, grammar, etc. The EF is initially drafted after the NCC and EF core team meeting by AFOTEC/ASE and provided to the core team members. Following the ITD core team meeting, the EF is updated by ASE with the latest information, and the this version will be sent to the Det TD to further capture the development of the ITD (scenarios, methodologies, etc.). The Det TD has distribution authority beyond the AFOTEC core team members.

The team is encouraged to add (to include major headings) and delete information as program knowledge changes and as the ITD evolves. Through coordination with the core team, ASE will crosscheck content currency with the ITD briefing, and format currency prior to attaching the EF to the Tasking Order. The EF should be the basis for the next step which is the test concept and it should be retained by the Det on the MIN.

3.4.8 Program Costing

The test team uses the ITD basis of estimate to develop initial resource requirements to be documented in the TRP upon ITD approval. TRMs review each resource category of the TRP to determine which line items need costing. Typically, a TRP category with a "FUNDED BY" column reflecting "AFOTEC" is costed. In order to acquire "overhires" in the "PERSONNEL" category, a request letter must be forwarded to AFOTEC/DP for approval. In this case AFOTEC is responsible for the resource cost, but test program dollars are not used. Additionally, there are cases when dollars are provided from another command or agency in support of AFOTEC OT&E activity. These dollars should be clearly defined in the TRP, so the best picture of projected test program costs are captured. Table 3.9 identifies what AFOTEC pays for and what

AFOTEC does not pay for. Historical cost data is available from AFOTEC/XOR to assist in costing similar test events.

Table 3.9. Test and Evaluation Support Costs

What AFOTEC Pays For:	What AFOTEC Does Not pay For:
• Range Costs • Rental of Equipment • Printing and Reproduction • Transportation of Things • Communications • Real Property Maintenance & Construction • Contractor Support • Data Reduction • Special Supplies & Equipment • Leases • Civilian Pay (temporary overhires) • Per diem and Travel • Transportation of things to support command personnel including in-use equip required for test • Supplies and equipment • Pretest planning • Test preparation	• Acquisition/modification of the System • Aircraft Flying Hours (other than range support aircraft) • Acquisition Costs for Major Test Vehicles • Cost of Procuring Test Item or Direct Test Item Support. Maintaining the Test Item is the funding responsibility of the owning command. Includes contractor support and supply items to maintain the test item and POL for the test item. • Regular Pay (base and benefits) of Permanently Authorized Personnel

3.4.9 The ITD Briefing

The test team develops the ITD briefing with core team support for presentation to XO and CA. The purpose of the ITD briefing is to communicate the complete, beginning–to-end scope of OT activities, resources, and costs with rationale. Tailor the level of detail in each area within the briefing to fit the specific program circumstances. Additionally, multiple areas may be combined on a single chart. If a particular subject area does not apply to a program, do not include that subject area in the briefing. Significant technical issues should be discussed with CA before the formal ITD briefing. Following completion of the briefing, the NCC and EF is updated as required by ASE to reflect the decisions made. The TD should now be prepared to begin doing "homework" for the eventual test concept. This homework normally would consist of refining the information in the ITD, developing initial MOEs/MOPs, and developing an initial TEMP input for MS B. The detailed briefing guide for the ITD is found on the MIN (see attachment 4) and normally addresses the following:

- Program overview and schedule.
- System description.
- Operations.
- Threat Summary.
- COIs and Objectives.

- OIA statements and topics.
- Operational scenarios and battlespace conditions.
- Test events.
- Test execution methodology.
- Test assets, ranges, TDY, M&S, etc.
- Numbers, types, sources of personnel.
- Schedule showing all activities.
- Other significant information.
- System contractor involvement.
- Test resource/capability shortfall.
- Technical issues.
- Way Ahead for follow-on activities.

NOTE: When using a seamless approach to initial test planning by collaborating with the developmental testers, the initial test design may become an integrated initial test design. An integrated initial test design is the result of combining the OT&E Initial Test Design with the preliminary DT&E test design. The integrated initial test design promotes the combining, where appropriate, of developmental and operational test events to satisfy both developmental and operational test objectives. The desired outcome of integrating DT and OT events is to reduce the unnecessary duplication between DT&E and OT&E. Early integration of DT and OT planning will provide the foundation for early TEMP development as well as support T&E requirements in the system development RFP.

3.5 TEMP/SAMP Updates (or Initial Inputs)

In some cases, initial TEMP/SAMP inputs may have been drafted during discovery or scope/cost activities. If not, then now is the time for the TD to start drafting the words for the AFOTEC parts of the TEMP/SAMP. In any case, it would be a good idea to initiate updates to the initial words of the TEMP/SAMP already drafted as a result of issuing the TO. Completion of the ITD, coupled with additional development of initial test measures (MOEs/MOPs), forms the foundation for the MS B TEMP input. AFOTEC XO and CA coordination and approval of the TEMP serves as the vehicle for approving the initial test measures. Refer to the *TEMP/SAMP* section of Chapter 1 of this pamphlet to understand how a TEMP/SAMP input is developed, coordinated, and updated.

3.6 Developing the Tasking Order

The goal of this step is to issue a CV-approved TO following XO approval of the ITD. The TO provides the commander's broad guidance on the scope of the evaluation, the resource bounds, and the

responsibilities during the PDP. AS is the headquarters' focal point preparing and coordinating the TO. AS manages the tasking order process. Amendments to existing TOs for FOT&E programs, or a change in scope, are managed by the executing detachment. Deviations from the TO are submitted to XO so that a revised TO can be prepared and submitted to the CV for approval. The funding request to support these amendments is submitted to the requirements review board (RRB) and subsequently to the financial management board (FMB) for approval.

Once the scope/cost process has been completed, AS, with support of the core team, prepares the TO. Topics covered include:

- Situation.
- Program Identification.
  - Title/Short Title.
  - Description.
  - ACAT.
  - OT Type.
  - AF Precedence/DAC.
  - OSD Oversight.
  - Lead OTA.
  - Decisions Supported.
  - Total Program Cost and Source of Funding.
- Tasking and Responsibilities.
- Product Delivery Activities, to include:
  - Direction on when to provide the Test Concept Briefing to XO/CA/CN (refer to the *Test Concept Development* area in Chapter 4).
- Resource Allocations.
- Core Team Members.
- Annexes will be included to provide supporting information (as required):
  - Evaluation Framework (required).
  - ITD Briefing (required).
  - ITD Briefing minutes (required).
  - Initial TEMP/SAMP inputs, if available.
  - TRP (required).
  - OTPM test program Network (required)

The TO also provides direction for AFOTEC personnel to plan, execute, report, and support the OT&E program. It assigns responsibilities, describes relationships between AFOTEC organizations, and allocates resources. In addition, it documents known limitations of the evaluation

and provides a permanent record of decisions made. See AFOTEC templates on the MIN (see attachment 4).

3.7 Test Resource Plan (TRP) Update

As explained in the previous paragraph on how to develop initial test design, the resource requirements are identified in sufficient detail to support preparation of a TRP. An update of the resource information should be accomplished at this point. The program TRP is attached to the tasking order. The TRP annex provides the executing field element (Det/ST) with the latest resource data.

The TRP is a planning and management document required throughout the test. The TRP provides the means for programming all resources to support OT&E, and is the source for OT&E inputs to the Air Force planning, programming, and budgeting system (PPBS). If a resource is not specified in the TRP, it likely will not be planned or programmed for the upcoming test. Test capability shortfalls (to include open ranges, ground test facilities, instrumentation, targets, M&S, and exercise involvement) may take 5 to 10 years to design and build. The TRP needs to be in sufficient detail to ensure it provides test resources in a timely manner.

TRPs are coordinated with appropriate commands and agencies. Two cycles (October through December and April through June) are established to formally coordinate TRPs. TRPs are updated, approved, and distributed by December and June each year when a test is scheduled to occur within three years, otherwise once a year is sufficient. The TRP is fully coordinated before submission to AFOTEC/XOR through the Detachment TRM and the core team or test team for IOT&E, QOT&E, FOT&E, and MOT&E. The TRP is kept current to reflect maturing resource requirements as the test develops. TRP development at AFOTEC is automated, and TRPs are updated continuously. TRPs should be revised as soon as program and test schedules change. The TRP should always reflect the most current status of requirements, since it interacts with the DoD PPBS process throughout the year.

3.7.1 Procedures

AFOTEC/XOR issues a call letter in April requesting updates to the TRP for distribution during June, and a call letter in December requesting updates in preparation for RRB review. Out-of-cycle TRPs are coordinated as developed. Reasons for publishing and distributing out-of-cycle TRPs include program restructuring or other substantial changes (e.g., schedule slip) that affect budget and requirements. The TRP is developed and maintained by the responsible TRM with support from the core team.

TRPs should be distributed to outside agencies as early as possible (even if in draft form) to allow MAJCOMs and other agencies time to POM (normally more than two years before resource is required). When it is determined that MAJCOM resources will be needed in the current fiscal year, in the budget year, or the first year of the POM, the detachment commander will sign out the TRP for MAJCOM coordination. The TRP **must** be forwarded to the appropriate MAJCOMs if any MAJCOM resources are needed in the next three years. The detachment commander signs out TRPs for programs in Scope/Cost, Planning, or Execution.

The TRP is neither an inventory list nor a supply document for non-expendable equipment items required to conduct the test. Therefore, only those requirements (e.g., computers, furniture, copiers, telephones, etc.) that "need" to be purchased in order to support the test will be included. Support requirements that need to be coordinated by another organization (e.g., telephone installation, administrative switchboard, and access to facilities) are included. The TD should list all the equipment necessary to conduct the test and make every effort to identify those already on hand or available through current supply inventory so that these items are not unnecessarily purchased or included in the TRP. Many of these items are available through redistribution from other test programs that have been completed. Contact RME and/or Det 1 Mission Support for assistance with existing equipment availability. Det 1 maintains an inventory of equipment available to support test activities which can be accessed via the MIN (see attachment 4).

3.7.2 TRP Distribution

As appropriate, at least one copy of a program TRP is provided to the organizations listed below. Identify other organizations requiring the TRP through the test program planning process and provide according to the TRP distribution list. These are the organizations that provide the approval and direct support of resources necessary to accomplish the program OT&E effort. The TRM keeps at least one copy of the TRP, along with comments provided by MAJCOMs, until the next distributed TRP is coordinated. AFOTEC/HO files and maintains all distributed TRPs for historical purposes.

- Internal Distribution (Use appropriate Dets/office symbol as required):
  - AFOTEC/AS/DPX/TST/XOR/ST/HO (3 copies).
  - Det x AFOTEC/(1 copy).
- External Distribution: All organizations identified in the Index to Resource Allocations section.

- AFMC (Send to appropriate SPO or agency providing resource).
- HQ AETC/XPR.
- HQ AFSPC/DOT.
- HQ AMC/TEP.
- HQ ACC/DRPT.
- HQ AFSOC/XPT.
- AFWA/XPP.
- AFIWC (as applicable).
- JITC (as applicable).

3.8 Scope, Cost, and/or Scope and Cost Change Process

There are three types of changes: scope change only (i.e., description, impacts, etc.); cost change only (i.e., deltas between budgeted and actual requirements); and scope cost change. When any of these changes results in unfunded requirements being identified, test teams coordinate unfunded requirements with XOO and XOR for XO approval. Following approval, unfunded monies are distributed after the Det has spent or is close to spending the money already distributed to them, according to their obligations plans. Test program information (i.e., spend plan data) will be updated on the MIN to reflect changes to the test program's baseline. Commanders/Directors may move funds between Element of Expense Identification Codes (EEIC) within a program on an emergency reprogramming need basis to meet field requirements. This may be done without additional approval but notification must be made to XOR within five working days of the action with rationale for the change. For scope or scope and cost changes, the TD should engage with the core team to reaccomplish the scope/cost process, as necessary.

Chapter 4 OT Planning

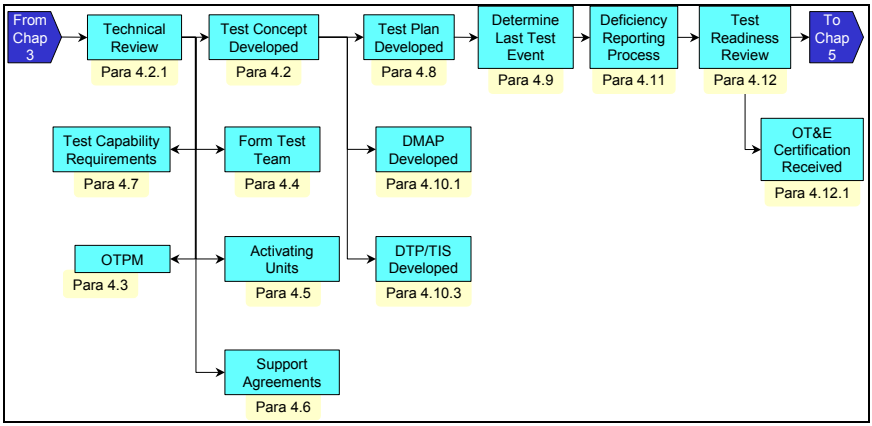

Figure 4.1. Test Planning Overview

4.1 Introduction

Test planning begins with the release of the tasking order and ends with approval to execute test at the TRR (see figure 4.1). The release of the tasking order also triggers the requirement to further refine the initial OTPM test program network developed prior to the ITD briefing. If no network was produced prior to the ITD, it is essential that it be developed at this point. This network reflects the tasks required to move a program from planning to execution to reporting and closeout. It should be recognized that the detailed scoping of the evaluation continues into the test planning phase and sometimes into the OT&E execution phase. It is important to realize that test and evaluation planning involves a high degree of flexibility and adaptability in the development of the test concept and the supporting documentation, mainly the test concept and test plan. Such flexibility and adaptability is driven by the varying conditions that exist from program to program. Program variables include the time available for planning, the type and complexity of the system, the acquisition strategy, the knowledge/maturity of operational concepts, the nature of system interfaces, and the availability of test methods and resources. The test concept and test plan development processes should accommodate this wide range of program/testing characteristics, yet still be accomplished in a disciplined manner using a seamless approach to leverage off of DT activities whenever possible. An ITT should be used to facilitate development of an integrated test concept and integrated test plan to promote the seamless approach. Recognize that OT&E planning should focus on what needs to be evaluated and why, plus identify potential variations for consideration.

AFOTEC ORM tools are used throughout the planning phase (see figure 1.7).

4.2 Test Concept (TC) Development

The purpose of the TC is to refine the approved OT approach necessary to evaluate/assess the COIs, assessment areas, and objectives identified through the scope/cost process and recorded in the Evaluation Framework. The TC is a detailed, fleshed out update of the approved initial test design. The XO reviews the TC for operational test sufficiency and CA reviews the proposed TC for technical adequacy, credibility, and sufficiency. The findings are incorporated for the XO and CA approval. The approval is based on the value of the OT information, resource requirements/availability, and technical sufficiency.

> NOTE: When using a seamless approach to test planning by collaborating with the developmental testers, the test concept may become an integrated test concept. An integrated test concept is the result of combining the OT&E test concept with the preliminary DT&E concept. The integrated test concept promotes the combining, where appropriate, of developmental and operational test events to satisfy both DT and OT objectives. The desired outcome of integrating DT and OT events is to reduce the unnecessary duplication between DT and OT, thereby reducing the amount of dedicated OT&E required and decreasing the length of time required for program testing.

This section is dedicated to explaining the numerous elements that the TD and the test team should consider when developing the TC:

- the evaluation framework, including the ITD.
- updating COIs, objectives, and determining MOEs/MOPs.
- refining test methodologies.
- identifying evaluation criteria.
- determining the rating methodology for operational effectiveness and suitability.
- determining the rating methodology for COIs, MOEs and MOPs.
- refining the sample size.
- refining the realistic test scenarios.
- planning the use of exercises and test capabilities to support OT&E execution.
- identifying contractor and developmental testing events that are required to support OT&E conclusions.
- preparing and presenting the test concept for approval.

Additional references which may help to understand the considerations for Test Concept development:

- *AFOTECPAM 99-104, Operational Suitability Test and Evaluation.*
- *DOT&E Policy Letters on Interoperability, Information Assurance, Electromagnetic Environmental Effects and Use of Test Data, (see attachment 4).*
- *AFOTEC Technical Note 01-01, Scenario Definition and Experimental Design (see the TS ATTIC (see attachment 4) for a copy).*
- *AFOTEC Technical Note 01-02, Techniques for Sizing Operational Tests Design (see the TS ATTIC (see attachment 4) for a copy).*

4.2.1 Technical Reviews

The purpose of a technical review is to review in depth certain aspects of a test team's approach for testing/evaluating the system. Most programs will have a technical review. The test team should bring to the initial test design briefing the technical issues that require further investigation and detailing in a technical review. Technical review(s) will occur before the Test Concept Briefing (Integrated Test Concept) for test design related topics and before the test readiness review for data evaluation/reporting topics. The test team should suggest appropriate timeframes to have the technical review(s). The Test Director and the Det Technical Advisor supported by members of the test team participate in the Technical Review to CA. XO and TS are invited to the technical reviews and participate as needed. The technical review does not need to be a formal briefing. Informal discussion is the preferred method guided by whatever technique the TD needs to address the requested information. The TD should ensure information in the following areas are presented/discussed:

- Test Program Overview
- Operations Overview
- Review Topic background
- Plan to address issue

Some additional tips and thoughts that the TD and the test team should consider when preparing for the technical review are:

- The technical review guide is contained on the MIN (see attachment 4)

- Use the "CA/CN Sample Questions for the Test Team" available in the TS ATTIC as reference for preparation of the technical review (see attachment 4).
- Present any particular areas of concern and risk, and tell CA the things that you do not know, as well as the things you know. Present a project plan using your OTPM test program network that outlines your milestones
- It is important that you know that everything may not be perfect in your test concept at this point. Depending on the length of the program there will likely be additional technical reviews scheduled all the way to the point where you do the OT&E Plan.
- Typical topics/issues for a Technical Review include; M&S, Instrumentation, data evaluation methodology, HITL testing, etc.

CA will provide guidance and will let you know if you need to come back (i.e., could be for another technical review or strategy session) but the intent is keep these to the minimum necessary.

4.2.2 Applying the Evaluation Framework

The evaluation framework captures all of the critical questions that must be answered in determining effectiveness and suitability and to support OIA. It captures the approved balance between E&S and OIA. AFOTEC's mission is to provide complete information to both the acquisition and warfighter communities on exactly how a system can be expected to perform its wartime mission in a joint warfighting environment. United States Code Title 10, Sec. 139 1.2.A states that:

> The term "operational test and evaluation" means –
> (i) 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 weapons, equipment, or munitions for use in combat by typical military users; and
> (ii) the evaluation of the results of such test.

This information is reported under two broad headings: (1) the results of a system's operational effectiveness and suitability performance evaluation (in accordance with United States Code Title 10, DoDI 5000.2), and (2) the assessment of the system's employment in a system-of-systems environment, including the impact of the system on other systems, and the capability of other systems to support the system under test (SUT). These results are recorded in AFOTEC's most important product, the final test report, and are provided to two distinct audiences:

- the acquisition community made up of decision-makers, developers, the test and evaluation community (developmental testers, AF/TE, DOT&E), and Congress.
- the system's operators, maintainers, and their Combatant Commanders.

AFOTEC produces one final report that always includes a section evaluating operational effectiveness and suitability and a section assessing operational impact. The OTPM test program network identifies the tasks required to meet the requirements of the OT&E evaluation framework by addressing E&S and OIA.

As a reminder, operational effectiveness is defined as a measure of the overall ability of the system to accomplish a mission when used by representative personnel in the environment planned or expected for operational employment considering organization, doctrine, tactics, supportability, survivability, vulnerability and threat. Operational suitability is defined as the degree to which a system can be placed and sustained satisfactorily in field use with consideration given to availability, compatibility, transportability, interoperability, reliability, wartime usage rates, maintainability, safety, human factors, habitability, manpower, logistics, supportability, logistics supportability, natural environment effects and impacts, documentation and training requirements.

An OIA examines employment in the larger Battlespace operation, from a broad system-of-systems perspective. It assesses capabilities and limitations, as the system operates with, and among, other systems across the full spectrum of military operations and phases. As a complement to the section on effectiveness and suitability, the OIA tells the warfighter other important information that may not have been fully explained in the E&S evaluation. The OIA topics addressed may be beyond the purview of the developing agency to address, but are necessary information to understand all the implications of employing the system. The proper balance between the effectiveness and suitability evaluation and the OIA is initially considered by each program's core team during the scope/cost process and continues to be refined by the test team as they construct the TC. Each "balance" will be program dependent. Figure 4.2 shows the structure the test team should follow when developing the "balance" of the effectiveness/suitability evaluation and OIA.

The operational effectiveness and suitability evaluation is organized using the COI, objective, MOE, and MOP framework. The OIA is addressed by using assessment statements and topics. ASE documents the OIA structure through the EF provided with the program's tasking

order issued to the executing detachment. The structure depicted in figure 4.2 is used when briefing XO, CN, CA, CV and CC on the test concept, the test methodology, the evaluation framework, the OT&E plan and OT&E final report. Each of these elements is captured in the OTPM test program network.

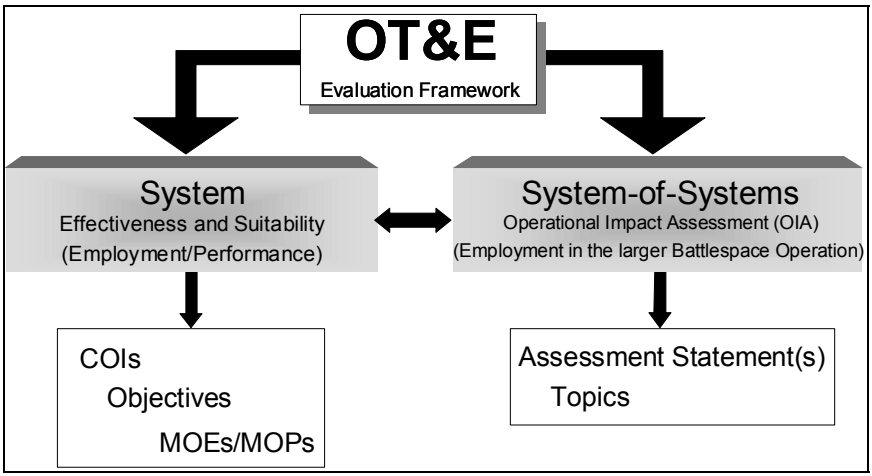

Figure 4.2. Depiction of OT&E Construct

4.2.3 COIs, Objectives, MOEs and MOPs Development

Defining OT&E COIs, objectives and measures is a critical step in the evaluation framework and test planning processes. The TD should consult their Technical Advisor and TSD/TSN for how best to define COIs, objectives and measures. The **draft COIs** developed during scope/cost **should be presented and coordinated with the user community and, for multi-service programs, with the other OTAs.** As a starting point the TD should review such items as:

- ICD, CDD, CPD (as applicable).
- CONOPS.
- ILSP.
- Program Office's requirement traceability matrix tying users operational requirements to contract systems specification/ performance attributes.
- AoA documents.
- STAR.

4.2.3.1 Definitions

The following definitions are provided to assist the TD in understanding COIs, Objectives, MOEs, MOPs and associated criteria.

- COI - Typically phrased as a question, COIs must be answered in order to properly evaluate operational effectiveness and operational suitability and to determine the system's ability to perform its mission. A COI may be written at a high level task (i.e., operational or assigned) or at lower level task (i.e., mission essential).
- Objective – Objectives are statements that break down the COIs into clearly defined, manageable tasks, and are developed to group or organize the measures needed to resolve the COIs. Objectives can be viewed as a tool to better focus the MOEs, MOPs and the entire OT&E. Since objectives are used to group or organize measures they may not be necessary for a COI that is very specific or focused. Such a COI would probably only have one or two MOEs. The report should contain a narrative about how well the system was able to accomplish the objective.
- MOE – An expression of a quantitative or qualitative "operational" measure that is a key indicator of task accomplishment. MOEs provide a way of expressing the degree to which the organization or force must perform a task under a specified set of conditions. Each task can have one or more MOEs with a criterion or criteria, expressed as the minimum acceptable level of performance.
- MOP – An expression of a quantitative or qualitative "system" measure that is, under specified conditions, a key indicator of a system's technical performance or system characteristic (e.g., range, velocity, payload).
- Note the difference between the definitions for the MOE and the MOP. The MOE is a measure related to operations and is an indicator of task accomplishment while the MOP is a measure related to the system and is an indicator of system technical performance or system characteristics.
- Criterion - An expression of a standard on which a judgment is based. The criterion is usually expressed as a parameter (a numerical descriptive measure of a population such as a mean, mode, median), proportion, percentage, rate or user rating. The criterion defines an acceptable level of performance and is often expressed as a minimum acceptable level of performance. The user should provide criteria for evaluation of MOEs. The operational tester may comment on the usefulness of the criteria with respect to OT&E and may even assist the user in developing criteria useful to OT&E. If criteria are solely developed by the operational tester, they must be endorsed/adopted by the user.

During the initial test design process, operational objectives and operational measures were identified. They were used as a tool to facilitate developing the battlespace. During the test planning phase, test objectives and quantifiable measures of effectiveness and measures of performance are developed. It is not expected that every operational objective and measure be directly translated into test objectives, MOEs, and MOPs; however, they provide a good starting point since they highlight what is important to the operation, and thus what is likely to be important to test operationally.

4.2.3.2 Guidelines

Objectives. In order to fit in the COI-objective-MOE-MOP structure, objectives are stated such that COIs are answerable with evaluation results. Objectives are statements that break down the COIs into clearly defined, manageable tasks, and are developed to group or organize the measures needed to resolve the COIs. Objectives can be viewed as a tool to better focus the Measures of Effectiveness (MOEs), Measures of Performance (MOPs), and the entire OT&E. Objectives do not have criteria and are not rated but contain the words "evaluate" or "assess." To facilitate universal understanding and standardization, the terms "evaluate" and "assess" are defined below:

- Evaluate is used when one or more of the measures grouped under an objective has user stated requirements in program documentation (e.g., ICD/CDD/CPD, RCM, CONOPS, ISP) and evaluation criteria have been identified specifying a quantitative or qualitative level of performance the system much reach. All objectives containing the word "evaluate" are accompanied by MOEs/MOPs with evaluation criteria that reflect the user's requirements. The MOEs/MOPs are rated as met or did not meet.
- Assess is used when the measures grouped under an objective have no user evaluation criteria, but information is needed or can be used to support the user or decision-making process. All objectives containing the word "assess" are accompanied by MOEs/MOPs without evaluation criteria. The MOEs/MOPs are not to be rated but are reported with a qualitative narrative.

Once tasks are determined, the challenge is to determine if the system, employed by the user, supports or contributes to unit task accomplishment or how well an operational task element accomplishes an assigned operational tasking. This is done through the development and use of MOEs and takes into consideration the effectiveness and

suitability issues that support accomplishment of the tasks. COIs do not have direct evaluation criteria. Each COI is supported by one or more MOEs and associated criteria. In some cases the user has developed MOEs for the tasks. Other MOEs can be found in requirement documents (ICD, CDD, CPD (as applicable), and AoA), CONOPS, and unit mission documents. Other sources of tasks, COIs, MOEs, MOPs and associated criteria become evident during the mission research phase of test concept development and include Combatant Commander's operations plans and Air Component Commander's plans for employing air power. Finally, MOPs (system technical performance characteristics and functionality) are related back to the task (requirements traceability). Many MOPs can be found in the CDD/CPD. MOEs and MOPs are used to quantify the results of an OT&E.

There are no hard and fast rules for developing COIs, objectives, MOEs and MOPs. However, there are certain rules of thumb that might be helpful:

- COIs should not be convoluted (i.e., be conditional, ask two or more questions in one COI).
- Occasionally there is a system characteristic that is so important that failure to meet the associated parameter makes the system unsatisfactory for operational deployment, employment or sustainment. This characteristic and parameter may become a COI.
- All tasks, COIs, MOEs, MOPs and criteria need to be developed in conjunction with the user and coordinated with the user. For multiservice programs they need to be developed in conjunction with other Service users and OTAs and coordinated with the other Service users and OTAs.
- Objectives do not have criteria and are not rated but contain the word “evaluation/evaluate” or “assessment/assess”.
- In selecting measures for an OT&E, you will need to consider the relative importance of the system characteristic to be measured, the cost and availability of the data collection methods, and the degree to which you will need to defend or justify the results.
- Generally speaking, quantitative measures are preferable to qualitative and objective measures are preferable to subjective measures, particularly when the measures are key parameters or central to answering critical operational issues.
- Quantitative measures typically cost more to collect than qualitative measures and may require instrumented data collection.
- Subjective measures are cheaper, involving, at a minimum, a human data collector with pencil and paper, and they are

sometimes the only way to collect certain kinds of data or any data in some test environments.

- AFOTEC support of MOE development during AoAs helps to provide testable MOEs and ensures linkage between MOEs used in the AoA, CDD/CPD and the TEMP or SAMP.
- The MOE or MOP needs to be written in objective, quantifiable and understandable terms.
- The data required to evaluate/asses the MOE or MOP needs to be measurable and collectible in test or the MOE or MOP needs to be answerable using modeling/simulation.
- MOEs and MOPs drive test design, test resource requirements, data collection, reduction, analysis and display requirements.
- With well-defined tasks, many appropriate MOEs and related MOPs will be evident.
- Data to answer a MOE is usually collected under realistic operational scenarios with representative users accomplishing specific tasks.
- An MOE is not usually a capability statement or assessment (i.e., capability of the system to or test team assessment). MOPs and MOEs should not begin with verbs like assess or evaluate.
- Data to answer a MOP is usually collected under specific and controlled test conditions and may be independent of any particular operational scenario, task, or user.

4.2.3.3 Examples

Theater Battle Management System

- COI 1. How well does system A support air campaign planning?
  - Objective 1.1. Evaluate the capability of system A to produce the Air Tasking Order (ATO).
    - MOE 1.1.1. Percentage of ATOs produced within 24 hours. Criterion. 90%.
    - MOE 1.1.2. Percentage of ATOs that need re-work. Criterion. <5%.
      MOP 1.1.2.1. Percentage of targets correctly matched to the preferred munitions. Criterion. 95%.
  - Objective 1.2. Evaluate the capability of system A to distribute the ATO.
    - MOE 1.2.1. Mean Time To Distribute the ATO. Criterion. 30 minutes.
      MOP 1.2.1.1. Percentage of distributed ATOs received by units. Criterion. >98%.
- COI 2. How well can system A support sustained operations?
  - MOE 2.1.1. Operational Availability. Criterion. 0.90.
    MOP 2.1.1.1. Inherent Availability. Criterion. 0.99.

- MOE 2.1.2. Mean Time To Repair (Organization Level). Criterion. 25 minutes.

Air Traffic Control System

- COI 1. How well does system B provide for control of aircraft?
  - Objective 1.1. Evaluate the capability of system B to provide positive separation of aircraft.
    - MOE 1.1.1. Percentage of aircraft maintaining minimum separation standards. Criterion. 99%.
      MOP 1.1.1.1. Maximum time to display separation caution or warning. Criterion. 2 seconds.
      MOP 1.1.1.2. Percentage of cautions or warnings displayed on screen. Criterion. >98%.
  - Objective 1.2. Evaluate the capability of system B to provide voice communication between the control tower and aircraft.
    - MOE 1.2.1. Percentage of voice communications established with aircraft. Criterion. >99%.
- COI 2. How well does system B interoperate with other ATC systems?
    - MOE 2.1.1. Number of interoperable ATC systems. Criterion. All CONUS and overseas ATC systems.
      MOP 2.1.1.1. Percent of IERs demonstrated. Criterion. 75%.

Communications System

- COI 1. Does system C provide secure global communications?
  - Objective 1.1. Evaluate the capability of system C to provide secure communications.
    - MOE 1.1.1. Number of secure communications links established. Criterion. Voice, fax and data.
      MOP 1.1.1.1. Number of classified telephones on the local network. Criterion. 50.
  - Objective 1.2. Assess the capability of system C to provide for information assurance.
    - MOE 1.2.1. Number of system security incidents during operations. Criterion. None. Report only, no user identified criteria.
      MOP 1.2.1.2. Number of identified system vulnerabilities. Criterion. None. Report only, no user identified criteria.
- COI 2. How well does System C survive in an information warfare/CNA environment?
  - Objective 2.1. Assess the capability of System C to protect itself from designated IW/CNA threats.

- MOE 2.1.1. Test team rating of effectiveness of System C countermeasures. Criterion. None. Report only.

– Objective 2.2. Evaluate the capability of System C to detect intrusions?
  - MOE 2.2.1. Percent of intrusions successfully detected. Criterion: 95%.

– Objective 2.3. Evaluate the capability of System C to recover from intrusion incidents.
  - MOE 2.3.1. Average time required to restore system C to full operation. Criterion: < 2 hours.
  - MOE 2.3.2. Test Team rating of Continuity of Operations Plan (COOP) adequacy. Criterion: None. Report only.
  - MOE 2.3.2. Test Team rating of training adequacy in system restoration activities. Criterion: None. Report only.

Munitions System

- COI 1. Does the JDAM enable accurate weapons attacks against fixed and relocatable targets in adverse weather conditions?
  – Objective 1.1. Evaluate if JDAM MK-82 can hit the selected target and enable desired weapons effects.
    - MOE 1.1.1. JDAM weapon system accuracy.
      MOP 1.1.1.1 CEP w/GPS against horizontal targets with impact angle greater than 60 degrees.
    - MOE 1.1.2. JDAM weapon system maneuverability.
      MOP 1.1.2.1. Percent of weapons that meet impact angle & AOA against horizontal weapons.

Aircraft System

- COI 1. Does MIDS LVT increase F-16 demonstrated operational performance when supporting counter-land missions?
  – Objective 1.1. Assess the capability of the F-16 to produce Multifunctional Information Distribution when supporting counter-land missions.
    - MOE 1.1.1. Percentage of tasks successfully accomplished during CAS, SEAD, and DEAD missions. Criterion. None. Report only, no user identified criteria.
      MOP 1.1.1.1. Percentage of targets destroyed. Criterion. None. Report only, no user identified criteria.
  – Objective 2.1. Assess the F-16 survivability during counter-land missions.

- MOE 2.1.1. Number of threats avoided during counter-land missions. Criterion. None. Report only, no user identified criteria.
  MOP 2.1.1.1. Number of identified system vulnerabilities.

Space System

- COI 3 Planning and Control. Can the satellites, networks, and user spectrum be adequately monitored, controlled, planned, and managed to provide assured access in support of strategic and tactical communications?
  - Objective 3.1: Satellite Control. Evaluate the capability of the fixed and ground mobile stations to perform routine, emergency and contingency Milstar/AEHF command and control functions.
    - MOE 3.1.1: AEHF Satellite Control. Criteria IAW AEHF ORD, 4.2.5.1.
      MOP 3.1.1.1: Collect, Archive, Report Configuration Information Capability Criteria IAW AEHF ORD, 4.2.4.1.2.
      MOP 3.1.1.2: Out-of-Band Satellite Tracking Communication with AFSCN Criteria IAW AEHF ORD, 4.4.1.
  - Objective 3.2: Communications Planning and Management. Evaluate the capability of the system to apportion, allocate, distribute and monitor EHF communication resources.
    - MOE 3.2.1: AEHF Apportionment, Development, and Coordination (KPP). Criteria: IAW AEHF ORD, 4.2.4.
    - MOE 3.2.2: AEHF Terminal Image Data Distribution. Criteria: IAW AEHF ORD, 4.2.4.3.4.1.
      MOP 3.2.2.1: Image Execution and Distribution. Criteria: IAW CPTR ORD, 4.4.6.1.
      MOP 3.2.2.2: Selectable Resident Images. Criteria: IAW CPTR ORD, 4.4.6.3.
    - MOE 3.2.3: AEHF Day to Day EHF Communications Planning. Criteria: No user-established criteria.
    - MOE 3.2.4: CPTR Key Management. Criteria: No user-established criteria.
      MOP 3.2.4.1: Zeroize Capability. Criteria: IAW CPTR ORD, 4.1.9.2.4.
      MOP 3.2.4.2: Key Loading. Criteria: IAW CPTR ORD, 4.1.9.3.1).
    - MOE 3.2.5: AWT Key Management. Criteria: No user-established criteria.

MOP 3.2.5.1: AWT Zeroize Capability. Criteria: IAW AWT ORD, 4.3.7.1.
MOP 3.2.5.2: AWT Key Loading. Criteria: IAW AWT ORD, 4.3.7.2.

Electronic Countermeasure System

- COI 1 Operational Effectiveness – Is the EC system on the aircraft an effective electronic countermeasure system?
  - Objective 1.1 Evaluate the EC system's contribution to successful accomplishment of air interdiction missions.
    - MOE 1.1.1 The difference between the minimum number of air interdiction sorties, with and without EC system, required to achieve an 80% chance of at least one sortie successfully reaching target area.
      MOP 1.1.1.1 Total shots taken by each threat each time an aircraft, flying an air interdiction mission with EC system on, flies through each threat's engagement envelope.
      MOP 1.1.1.2 Total shots taken by each threat each time an aircraft, flying an air interdiction mission with EC system off, flies through each threat's engagement envelope.
      MOP 1.1.1.3 Total successful shots taken by each threat each time an aircraft, flying an air interdiction mission with EC system on, flies through each threat's engagement envelope.
      MOP 1.1.1.4 Total successful shots taken by each threat each time an aircraft, flying an air interdiction mission with EC system off, flies through each threat's engagement envelope.
    - MOE 1.1.2 Reduction in lethality of each threat due to the use of EC system during air interdiction missions.
- COI.2 Interoperability – Is the EC system interoperable with other aircraft systems?
  - Objective 2.1 Assess the effect of interoperability problems on the ability of an aircraft with the EC system to accomplish air interdiction missions.
    - MOE 2.1.1 The number of EC system mission critical failures during air interdiction missions that were attributed to interoperability problems.
    - MOE 2.1.2 The number of EC system mission critical failures during offensive counter air missions that were attributed to interoperability problems.

4.2.3.4 COI/MOE/MOP Checklists

When reviewing COIs, ask the following questions:

Yes	No	
___	___	Are all COIs supported by Objectives, MOEs and MOPs (if applicable)?
___	___	Are COIs specific to the tasks the system must perform?
___	___	Are all COIs consistent with the purpose of the OT&E?
___	___	Can the COIs, as stated, be answered through OT&E?
___	___	Have COIs been reviewed to ensure they do not overlap?
___	___	If more than one mission is envisioned for the system, do the COIs reflect the user's priorities?
___	___	Are COIs consistent with the existing or planned operations and maintenance concepts, tactics, techniques, and doctrine?
___	___	Are new tactics or techniques necessary for the test, and are they properly factored into the COIs?
___	___	Do COIs reflect supporting command inputs?
___	___	Have COIs, which were developed in the past, been reevaluated for compatibility with current program conditions?
___	___	Do COIs address areas of interface (interoperability) with other Air Force systems and systems operated by other services?
___	___	Have the COIs been discussed with technical advisors and CA and feedback incorporated.

A well-written effective measure statement:
- *Is not an issue-type statement; i.e., not an open-ended question.*
- *Is not an objective-type statement (evaluate, assess, determine.*
- *Usually does not include its criteria.*
- *Frequently is a summary statistic (mean, median, etc.).*
- *Is (usually) more than just a name, such as accuracy or timeliness.*
- *Should be complete (self-contained) to the extent possible.*

When reviewing MOEs/MOPs, ask the following questions:

Yes	No	
___	___	Are the MOEs related to COIs? Are the MOPs linked to the MOEs? Are the MOEs related to the Objectives?
___	___	Are criteria stated as user requirements as desired at the end of the OT&E period?
___	___	Have the MOEs/MOPs been discussed with the technical advisors and CA/CN?

___ ___ Are MOEs/MOPs quantitative (where practical)?
___ ___ Do the MOEs/MOPs address the requirements?
___ ___ Are MOEs/MOPs feasible/executable in terms of time, cost, and resources?
___ ___ Can any of the MOEs/MOPs be satisfied by answering other COIs or through add-on data collection performed on a noninterference basis?
___ ___ Can MOEs/MOPs be satisfied by field testing, or be addressed by simulation or a combination of both?
___ ___ Do MOEs/MOPs address the information and data requirements in controversial areas?
___ ___ Do shortfalls or limitations exist in addressing requirements? Do they have impacts? Are there any workarounds?
___ ___ Have electronic countermeasures and electronic counter-countermeasures, infrared countermeasures, and infrared counter-countermeasures considerations been addressed?
___ ___ Have nuclear survivability issues been addressed?
___ ___ Do MOEs/MOPs call for evaluation of maintenance and other logistics requirements?
___ ___ Are unique support aspects related to the system integrated into MOEs/MOPs?
___ ___ Are reliability, availability, and maintainability(RAM) properly considered?
___ ___ Are issues such as human factors, safety, training, integrated diagnostics, and system maturity sufficiently addressed?
___ ___ Are the methods of determining the impacts of support issues on system effectiveness or suitability described?
___ ___ Are interoperability and compatibility, information assurance and electromagnetic environmental effects aspects properly considered, particularly the conditions between other systems and equipment involved?
___ ___ Are environmental compliance aspects properly factored into the OT&E plan?
___ ___ Are system survivability (susceptibility/vulnerability)/ recoverability requirements addressed?
___ ___ If an acquisition program has an AoA, are testable MOEs linked to the AoA?

4.2.4 OIA Assessment Statements and Topics

Assessment Statements and Topics are used to provide the user and/or decision-maker with additional information on employing the system within the Battlespace. Assessment statements and topics are not inherently rated. The assessment statements are used to describe the

activities planned to be accomplished during future OT activities to gather information that is pertinent to employing the system in its intended Battlespace. Topics are used to document the supporting rationale that led to the core team's and/or test team's determination that further assessment of operational impact was required. See table 3.1 for additional information on OIA assessment statements and topics.

4.2.4.1 OIA Definitions

- Assessment statements correspond to specific topics. While topics clearly state what is known today, assessment statements address what is intended to be done in the future (i.e., assess the impacts of a topic on a given piece of the operation). Assessment statements are answered in narrative format that documents the test team's findings during the reporting process.

- OIA Topics are at an equivalent level to E&S MOEs and MOPs. They are used to provide an OIA description for the individual pieces of information gathered while assessing the impacts, both positive and negative, encountered while employing the system in its intended Battlespace.

4.2.4.2 OIA Examples

Assessment Statement: Assess the impact of "dirty doffing" (removal of contaminated articles) large numbers of aircrew on flying operations.

Topic: Pilots must be assisted in "dirty doffing" after flight. Processing large numbers of aircrew members in contaminated environments has seldom been attempted, but it's recognized that there are a limited number of required personal equipment specialists to assist the aircrew. Consideration should be given to the time required and procedures for "dirty doffing" a large number of aircrew at the squadron level (i.e., returning strike package) without impacting flying operations.

Assessment Statement: Assess the ability to produce target sets in the numbers required to support ATO development.

Topic: Small Diameter Bomb (SDB) provides the capability to strike a greater number of targets in differing locations than previous munitions. Additional time will be required to plan additional primary target sets and alternate targets given SDB capabilities. Given increased targeting demands, the impact on the mission tasking and planning activities is unknown.

Assessment Statement: Assess logistics support impacts on the ability to generate A-10 aircraft while legacy radios are being phased out.

Topic: As the Joint Tactical Radio System (JTRS) enters the inventory and legacy radios are phased out, it is not clear how legacy radios, awaiting JTRS replacement will be supported (i.e., spared and maintained). Until all aircraft have been modified, units will have aircraft equipped with different radios. Action should be taken to coordinate with the item manager to ensure they have a plan to provide the necessary logistics support for all legacy radios through phase-out.

Assessment Statement: Assess the impact on AFSPC's capability to verify/validate MM III accuracy with a limited number of launches and increased RS/RV configurations.

Topic: Future FDE will have only three launches per year. With a limited number of launches and an increased number of RS/RV configurations (MK21, MK12A, and MK12A-MIRV), will AFSPC need to modify number of launches to accomplish force development evaluation (FDE) verification and validation of MM III accuracy post SERV deployment?

Assessment Statement: Assess how well battle planners can use real-time intelligence, surveillance, and reconnaissance (ISR) information to support time-sensitive combat operations.

Topic: The MQ-9 possesses the capability to disseminate real-time tactical data including transmitting target information (coordinate data and imagery) directly to specific combat air forces (CAF) assets (for example, F-16s via IDM or video link to AC-130 Gunships) to facilitate real-time precision attacks. The capability to use the increased intelligence gathering and dissemination provided by MQ-9 is unknown.

Assessment Statement: Assess the impact of environmental regulatory constraints on capability to perform low observable (LO) maintenance in support of sortie generation.

Topic: LO maintenance may be restricted at certain deployed locations due to environmental restrictions on the types of materials and chemicals used, as well as the hazardous waste produced.

4.2.5 Test Methodology

After the MOEs/MOPs have been identified, a test method is devised with specific data requirements to answer each MOE/MOP. Field testing is the primary arena to operationally evaluate system effectiveness and suitability. Field testing may be supplemented by M&S, studies, etc. Where feasible, models are used in test planning activities to identify data needs, sensitivity, etc. Test planners determine which methodologies can best support operational testing. The OTPM test

program network tasks show how the elements of test planning lead into the elements of test execution. Plan each OT&E to accomplish *operational task level evaluation*, not necessarily *operational task level testing*. (Good examples of this type of testing are the "-ilities" testing. Testing of a system's turnaround time reflects the system's generation capability. The turnaround time is operational-level test; the generation capability is an operational-level evaluation.) The technical advisors and CA/CN can give additional feedback on the test methodology during the TC briefing. Tests must be at the appropriate level for the system or subsystem being evaluated. Whether evaluating MOPs in support of MOEs or in support of capabilities-based performance attributes, the focus should be on performance within the context of the system's mission, rather than on system specifications.

4.2.6 The Use of Modeling and Simulation (M&S)

M&S includes digital M&S, virtual simulations, test drivers such as data injectors and stimulators, and other test capabilities. In most cases, the phrase "M&S" refers to digital models executed on computer platforms ranging from PCs to workstations, and this section covers those uses. Although M&S capability continues to improve and AFOTEC's policy on M&S continues to evolve, AFOTEC endorses use of digital M&S for three primary purposes: test planning, prediction of SUT performance, and extension of field test results. In any case where M&S results will be used to derive information to be captured in an OT final report, verification, validation, and accreditation (VV&A) is required (see paragraph 4.7.6 later in this chapter. Also see paragraph 4.7.6.7 for useful websites associated with M&S). TS maintains limited information on AF & DoD M&S availability and operates a M&S facility capable of hosting a wide variety of many popular M&S programs covering all types of weapons systems. Test directors are encouraged to contact TS early in the life a program for assistance in determining M&S applicability to a given program.

During the test planning phase, M&S can play a helpful role in optimizing limited OAR or ground test facility test time. OAR and SUT systems can be simulated and various configurations examined via M&S. Resulting information can be used to maximize return from limited range time and to investigate areas of principle interest to the warfighter.

With an adequate representation of the SUT, digital modeling can be used to predict SUT performance. This information can be used to optimize field test events by estimating SUT performance boundaries. Field testing can then be tailored to address those areas that merit further evaluation or are of special interest to the user.

M&S can fill in gaps associated with field testing in cases where it would be too expensive or impossible because of lack of capability to conduct an OAR-only evaluation. In this case, carefully chosen field test results are supplemented with M&S events. M&S would be used to repeat OAR events to ensure a common baseline and then M&S, appropriately accredited, can be used to run events beyond the scope of OAR events. Testing an air-to-air missile system is an example, where the primary aircraft of interest is a foreign fighter. Since it would be impractical or impossible to fire the SUT missile at an actual foreign aircraft, OAR events may consist of firing the SUT missile at a USAF fighter configured as a drone aircraft. M&S would then be used to repeat the OAR drone aircraft firings and "extend" the results to the foreign aircraft of interest by executing the M&S with a representation of the foreign aircraft signature and other parameters of interest. In this manner, AFOTEC could provide the user information regarding SUT performance versus real threats. Other reasons for using M&S are: safety concerns, environmental concerns (hazmat), or treaty limitations.

Use of M&S should be identified early and explicitly described in the ITD, test concept, and test plan. Early discussion with TS and CA/CN will increase the likelihood of successful M&S effort. The test team should meet as early as practical with the SPO for the purpose of identifying OT M&S requirements and necessary verification and validation (V&V) activity and for securing SPO M&S funding IAW DODI 5000.2 and AFI 16-1002.

Below are some guidelines covering effective use of M&S:

- Models should help predict (quantify) performance throughout the operational environment.
- Models should help design tests to maximize our learning and optimally apply our resources.
- Models should help replicate the environment during test to realistically stress the system under test.
- Models should add to the insight and understanding in interpreting collected data.

The M&S Support Plan, developed by the program office, captures all the M&S requirements over the life cycle of an acquisition program including those for test and evaluation (DT and OT). TDs need to be aware of this document and ensure OT M&S requirements identified by the TD are included in this document as early as possible in order to be a part of the program office's M&S funding strategy (the PM is responsible for funding required M&S resources). AFOTEC needs to have early involvement in creating the M&S Support Plan. The PM is responsible

for creating the plan, but AFOTEC is responsible for providing the OT M&S resource requirements to the PM. The M&S Support Plan goes along with the SAMP. This is also a good time to establish the funding strategy (the PM is responsible for funding the required M&S resources). Reference DoDI 5000.2 and AFI 16-1002.

4.2.7 Evaluation Criteria

Evaluation criteria are tied directly to the operating command's operational capability requirements and represent a level of performance against which system characteristics and capabilities are compared. Evaluation criteria, when available, are associated with MOPs and MOEs.

4.2.7.1 Establishing OT&E Evaluation Criteria

AFOTEC develops evaluation criteria with the operating and supporting commands' assistance. The CDD/CPD thresholds are used as evaluation criteria. Memoranda of Understanding (MOU) are used to clarify evaluation criteria when necessary – see paragraph 4.6 for information on MOUs. The CDD/CPD objective values are not considered evaluation criteria and therefore, are not rated, but reported in narrative style. Criteria should be quantitative, wherever practical, but may be supplemented by qualitative inputs based on test team expertise. Operational capability requirements established in early program documentation (e.g., ICD, CDD, and AoA) form the basis for evaluation criteria, which are agreed to in writing by the operating command and AFOTEC in the OT&E plan. Each criterion is related to a documented operational performance attribute or specified in the MOU. Ensuring that values are related to the operational performance attributes is the most important consideration when identifying and establishing evaluation criteria. Evaluation criteria cannot be used to change a requirement, but only to evaluate the requirements. If the requirement/capability documentation and the threat documentation (STA/STAR, etc.) disagree on the level or type of threats, AFOTEC/TSI, in conjunction with the test director, will coordinate a revised user approved threat list as deemed appropriate. The capability requirements document should be updated prior to test start.

4.2.7.2 Interim OT&E Evaluation Criteria

Because of the length of time dedicated to the development of some systems, it may be necessary to establish evaluation criteria that apply to the immature system at various points in its development. These interim evaluation criteria are not predictive in nature and may not match the maturity threshold criteria but will provide an indication that the system is progressing toward maturity. One source of interim evaluation criteria is

the SMM. Interim evaluation criteria should be stated as user needs at the end of the testing period. AFOTEC does not independently derive interim criteria based on a growth curve estimation scheme and does not accept SPO/Contractor interim criteria without user buy-in through revision to the capability requirement document. The risk avoided is passing a system based on planned resource commitments that may not be implemented in the fielded system.

4.2.7.3 Updating Evaluation Criteria

Evaluation criteria and the OT&E plan are updated if requirements change. These changes are documented in the operating command's update to the CDD/CPD/MOU or General Officer (or equivalent) message.

4.2.8 Planning the Determination of Effectiveness and Suitability

As the operational test is being planned, the test director should be thinking ahead to the eventual final report and how the system's operational effectiveness and suitability will be determined and reported. Detailed information on reporting philosophy, effectiveness and suitability determination, and aggregation methodology can be found in paragraph 6.1.

4.2.9 Realistic Conditions

Evaluating an MOE by replicating a realistic mission or mission segment should be used whenever feasible. This approach need not necessarily focus on the engagement or battle outcome level (this level of testing is cost prohibitive), but should provide the means to evaluate the operational effectiveness and suitability of the system or subsystem in realistic conditions. Test planners create controlled test scenarios that reflect the conditions to best evaluate the system. Similarly, to focus the OT&E, subsystems often require a separate evaluation preceding overall system evaluation. In those cases, "graduation exercise" scenarios (scenarios that include all subsystems) should be included to evaluate effectiveness and suitability in the context of all pertinent subsystems' performance.

4.2.10 Test Scenarios

Once feasible test methodologies has been defined, the process of determining the sequence in which the required data will be obtained (through specific operationally representative test scenarios) can begin. Test scenarios encompass the test events identified during the initial test design. Here again, the TD and the core team/test team should incorporate as much operational realism as practicable. On completion

of this step, the test concept should be well enough defined that the test resource requirements can be coordinated with the implementing and supporting agencies. Test scenarios should be a reflection of the operational scenario as provided in the CONOPS. Test scenarios provide the context for the test events identified in the initial test design. Although one would like to conduct test scenarios as "end-to-end" flows, the test scenarios may be segmented for several reasons, such as: (1) it makes the test manageable in terms of control and resources, (2) it accommodates the management of test data, and (3) not all testing is done in one location.

4.2.10.1 The Process of Structuring Test Scenarios

The process begins with a review of the operational tasks, MOEs, and MOPs. Ensure that the test scenarios cover all the operational phases of the mission deployment, employment, and sustainment. In considering the entire operational requirement, do not forget real-world environment, electro-magnetic interference, electro-magnetic compatibility, etc. Consider how the data will be obtained to support the metrics. These conceptualized test scenarios may be segmented for manageability and real world constraints. The following factors should be considered if segmenting the test scenarios is required:

- Size of the events in terms of time and space.
- Data management limitations.
- Evaluation criteria to be addressed.
- Statistical confidence requirements (especially important for suitability issues such as RM&A).
- Resource availability:
  - Test ranges (threats, weather, terrain, instrumentation, etc.).
  - Test schedule, including dry runs.
  - Test articles.
  - Funding.

With the above information in hand, test scenarios are structured, sized, and prioritized.

The choices made during development of test scenarios require the TD and core team/test team to continually scope the OT&E. Test capability limitations, test article shortfalls, and funding factors continually creep into the list of factors that must be dealt with. This is where alternatives may be considered in the test concept. In those instances where test resources, including length of test, are substantially restricted, M&S may be an appropriate tool to support the evaluation of the task. Where it is appropriate to answer critical user questions, to fully evaluate critical system functions, or to provide a wider, more comprehensive view of the system's operational effectiveness and suitability, the TD should consider the use of M&S.

4.2.11 Presenting the Test Concept for Approval

Once the Det/ST test team develops the TC, it is briefed to the XO and CA for XO approval. The tasking order for the program will direct when the TC is expected to be briefed. The TC may be updated as the program matures. Depending on the complexity and duration of the program, the TC may be briefed once or there may be several phases to the TC briefings. The number of times the TC is updated and presented is at the discretion of the XO and CA. The AFOTEC Commander approves any TC briefings for ACAT I programs or any program on the OSD oversight list before they are presented to AF/TE or DOT&E. In all other cases, the XO and CA will informally discuss test concepts with the commander as they see the need. An electronic copy of the briefing is maintained on the MIN. Briefings should be in the approved AFOTEC briefing format found on the MIN (see attachment 4). When scheduling the test concept briefings, ensure that TS, AS, SE, XP, XO, and CA are invited, and attempt to schedule the meeting with enough lead-time so invitees (or their representatives) may deconflict their schedules to attend the briefings. Read-ahead copies of briefing slides should be provided to the invitees a few days before the scheduled briefing.

The presentation of the TC to CA and XO for XO approval, prior to presentation to the CC and outside agencies (if appropriate), is to introduce the test team's feasible approach for testing the system as directed by the test design and tasked to execute by the tasking order. An updated version of the programs OTPM test program network reflecting the current test concept should be available to explain the relationships between the projects cost, content, and schedule. The comprehensive format for the TC briefing is on the MIN (see attachment 4) and includes such areas as:

- Introduction
- Program Overview
- Operations

- Evaluation Framework and OT&E Methodology
- Effectiveness and Suitability
- Operational Impact Assessment
- Other Significant Information

4.3 OTPM Test Program Network Update by the Det/ST

Test Planning includes the development of an OTPM test program network for each program. Detachments may do a separate network to break out various projects (e.g., OUE, OA, etc.). If an initial network was developed prior to the ITD it should be progressively refined as new programmatic information becomes available. The test program's OTPM network should define the tasks required to move from project planning through closeout. The organization's Project Management Advisor (PMA) will assist the TD in refining the program's OTPM network. The starting point for this process will normally be the initial OTPM network developed prior to the ITD. Normally the TD attends AFOTEC's Introduction to Project Management course prior to building or using OTPM tools to manage the project. Following the training, the team can build or refine the projects network. The OTPM test program network defines the nature of tasks required by the Det/ST to successfully move the program from planning through closeout. The network also defines the time required to accomplish each task considering the variability in each estimate. The ultimate goal of the network is to ensure that AFOTEC meets the required delivery date for the information or product required by the customer(s). This information can take many forms to include final reports, interim reports, briefings, etc. In most cases the information is used to support a acquisition decision (e.g., fielding, production). The OTPM test program network provides a comprehensive roadmap for the TD and a tool to communicate program requirements, status, risks, and response strategies to leadership. Once an OTPM test program network is completed it should be presented to leadership to attain essential approvals and buy-in. The detachment determines the level of review depending on the project. XO, and Det/ST leadership validates the program OTPM networks. The primary indicator of schedule risk is the project buffer status. Buffer status provides advanced warning of potential problems that could compromise on-time test start or product delivery. The primary indicator of resource requirements and resource availability are resource histograms and reports available across AFOTEC. The networks capture resource requirement for the life of the program. This is critical since AFOTEC leaders must forecast resource utilization as well as resource requirements. Standard elements of the OTPM test program networks include: TO, TRR, test execution, last test event (LTE), report coordination, and closeout. The PMAs maintain standard templates that can be customized to suit individual test projects.

4.4 Forming the Test Team

Test team composition depends on the scope of the test. The OT&E plan shows the formal organization of the test team. Test teams not collocated with a detachment are established as an operating location assigned to the appropriate detachment. Establishing a test team is a complex task, and developing a detailed organizational chart may be helpful. Once assigned and oriented, the TD may make adjustments in needed personnel and where they will be assigned. Consider obtaining expertise from the local area where the test will be conducted to support the team and expedite acclimation to the area. Refer to paragraph 4.5 for additional guidance on test team activation and operating instructions.

4.4.1 Test Team Members and the Test Resource Plan (TRP)

During the early part of test planning, the TD identifies which specialties and skill levels are needed for the test team. The results of this determination are included in the TRP and are updated biannually or on an as-needed basis. The test program network is developed concurrently with the development of the TRP. Once complete, the TRP defines the resources that are used to accomplish tasks in the OTPM test program network. The TD decides which test team positions are permanently assigned and which positions are better filled using individuals in a TDY status. AFOTEC permanent party positions must be coordinated with AFOTEC/DPX (Manpower) through the TRP process, and are normally taken from current directorate/detachment resources. The TD and initial administrative support normally are the first test team members to arrive on station. The deputies for operations, analysis, and logistics, normally trail the lead team. In determining how early to position the test team, consideration must be given to ensure adequate time for training and familiarization of the test environment. The scope of the test, the location (for example, not with a detachment), or special activities associated with an OA may warrant earlier assignment and placement of key test team members. All requirements for the numbers, skills, and reporting dates of test team members are included in the TRP. Any late changes to test team personnel are coordinated with AFOTEC/DP and approved by CV.

4.4.2 Test Team Selection

The TD is usually responsible for test team selection with Det CC or Director concurrence. It is important to form the test team early enough for indoctrination and training, thus ensuring all tasks required by the OT&E plan can be accomplished. There are two types of test team positions: permanently filled positions where the Air Force Personnel Center (AFPC) selects individuals, and temporary positions filled by individuals performing TDY. For AFPC-filled positions, ranks of Major

and above require AFOTEC/CC approval. The selected test team members should have skill levels that are representative of personnel expected to maintain and operate the system. The validity of evaluating the test depends on using representative operators from the using commands and avoiding the highly qualified or specially trained personnel. Those involved in test execution should have operational experience in the system to be tested or in a similar system.

4.4.2.1 Test Team Positions

Normally, the core test team consists of AFOTEC personnel in the key management positions. The following are usually designated as key positions: TD, and deputies for operations, analysis, and logistics. Members of the operating and supporting commands under AFOTEC's operational control perform non-key test team positions responsible for the functional-level efforts.

4.4.2.2 Test Team Requisition

For AFPC-filled test team slots, TDs submit requisitions, along with selection criteria, for personnel through the applicable director/detachment CC to DP as soon as possible but not later than 180 days prior to the desired report-no-later-than date. HQ AFPC selects candidates based on the selection criteria from the assignment volunteer list to fulfill AFOTEC test team requirements. TDY-filled positions are normally requested in the TRP and coordinated through the applicable MAJCOMs. The responsible director or detachment CC selects program TDs.

4.4.2.3 MOT&E Test Team Structure

For MOT&E, use the multiservice test team structure as described in the MOA on MOT&E found on the MIN (see attachment 4).

4.4.3 Administrative Support Requirements

Administrative requirements, in addition to civilian overhires, should be documented in the TRP. If the test team is collocated with an AFOTEC detachment, administrative support should be requested from the detachment and the TRP coordinated with the Det CC. If the test team is not collocated with a detachment or if the detachment is unable to satisfy all the administrative support required, include a requirement in the TRP for the participating MAJCOMs to provide administrative support. TDY administrative assistance from AFOTEC may be provided to the test team location to assist in activation of the OL.

4.4.4 MAJCOM-Assigned Test Team Members

The MAJCOMs retain command authority over their personnel. Although not always possible, it is highly recommended that a formal agreement for rating MAJCOM personnel on a specific test team be formulated, agreed to, and signed by AFOTEC/CV or the designated representative (with AFOTEC/DP involvement) and the appropriate command level of the MAJCOM organization providing the personnel. Rating MAJCOM test team personnel should be addressed early in test team formation, preferably at the time host/tenant and other test team administrative procedures are formalized. Ensure that officer performance report and enlisted performance report authority for members of other commands are clearly understood by all test team members and (if applicable) their parent command. See AFI 36-2406, *Officer and Enlisted Evaluation Systems.* Deviations from the guidelines provided in this paragraph are coordinated through DP and approved by CV.

4.4.5 Test Team OT&E Training

Before initiating the test, all OT&E members and support personnel are trained on the general principles and policies of testing and on the test program itself commensurate with each team member's responsibilities. AFOTEC/XOT is the AFOTEC OT&E training focal point and conducts a variety of training courses that cover a portion of the training required by test team members. It is the TD's responsibility to determine the OT&E training requirements of test personnel and participants and XOT will assist the TD with identifying training requirements for test team personnel. The TD should work with AFOTEC/XOT to ensure that training is scheduled in sufficient time prior to OT&E to enable test personnel to plan and develop detailed test procedures and identify test instrumentation. AFOTEC/XOT conducts the Test Team Operations Course, PDS Code 301, for all test team members, which addresses a number of the topics listed below. Providing the required training for test team members will be accomplished through a combination of XOT, SPO, contractor, and Test Team efforts. Training should involve the following procedures and instructions (see the XOT web page at MIN (see attachment 4):

- Applying governing regulations, policies, and procedures.
- Ensuring each team member knows the background and purpose of the test, the specific test events, a description of the test items, the methods for conducting the test, and program milestones.
- Ensuring team members clearly understand their responsibilities and relationships to the overall test program.

- Interacting and coordinating with other organizations, agencies, and commands.
- Ensuring each team member is aware of changes to test events or scenarios, and their impacts.
- Making sure each team member has a thorough understanding of the data required, including how the data will be collected, processed, analyzed, evaluated, recorded, and safeguarded, and who will accomplish and be responsible for each of these tasks.
- Understanding the responsibilities of each support activity, how their efforts affect the test program, and how the test results are evaluated and reported.
- Understanding responsibilities for OT&E reporting.
- Releasing OT&E information to outside agencies. Team members should be informed on how to handle the media or visiting personnel. This is especially important to prevent releasing premature or inaccurate test results that could jeopardize successfully completing the test or compromising the source selection process. Contact AFOTEC/PA for assistance (see paragraph 5.12 for additional information.).
- Reviewing the program's SCG and the implementing or using command OPSEC guidance. Copies of the guides are available in AFOTEC/HO, and test teams should contact AFOTEC/SF with OPSEC questions.
- Familiarizing the test team with the lessons learned program.
- Verifying the test support each agency has been tasked to provide. The TD must identify support problems to the agency's headquarters as early as possible.
- Ensuring team members are provided with the detailed, program-specific training necessary to execute and report their OT&E.
- Identifying real/potential hazards of the equipment, facilities, and procedures of the test; identifying the presence and use of hazardous materials IAW AFOSH 161-21, *Hazard Communication*, and identifying areas of safety interest to be observed during the test.
- Ensuring team members have been briefed/trained IAW AFOSH, OSHA, and AFI 91 series including but not limited to, local area orientation, flight-line driving, hazardous waste management plans, etc. Ensure safety training is documented on member's AF Form 55, *Employee Safety and Health Record.*

4.4.6 Test Team System Training

Team members may require system familiarization training to support the OT&E of a new or modified system. Familiarization training includes both operator and maintenance training. System training may need to be done by the developing contractor; if so, it is identified in the contract. The TD should also consider obtaining any other special training that may be necessary for supporting or using the system such as airdrop training or specific training on what a system failure would look like.

4.4.7 Real Property, Facilities, Furniture, and Off-Base Leases

Test teams need to plan facility, furniture and real property acquisitions in the one to five year timeframe. In general, small facility projects and furniture procurements should be submitted in memorandum form with an explanatory AF Form 332 or AFOTEC Form 23 to RME as part of the budget call for the following FY. Larger projects such as new buildings, building additions, extensive renovations, and off-base leased facilities space or land should be submitted to RME on an AF Form 332 at least three years prior to the projected need date. The following should be considered:

- New requirements such as remote test sites, special security, and new or expanded mission that require office space, land, or special use area should be documented on Part 1 of AF Form 332, along with a brief justification, and submitted to RME as soon as the requirement is known.
- Repair and maintenance of existing facilities should be documented on Part 1 of AF Form 332 and submitted to RME. Items that typically require an AF Form 332 submission to RME include new carpeting, painting, wall coverings, modification to the building mechanical or electrical systems, or installation of equipment with any permanent connect to building systems or utilities.
- Furniture and facility equipment requirements should be documented on AFOTEC Form 23 and submitted to RME. Request for specific furniture or equipment must contain a sole source justification letter. All other requirements will be met first from AFOTEC existing inventory, UNICOR (Prison Industry), GSA, GSA approved vender, and open market in this order. Dollar amounts for a proposed requirement do not affect procedures for obtaining furniture or facility equipment.

4.5 Activating Units

This guidance will assist in activating a unit should a new unit (OL, test team) be required for the program. Additionally, a page located on the

MIN (see attachment 4) is available to assist with unit activation. It is also important that a review of the information contained in paragraph 4.6 be accomplished since the establishment of a unit will normally require some form of support agreement. See Chapter 7 for guidance on inactivating a unit.

4.5.1 What is the process to activate a new unit?

The directorate or detachment who will own the new unit should identify an Action Officer (AO). This AO should contact the XP bases and units OPR and review the unit activation checklist on the MIN (see attachment 4) for additional guidance and details on the process. The process includes AFOTEC CC unit approval and request for unit special orders, identification of site activation task force (SATAF) members, and request letter for host base support, SATAF meetings and site visit with selected members, support agreement coordination and signature, and completion of a site activation status report. AOs should initiate this process as early as possible, preferably during scope/cost.

4.5.2 What is needed?

Prior to preparing any approval package, the need for a new unit should be checked with the command section. This can be accomplished via a staff package in AECS or may require a briefing to the XO/CV. Once CC go-ahead has been given to establish a unit, a request package must be submitted to AFOTEC/CC for approval. Along with identifying a project officer, this package must contain a mission statement and provide enough information to explain the intent and need for the new unit. The project officer serves as the unit activation team chief.

4.5.3 What happens when the request for unit activation is approved?

The project officer should contact all key players and arrange a meeting. This has worked extremely well for the past several unit activations, and also has identified needed requirements by having all the different key players in the same meeting.

4.5.4 Who must be kept informed?

Within 120 days after the completion of site activation, a status report is submitted to AFOTEC/CC. This report covers the effectiveness of support provided during the activation process. After command section review, the report is provided to XPY. Any problems that were encountered will be defined, and suggestions on how to avoid those problems in future activations are submitted as input to the PEP (see paragraph 1.11.9).

4.5.5 How much time should be allotted for activation?

The unit activation team lead should get the team together about 15 months prior to the required activation date.

4.5.6 Activation Activities

4.5.6.1 The unit activation team does the following:

- Defines the role and mission of the unit in terms of the projects/tests to be performed.
- Briefs the host base commander and staff on support requirements.
- Establishes unit and host base POC in each major functional area for use by personnel during and following activation.
- Ensures appropriate test team facilities are identified and available when the first unit members arrive.
- Accomplishes any additional actions necessary to allow the unit to become operationally viable immediately upon activation.
- Identifies, plans, and coordinates the required host base support. Negotiate a support agreement with the host base/organization. Refer to DoDI 4000.19 and AFI 25-201, *Support Agreement Procedures*, for additional information. Even if the gaining unit does not require a support agreement, some form of documentation is still required to meet AFOTEC requirements.

4.5.6.2 AFOTEC Support

The unit activation team takes all necessary actions to establish the unit including contacting the various headquarters staff offices that will provide support. Many of these activities need to be done while the activation package is being prepared:

- DPC (Directorate of Personnel - Civilian): establish, recruit and fill civilian positions.
- DPM (Directorate of Personnel - Military): requisition personnel for vacant positions; provide instructions and guidance for personnel action forms; coordinate with MAJCOMs to identify personnel requirements, placement, and tour stabilization as required to staff the unit. Negotiate (if required) OPR or letter of evaluation authority for members of other commands. The TD or a deputy should be the rater for each senior command representative, as a minimum.
- DPX (Manpower Office): realign positions to meet identified moves; establish the personnel accounting symbol (PAS), and create the activation order (G-series).

- Detachment Admin Function: work with host base administration, as necessary, to publish routine unit orders and/or establish a "t-series" prefix if the unit is to publish their own travel orders; work with unit activation team to establish records and files; receive a copy of the published G-series order and update the address directory to add new unit; establish technical order sub-accounts to ensure basic Tech Orders (i.e., 00-5-1, 00-5-2, 00-35D-54) are obtained (as required).
- LC (Legal Counsel): interact with base and local agencies on legal matters, as required.
- PA (Public Affairs and Protocol Office): If warranted and based on public interest, PA will prepare a news release to announce the unit activation and identify unit leadership.
- RMC (Contracts): work with unit activation team to identify any unit specific requirements and coordinate with appropriate agencies to establish appropriate contract mechanisms.
- RME (Engineering and Facilities): submit real property request for office space, identifying facility requirements as appropriate; in conjunction with SE, conduct site survey, determine facility modifications, and submit requests, as necessary.
- RMF (Financial Management Office): manage the financial process. If the unit activation is not in the current fiscal year, associated costs should be submitted to RMF for inclusion in POM and budget submissions. Immediate costs should be addressed through the "Unfunded Requirements" process.
- XOR (Test Resources Team): ensure the TRP identifies the new unit's specific resource requirements and coordinate requirements with appropriate personnel.
- SC (Communications and Information Team): Test teams plan for Information Technology (IT) assets and services, such as: computers, scanners, printers, nonstandard software, local area networks, and wide area network connectivity; IT audio visual equipment to include digital display projectors and digital cameras; communications devices, such as cell phones and pagers. Test team prepares Communication Requirement Document to outline unit computer and communication requirements using guidance in AFOTECI 33-103. Detachment Equipment Control Officers (ECO) are the primary POCs for receiving, storing, tracking, and disposal or turn-in of all comm-computer equipment used by test teams. ECOs ensure test team leaders assign a primary and an alternate Equipment Custodian (EC) to manage equipment accounts in accordance with AFI 33-112, *Computer Systems Management* and AFOTEC supplement 1. New network accounts are obtained using an AFOTEC Form 14, AFOTEC computer Account Access Request,

or, for classified network accounts, an AFOTEC Form 97, ACNET Account Request. Ensure the Test team identifies a requirement for appointment of an Information System Security Officer to oversee adherence to IT security requirements. SCSI (Information Management Team) coordinates with TD/operating location chief on Records Management responsibilities in accordance with AFMAN 37-123, Management of Records; AFMAN 37-139, Records Disposition Schedule; and AFI 37-138, Records Disposition – Procedures and Responsibilities.

- RMS-SCXR (Requirements and Acquisition Team): coordinate with the TD/operating location chief on supply and equipment requirements and in establishment of supply/requirement accounts.
- XPY (Policy): assist the site activation team with the support agreement process.
- SE (Safety): provide advice on host base safety and environmental requirements or unique conditions; perform facility/location visits and surveys, as required; establish safety and environmental package(s) for sites not located on a DoD installation or when safety assistance is not available at that location; coordinate on all MOAs and MOUs to ensure safety support is provided for the OT team.
- SF (Security Forces): determine unit security, and classified storage requirements and coordinate with host base agencies; process unit personnel investigation requests (AF Form 2583), clearance checks, visit requests, badge requirements.
- XOT (Training): identify unit training requirements and provide necessary training to test team personnel.
- TS (Test Support Directorate): advise and assist the unit activation team chief on matters related to data support and analysis.

4.6 Support Agreements

Support agreements document recurring support requirements received from or given to another DoD or non-DoD Federal activity. They define the support to be provided by one supplier to one or more receivers, specify the basis for calculating reimbursement charges (if any) for each service, establish the billing and reimbursement process, and specify other terms and conditions of the agreement. The Support Agreement Manager (SAM) in XPY coordinates all support agreements and amendments. Most of AFOTEC's support agreements identify test responsibilities, outline financial responsibility for various test activities, and provide general guidelines for test support, and/or establish host-base provisions. AFOTEC uses the following support agreements.

4.6.1 Memorandum of Agreement (MOA)

MOAs define general areas of conditional agreement between two or more parties – what one party does depends on what the other party does (e.g., one party agrees to provide support if the other party provides the materials). MOAs that establish responsibilities for providing reimbursable support are supplemented with a DD Form 1144 or its equivalent (e.g., CRD, program introduction document (PID), statement of capability (SOC), contract), describing the specific terms and conditions of the agreement. Host Tenant Support Agreements are considered MOAs.

4.6.2 Memorandum of Understanding (MOU)

MOUs define general areas of understanding between two or more parties – explains what each party plans to do; however, what each party does is not dependent on what the other party does (e.g., does not require reimbursement or other support from receiver).

4.6.3 When is a support agreement required?

All AFOTEC Detachments and OLs, other than those co-located with AFOTEC, need to have a support agreement covering host-base provisions and/or general test program support. All AFOTEC-Non-DoD activities, where there is an exchange of services or resources, reimbursable or not, is documented with a support agreement. All AFOTEC-DoD activities, where there is a reimbursable exchange of services or resources between AFOTEC and two or more agencies, must be documented with a support agreement. All AFOTEC reimbursable activities are documented with a DD Form 1144, or its equivalent, describing the specific terms and conditions of the agreement. Research the support agreement database to determine if an agreement already exists that address the new requirement or to see if an existing agreement could be modified instead of creating a new one. The DD Form 1144, or its equivalent, is not required in AFOTEC-DoD situations where the activity is non-reimbursable and an existing MOA, Support Agreement, or TRP sufficiently defines areas of responsibility and agreement between the involved parties. Tasking Orders include general instructions for documenting support agreements.

NOTE: Some programs or OLs may have unique safety and environmental support requirements (to include weather warnings and advisories) and/or hazardous material handling and disposal requirements; the appropriate provisions are included in the support agreement.

4.6.4 Who develops, coordinates, and approves support agreements?
For most AFOTEC activities, the test team develops the support agreement and originates the DD Form 1144. The Support Agreement Manager (SAM) in XPY coordinates all support agreements and amendments. Normally support agreements require 2Ltr coordination and Vice Commander signature, unless the agreement is with Non-DoD entities, which require AFOTEC/CC signature, or the XP determines otherwise.

4.6.5 Who can help with preparing a support agreement?
The Policy and Procedures office (AFOTEC/XPY) is the focal point for support agreements. The SAM (see definition below), is the first person to be contacted whenever a support agreement (of any kind) is required. The SAM can provide examples, assist in creating the agreement, establish reasonable timelines, and determine the appropriate coordination process within the headquarters. The SAM at each DoD organization is responsible for providing assistance to teams in preparing support agreements and administering the support agreement program. Preparation of agreements includes collecting, from appropriate sources, all information needed to draft agreements and facilitate related negotiations, coordination, approvals, and implementation. Administering agreements includes maintaining a record of active agreements, ensuring their continued accuracy, and facilitating agreement on modifications and terminations when appropriate. There are two major support agreement directives: DoDI 4000.19, Interservice and Intragovernmental Support and AFI 25-201, Support Agreement Procedures.

4.6.6 What happens if the other unit refuses to sign the agreement?
There have been instances where the agency providing the support does not want to sign an agreement – the AFOTEC Vice Commander still requires that our side of things be documented. Contact the SAM and refer to AFI 25-201. Be sure to start a memorandum for record (MFR) that documents the specific terms of the impasse, including names (i.e., AFOTEC and other agency POCs), meeting minutes, and any supporting rationale for the refusal. This MFR will be used in impasse resolution and will be part of the agreement file.

4.6.7 How are activation, review, and termination dates determined?
All support agreements should include an activation, review, and termination date. The activation date is usually the date of the last approving signature. All parties normally review support agreements annually. Review dates are determined by the parties involved and

largely depend on the length and type of agreement. For example, "as needed" is probably best for short-term agreements, "annual" is standard for longer agreements, and "tri-annual" is common for host-tenant agreements. Support agreements are usually tied to program schedules; accordingly, many end once testing is complete – they should be worded this way. Otherwise, termination dates, like review dates, are determined by the parties involved and normally include a statement regarding the number of days required for notification prior to mutual termination of the agreement.

4.7 Test Capability Requirements

TS is the primary AFOTEC POC for test capabilities, including test investment planning. As such, AFOTEC/TS supports core teams, Det/ST, and headquarters staff in the identification of test range/facility capabilities, determining test capability shortfalls, submitting requirements; and advocating for OT&E needs within the AF and DoD test investment process. TS updates the Test Capability Roadmap every other year and maintains a current test capability prioritization list. TST works closely with XPZ, which has the charter to develop and maintain OT capability at the Nevada Test and Training Range (NTTR).

4.7.1 Test Capabilities

Test capabilities are assets that are used in conjunction with the system under test or a representation of the system under test to generate data to address test measures. Test capabilities include test ranges (i.e., DoD Major Range and Test Facility Base, as well as smaller "backyard" ranges and/or commercial/private air and ground space), instrumentation and data collection systems, ground test facilities, distributed test capabilities, test drivers and digital modeling capabilities. Examples of AFOTEC high-interest test capabilities include the Air-to-Air Range Infrastructure system, various missile warning sensor stimulator systems, the F-22 Air Combat Simulator, surface and airborne targets, and the AFOTEC Analyst Work Center. Establishing and maintaining adequate test capability is essential to the AFOTEC core mission of determining operational capabilities and limitations of AF and joint systems. Test capabilities enable test teams to expose systems under test to operationally realistic environments. Test capabilities must be developed and maintained to support testing of advanced weapons systems that exploit the latest technologies.

Successful development of adequate test capabilities begins with the establishment and approval of an initial test design. The test design defines the primary COIs and MOEs and the test and evaluation approach associated with a program, and serves as the foundation for identification of test capability requirements. Once test capability

requirements are defined, AFOTEC/TST can establish test capability shortfalls and advocate for the development of solutions to those shortfalls. When a test capability shortfall relates to a threat system, TST works closely with TSI in advocating for the development of solutions. Sometimes, the best means for satisfying the threat-related shortfall is through the DoD Foreign Materiel Program (FMP) that acquires and exploits foreign systems for testing, training, and intelligence purposes. Test teams should work with TSI to ensure AFOTEC's FMP requirements are properly prioritized and advocated within the Air Force and DoD.

Test capability requirements should be identified as early as possible, usually during initial test design and scope/cost. TST action officers, knowledgeable on current and projected test capabilities and requirements, are present to assist with test design and subsequent test concept development. On relevant programs, XPZ action officers participate to provide NTTR capabilities.

4.7.2 Test Capability Roadmap

TST will combine information from the initial test design along with AFOTEC long-range goals documented in the Strategic Plan and future weapons system characteristics from a variety of sources to develop and publish the AFOTEC test capability roadmap. The roadmap covers aero platforms (including EW), space, armaments/munitions, C4I, directed energy weapons, and chem/bio weapons. The roadmap serves as the cornerstone of AFOTEC's test capability investment strategy. The roadmap includes a detailed description of each test capability requirement, information on the baseline test capability, existing shortfalls, potential solutions and the preferred solution/investment strategy. The roadmap focuses on AFOTEC's overall requirements, emphasizing test capability infrastructure needs for approximately 3-10 years in the future. The roadmap also serves as a primary source of input for developing an NTTR test investment POM developed and managed by AFOTEC/XPZ. The roadmap is updated every two years and is available on the MIN (see attachment 4).

4.7.3 Test Capability Shortfall Matrix

TST maintains a master prioritized list of all AFOTEC test capability shortfalls. Some test capability shortfalls apply to multiple test programs; the matrix ties specific test capability shortfalls to AFOTEC programs. TST, TSI and XPZ use the matrix and associated prioritization criteria to propose test capability investments, which are approved by the commander. The matrix is available on the MIN (see attachment 4).

4.7.4 Determining Range Requirements

In building a mission scenario and determining range requirements, the test planner needs to know, for example, the type of target, the number of aircraft attacking a target, and weapons employed. The planner also needs to consider the range's ability to accommodate the planned operational test without environmental impact. The Air Force TTP 3-1 should contain information such as specific tactics and techniques to be employed against certain targets and threat systems. Ensure that range personnel have a full understanding of the specific OT objectives. The core team should consult with AFOTEC/XPZ and OL-NN for testing considerations at NTTR and TST for any other test range or facilities.

4.7.4.1 Range Requirement Identification

Carefully thought-out mission scenarios provide the test team with preliminary test range resource requirements (e.g., threat simulators and instrumentation packages.) Early identification of these requirements is extremely important for advanced range scheduling, TRP development, and incorporation of new range requirements into the various range improvement programs and other investment forums (at least one year lead time is needed). In support of the core team, TST provides information on current and legacy DoD test and evaluation databases that archive data on existing test and evaluation test assets, and is the Air Force focal point for integrating new test and evaluation range requirements into the range improvements program. All potential test sites should be considered before the final selection is made.

4.7.4.2 Range Selection Considerations

Special consideration may have to be given to the area of test range selection and use. Usually, flight test programs require scheduling of and coordinating with test ranges for some or all test sorties. As military cutbacks continue, range consolidation will become more prevalent and test teams need to ensure range availability at the time of their scheduled test. All major ranges and centers are subject to the DoD uniform funding policy and require formal documentation of the test and the support needed. The range, in turn, provides a statement of their capability to support the test. This process can take six months or more. Although documentation requirements vary greatly among the ranges and centers, most require the development of a PID and support agreements (contact AFOTEC/XPY for information on preparing support agreements). To determine specific range initiation requirements, consult the Universal Documentation System Handbook 501-90, available from Secretariat, Range Commanders Council STEWS-SA-R, White Sands Missile Range, New Mexico 88002-5113.

4.7.4.3 Test Targets

Test targets, when applicable, should be realistic; they should be operationally representative and challenging. The intent is not to design test targets that are so difficult that they force a system failure. The TD should coordinate with the applicable MAJCOM to develop the target list. Coordinate the design of selected targets, existing and newly developed, with the appropriate intelligence agency, through AFOTEC/TSI. AFOTEC/TST maintains current lists of available aerial test targets in the inventory and is the POC for obtaining target allocations. TST also maintains contacts for other target types such as surface targets. Funding for target-related expenditures needs to be included in the TRP.

4.7.4.4 Range Safety Considerations

Ranges and centers are sensitive to safety considerations. Ranges and centers may require special test procedures, hardware, or software to reduce the risk of a mishap during the test. Ranges and centers frequently require safety review boards before start of testing. During evaluation planning, the TD should allow sufficient time to support these safety reviews. AFOTEC/SE can assist in resolving any range safety issues or support in safety reviews. When identifying required test resources and range requirements, test teams ensure the need for weather warnings/advisories is considered in support requirements (contact HQ AFOTEC/TSW for assistance).

4.7.4.5 Verifying Test Site Access Procedures.

Once a test site has been selected, test directors ensure access procedures are established and followed. Some questions to ask:

- What organizations are involved?
- What are the governing unit/area instructions/regulations and are copies available?
- Are procedures established for notification of safety and security POCs? What about after hours?
- How often are test site schedules updated? Is the test team on distribution?
- How is test site schedule change information disseminated?

4.7.4.6 Range Instrumentation Considerations

Instrumentation varies widely among ranges. Therefore, the test team carefully selects a range to ensure instrumentation is available to provide the needed information and to allow the most realistic representation of the operational environment.

4.7.4.7 Range Data Processing Considerations

Data processing capabilities and times are considered when the test schedule is prepared. The range equipment user's guide, facilities handbook, or the test support contact may be consulted for typical processing times.

4.7.4.8 Test Article Instrumentation

The test article instrumentation requirements need to be identified early to ensure that instrumentation will be sufficient to support test events. There is a fine balance between not compromising the production representative test article and obtaining telemetry from an instrumentation package. Test article instrumentation should be compatible with the range or test facility telemetry and data collection systems, with sufficient accuracy and sample rates to enable verification of system performance. If the test article needs to transmit instrumentation data, the instrumentation package needs to be compatible with the MIL-STD-1553 multiplex data bus.

4.7.5 OL-NN Responsibilities

HQ AFOTEC established an OL at Nellis AFB to ensure the test process at the NTTR is well devised and technically sound. As such, OL-NN is the on-site representative to assist the core team with the development of the test and evaluation concept during the discovery and scope/cost phases, as well as assist the test team with detailed test planning, test execution, and analysis of the NTTR results. OL-NN provides support in order to ensure the testing that takes place at the NTTR incorporates the discipline and structure to fully support the operational evaluation. The responsibilities of the OL are to advise the core team during the discovery and scope/cost phases, and to assist the Dets/ST during the PDP in preparing for and execution of testing at NTTR. Those directorates/detachments planning to use the NTTR as part of their approach involve OL-NN personnel in the planning and execution of their test at the appropriate level. It is acknowledged that in some cases AFOTEC has indirect involvement in testing at NTTR where the program office or system developer is responsible for the testing. For these cases, test teams are encouraged to use the services of OL-NN personnel. OL-NN personnel assigned to specific OT programs will be matrixed to the TD and will work as a member of the test team. For those personnel requiring access to the range special access program, an appropriate clearance and current background investigation within the past 5 years is required.

In summary, on-site technical assistance to AFOTEC test teams during detailed test planning and execution at the NTTR is OL-NN's primary mission. OL-NN:

- Coordinates program/site requests.
- Arranges site visits and meetings.
- Provides ROM cost estimates for early test and evaluation concepts.
- Assists test teams with range resource configurations, instrumentation, scheduling and PID preparation.
- Ensures the timely development of the SOC and test support plan (TSP).
- Assists test teams in identifying data requirements.
- Coordinates the release of range data.
- Assists test teams with test mission support (e.g., test execution, data collection, analysis, logistical support, facilities) as appropriate.
- Provides XPZ and TST with feedback on range shortfalls.
- Assists TD in the preparation of unfunded requests for program specific test range requirements.
- Provides tailored NTTR orientation and training to test teams.

4.7.5.1 NTTR CONOPS

The NTTR is an indispensable component of the DoD range infrastructure providing a high-fidelity open-air test, training and operations environment. By providing a realistic and credible combat environment, AFOTEC can thoroughly evaluate the performance of various weapon systems to ensure they meet the warfighter's requirements.

Designed to provide a flexible test environment, the NTTR can meet the test needs of a wide variety of weapons systems. It comprises 3.1 million acres and 12,000 square miles of airspace. AFOTEC is a partner with the range and has made considerable infrastructure investments in air-to-surface and air-to-air operations over a wide portion of the range. This sophisticated range infrastructure allows test operations involving complex multi-aircraft scenarios over the majority of the range. The test infrastructure includes high fidelity threat systems that represent an air defensive environment, live weapon drop capabilities, realistic surface attack target arrays and instrumentation/debrief systems.

Range systems are specially instrumented to provide data for mission conduct and for use during detailed analysis. Live monitoring of flight parameters, the spatial relationship to other aircraft or targets, and other information is provided with GPS pods or plates and air-to-ground or air-

to-air data links between instrumented aircraft. These capabilities allow the test team to observe the mission in real-time and record these activities for analysis.

It is important to learn what is available at the NTTR, and then determine whether the NTTR can provide the test environment, facilities, test assets and the data products necessary for the evaluation. By working with OL-NN personnel and range project officers, the best approach to executing a test on the range can be developed. To successfully execute a test at the NTTR a planning and coordination timeline should be developed which highlights the events and exchange of information that needs to occur prior to test execution.

Planning and Coordination Timeline. When planning a test at the NTTR, it is imperative that the test team develop a timeline for the products such as the PID, test plan, and the DMAP, needed to successfully plan and execute the test. Figure 4.3 shows a recommended planning and coordination timeline to ensure the resources and test tools are in place. The timeline depicted in figure 4.3 will need to be modified to meet the specific requirements of the test program. It shows major test planning activities and coordination events for a 12-month period leading up to test execution. For large programs with complex missions, it may be necessary to start the planning and coordination earlier than 12 months prior to test start. Coordination of the test requirements with the NTTR will help the range fully prepare and organize the needed resources to produce the data products for the evaluation. The TD is responsible for establishing controls, reviewing initial and periodic schedules for accuracy, ensuring timelines are followed and suspenses are kept in accordance with the timeline. To make certain the evaluation is well planned and executed it is recommended that the test team use a checklist (see below) when preparing to use the NTTR. The actions in the checklist should be linked to the OTPM planning timeline. The actions depicted in the figure and the checklist represent the “not later than” points for providing information to the NTTR.

Test Conduct Preparation Activities. The following NTTR test conduct checklist highlights some of the actions and timelines which, when accomplished, will guide test teams in preparing to execute successful

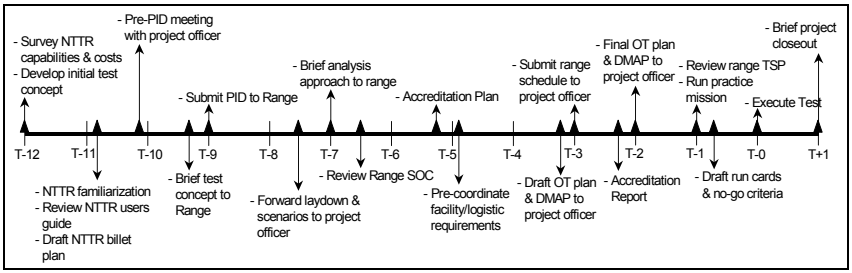

Figure 4.3. NTTR Timeline (time in months)

evaluations at the NTTR. This checklist should serve as a guide and a memory jogger in preparing to deploy and execute a test at the NTTR:

- At 10 to 12 months prior to test start, the test team should develop the initial test concept, survey NTTR capabilities and costs, and become familiar with NTTR products and procedures. For large programs with complex missions, it may be necessary to start the planning and coordination earlier than 12 months prior to test start.
  - Develop program baseline and lay out program milestones (e.g., test concept, test plan, accreditation plan, DMAP).
  - Develop initial test concept.
  - Survey NTTR capabilities (e.g., test assets, data products, range instrumentation) and costs.
  - Review NTTR User's Guide.
  - Draft NTTR test team billet plan.
  - Security – submit program access requests to the HQ AFOTEC SAP security manager for those needing program/site access to the NTTR.
  - Research any accreditation requirements that may be required, (e.g., missile flyout models).

- At seven to 10 months prior to test start, the NTTR test requirements should be forwarded to the range. The type of information the range is looking for is contained in the test concept, analysis approach, and PID. This will give the Range project officer the information necessary to develop the range SOC, which outlines what resources and data products the range will provide as well as the range cost. Keep in mind that the size of the program will determine when the requirements should be forwarded to the range. The larger or more complex test programs should forward their requirements to the range earlier if possible.
  - Pre-PID meeting with Range project officer.

- Develop preliminary PID.
- Coordinate PID within AFOTEC.
- Forward final PID to the Range project officer.
- Forward initial test concept, threat laydown and scenarios to the Range project officer.
- Begin draft test plan.
- Brief final test concept to range.
- Brief analysis approach, methodology, data formats and data merge requirement to the range.

- At six to seven months prior to test start, coordination of products and services should take place. The test plan should be in draft form, the accreditation plan finalized and the DMAP started.
  - Review system and instrumentation requirements with the Range project officer.
  - Review range SOC.
  - Begin draft DMAP.
  - Coordinate aircraft requirements with using command.
  - Test plan in final coordination.
  - Finalize accreditation plan, if required.
  - Pre-coordinate with other organizations for base support, logistics, facilities, and ramp space.

- At three to four months prior to test start, the test approach, airspace requirements and frequency clearances should be firm enough to submit to the Range project officer so he/she can begin working with the range scheduler to schedule range dates and times. During this period the test team will finalize the test objectives and data requirements with the Range project officer. It is during this time that the Range project officer will begin writing the range TSP, which is based on the information provided to this point.
  - Submit range schedule request to Range project officer.
  - Develop deployment checklist (if applicable).
  - Begin safety planning.
  - Submit frequency/jamming request to Range project officer.
  - Forward airspace requirements and missions profiles to Range project officer.
  - Forward draft test plan and DMAP to Range project officer.
  - Define test team roles and responsibilities.
  - Meet with range project officer to finalize coordination on test objectives, MOEs, data requirements and final report format.

- At two months prior to test start, the final test plan and DMAP is forwarded to the Range project officer. This will provide the information necessary for the project officer to finish writing the TSP.
  - Test plan signed.
  - Final test plan sent to Range project officer.
  - Meet with Range project officer to finalize test conduct, observer lists and clearances, aircrew briefings, and practice missions.
  - DMAP sent to Range project officer.
  - If beacons are to be installed, make arrangements to get beacons or pods from the range.
  - Confirm tentative airspace and range times, and frequency clearances with the Range project officer.
  - Establish “no go” criteria.

- At one month prior to test start, the test team should finalize all plans to execute to test. Again meet with the Range project officer to ensure that the range/airspace dates and times are set. Verify that the data products meet the evaluation requirements, funds have been sent to the range, and operator and aircrew procedures outlined. It is highly recommended to run a full scale dress rehearsal mission, with the systems that will be used during testing, to ensure that test procedures, and data collection and reduction systems are ready for testing.
  - Check with Range project officer to ensure that range/airspace dates, times and systems have been scheduled.
  - Review the range TSP.
  - Confirm site access requests have been approved.
  - NTTR sensitive equipment form – submit if applicable.
  - Deployment – pre-coordinate requirements.
  - Run practice missions if required.
  - Verify data products and analysis approach with range project officer.
  - Coordinate location and numbers of site observers and/or recorders with range project officer.
  - Verify with RMF that funds for the test have been sent to the range.
  - Develop system operator and aircrew instructions
  - Develop draft run cards.
  - Review “no go” criteria with range project officer.

- At one to two weeks prior to test start, the test team should finalize all logistical details for the test.
  - Check with range project officer to ensure that the scheduled dates, times and systems have not changed.
  - Finalize billeting arrangements.
  - Review run cards with range project officers.
  - Confirm vehicles are reserved.
  - Confirm communication requirements (radios for aircrew and range communications as well as safety requirements).
  - Develop control room setup and communication/video/audio plan with Range project officer. For large tests/complex missions, control room setup and communication/video/audio plans are developed several months, even more than a year prior to testing. It is also very important that all test team and range team members know who says and does what and when.

- At one-week prior to test start, confirm with the Range project officer that everything is on track according to plan and any last minute items are resolved. Any discrepancies discovered should be resolved through the Range project officer.
  - Brief instructions to aircrews and the Range project officer.
  - Schedule – check with the Range project officer to ensure dates, times, systems are set and any problems have been resolved.
  - Confirm billeting arrangements.
  - Confirm access and transportation to range.
  - Conduct pre-mission briefing with the operators and Range project officer.
  - Finalize run cards.
  - Confirm cover times with the Range project officer.
  - Confirm frequency request approved with the Range project officer.
  - Ensure beacons are installed on the aircraft.
  - Final meeting with Range project officer to review test execution and clarify any last minute changes (e.g., range systems, aircraft, and recording equipment).

- At least one day prior to test start, deploy to the range and prepare the team for test execution. When planning the deployment, take into account the activities that will have to be accomplished prior to starting the test and adjust the deployment schedule as required.
  - Weather – check forecast.

- Review team roles and responsibilities.

- The day of test execution is divided into pretest execution, test execution and post mission. The items in the checklist are designed to ensure the test is executed smoothly and to prepare for follow-on test missions.
  - Pretest execution.
    - Confirm airspace reserved with the Range project officer.
    - Confirm cover times with the Range project officer.
    - Confirm system status with the Range project officer.
    - Ensure test team is in place 30 minutes prior to test start time.
    - Verify test article, test aircraft and system status.
    - Check weather, winds and NOTAMS.
    - Arrange mission debrief time and place.
  - Test execution.
    - Monitor aircraft and other test conditions.
    - Monitor weather.
    - Monitor “no go” criteria.
    - Track run card and test conditions.
    - Communicate with aircrew, flight test engineers, analysts, and Range project officer as required to execute the test.
  - Post mission.
    - Conduct debrief with Range project officer and operators.
    - Review data for security, then wrap and ship.
    - Update and brief next mission run card.
    - Resolve problems discovered during test, develop plan for next mission and notify team, aircrew, and Range project officer.

- At about 30 days after the test, the TD should close out the NTTR portion of the test. Feedback to the Range project officer and operators is highly recommended, as this is the time to glean any additional system performance information from the range.
  - Debrief Range project officer and operators on performance and program results.
  - Review any data anomalies with Range project officer.
  - Project closeout – document lessons learned at the NTTR.

4.7.5.2 Additional Information Sources

Target data for the NTTR is available on the Internet. A web browser, such as Netscape or Internet Explorer is required, in addition to Internet connectivity. Due to the sensitive nature of the target data, access is only allowed to systems that can be reverse mapped through the Internet, allowing verification that the data request originates from a .mil site. The following resources are also available:

- AFMAN 99-112, Electronic Warfare Test and Evaluation Process – Direction and Methodology for EW Testing.
- AFI 13-212 series on test range guidance.

4.7.6 Test Capability/Instrumentation Accreditation

Test capability/instrumentation accreditation should be considered for all OAR assets, ground test facilities, digital M&S, foreign materiel acquisition (FMA), test drivers, targets, the use of blue weapons as threat surrogates, time-space-position information (TSPI) systems, and range feedback/scoring systems. The core team will determine and recommend when test capability accreditation is required.

TDs are responsible/accountable for accreditation plans and reports. The TD may delegate all/portions of these tasks to test team/core team members (usually supporting analysts from the appropriate Detachment). Ideally, the analyst expected to author the effectiveness section of the weapon system test final report will prepare the accreditation plan and report. This prepares the author to write an OT final report with complete understanding of the limitations of the test capability involved.

The AFOTEC accreditation policy exists to ensure standardization across test teams and a consistent level of rigor in determining adequacy of test capabilities. Accreditation activities should not excessively burden test teams or lead to inordinate expense. Accordingly, early in the life of the program the test director should brief the accreditation approach, including proposed level of effort, completion date(s), and documentation format (briefing, report, etc.) to CA during a technical review. This enables CA to provide a heading check on the overall accreditation approach and prevent unnecessary expenditure of resources.

4.7.6.1 Definitions

- *Test Capabilities.* Test capabilities include OAR assets, ground test facilities, Digital M&S, FMA, test drivers, targets, and the use of blue weapons as threat surrogates.

- *Independent Instrumentation.* Measuring devices and/or systems used to indicate SUT and/or environment characteristics such as airspeed, location, altitude, data rate, energy on target, weapon impact location, etc.
- *Verification*. The process of determining that a test capability accurately represents the developer's conceptual description and specifications.
- *Validation*. The process of determining the degree to which a test capability provides an accurate representation of the real world from the perspective of the intended uses of the test capability.
- *Accreditation*. The official certification that a test capability is acceptable for use for a specific application.

4.7.6.2 Background

AFOTEC's purpose is to exercise production representative weapons systems in an operationally realistic environment, gather data and form conclusions regarding SUT effectiveness and suitability. To do this, AFOTEC creates a pseudo employment or combat environment. This environment consists of three elements: the SUT, test capabilities representing combat conditions, and instrumentation. Each of these elements require analysis to determine their respective adequacy in accomplishing AFOTEC's purpose. Accordingly, each element has guidelines governing determination of adequacy. SUT certification is governed by AFMAN 63-119 as previously discussed in paragraph 1.11.8.

The test capabilities used in a given test will not always 100% accurately represent the employment environment. There will be some differences in fidelity between the actual combat systems and test representations. Likewise, test instrumentation has accuracy and precision limitations. Given this, AFOTEC must be careful in drawing conclusions about SUT effectiveness and ensure that the representation of the employment environment and instrumentation are adequate to draw credible conclusions regarding SUT effectiveness. Inherently, AFOTEC assumes some degree of risk when using test capabilities to represent an employment environment to determine SUT effectiveness. The purpose of accreditation is to assess and document that risk.

Test capabilities and instrumentation will be addressed together in this section (paragraph 4.7.6). Throughout the remainder of this section, the phrase "test capabilities" should be understood to include "instrumentation."

Verification and validation is the responsibility of the owner/operator of test capability/instrumentation and addresses specific applicability and limitations. AFOTEC is responsible for accomplishing accreditation, which addresses whether a test capability is acceptable for a particular test.

4.7.6.3 Accreditation Scope

Accreditation is applicable when a test capability is used to directly or indirectly provide information that will appear in an OT final report. This applies to I/Q/F/MOT&Es as well as OUEs, EOAs and OAs. If you are intending to draw weapon system effectiveness conclusions based upon use of test capability, that test capability requires accreditation. Some examples follow:

- The electronic warfare laboratory, AFEWES, will be used to simulate a surface to air missile engagement involving a threat missile and the SUT and estimate probability of hit. The AFEWES accreditation must address the fidelity of the threat missile simulation as well as SUT radar cross section (RCS), countermeasure signals, flight dynamics and tactics.
- The QF-4 target drone will be used to represent a threat fighter aircraft in a test of the effectiveness of a new air-to-air missile. The QF-4 must be accredited in terms of how well it represents the threat fighter aircraft.
- A ground-based laser will be used to represent the plume signature of a ballistic missile. The laser is fired at a space-based sensor designed to detect ballistic missile launches. The laser must be accredited in terms of how well it represents ballistic missile plume signatures of interest.
- A TSPI system will be used to measure and record aircraft position and attitude during an air-to-air combat mission. The TSPI system must be accredited to ensure it is accurate and precise enough to address test measures such as which aircraft fired the first missile and when did the missile firing occur.

Test capabilities used solely for test planning purposes do not require a formal accreditation, although the analyst should exercise a similar process to ensure that the test capability is adequate and identify risks involved and how they may affect the overall test. Any informal accreditation investigation procedures (peer review, analyst investigations, etc.) should be documented to ensure continuity when program personnel change.

4.7.6.4 When is Accreditation accomplished?

In most cases, the accreditation analysis and results should be completed and approved by the accreditation authority no later than 120 days before the test or commencement of the simulation effort. If this is not possible, the test director should propose an alternative completion date along with rationale and associated risks. Additionally, the test director will address accreditation status at the TRR. This allows time to explore alternative test approaches or modifications to the test process if the accreditation authority feels that the risk warrants such action.

4.7.6.5 Accreditation Procedures

The VV&A process is shown in figure 4.4. Test capability requirements are identified during the initial test design and scope/cost process and are documented in the TO/test concept, and test plans.

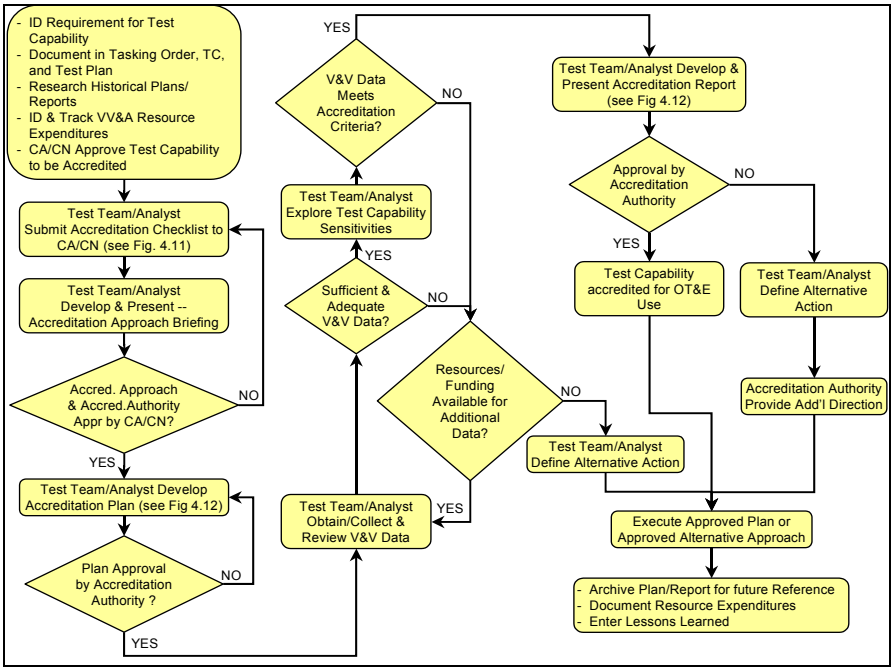

Figure 4.4. Accreditation Process

Many test capabilities have existing validation and/or accreditation reports that may be useful for current/future VV&A efforts. The TD/analyst should check with TST, TSE, TSI and/or HO for copies of previous validation/accreditation reports. TST may also have information on previous VV&A efforts associated with a given test capability. Once the source and adequacy of all test capabilities are determined and the

test design/concept has been approved by CA, the TD/analyst develop(s) a test capability accreditation approach briefing and completes the accreditation authority checklist (see figures 4.5 and 4.6) for CA approval. The purpose of the accreditation approach briefing is to get early buy-in from CA on what VV&A activities will be done (as well as what activities will not be done), on who will be performing the VV&A, how the activities will support accreditation and the estimated level of effort. The test team identifies and begins tracking VV&A resource expenditures including manpower and dollars. The test team writes an accreditation plan for approval by the accreditation authority, in parallel with the development of the test planning documents identified earlier in this chapter.

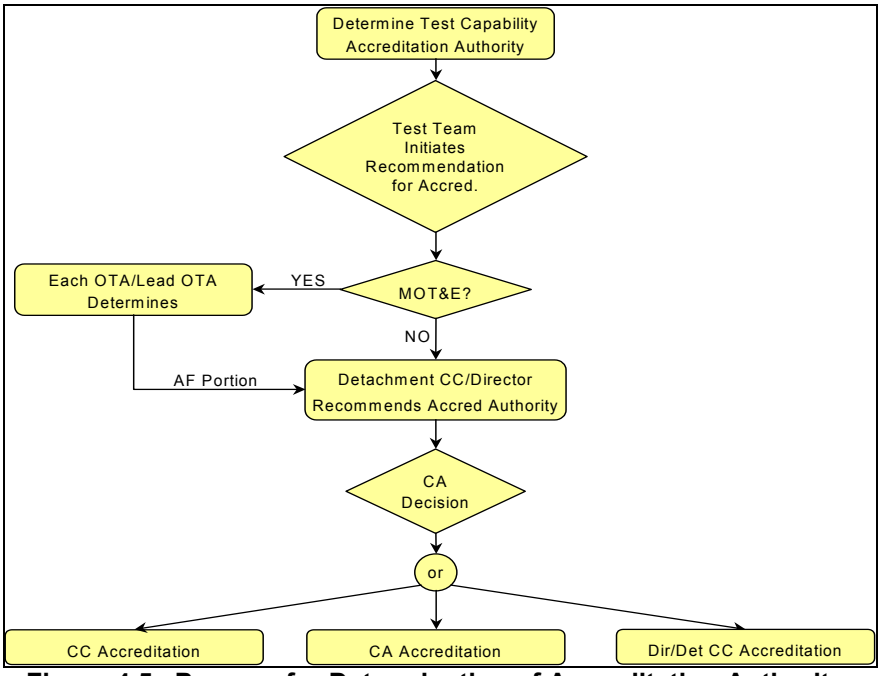

Figure 4.5. Process for Determination of Accreditation Authority

Upon approval, the test team will execute the plan. In cases of a "not accredit" decision, the TD/analyst defines alternative action(s) for the accreditation authority's review and direction. All accreditation plans and reports and the corresponding documentation for VV&A resource expenditures are submitted to History Office (HO) for future reference and submitted to the AF M&S Resource Repository (AFMSRR) and the Defense Technical Information Center (DTIC).

Accreditation Authority. The accreditation authority is determined per the decision process shown in figure 4.5. In general, for all AF OT&E, the TD/analyst initiates a recommendation for level of accreditation authority using the checklist in figure 4.6. This checklist indicates the

Program Name:				Test Director/Org/Phone:
Program Description:				
Test Capability Requiring V&V:				AFOTEC Accreditation POC/Org/Phone:
Test Process Description:				
Description of Application:				
Factor	Director/Det CC Rating			Rationale (Continue On Additional Page If Necessary)
1. Level Of Outside Interest Congress, OSD, Flag Officer, GAO, etc.	Low	Med	High	
2. Program Decision(s) Affected By Operational Testing - Milestone Decisions, CONOPS, Maintenance Concepts	None	Minor	Major	
3. Level Of OIA/ COI/MOE Supported By Test Capability - Key Parameters; Sole Vehicle For COI/MOE Resolution	Insignificant	Significant	Critical	
4. Resource Required For Accreditation - Money, Manpower, Time, etc.	Minimal	Significant	Vast	
5. Legacy Model/ Capability	100% Legacy	Combination	100% New Capability	
6. Other Factors	Low	Med	High	
Detco/ST Recommendation	Detco/ST Accredit	CA Accredit	CC Accredit	Detco/ST Comments
AFOTEC CA Decision	Agree	Disagree		AFOTEC CA Comments

Figure 4.6. Accreditation Authority Checklist

Det/Dir recommendation to CA for level of accreditation authority. The CA staff reviews all recommendations; CA determines the final level of accreditation authority. AFOTEC/CC, CA, or the Det/Dir, is the final approval authority for all accreditation reports/ recommendations.

For multiservice OT&E, the same process is followed taking into account any specific lead or supporting OTA direction. The test team conducts and documents all test capability accreditation investigations; support to/from OTAs is included as appropriate.

Accreditation Plans and Reports Format. Figure 4.7 specifies the format for accreditation plans and reports. Accreditation documentation need not be voluminous, but should provide sufficient information to enable the accreditation authority to make the accreditation decision. If the plan or report will be distributed outside of AFOTEC, it needs to marked with the appropriate distribution statement.

Accreditation Plans and Reports Coordination. See Attachment 1 for details on coordinating accreditation plans and reports.

4.7.6.6 Summary of Responsibilities

	Responsibility
Test Director	• Briefs CA on the accreditation approach for approval to proceed with the writing of the VV&A plan and execution of the accreditation process. • Ensures that all test capabilities are accredited.
Test Support Directorate (TS)	• Assists the test director with the accreditation process as agreed to in the program tasking order. • Advises on VV&A policy. • Assists the test team in identifying all test capabilities development requirements and associated costs for inclusion in appropriate test planning documents.
Analyst	• Develops and executes accreditation plans and writes reports for all test capabilities.
Accreditation Authority (Detco, CA, or CC):	• Reviews and approves accreditation approach briefings. • Approves accreditation plans and reports for adequacy of test capabilities to support OT&E. • Makes accreditation decision, for or against. • Signs accreditation approval document and/or provides additional direction.

Title and Signature Page -- Use current format for AFOTEC plans and reports.

Executive Summary -- In one-page or less, state the key, pertinent points detailed in the following sections. In the accreditation plan, include a statement for recommended accreditation authority and how risks will be determined. In the accreditation report, include a statement for recommended accreditation and a summary of the risks associated with using the test capability.

1.0 *System Background* -- Provide a brief description of the SUT. Include the type of test (e.g., OUE, EOA, OA, IOT&E, FOT&E, MOT&E); test category (e.g., ACAT I, II, III), OSD oversight status, and milestone decision supported.

2.0 Intended Uses of the Test Capability -- "What operational testing issue or question is being addressed?" Application of a test capability should be aimed at a specific purpose(s). State the intended uses for this OT&E; state the specific test metrics it will answer (should come from the ITD/TC).

3.0 Test Capability Elements -- "What parts of the test capability are most important to answering this issue or question?" Describe the test capability and any SUT elements to be represented, why the particular test capability was selected, and how its use benefits answering the test issues and questions. Highlight the critical aspects of the test capability necessary to represent the employment environment (e.g., target signature, airspeed, altitude, data rate, etc.). Describe how the test capability fits into the overall test design/concept.

4.0 Accreditation Approach and Supporting V&V Activities -- "What will be or has been done to ensure the test capability is "good enough" for its intended use? Provide a description and the source of V&V data and associated acceptance criteria to be used (Plan) or used (Report) to ensure adequacy of test capability application. Document V&V activities, parameters, and data that will be (Plan) or have been (Report) applied to support accreditation; document the rationale for their use. Address how accreditation will be (has been) accomplished for all test capability elements. Include a discussion of how data from the test capabilities will be (has been) used in the analysis methodology to resolve each applicable OT metric. Provide a summary of the significant differences between the test capability and actual employment environment. Provide a summary of the accuracy of the independent instrumentation.

5.0 Risks, Limitations and Impacts -- "What are the limitations of the test capabilities, and the impacts on its intended use?" "What risk does AFOTEC incur by using the test capability to represent the employment environment?" Describe test capability/instrumentation limitations and the impacts as they relate to the intended uses to support OT&E. Summarize the deltas between the test capability and employment environment. Include enough detail such that the accreditation authority can assess whether the test capability should be used for the intended purpose(s). Summarize this section by stating the overall risk incurred by using the test capability to address MOEs/MOEs and/or resolve COIs.

Figure 4.7. Sample Accreditation Plan/Report Format

4.7.6.7 Accreditation References and Resources

Following is a listing of web sites that the accreditation team can reference for assistance in gathering pertinent accreditation information.

Air Force Agency for Modeling and Simulation (AFAMS) – (http://www.afams.af.mil/). AFAMS was created in June 1996 to coordinate the growing requirement for M&S. Their mission is to support implementation and use of the Joint Synthetic Battlespace by implementing Air Force and DoD M&S policy and standards; managing, coordinating, and integrating major Air Force M&S programs and initiatives; supporting corporate Air Force M&S operations; and promoting and supporting technology improvements. The AFAMS web site includes an on-line document library, lessons learned, and the AFMSRR (see next paragraph). The library contains links to several hundred M&S-related documents and meetings.

Air Force Modeling and Simulation Resource Repository (AFMSRR) – (http://afmsrr.afams.af.mil/). The AFMSRR's goal is to provide a single source for information about and access to DoD M&S, data sources, algorithms, and other M&S resources in order to facilitate reuse and avoid duplication. Air Force organizations that have existing models, simulations, data sources, algorithms, and other M&S resources are encouraged to register with the AFMSRR.

Defense Modeling and Simulation Organization (DMSO) – (http://www.dmso.mil/). The DMSO was established in June 1991 to serve as the executive secretariat for the Executive Council on Modeling and Simulation and to provide a full-time focal point for information concerning DoD M&S activities. Currently DMSO promulgates M&S policy, initiatives, and guidance to promote cooperation among DoD components. DMSO is a staff activity reporting to USD(AT&L).

The Joint Accreditation Support Agency (JASA) – (http://www.nawcwpns.navy.mil/~jasa/). JASA's mission is to provide the DoD M&S community with a cost-effective means of defining and meeting simulation credibility requirements including: VV&A planning, execution, reporting, and training; facilitation of expert reviews; maintenance of VV&A documentation archives; and development and tailoring of VV&A standards. Accreditation support packages on file include: Alarm, Brawler, EADSIM, ESAMS, JIMM, JSEM, RADGUNS, Suppressor, and Thunder. There are also links to other libraries.

The Modeling and Simulation Information Analysis Center (MSIAC) – (http://www.msiac.dmso.mil/). MSIAC is an integrated support activity for DoD dedicated to helping both developers and users of M&S. The

MSIAC operates under the direction of DMSO and the DTIC. MSIAC is the keeper of the *VV&A Recommended Practices Guide*.

4.8 Test Plan Development

OT&E activities can span the spectrum from OAs to OUEs to I/Q/M/FOT&Es. The specific activities for the program are identified in the TO. The TC, or integrated TC (if developed), is used as a basis for detailed test planning. Test plan details are captured in the OTPM test program network tasks. Emphasis here is placed on the OTPM test program network tasks that relate directly to the elements of detailed test planning. The plan should address the following:

- Executive Summary
- Program Overview
- Operations
- Evaluation Strategy
- Evaluation Framework & OT&E Methodology
- Administration
- Reporting
- Attachments as needed

NOTE: If using a seamless approach to test planning and execution by collaborating with the developmental testers, the test plan may become an integrated test plan (ITP). An integrated test plan is the result of combining the OT&E Plan and objectives with the DT&E plan(s) and objectives. The integrated test plan promotes the combined execution, where appropriate, of developmental and operational test events to satisfy both developmental test and operational test data requirements. For DOT&E Oversight programs, a requirement still exists to have the adequacy of the planned OT&E approved prior to starting any operational testing (combined DT/OT, OA, IOT&E, or FOT&E). This requirement may be satisfied with the ITP or with a separate OT&E plan.

4.8.1 Considerations during T&E Planning

There are several areas that the test team should take into account when planning the OT activity. The following paragraphs discuss a variety of topics that may apply to the specific program being worked.

4.8.1.1 Limitations

Time and resources are the factors that most often limit OT&E. The test item must be available, the test team must be organized and on-site to conduct the test, and the schedule must be realistic. Factors that may

affect test item accessibility include the design maturity of test item, test item instrumentation, or ongoing testing by agencies outside the OT&E community. Additional test limitations may be identified when specific test methods and analyses are addressed. The core team assesses, consolidates, and presents the impact of each limitation/constraint on the ability to evaluate each affected MOP. If a test limitation is clearly unacceptable, appropriate actions should be taken to minimize its impact on OT&E. The impact of these limitations and constraints is stated in the OT&E plan. Should the impact indicate that required testing cannot be accomplished, the test planner informs the SPO and responsible director/detachment CC. Test teams should perform a dry run of all test procedures before doing the actual test – including the data collection, reduction, and analysis procedures. **The majority of problems encountered and submitted as lessons learned during the last several years have been those problems uncovered when a test team did not do a dry run of their test procedures.** This is an item of discussion during the TRR. Examples of planning limitations that have hampered past OT&Es are:

- Test schedule too compressed to answer all COIs and MOEs/MOPs.
- Difficulty of scheduling outside operational agencies for test participation.
- Technical orders or support equipment not available.
- Safety requirements differ from range to range necessitating different test configurations.
- Test item had complex interfaces with existing on-line operational systems, creating scheduling and resource availability problems.
- Land test range too small; forced to test over water, reducing operational realism.
- Testing must be conducted on a non-interference basis with daily operations, thereby extending schedule.
- Instrumented missile radar cross section not representative of true missile cross section.
- Interoperability, Information Assurance, and E3.

4.8.1.2 Baselining Hardware and Software

Both the hardware and software baselines should be frozen before entering dedicated OT&E. Any changes should be made only when they are absolutely necessary to continue testing, and at the discretion of the TD. However, changes should be kept to an absolute minimum. In cases where software changes are made, configuration management of the test baseline is a must.

4.8.1.3 Survivability

Figure 4.8, AFOTEC Survivability Assessment Flow Chart, can aid the core team in determining if survivability is a potential program concern. If survivability is not a major issue and the OT&E team still plans to provide information about system performance and characteristics that can affect survivability, provide appropriate rationale during the scope/cost process. The test team ensures that program specific DIA validated direct hostile man-made threat environments such as anti-aircraft missiles, E3, nuclear-biological-chemical (NBC), EW, information warfare (IW), etc. and their associated collateral effects environments are addressed in the test plan. The OT concern is the proper reporting of potential or observed mission impacts due to man-made hostile threats. The desired test method is operationally realistic combined DT/OT events, paid for by the SPO. Any untested requirement should be reported as such in the final report. Contact TSE for more information. Also the AS/TS

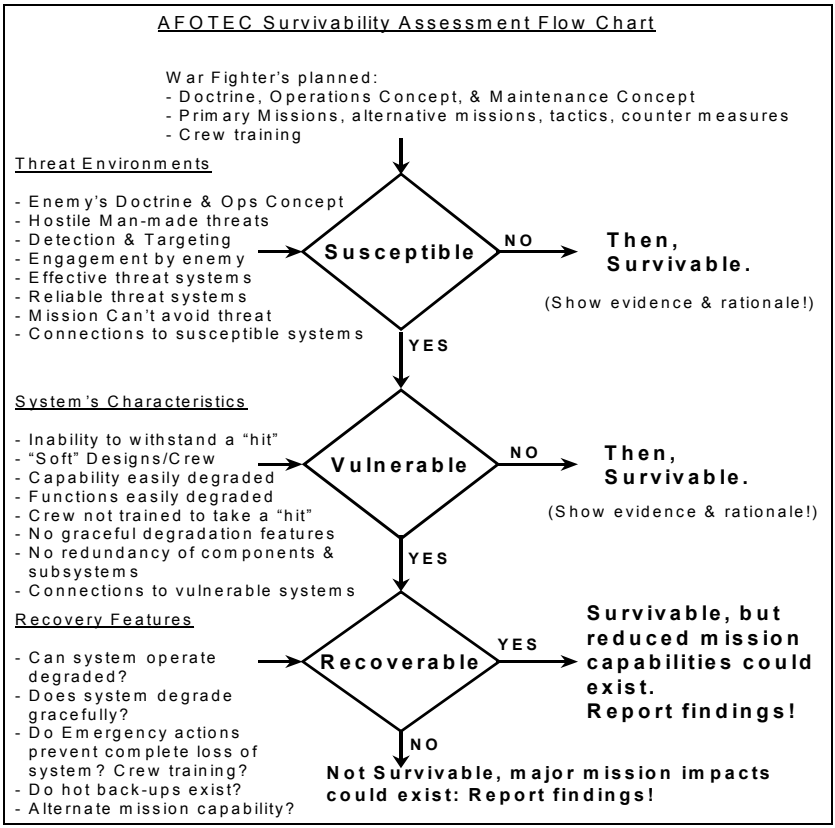

Figure 4.8. Survivability Assessment

developed reference *Introduction to Survivability Assessment*, June 2003, is available on the TS ATTIC web site available through the AFOTEC MIN (see attachment 4).

4.8.1.4 Contractor Involvement

OT&E must be structured to yield the most credible and objective results possible. This means that all facets of the test effort from planning to execution to data analysis, evaluation, and reporting must operate under rules that support total objectivity and preclude even the appearance of improper data manipulation. AFOTEC personnel should fully understand these rules, roles, and responsibilities prior to test start date. The use of system contractor personnel during any phase of OT&E, therefore, becomes a matter for careful management attention. System development contractor personnel may be involved in the dedicated phase of OT&E of ACAT I and II systems only to the extent that it is planned for them to be involved in the operation, maintenance, and other support of the system being tested when that system is deployed in combat. If the OT&E cannot be conducted without system contractor participation in instrumentation, data collection, or data processing, test planners identify the resultant impacts at the TRR.

Operational Test Event Observation. AFOTEC should honor requests from the user, SPO, and associated contractors (with a need to know), to attend operational test planning meetings, observe data collection, and test execution activities on a non-interference basis. SPO and developmental contractors that are present can provide valuable background information and insight in addressing system issues that may occur during OT&E. Cooperation between AFOTEC testers, the user, SPO, and the developing contractor (within the guidelines of Title 10, US Code) fosters an atmosphere mutually beneficial to all parties. System contractors may not influence the conduct of the test, the test results, or the operational realism of test scenarios, and they cannot be involved in the actual conduct of the test. (Exception: System contractors may be involved in conduct of the test if their involvement is planned for the operation, maintenance, and support of the system when it is deployed in combat.) Under no circumstances will any contractor be permitted to establish criteria for data collection, performance assessment, or evaluation activities.

4.8.1.5 Security

Survivability and combat effectiveness of weapons systems are dependent on how effectively program protection is provided throughout their life-cycle. Therefore, OT&E planning should include suitability and

effectiveness of established program protection integrated into the system.

HQ AFOTEC/SF Support
HQ AFOTEC/SF assists TDs in identifying appropriate security elements and tailoring them to particular OT&E efforts.

- Information security
- Foreign disclosure
- OPSEC
- Industrial security
- Physical security
- Personnel security

HQ AFOTEC/SC Support
HQ AFOTEC/SC assists test teams in identifying appropriate security-related communications requirements and tailoring them to particular OT&E efforts.

- EMSEC
- COMSEC

Security Elements to Consider
OT&E planning and reporting should consider those security elements that apply to the particular OT&E effort. Include *applicable* elements in the test plan; lead time is critical when working security issues. Some elements are:

- **Program Protection Plan (PPP).** DoDI 5000.2 requires that acquisition authorities create a protection management plan for each new weapon system acquisition. Its purpose is to: (1) identify essential program information, technology, and system to be protected, and (2) ensure combat effectiveness is not compromised and necessary security measures to protect the system throughout its life cycle. While not all systems have a PPP, OT&E planning determines if one exists and considers its relevance.
- **Information Security.** DoDI 5200.1-I, *Index of Security Classification Guides,* provides a listing of all SCGs published by DoD components. Program managers and operating commands are other sources for identifying guides applicable to systems involved in OT&E. HQ AFOTEC/SF maintains a file of most guides published by the Air Force and can assist in procuring others. AFOTEC/CC has Top Secret classification authority for classifying new OT&E information or information not covered by an existing guide. Identify by title and originator, SCGs, or guidance related to the OT&E. Also, state that classified

information will be safeguarded according to DoDD 5200.1-R and AFI 31-401 *(Information Security Program Management)*.

- **Personnel Security.** Personnel involved in OT&E operations may require access to Restricted Data (RD), Formerly Restricted Data (FRD), Special Access Programs (SAP), Sensitive Compartmented Information (SCI), NATO classified information, Single Integrated Operational Plan-Extremely Sensitive Information (SIOP-ESI), or Critical Nuclear Weapons Design Information (CNWDI). In most cases a briefing is required before access to the information is granted. Security managers or HQ AFOTEC/SF provides briefings for access to NATO, CNWDI, and SIOP-ESI. Identify special access or briefing requirements for personnel. Early determinations are crucial if lead time is needed to complete additional personnel security investigations. Certain special accesses require extensive personal background investigations that can take an extensive amount of time to complete. However, emergency situations can be handled on a case-by-case basis. *Sometimes*, interim clearances can be granted before the formal completion of these investigations, but not always. Therefore, test team members should initiate the process of obtaining such clearances at the earliest possible date.
- **Industrial Security.** DoDD 5220.22-M, *National Industrial Security Program Operating Manual (NISPOM),* applies to and is used by contractors to safeguard classified information released during OT&E operations. HQ AFOTEC/SF approves the DD Form 254*, Contract Security Specification,* identifying classification guidance and other security related requirements applicable to the contract. Test teams should contact HQ AFOTEC/SF for assistance in preparing this form. TDs and subtask officers ensure classification guidance is provided to the contractor.
- **Emanation Security (EMSEC) (formerly TEMPEST).** Equipment processing classified information may require countermeasures to preclude interception of compromising emanations. HQ AFOTEC/SC advises test teams of vulnerabilities, threats, and risks, and recommends appropriate countermeasures. TDs should identify the need for EMSEC countermeasure considerations when classified processing equipment will be used.
- **Operations Security (OPSEC).** The Air Force OPSEC program implemented by AFOTEC Supplement 1 to AFI 10-1101, *Operations Security*, identifies OPSEC factors and critical elements of information test teams should consider in OT&E planning and reporting. HQ AFOTEC/SF is the AFOTEC

OPSEC program manager. If there is a PPP, identify any OPSEC requirements it includes that are applicable to the OT&E. Also, include applicable OPSEC requirements defined by the owner/user and AFOTEC Supplement 1 to AFI 10-1101. Identify the critical elements of information that need to be protected during the test. OPSEC should be incorporated into all test plans/reports and everyday security practices.

- **Physical Security.** The Air Force secures its warfighting assets such as aircraft, munitions, weapons systems, and command, control communications, space, and intelligence resources against theft, damage, or destruction. Host-base security forces provide security. Identify any special security requirements applying to the OT&E to HQ AFOTEC/SF.
- **Foreign Disclosure.** Foreign disclosure authorities must approve visits by foreign nationals and their participation in OT&E efforts and release of information to foreign governments and international organizations in advance. SAF/IADP has delegated disclosure authority to AFOTEC to approve and authorize the disclosure of certain categories of military information under Air Force control to foreign governments and international organizations. HQ AFOTEC/SF is the foreign disclosure authority for AFOTEC. HQ AFOTEC/SF must approve all foreign visit requests and disclosures to foreigners. Include the following statement on all pertinent plans and reports: "Requests for visits by foreign country representatives or for OT&E information from foreign countries or international organizations will be referred to the AFOTEC Foreign Disclosure Authority (HQ AFOTEC/SF). Requests for information related to the system or program involved in the OT&E are referred to the Foreign Disclosure Authority at (identify the owner/user MAJCOM for the system or program)."

Communications Security (COMSEC)

COMSEC material required for OT&E, including STE and STU-III, will be provided by the COMSEC manager (HQ AFOTEC/SC) (reference AFOTECI 33-209, Procuring, Keying, and Operating the Secure Telephone Unit Type I). Determine as early as possible if COMSEC material or secure communications equipment are required and identify the requirement so that materials are ordered to meet OT&E schedules.

Special Access Programs (SAP)

SAPs established and managed according to DoDD 5200.1-R, AFI 31-401, and AFI 16-701, *Special Access Programs,* impose controls beyond those normally required for Confidential, Secret, or Top Secret

information. Consult the SAP manager in AFOTEC/ST for any special OT&E considerations.

Sensitive Compartmented Information (SCI)
Established and managed according to DoD 5105.21-M-1, AFI 14-303, and AFI 14-304, *SCI* imposes controls on *intelligence information* beyond those normally required for collateral Confidential, Secret, or Top Secret information. Test team members may require access to SCI to fully understand the threats their system may face in the real-world operational environment. The intelligence analyst supporting your program assists you in making that determination. The SSO within HQ AFOTEC/TSI manages access to SCI for AFOTEC members, including Dets, OLs, and AFOTEC contractors.

4.8.1.6 Environment, Safety and Health (ES&H)

Providing a safe and healthful workplace, conducting test in a manner that enhances mission accomplishment, preserving resources, and minimizing the risks to the environment, the safety and health of test personnel, and the public both on and off the installation is the responsibility of the TD. The TD promotes an atmosphere of trust and teamwork where individuals are committed to the ES&H principles. The TD employs quality-based management practices using a systematic method of planning, implementing, checking, budgeting, and reviewing results to support ES&H activities. This management process includes the three basic principles of ES&H: sustain readiness, leverage resources, and be a good neighbor.

Environment, Safety and Health Certification Board (ES&HCB)
ES&HCB, the last ES&H review prior to TRR, is chaired by SE or a designated representative. The ES&HCB is the final opportunity to systematically review safety, environment, and health related issues in support of the readiness for dedicated OT&E decision. The board produces the safety certification and the environmental certifications for TRR. The ES&HCB is coordinated by the TD and accomplished at least four weeks before TRR (as early as possible for NTAs). The ES&HCB can be flexible in composition and venue, depending on the programmatic situation—a formal setting with many attendees for a complex ACAT I or a teleconference with limited attendance for a less complex program without issues. Long duration programs may require multiple ES&H reviews. All ES&H reviews are composed of the chairman, the TD, and invited members. The TD will structure the review attendance as required but consider including the following expertise: SPO or sponsor, using command, DT&E, range/test site safety and environmental, installation safety and environmental, operations analyst, logistics, human factors, integrating contractors, software analysts,

others. The ES&HCB reviews at least the AFMAN 63-119, Attachment 22 requirements and the following areas as required:

- Closure of all catastrophic and critical (category I and II) hazards.
- Safety constraints and limitations placed on the CONOPS.
- Any hazard analysis intended to minimize dedicated OT&E risk.
- Any OSHA, State, or Air Force hazardous waste requirements including spill plans and training.
- Availability of validated technical safety and procedural manuals to support OT&E.
- Completion of operator and maintenance safety training.
- Certifications from all the applicable boards: Non-nuclear Munitions Safety Board, Conventional Munitions Safety Board, Flight Safety Board, Range Safety Board, Airframe Certification, Nuclear Surety Board, DT&E Test Safety Boards, Flight waivers, etc.
- Environmental mitigation/neutralization plans.
- Environmental OT&E compliance completion memorandum.

Safety Requirements

System safety and safety of test is the responsibility of the TD. HQ AFOTEC/SE (see attachment 4) supports your test by assigning a safety POC to advise and consult on safety-related matters and to attend required safety meetings. The test team should review past safety mishaps, safety lessons learned data, safety data documented in previous and similar test programs, hazard analysis data, and other relevant information to ensure risks are designed out or mitigated to an acceptable level prior to the start of test. Safety-related concerns are normally identified during OT planning through attendance at system safety working group meetings or system safety design review meetings. Unidentified or inadequately controlled hazards may present excessive risk to the test team members or test item. The TD coordinates with AFOTEC/SE to conduct and document an initial ES&H review (see ES&HCB paragraph above for structure and attendance). Identified hazards must be controlled before start of test through pretest reviews by the test team and the ES&H review process. At completion of the final review, the ES&HCB, SE will issue the safety and the environmental certifications for TRR.

Environmental Legal Requirements for OT

The National Environmental Policy Act (NEPA) of 1969 requires Federal Agencies to consider environmental impacts in planning for all decisions. The intent of the law is to have the decision-maker knowledgeable of the planned potential impact and therefore of the other laws affected by

those potential impacts. NEPA then is an umbrella law reaching out to other environmental statutes. As applied, each OT event has a separate NEPA review that also considers the specific requirements of these "substantive environmental laws." This is important to AFOTEC and to the TD who is the agent responsible for NEPA compliance. A NEPA challenge like a lawsuit and injunction might delay or even stop a test while any associated substantive law violations carry the threat of personal felony conviction and fines for the TD.

References. AFI 32-7061, The Environmental Impact Analysis Process (EIAP) establishes tasks and procedures for NEPA compliance within the United States and abroad. Senior management oversight is provided by the Environmental Protection Committee (EPC), chaired by the Vice-Commander and composed of detachment commanders plus AS, ST, TS, XO, and SE. AFI 32-7005, Environmental Protection Committees, mandates EPC.

How to Get Started with EIAP. Initiate EIAP on the MIN (see attachment 4) by submitting the *AFOTEC Environmental Impact Survey (AEIS*) electronically or by hardcopy to SE. AEIS analysis maps out a specific EIAP path. SE will provide a response back to the proponent in 3 workdays. AEIS alone completes NEPA for many programs. Additional steps may be required for other programs including when to prepare AF form 813s and where to send them. AEIS facilitates completing the AF form 813 and the formats preferred by other Services but it is not recognized outside AFOTEC.

EIAP Completion Acknowledgement and Certification for TRR. SE recognizes satisfactory NEPA/EIAP completion by memo to the TD and EPC as soon as the requirements are met. This memo is an important legal document that acknowledges proper environmental credentials for NEPA compliance. File the memo with supporting documentation in the program case files, Special Studies/Analyses. The memo is also the primary environmental reference for the ES&HCB, which for OT&E is held four weeks before TRR. The ES&HCB certificate of environmental compliance is signed and distributed upon successful board completion.

Environmental Points of Contact (POC). Each EPC member-unit assigns unit environmental POC(s) to smooth unit EIAP flow. Remote detachments and OLs participate in the host base environmental program as specified in the host/tenant agreement or MOU, and designate a POC to the host unit environmental council or equivalent EPC subcommittee to facilitate OT EIAP actions.

EPC Meetings. The EPC meets formally when directed by the chairperson or electronically each quarter via an email status update sent to and voted-on by the membership for publication as EPC minutes.

4.8.1.7 Suitability

In simple terms, the objective of operational suitability OT&E is to ensure that emerging systems can be satisfactorily supported and maintained when used in combat. Normally, OT&E is associated with an acquisition program, be it a major system procurement or a modification to an existing system. As such, a system may include the prime mission equipment (both hardware and software), the person who will operate or maintain the equipment, the logistics support structure for the equipment, and other elements of operational support infrastructure. This definition scopes the extent of suitability OT&E to the equipment, operator/maintainer, and the logistics support structure. AFOTECPAM 99-104, *Operational Suitability Test and Evaluation*, provides a comprehensive description of how to plan, test, evaluate, and report on a system's operational suitability. AFOTEC/XOT provides training in evaluating suitability through the OT&E Suitability Course.

Who Works Suitability Test Planning, Execution, and Reporting. Each detachment test team (including ST) is responsible for suitability evaluations. AFOTEC/AS PMs provide acquisition and operational logistics expertise, while TSE provides specialized program support (e.g., suitability analysis) and analyst training. SE assists with safety issues. In addition, the training function for suitability personnel is the responsibility of XOT. Table 4.1 lists primary areas of suitability expertise by detachment POC and HQ division. It should be noted that although SE is shown with responsibilities specifically for safety and environmental effects and impacts, safety is integral to and should be considered in all suitability areas.

Where Suitability Information Is Found. The ability to perform a responsive OT&E is dependent on the availability of system-specific information. Much of the information is available from the implementing and using commands and DoD. For major systems, a series of documents provide this information as described in AFOTECPAM 99-104, *Operational Suitability Test and Evaluation.* In general, an OT&E framework is based on information contained in the capability requirements document, the AoA, and the system's operations and maintenance concepts. All these documents are produced by the using

Table 4.1. Suitability Experts

Suitability Area	Combat Support Operations	Total System	
		Equipment	Human
RAM	AS/TSE	TSE	TSH
Compatibility & Interoperability	AS	DLE	---
Transportability	AS	DLE	---
Wartime Usage Rates	AS	DLE/TSE	---
Safety And Environmental Effects & Impacts	AS/SE	SE	SE
Human Factors	AS/TSH	TSH	TSH
Logistics Supportability	AS	DLE	TSH
Logistics Survivability	AS	DLE/TSE	---
Documentation	AS	DLE	TSH
Training	AS/XOT	XOT	TSH
Software	Det/ST/TSE	Det/ST/TSE	Det/ST/TSE/TSH
Natural & Space Environmental Impacts And System Sensitivities	TSW	TSW	TSW
Locations For "Operationally Realistic" Test Based On Climatology Or Specialized Studies	TSW	TSW	TSW

command with support from AFMC and the OTA. COIs and MOEs are developed based primarily on the capability requirement document and AoA. Another useful document is the acquisition program baseline that links operational capability requirements to contractual specifications.

In reviewing documents, AFOTEC members will probably find plenty of information pertaining to the system's required operational effectiveness. Suitability personnel often find themselves advocating the need to emphasize logistics considerations for the emerging system in these documents, at meetings attended, and in daily interfaces. For example, RAM are essential design considerations that need to be highlighted early in system development and reflected realistically by the user when defining requirements documented in the CDD/CPD. AFOTEC/AS should decide the extent of suitability's role for a given program during the discovery and scope/cost phases of test planning. AS should work closely with the Det, MAJCOM, and SPO to identify training and documentation constraints relative to deploying, employing, sustaining, and reconstituting the system in its operational environment. AS and

Deputy Logistics Evaluator (DLE) should use the certification templates to ensure the SPO takes proper actions to provide verified technical data prior to the start of dedicated OT&E.

Contractor suitability information is obtained through the SPO by responding to data calls during contract solicitation. Suitability evaluators should review the contractor data requirements lists (CDRL) portion of the contract and ensure AFOTEC is on distribution for the appropriate data items. Meetings sponsored by the program office or contractor are also a source of information. Suitability evaluators should plan to attend system developer program reviews, design reviews, and applicable working group meetings. Often separate meetings are held for tradeoff studies, model development, simulation development, and other specialized topics. There are also meetings with the system users and other service/test organizations.

Raw suitability data is captured by several Air Force data systems and contractor data systems. Use of the latter requires extreme caution, as there are public law restrictions on the use of contractor data. Under the integrated weapon system concept, much of the suitability information can be obtained (perhaps even on-line via computer networking) from the SPO, rather than employing past practices of contacting various Air Force offices (user logistics offices, supporting command logistics offices, and one or more acquisition logistics program offices).

Considerations For Suitability T&E. Two pillars of military capability defined in Joint Chiefs of Staff (JCS) Publication 1-02 are readiness and sustainability. Readiness is the ability of weapon systems to deploy and employ without unacceptable delays and to deliver the outputs for which they were designed. Sustainability is the ability to maintain the necessary level and duration of operational activity to achieve military objectives. It is a function of providing and maintaining levels of ready forces, materiel, and consumables necessary to support the military effort. With respect to these two pillars of military capability, the degree to which a system can be placed satisfactorily in field use depends on the system's ability to accomplish one or more of the following battlefield operations:

- Deploying the system to the area of conflict or use (deployability or deployment readiness). Deployability is the ability of the system (or unit) to move or relocate to a desired area of operations without unacceptable delays. To answer this question, there needs to be an understanding of battlefield operations as outlined in Joint/AF doctrine.

- Preparing the system for operational use or placing the system in an operable and commitable state (availability or employment readiness). Employment readiness is the ability of a military unit to respond to its operation plans upon receipt of an operations order (a function of assigned strength, item availability, supply, and training). Item availability and training are important parameters (sometimes key parameters) in determining operational readiness. Availability is a measure of the degree to which an item is in an operable and commitable state at the start of a mission when the mission is called for at a random point in time. It is a function of the system's reliability, maintainability, and logistics supportability characteristics. For systems that operate continuously (24 hours), operational dependability (D_o) may be a more appropriate measure. If the desired availability (or dependability) is not achieved, the impact to warfighter operations will be a system that is not ready to perform its assigned missions.
- Sustaining and reconstituting the system depends on several logistics factors. Sustainability is the ability to maintain the necessary level and duration of operational activity to achieve military objectives. It is a function of providing and maintaining levels of ready forces, materiel, and consumables necessary to support the military effort. These logistics factors are typically evaluated using questionnaires.

Constraints on Suitability T&E. Operational suitability tests are frequently conducted under constraints such as small quantity of test assets, prototype equipment, immature or nonexistent logistics elements (technical orders (T.O.s), supply support, and support equipment), and the need for no contractor involvement. Proper test planning can help minimize the impacts of these constraints. An obvious constraint concerns the ability to test the system in a wartime environment. A primary operational test requirement is to execute the test in as realistic an environment as possible. In some instances, the system is deployed to a potential operational site for testing. However, considerations such as test schedule, funds limitations, and system immaturity often preclude testing at other than a test range. Consequently, system analysis modeling is frequently used. Models provide the capability to tackle issues such as a system's logistics characteristics during war, to give significance and utility to test results beyond the narrow conditions of the test, and to develop a reasonably accurate measure of the system's availability and mission reliability. Models should also be used to efficiently plan a suitability test and to augment OAs. AS and DLE action officers should interface with AFOTEC/TS when defining modeling requirements.

Certification/Verification of Technical Orders (T.O.). AFPD 21-3, *Technical Orders (T.O.),* and T.O. 00-5-1, *AF Technical Order System,* provide guidance on developing, acquiring, and changing technical publications. Formal technical orders are not delivered to using activities until they have been certified by the contractor and verified by the SPO. AFI 21-303, paragraph 3.3, requires verified preliminary T.O.s (PTOs) or formal T.O.s to be used in OT&E. Certification and verification will not be performed simultaneously except as allowed by T.O.-00-5-1. The OT&E team is not responsible for technical order certification and verification but may assist in the effort because of the team's assembled expertise. The following are considerations for assessing technical orders:

- Technical Data Assessment. Normally, the test team assesses the accuracy, adequacy, usability, and completeness of technical data. Once a discrepancy is identified, it should be brought to the attention of the SPO and, through proper channels, to the contractor.
- Reporting on T.O.s in the OT&E Report. T.O.s should be available before test. If T.O.s were not available during the test, the OT&E report addresses why they were not available. The report also differentiates between a failure to have T.O.s delivered for evaluation and T.O.s that were delivered but were deficient.

Software in Suitability. AFOTEC reports on suitability at the system level which includes hardware, software, and any other supporting systems, such as personnel or training. Exclusion of system failures or maintenance actions in RAM calculations is left to the discretion of the JRMET but should be done sparingly and for good cause. Do not exclude software for software's sake. System RAM calculations must include software failures, including failures that cannot be duplicated. AFOTEC measures maintainability at the organizational or field level. Any maintenance done at the field level in support of the software counts as repair time. This includes time to reboot the system, or restore it in some fashion, data backups, system administration, and configuration management etc.

4.8.1.8 Software Evaluation

The AFOTEC test process focuses on evaluating overall system performance, and not solely on evaluating system components and subsystems to include software. This focus applies through all phases of the test process to include the pre-TRR and post-TRR test phases. With respect to software (S/W) evaluation, test teams do not normally accomplish activities such as software process evaluations, code and

documentation evaluations, and software product risk assessments. During early involvement, AFOTEC operators, maintainers, and test analysts normally monitor system development to assess the system's readiness for OT&E. This could involve (but is not limited to) interfacing with developers and developmental testers; leveraging off their expertise and activities; and injecting operational insight into the system design. In monitoring the system's maturity and readiness for OT, test teams focus on the operational functionality of the software and typically review the program manager's software maturity assessments for OT and mission impacts.

Test teams use software maturity tracking tools (as appropriate) to accomplish this task. The Maturity Evaluation and Analysis Tool (MEAT) is a standardized tool for tracking system software maturity. The Risk Assessment Level of Test Tool (RALOTT) is also recommended. OPR for these tools is AFOTEC/TS.

Recognizing the prevalence of software-intensive systems and the common, integral role in providing combat capability, a level of resident software expertise at the Dets/ST and TS is prudent and recommended to support specific needs of the test teams. Detachment Commanders and/or the test team propose the level of resident software expertise deemed necessary to AFOTEC/XO for approval during the normal pre and post-tasking order (TO) process. This software expertise is not to be test dependent, but part of the overall Detachment manning requirement.

The list below outlines those software-related activities not normally conducted as part of the OT&E process. If Detachment Commanders and/or test teams believe deviations to this policy are required, they will present software-related activities, requested resources, and justification to XO for approval.

- **S/W developer process evaluations** – e.g., SEI (Software Engineering Institute) S/W CMMI (Capability Maturity Model Integration) evaluations of software development processes.
- **S/W maintenance process evaluations** – e.g., SEI (Software Engineering Institute) S/W CMMI (Capability Maturity Model Integration) evaluations of software support processes.
- **S/W code and documentation evaluations** – e.g. the evaluation of the inherent characteristics of software, as documented in manuals and source listings, sometimes referred to as the "one's and zero's" at a very low level.
- **S/W reliability evaluations** – e.g., evaluations of the probability of failure-free software performance for a specified time under specified conditions; or the use of CASRE (Computer Aided

Software Reliability Estimation), or other tools or methods that attempt to arrive at a S/W reliability estimate apart from the system as a whole.

- **S/W technical risk assessments** – evaluations dealing with the areas of standards compliance, interoperability, and system certification.
- **S/W product risk assessments** – evaluations dealing with S/W requirements, design, code, test coverage, and other technical areas.
- **S/W design critique** – a general area of giving direction concerning the developer's design, or solution to a problem or issue, to include recommended solutions to SPRs.
- **S/W Verification and Validation** – the broad area that covers S/W verification and validation, which is the process of determining whether the requirements for the software or software component are complete and correct, the products of each development phase fulfill the requirements or conditions imposed by the previous phase, and the final system or component complies with specified requirements.

4.8.2 Integrated Test Considerations for Seamless Verification

The fundamental goal behind integrated testing is to work smart. Test resources (money and people) and time continue to shrink. AFOTEC members need to avoid duplicating tests, share test data, and add operational realism as early as possible. Test teams need to implement integrated testing whenever possible with a goal of achieving a process which integrates developmental and operational testing events. The early collaboration with DT counterparts facilitates a total team effort to develop a testing strategy that integrates both DT and OT. During government DT in the operational environment, AFOTEC should attempt to address task accomplishment and some MOEs and MOPs. During dedicated OT&E, having attempted to answer many measures earlier during CT and DT, AFOTEC should then focus on answering COIs and mission impacts. Integrated testing can also include other agencies, such as JITC to validate and certify technical compliance with compatibility, interoperability, and integration standards, or Air Force Information Warfare Center (AFIWC) for Information Assurance (IA) procedures and activities. Implementing integrated testing is not easy and requires additional coordination and agreements among the test organizations, which define who does what, when, and who pays for it. A suggested way of executing integrated testing is to use a Combined Test Force (CTF) approach. TDs, core teams, and test teams should use the checklists (tables 4.2 through 4.4) as a guide for integrated testing to ensure teaming between the contractor DT&E, government DT&E, and government OT&E. These checklists address

documentation, level of involvement, and proper procedures to be performed for integrated testing. The checklists define actions needed for each of the OT&E phases. Remember, DoDI 5000.2 requires DOT&E approval of the OT&E portion of the combined/integrated test plan for programs on OSD Oversight. This approval can be obtained through several vehicles such as: the TEMP, an OA plan, or a separate memorandum from AFOTEC/CC outlining the OT portion of the integrated testing.

4.8.2.1 Integrated Test Team or Combined Test Force Charter

A charter for the ITT or CTF, if needed, identifies the need for an ITT/CTF, resources, location, test philosophy, and roles and responsibilities. Some areas of interest in the review and drafting of ITT/CTF charters are:

- Significant references to other AF test organizations' roles and responsibilities.
- Words that limit AFOTEC's ability to perform its mission (i.e., dedicated testing and independent analysis/reporting).
- Obvious references to AFOTEC's participation or focus on DT-specific events and/or analysis.
- Improperly documented resource (i.e., funding, manpower, test item) requests.
- References to release of processed data without AFOTEC approval.
- References to contractors participating in Test Data Scoring Boards.

AFOTEC/CV is the approval signatory for ITT/CTF charters. The test team reviews and provides input to the document prior to coordination. AFOTEC/XPY is the administration office for ITT/CTF charters, and they will be staffed, coordinated, and approved using the same procedures as for support agreements.

4.8.3 Operational Assessments (OA)

AFOTEC is tasked with providing OAs to AF/TE, DOT&E, OUSD(AT & L) and, if required, OSD in support of major milestones and decision points. Some points regarding OAs are:

- OAs should not be conducted in lieu of OT&E.
- OAs are conducted by AFOTEC on ACAT I through ACAT III defense acquisition programs when required to support a milestone/acquisition decision. OAs are required for all OSD oversight programs or as directed, and are approved by DOT&E.

Table 4.2. Integrated T&E Planning Considerations.

Task	Elements
Develop Manage-ment Plans Note: the goal is to develop an integrated DT-OT plan.	• PMD - Determine roles and responsibilities • TEMP - Determine roles and responsibilities/schedule • Integrated Test MOA (determine if applicable) • System Test Plan - Develop test events and resources • OT&E Plan - Develop test scenario and resources • ILSP - Develop test events and resources • TRP - Determine shared resources, facilities, equip. • Software Plan - Develop test events and resources • SMM
Derive Integrated Test Priorities	• DT&E: Technical Priorities (events and data desired) • OT&E: Operational Priorities (events and data desired)
Identify Milestones	• Acquisition decision points - what tests support • SMM - Determine evaluation criteria • First Test Event - Start of development test • IOC - Driver • Major Test Events - Focus of integrated test team • System Design Reviews - Determine opportunity for early operational tester involvement
Develop Integrated Test Matrix	• Integrated Test Matrix - Identify events, resources, and data desired • Major Test Events - Focus of integrated test • DT&E - Unique events (e.g., bench test, OT&E over-the-shoulder); prioritize • DT&E/OT&E - Develop mutual test events • Dedicated OT&E - Develop unique test events (DT&E over-the-shoulder); prioritize • Test Team Activation
Test Structure/ Operations/ Maintenance	• Resources (manning, facilities, equipment) - Shared • Infrastructure/Processes - Seamless team for DT&E/OT&E execution • Technical/Ops/Maintenance Support - Shared but controlled • Program Staffing - Mutual except for analysis and reporting • Organizational Relationships - Seamless for execution
Prepare for Test Readiness	• DT&E Test Plan - Perform separate reviews • OT&E Test Plan - Perform separate reviews • Integrated Test Plans - Develop single negotiated plan • Pretest Modeling/Simulation - Shared • Environmental, Safety & Health Reviews - Shared • Range/Targets - Shared • Environmental Assessments - Shared • JRMET Plan • Live Fire Test Plan • Data Collection, Instrumentation and Reduction Plan
Support	• Logistics - Shared • Technical Services - Shared • Operations - Shared • Range - Shared

Table 4.3. Integrated Planning Considerations for Test Execution.

Task	Elements
Prepare Detailed Test Procedures	• Technical Operations - Integrated DT&E/OT&E • Test Team Buildup
Test Readiness and ES&H Reviews	• Event Pretest Briefings - Shared with DT&E or OT&E as lead depending on who has the greatest interest in the event
System Configuration Control	• Instrumentation - Shared • Modifications - Configuration control • Software - Configuration control
Prerequisite Test Training	• Ground Test Training - Shared • Flight Test/Launch Training
Command and Control	• Ground Test - Shared • Flight Test - Shared • Space/Launch Test - Shared • Safety/Environmental
Test Conduct	• Ground Test - Perform seamless test (optimum mix of DT&E, OT&E, and contractor depending on the type of test event) • Flight Test - Perform seamless test • Test/Retest - Perform seamless test • Operational Test - Perform seamless test • Safety
Data Acquisition	• Real Time - Shared • Telemetry - Shared • Manual – Shared
Recovery	• Maintenance - Shared • Operations - Shared • Technical – Shared
Data Group Integration	• Data Products - Shared or unique • Customer Service - Shared or unique
Data Processing	• Real Time - Shared processing • Quick Look - Shared processing • Posttest - Shared processing • Film/Video - Shared processing
Data Quality Control	• Lost Data - Develop mutual agreement on data quality
Posttest Debriefing	• Test Mission • Test Vehicle • Technical

Table 4.4. Integrated Planning Considerations for Test Reporting.

Task	Elements
Data Repository	• Archiving - Develop mutual agreement - shared access
Independent Analysis	• DT&E - Separate - unique • OT&E - Separate - unique
Exercise Analysis Packages - Independent	• Statistical • Models • Simulation
Build Data Summaries - Independent	• Graphs • Figures
Evaluate Results - Independent	
DT&E Reporting	
Intermediate Technical Reports	• Functional Analysis • Test Information • Sheet Reports • Integrated System Evaluation
Final DT&E Reports	• Air Frame • Propulsion • Avionics • Pilot Vehicle
Operational Utility Evaluation	• Technical Demonstration • Non-production
Operational Assessments	• Operational Effectiveness • Operational Suitability • Programmatic Voids
Final OT&E Report	• Operational Effectiveness • Operational Suitability • OIA
Review/Submit Lessons Learned	• lessons learned
Operator Reports	• Mission Reports • Surveys • Questionnaires
Special Reports	• Review • Briefings
Deficiency Reports	• Watch Items • Deficiencies • Minor Defects
Business Reports	• Periodic Reports • Metrics

- An EOA is simply an OA conducted prior to Milestone B.
- OAs have several important objectives. The first is to identify and assess major impacts affecting potential operational effectiveness and suitability and determining a program's readiness for OT&E. A second is to provide an early look at OIA topics as described in the evaluation framework. Other objectives include interacting with the operating command and

developer and (from an operational perspective) ensuring the establishment of clearly defined operational requirements and meaningful OT&E criteria. An OA can also validate a test concept.

- OAs should be documented in the TEMP and the TRP. Multiservice ACAT I and II programs with the Air Force designated as the lead service will normally require an OA. For non-Air Force lead multiservice programs, the AFOTEC OPR will coordinate with the lead service to determine if an OA is required. Provisions to support any multiservice OA will be covered by an MOA with the participating services.
- An Early Operational Assessment (EOA) may be accomplished while a program is in scope/cost when recommended by the core team. The Det acquires funding for EOAs during scope/cost by having the Det TRM update the TRP and submit an obligation spend plan for the activity.

4.8.3.1 *OA Introduction*

OAs may vary depending on the program category, the acquisition strategy, or higher headquarters' direction. Depending on these factors, the OA can be tailored to fit the specific test strategy. The content of the majority of OAs consists of examining developmental or other relevant test data (if available) as they relate to the COIs, objectives, MOEs, and MOPs, to provide a perspective on a system's potential operational effectiveness and suitability. As with OT&E, OA tasks are reflected in the OTPM test program network. The depth of assessment will be program-specific, i.e., depending on the nature of testing (DT&E or IOT&E) and type of results. The following examples could apply to collecting and reporting test data in an OA plan or report:

- **No IOT&E or QOT&E Has Occurred.** If the data address the COIs, MOEs, and MOPs, AFOTEC may use developmental M&S data. The DT&E results should not be critiqued; however, comments may be made on the relationship of the developmental data to operational scenarios and significant voids and trends. A possible method of reporting the test data could be: mean time between critical failures (MTBCF) to date: 150 hours, criterion: 200 hours. System is still evolving and is not a production representative article, or data quantity is very limited.
- **If IOT&E Has Begun**. In the rare instance IOT&E or QOT&E has begun and an OA is required, and analyzed data are available that apply to the COI, MOEs, and MOPs, a possible method of reporting the test data could be: “circular error

probable (CEP) demonstrated to date with 15 live deliveries: 300 feet, criterion: CEP - 200 feet."

In addition to the data analysis described above, OAs should outline the rationale (decision point being supported), the overall program decision points (show program, production, and assessment/test events known or projected), and the general activities that are to be performed. Describe anticipated or planned inputs at the remaining decision points and method of obtaining any assessment/IOT&E results.

4.8.3.2 OA Areas

Typically, OAs consist of five areas as described below:

Area 1. Identify and assess major impacts affecting potential operational effectiveness and suitability (area 1a). This is done through examination of available developmental or other relevant test data and how these data relate to or address the system COIs, MOEs, and MOPs. Look at known areas of risk in developing the system to identify significant trends. Pay particular attention to DOT&E special interest items, as applicable. Assess the potential impacts to the warfighter as a result of employing this system – OIA (area 1b).

Area 2. Identify any programmatic voids that would adversely impact the ability of the system to meet operational requirements. Pay particular attention to DOT&E special interest items, as applicable. Review program information and documentation to determine if enough currently exists or will be provided in sufficient time to support planning and conduct of OT&E. This area is also used to report missing documentation.

Area 3. Assess program documentation and testability of user requirements. OT&E related documentation and user requirements/test criteria development are assessed under this area. OT&E-related documentation should address the following:

- Is the progress of document development appropriate to the milestone decision point supported?
- Is the progress sufficient to support OT&E?
- Will the documentation be sufficient to complete a sufficient OT&E on a properly configured test article in time to support the intended milestone/decision point?
- Is the planning in this area sufficient? For example, ensure the:
  - Capability requirements document includes primary/ secondary mission, operational concept, employment

concept, deployment concept, support concept, and performance/support parameters.
  - CDD/CPD contains key parameters (identified, and testable); operational requirements (prioritized, sufficiently supported by system design/system specifications, and disconnects noted); and contains no voids or shortfalls.
- Additional documents are available for review (as appropriate): TEMP, OT&E plan, service reports, STAR, reliability and maintainability management plan, TRP, ISP, ILSP, MOA/MOU, life-cycle management plan, technical orders, JRMET charter, and CONOPS (if available).
- User requirements/test criteria development. Requirements and evaluation criteria development should address:
  - Operational capability requirements development: completeness, clarity, priority, rationale, or other factors that could affect testability.
  - Progress of operational capability requirements and evaluation criteria development appropriate to the decision point supported.

Area 4. Assess the ability of the program to support OT&E. The following items are assessed under this area:

- Program schedule to accommodate OT&E activities should address the following:
  - Does the OT&E schedule provide sufficient time to complete a credible OT&E?
  - Sufficient time to complete analysis/report before the milestone decision point.
  - Is integrated DT/OT meeting expectations or will expanded OT&E be required?
- Insufficient system development or major problems that could prohibit conduct of OT&E on a properly configured test article need to be identified to start and complete OT&E in time to support the intended milestone/decision point. For example:
  - Software development for the system has fallen behind, and the operational tape will not be available until the end of OT&E. (Impact: OT&E will be delayed until operational software is available.)
  - A primary part of the system is 6 months behind in development. The hardware will not be delivered until 6 months after dedicated OT&E is planned to begin. (Impact: OT&E will slip and will not be completed until after the scheduled Defense Acquisition Board.) A subset of the system will not be available during OT&E. (Impact: OT&E

will start/finish as scheduled; however, this part of system will not be tested.)
  - Reliability has not met DT&E criteria, and no plan has been initiated for improvement. (Impact: OT&E will slip until reliability has been improved, or OT&E will be conducted knowing reliability is deficient.)
  - The system, as currently designed, will not meet the requirements as outlined in the operations concept. (Impact: None, if engineering change proposal corrections are initiated to resolve the fault before OT&E.)
  - Catastrophic and critical hazards have been identified with planned system operations or support functions that have not been resolved before the start of OT&E. (Impact: OT&E will not proceed until the mishap risk is reduced to an acceptable level.)
- Required resources available to support an OT&E should address the following:
  - Test article availability (date, required number, and correct production representative configuration (hardware/ software)).
  - Logistics support adequacy including review of support equipment, technical data, training program (plan), facilities, and spares.
  - Test resource adequacy including availability of threats, targets, test area/ranges, test instrumentation, simulation, data analysis/reduction, and support aircraft.
  - Completeness/progress of system (security) certification for (interim) interoperability and information assurance for those weapon, C4ISR, and information programs that are dependent on external information sources, or that provide information to other DoD systems.
  - Manning: sufficient, approved, and trained.
  - Funding: amount required, identified, and approved.

Area 5. Assessment of special field activities requested by higher headquarters or decision maker. These activities might include:
- First 50 hours of operational flight time during the OT&E.
- Assessments of hardware/software items requested by the acquisition decision maker.
- Requested “fly-offs.”

4.8.3.3 Written OA Plans

As a reminder for MDAPs, if the OA will include participation in combined testing, DOT&E wants to approve the OT&E portion of the combined test plan.

If the AFOTEC/XO determines a written OA plan is required (via the tasking order), the following guidelines apply:

- **Coordination Cycle.** Recommended internal coordination is contained in Attachment 1.
  OA Plan Briefing. The TD briefs the staffed and coordinated OA plan to the CC or designated representative approximately 50 days before OA start. The OA plan approval represents authority to conduct the OA (refer to Attachment 1).
- **OA Plan Format.** See the Test Plan template on the MIN (see attachment 4).

4.8.4 Operational Utility Evaluations (OUE)

The acquisition process has undergone several changes recently. With acquisition reforms and streamlining, AFOTEC has been asked to participate in many nontraditional programs. Examples of such programs are one-of-a-kind buys, or an expanded or modified role of an existing system (e.g., putting a fighter ECM pod on a transport aircraft).

To keep pace with these trends, the OUE was developed to be more flexible in responding to customer's needs. The OUE was designed to allow AFOTEC a convenient and proper tool to assist both users and decision makers in determining the utility and value of a system. However, there are differences in how an OUE should be applied versus either an OA or OT&E:

- OUEs are small, flexible evaluations where time and resources are at a premium. Even though OAs and OT&E may also be referred to as small and flexible, the primary difference is that OUEs do not support the traditional acquisition, production, or full-buy decision process.
- OUEs are unique to the Air Force; therefore, are not used for programs that require DoD approval (e.g., ACAT I, II, and OSD oversight) or those which require other service involvement.

4.8.4.1 Uses for OUEs

OUEs can be used to:

- Identify capabilities and limitations of fielded systems.
- Determine the effectiveness/suitability or operational military utility of nonfielded systems.

- Validate (demonstrate) a system's concept.
- Evaluate the expanded (modified) role of fielded systems.
- Assess competing concepts, alternatives, or systems.
- Evaluate a new application of an existing technology.
- Determine utility of a system to perform operational mission requirements.
- Support AoA development.
- Support source selection.

NOTE: Contractor data can be used if appropriate and properly documented.

4.8.4.2 Unallowable uses for OUEs

OUEs cannot be used to:

- Replace IOT&E, QOT&E or FOT&Es.
- Support fielding and initial operational capability (IOC) decisions for ACAT I, II or oversight programs.
- Support acquisition production or full buy decisions for ACAT I, II or oversight programs.

4.8.4.3 Attributes of OUEs

When OUEs are used, they should be:

- Conducted without excessive expenditures of time, money, and resources.
- Streamlined tests that are specific in nature.
- Flexible in planning and reporting formats.
- Adjustable to customer expectations.

NOTE: OUEs normally will not provide the high confidence levels associated with OT&Es. Due to their limited time and scope, there is a risk associated with the information provided.

4.8.4.4 OUE Contents

The OUE concept/plan should be customized to provide information to:

- Implement an executable OUE test plan/concept.
- Establish test data to be collected.
- Specify type of test and number of test events.
- Distinguish between types of test/evaluation data.
- Describe any planned use of M&S to include:
  - Rationale for use.
  - M&S methodology.
  - Models and simulations chosen.

- Specific data to be produced and measures (if any) that they support.
- Resources required.
- Schedule.
- Limitations.
- A discussion of the expected credibility of the product, to include VV&A of the models used.

4.8.4.5 OUE Planning

The OUE plan should define the purpose, scope, resources, timing of events, and allocation of test responsibilities as required for the OUE. The organization requesting the OUE and AFOTEC jointly develops a test-readiness certification process that may be tailored as appropriate. The OUE concept/plan may be tailored from the OT&E plan format and coordinated with the organization requesting the OUE prior to starting the evaluation. If not directed by a PMD and supported with a verified capability requirements document, the OUE can be negotiated through a MOA (contact AFOTEC/XPY for more information). The MOA, jointly approved by the requesting organization and AFOTEC/CV, also specifies the OUE requirements in a manner that clearly defines the questions to be answered by the OUE. Plans and reports are coordinated and approved in the same manner as I/QOT&E plans and reports (see attachment 1). As with OT&E and OAs, OTPM test program networks are built to reflect the OUE tasks required to successfully accomplish the evaluation.

4.8.5 IOT&E/QOT&E/FOT&E Plans

Since each plan is developed for a specific program, copying a previously approved plan may not lead to the optimum program test solution and is discouraged. AFOTEC/CC is the approval authority unless otherwise specified in the TO. When CC approval is required, test plans are forwarded to AFOTEC/CCX for headquarters staffing (see attachment 1). AFOTEC/CC approves all test plans prior to external AFOTEC release unless otherwise delegated in the TO. For those programs on the OSD oversight list, the test plan is briefed to AF/TE, and then DOT&E at least 120 days before test start. Following approval of the plan, the OTPM test program network should be updated to reflect the approved activities for the program. The network should be validated by the Det CC/Dir and then loaded on the MIN. The Test Plan describes what is necessary and how to execute the special topic aspects of the OT&E. Information assurance, E3, interoperability, and GPS signal loss are addressed as Special Interest Items in the Test Plan template.

4.8.5.1 Plan Guidelines

The plan should:

- Define the OT&E scope and cost by identifying the purpose of the evaluation; the necessary resources (e.g., personnel, test equipment and assets, range needs including support facilities and activities, M&S); and the sequencing of the test events.
- If applicable, describe the test activities associated with DOT&E special interest items (particularly, information assurance, E3, and interoperability). Identify any external agency performing the these activities to clearly indicate who is doing what and how.
- State the evaluation criteria and if applicable, the requirements document (e.g., the CPD, date, section/paragraph number) where the evaluation criteria (requirement) was extracted from for each measure. Note, when the user has not provided or agreed to a criteria for a specific measure that AFOTEC deems necessary to test, the evaluation criteria should state "No User Established Criteria, Report Only" and that the results are reported in narrative terms.
- Describe the test mission scenarios and methods that evaluate the criteria established for the measures including the aggregation methodologies to be used to evaluate this information. This includes the M&S that replicated test activities or evaluated the information obtained during testing.
- Define any test limitations that may affect the outcome of the test results. Note, although these limitations may already be defined in the program TEMP, they may be stated in greater detail in the plan to describe how the limitations affect the scoping of the OT&E. For example, the TEMP limitation may state that only so much time or only so many of this asset is available, and the OT&E test plan may state that only X test events instead of the desired number of Y events should be accomplished.
- If applicable, provide a description of Supporting Assessments with their measures, criteria, and methods.
- Provide additional information necessary for the OT&E team to develop detailed test procedures.

4.8.5.2 Writing The Plan

The OT&E plan should be written to the level of the AFOTEC program approval authority with consideration that other outside agencies and high-level decision makers may also be reviewing the plan. The test plan template can be found on the MIN (see attachment 4). The plan should be written in clear, concise terms that do not leave room for misinterpretation of the OT&E test process. Repeating information

covered in other parts of the plan should be avoided if possible. This should be done by referencing previous information or other documents. The approval process for the OT&E plan is outlined in AFOTECI 99-103, figure 4.3. The revision process follows:

- If a substantial change in the OT&E direction occurs, or if additional resources are required after the plan has been approved, the AFOTEC/CC or designated approval authority should approve the changes. Test teams should consult with their XOO representative to determine if proposed changes require XO approval.
- When the revision affects only the method of testing but does not require extra resources, the TD (or designated alternate) should inform AFOTEC/XO of the change.
- Minor updates may be made in a letter directing write-in changes. More significant updates should be made through the use of change pages, or if necessary, complete revision of the plan.

4.8.5.3 Briefing the Plan

Prior to signature, the plan is briefed to all concerned parties. A list of topics for an I/Q/FOT&E briefing follows. For additional information, refer to the detailed briefing guide on the MIN (see attachment 4).

- Introduction
- Program Overview
- Operations
- Evaluation Framework and OT&E Methodology
- Effectiveness and Suitability
- Operational Impact Assessment
- Other Significant Information

4.8.5.4 Finalizing the Plan

Before a test plan can be entered into AECS for coordination, it must have an accurate distribution statement on the plan and a plan control number. The AFOTEC Scientific and Technical Information Officer (STINFO) in HO will assist the test team with selecting the right distribution statement for the plan. Once that's done, then HO will provide the plan control number. See paragraph 5.10.8 for more information on the distribution statement requirements.

4.8.5.5 Plan Distribution

After plan approval, the TD is responsible for reproduction and distribution of the plan. After reproduction, the TD or designate should

package the document including correct number of copies with a transmittal letter to the appropriate outside agencies. Also, the TD should be responsible for proper address and distribution of the plan to only those agencies having a requirement to receive the document. The plan distribution list should be checked periodically for currency.

4.8.5.6 Multiservice Plans

For multiservice tests where the Air Force is the lead service, OT&E plan annexes may be added, as necessary, to satisfy service-peculiar requirements. If the multiservice test and evaluation is fully integrated, AFOTEC develops a single multiservice OT&E plan in this format; the supporting services may develop supplemental OT&E plans in their own formats to satisfy individual service requirements. If the multiservice test and evaluation involves separate parallel efforts, the overall multiservice OT&E plan may be developed in volumes. The supporting services are responsible for their own OT&E plan and format. AFOTEC writes the Air Force plan in AFOTEC format with additions or deletions as required. For multiservice tests where the Air Force is not the lead service, AFOTEC may develop an independent OT&E plan, except that the scope may be reduced to be consistent with the level of AFOTEC involvement in the test. As a minimum, a supplement for evaluation of operational effectiveness and suitability is developed. Appropriate information from the Air Force independent OT&E plan is included in the lead service/agency OT&E plan to reflect Air Force test requirements.

4.8.5.7 Attachments to the OT&E Plan

Attachments should be used to expand upon the information in the body of the plan and may be added as needed. If an attachment is published and distributed separately from the OT&E plan, it should be coordinated in the same manner as the OT&E plan and should have a signed title and signature page. Examples of attachments for the OT&E plan follow:

- Intelligence and Threat Assessment
- Classified Evaluation Criteria
- Software Maturity
- Human Factors
- Weather
- Modeling and Simulation (M&S)

4.8.5.8 Reviewing the OT&E Plan

The following questions provide a means for the reviewer to judge whether the OT&E plan is sufficient. It may be necessary to review these several times to add detail or to correct any inconsistencies.

- Does the Plan implement all of the direction provided in the TO?
- Does the Plan adequately address the evaluation framework with specific attention to OIA Statements?
- Are the operations and maintenance characteristics defined and consistent with other program documents (e.g., ADM, PMD, ICD, AoA, CDD/CPD, TEMP, acquisition program baseline, AF Form 1067, Modification Proposal)?
- Is the test concept (TC) consistent with the MAJCOM's CONOPS and maintenance CONOPS?
- Is the OT&E plan consistent with the TC? (There should be documented justification for any significant deviations.)
- Is the OT&E plan consistent with the TEMP?
- Do the MOEs/MOPs answer the Objectives and COIs?
- Are the MOEs/MOPs for each Objective and COI appropriate? (The MOPs should describe system characteristics in enough detail to support an evaluation and be quantitative where practicable. The conditions under which data will be collected must be clearly defined.)
- Have evaluation criteria (and interim evaluation criteria, where appropriate) been established?
- Have the data management instructions described how and in what form data will be collected for each MOE/MOP? (If questionnaires are used, the method for collecting, reducing, and analyzing the information should be clearly spelled out. Data must be carefully reviewed to ensure clarity and accuracy.)
- Will the methodology provide the information needed? (Any significant differences between the test and operational environment need to be clearly stated as planning considerations or limitations.)
- Is it clear how the system will be evaluated? (The method of evaluation paragraphs should connect the MOEs/MOPs to the Objectives and COIs.)
- Are there ample test time (hours, sorties), instrumentation, and other test resources available to ensure they will provide the needed information? Have inevitable delays been planned for?
- Has M&S been adequately addressed?
- Have explicit sample size requirements been set?
- Have safety concerns been identified that could affect the operational realism of the test? (Any significant differences need to be clearly stated as planning considerations or limitations.)
- Has involvement (if any) by system contractors in dedicated OT&E been carefully controlled? Participation by system contractors in dedicated OT&E is strictly controlled by law. Have contractors been excluded where appropriate?

- Is the system software maturity and operational functionality properly considered in all aspects of the test?

4.9 Determine Last Test Event (LTE)

In order to properly plan for the development and coordination of the final report, the TD defines the activity that constitutes the last test event and notifies the CAG. The LTE is documented in the test plan, added to the MIN page, reflected as a task in the OTPM test program network, and briefed at the TRR. If the LTE needs to be changed, the new LTE is approved by the director or Det CC. Upon completion of the last test event, the TD submits an OPSCENTER report to trigger coordination timelines for the final report.

4.10 Data Collection and Analysis

4.10.1 Data Management and Analysis Plan (DMAP)

The purpose of the DMAP is to provide detailed procedures for the collection, reduction, quality assurance, collation, analysis, storage, and disposition of data gathered to support operational effectiveness and suitability evaluations and OIAs. This document aligns with the test plan and detailed test procedures (DTP) in terms of contribution to a successful test. The DMAP is both a planning tool to ensure procedures are in place for data collection and a data management tool (see figure 4.9, section 5.d) for tracking and assessing data collection during test execution. A DMAP is required for all ACAT I and OSD oversight programs, and is a separate document, not a supplement to the OT&E plan. For all other programs, the essential elements of the DMAP can be included in the OT&E plan if desired. The test team should develop the DMAP in parallel with the OT&E plan. It is designed to provide the specifics for the management and analysis of operational and suitability data collected during OT&E.

4.10.1.1 DMAP Format

The complete format (reference figure 4.9) contains the organization of the test team analysis section, and provides a road map of the required data to address the COIs and assessment areas. It also specifies the data and sample size needed to address each MOE/MOP and identifies the data source, data collection method, type of analysis to be performed, etc., for each phase of testing (e.g., ground, bench, simulator, flight).

4.10.1.2 Data Injectors/Test Tools

In developing the DMAP, attempt to anticipate the outcome of the test before expending scarce resources. This prediction is possible only

SAMPLE DMAP FORMAT

1. **Introduction.** Briefly explain the DMAP organization. Give an overview of the data management scheme to be used.

2. **Organization of the Test Team Analysis Section.** Describe and show an organization chart for the operations and logistics analysis functions on the test team. Show the relationship of operations and logistics analysts to the TD, the deputy for operations, the deputy for logistics, and, if applicable, the deputy for analysis. Also show the relationship of any contractor support personnel to the test team organization. Account for all analysts, engineers, and data technicians whether they are from AFOTEC, MAJCOMs, other government organizations, or support contractors.

3. **Types of Testing**. Describe in general terms the types of tests that will be conducted, i.e., flight tests, ground tests, simulations, etc. Introduce any unique or unusual test facilities to be used.

4. **Data Management System**. Describe the type of data management system to be used. Include an overview of data verification, data processing and reduction techniques, database design, analysis, reporting and disposition, an integrated data requirements list (IDRL), and a description of the analysis techniques. Ensure any version differences in your data collection software are discussed and workarounds developed, if required. For example, MS Access 2000 files are not readable by earlier versions resulting in a workaround having to be developed.

5. **COIs**. List verbatim from the OT&E plan.
   a. **Test Objective**. List verbatim from the OT&E plan.
   b. **Measures of Effectiveness/Performance and Evaluation Criteria**. List verbatim from the plan.
   c. **Method**. Describe the specific test activity, operation, or mission to be used to answer the COI. Describe how the testing will be done (i.e., separate OT&E, combined DT&E/OT&E, through simulations, or field testing). When MOEs and MOPs are being answered by M&S, identify any field test data that are required for that effort. Identify the participants, resources, configurations, test conditions, and any other preparations.
   d. **Data Management**.

      (1) **Data Requirements and Parameters**. Describe the source of every data item necessary to answer each COI. Note data obtained from other similar tests. Base data requirements on the MOEs/MOPs, the test variables to be measured, and sample sizes. Use a single description and refer to it if it will serve several COIs, the Test Objectives, and MOEs/MOPs. Include a summary (matrix or table, i.e., basis for IDRL database structure--see table 1 below) listing the data required for each MOE/MOP and the agency responsible for obtaining and collecting the data. Include logs, evaluator comments, operator or maintenance comments, film, and any other input items necessary for the evaluation.

Figure 4.9. Sample DMAP Format

Table 1. Integrated Data Requirements List

COI	Test OBJ	MOE	MOP	Data ID #	Data Desc	# Required	# Rec'd	OPR Info
1	1-1	1-1-1	1-1-1-1	1-1-1-1-3	X, Y, Z position and plots.	20 TSPI data points for each of 10 passes at target for wet and dry conditions. 1 pilot each for wet/dry.	Maintained during test.	AFFTC SMSgt Jones, DSN 527-xxxx

(2) **Data Collection and Processing**. Describe in detail the methods used to collect the data described in paragraph 5d(1) and any manual or automated processing that will be used to transform the data into a form for analysis. Discuss the data configuration management process (i.e. procedures for (1) marking/tagging data sources especially hard copy questionnaires, maps, or film; (2) verifying that the data are complete and accurate; (3) ensuring the integrity of processed OT&E data—i.e., it cannot be changed to the advantage of the contractor, etc.).

e. **Data Analysis**. Describe how the processed data from paragraph 5d(2) will be analyzed to support each MOE/MOP in paragraph 5b. If any statistical methods are to be used, describe them here or give a suitable reference.

(1) **Data Evaluation**. Discuss the evaluation techniques or procedures to be used. Explain how they will be applied to answering the COI. Explain how the test results and data analysis will determine MOE/MOP and COI ratings.

(2) **Data Presentation**. Describe how the data will be presented in the data document supporting the test findings. Show sample tables or plots if used (see table 2 below).

Table 2. Data Presentation

B-1B COI-4. Does the ALQ-161 degrade early warning and ground-controlled intercept (EW/GCI) radars in an integrated air defense network?			
TEST ACTIVITY	**DATA**	**ANALYSIS**	**MOP SERVED**
B-1B ECM Run vs. EW/GCI Vectorings	B-1B Time and Position From EW/GCI Radar	Summarize Engagement Each Radar	MOP 4-1 % Unsuccessful Parameters
	Detection and Tracking Times Terrain Masking Data	Time In Coverage # Successful Vectorings	MOP 4-2 % Time Accurate Target Data Denied
	B-1B ECM Status AI Data for EW/GCI Vectoring Tests	Wet (ECM On) vs. Dry (ECM Off) Performance Comparison	MOP 4-3 % Reduction in EW/GCI Tracking Range

Figure 4.9. Sample DMAP Format (continued)

when the data that stimulates the system are controlled. For example, in a C4I or radar system, control is possible by using pre-approved test tools that inject operationally realistic messages, signals, or data traffic into the system at the source. Refer to the section on test process accreditation to identify all test tools (e.g., data injectors) that are included in resolution of test metrics that require using test capabilities.

Test capability accreditation is mandatory to ensure the tool is working correctly and that it properly reflects the appropriate operational usage rate and priority level for the given test.

4.10.1.3 Integrated Data Requirements List (IDRL)

The IDRL is an information model that describes elements of test planning (COIs, test objectives, MOEs, MOPs, test range requirements, etc.) and relates them to data to be collected during the test. The IDRL is based on the Data Source Requirements that are stated in the DMAP (see figure 4.9, table 1). During test execution, the IDRL should be placed on-line as a DMAP support tool to centralize the tracking of how many total test data samples have been received. When all of the required numbers of samples have been met from a certain kind of test, then that test does not need to be continued. This has happened in operational tests dealing with Space or C4ISR systems. It saves time and money for the TD to know this in a timely manner.

The IDRL is used in many different ways. Some uses include: (1) tracking how much of the required data are collected, (2) tagging data in databases for information retrieval, and (3) managing test resource requirements for a given test scenario. Some kinds of test data element requirements check lists or matrices are necessary to assure that the right data are collected from field tests. When test planning and execution goes on for an extended period of time, it is invaluable to also add a couple more columns in the IDRL: the POC and phone numbers of those who are responsible for each data source. This can then be passed on to new test team members when (not if) there is turn over of test team personnel. In general, the IDRL describes all of the test data requirements and ties them to specific COIs, test objectives, MOEs, and MOPs to be answered.

The IDRL uses data traceability fields to link data requirements with COIs, test objectives, MOEs, or MOPs in the test plan. Each data requirement has a unique identifier called the data identification (DID) code. The DID fields are shown in figure 4.10.

DID								
COI	Test Objective	MOE	MOP	Test # Data ID	Req'd Data Source	# Usable Test Data in Hand	POC Name	Phone Number

Figure 4.10. Data Item Description Fields

The DID uniquely identifies each data requirement and ties it to the question it supports. Using the IDRL and the DID allows the test team analyst to set up a database with a meaningful key.

4.10.2 Questionnaires

As has been mentioned, AFOTEC must often turn to subjective methodologies and measures to collect OT&E data, which can run the gamut from informal subjective observations using data collection forms, to interviews, unique test questionnaires, and standardized surveys. Because AFOTEC does rely on subjective test instruments such as questionnaires for a substantial amount of test data, it is crucial to plan carefully to ensure questionnaires are as reliable as possible. Test teams should schedule appropriate test team personnel for the course on questionnaire construction, employment, analysis, and reporting that is offered periodically by the HQ Human Factors Division (TSH). In addition, a storehouse of information on questionnaire employment is available in the *AFOTEC Questionnaire Handbook* (August 2000), which can be downloaded from the TS ATTIC web page on the MIN (see attachment 4), TSH page on the MIN (see attachment 4) or can be obtained in hard copy from TSH. A final step to ensure highest questionnaire quality is to have the Human Factors representative for the test team review test questionnaires well in advance of the test start date.

4.10.3 Detailed Test Procedures (DTP)

DTPs are written and maintained by the test team. DTPs are living documents. The DTPs describe how the test team executes the test. DTPs are working-level reference documents that provide an audit trail of planning decisions, rationale, and records. The DTPs are intended for test team use only and are not required to be coordinated externally. However, there may be situations when the test site requires the DTPs to be reviewed for safety, security, and operational integrity issues.

The TD assigns responsibility to maintain the DTPs. Revisions are continuous, and often continue well into test execution as more information becomes available to the test team. To minimize any adverse effects on test execution, it is highly recommended to dry run the procedures as completely as possible before the test starts. To ensure the operational flavor of the procedures is maintained, use actual equipment and personnel, where possible.

The format of DTPs will vary for different test teams and for different test locations. Where possible, use a format familiar to the support personnel at the test location to minimize additional workload. This smoothes the coordination process at the test location. In some cases, the format is directed by the test location. Early coordination with the test site is crucial to getting the proper content and format for the DTPs.

One such familiar format is a Test Information Sheet (TIS), such as a test flight card for pilots and aircrew members. It often is used for testers/test data collectors to keep track of specific information and procedures during certain conditions of the test. REMINDER: If the TIS is used as the format for the DTP, it is important to capture somewhere the day-to-day specific test planning decisions made and the rationale for them in addition to developing the test flight cards for the next flight. Also, be sure to track the number of usable data samples in hand for each row of the IDRL and compare that column with the required number of data samples. The next flight might not be required!

Care should be taken to ensure that there are no gaps between the DMAP and the DTP/TIS. It is important to check that the DTP/TIS collects data for the same items and in the same format as required by the DMAP. This procedure provides the test team the opportunity to cross check the data and expand procedures if required. The test team may authorize changes to the DMAP if conditions have changed. Consult with the test team for major assumption changes in the DMAP to ensure there will be no disconnects with the methodologies written in the test plan and those chosen for data analysis and reporting.

4.11 Deficiency Reporting (DR) Process

AFOTEC is responsible for supporting the DR process by reporting deficiencies found during OT&E. Detailed information about the DR process is contained in T.O. 00-35D-54, USAF Deficiency Reporting and Investigation System, and test teams are encouraged to review it in its entirety. Deficiency report status is included in the final OT&E report. Once AFOTEC is no longer involved in a program, any active DRs are transferred to the operating commands for tracking and prioritization. Dependent on the size and complexity of the system under test, a large number of DRs may be generated and all have to be tracked. Also, any open software problem reports should be converted to DRs prior to the start of OT&E. The terminology to be used in the DR process must be agreed to by all parties. Test teams get involved with the DR process early to establish database account(s), obtain training as required and establish a contact for the screening point. **Note:** If AFOTEC generates a DR, T.O. 00-35D-54 says: "If any doubt exists concerning the category of a report between Cat I or Cat II, it will be coordinated with the safety office." TDs generating a DR should also coordinate with SE to re-assess the overall risk of continued testing. Deficiency report categories are:

- Category I: A report of a deficiency which if uncorrected, would cause death, severe injury, or severe occupational illness, or if

uncorrected, would cause major loss or damage to equipment or a system, or; directly restricts combat or operational readiness.

- Category II: A report of a deficiency which does not meet the criteria of a CAT I or is attributable to errors in workmanship, nonconformance to specifications, drawing standards or other technical requirements, or; is required for tracking by agreement of the SM and the using command DR Point of Contact, or; identifies a problem for potential improvement through the following forums: Product Improvement Working Group or Vehicle Improvement Working Group, or identifies a potential enhancement (applies to enhancements noted during the acquisition/sustainment cycle).

4.11.1 Deficiency Reporting Procedures

AFOTEC ensures the procedures required to support the DR process during operational test are defined and practical. Some of the procedures that should be determined are:

- How is the INFOCEN database used? What training is required?
- What format is used for reporting? When?
- How are the DRs actually sent? Where?
- Who are the screening and action points?
- What are the required boards? When do they meet?
- How are DRs prioritized?
- How are DRs required to support specific evaluations?

All test team members should be familiar with the DR process. Remember, INFOCEN is an unclassified system - it cannot accept classified or restricted (source selection or competition sensitive) information.

4.11.1.1 INFOCEN Database

Reporting procedures outlined in T.O. 00-35D-54 require that DRs for Air Force programs are entered into a central database (GO21) maintained by HQ AFMC/EN. Complete information can be found on the Internet at https://infocen.wpafb.af.mil/infocen. In the event the implementing command has obtained a waiver to not use the INFOCEN database (reference T.O.-00-35D-54), the AFOTEC TD ensures the deficiencies identified during the OT&E will be entered into the SPO developed and approved database. Deficiency report submission has been streamlined with the use of the Deficiency Reporting Entry and Mail System (DREAMS). Test teams can make automated submissions, via email, in either a Microsoft Word based system (DREAMS) or Microsoft Access based system (DREAMS II). Both DREAMS versions facilitate DR submission with the use of templates. Deficiency reports entered into

the INFOCEN database have a Report Control Number (RCN). Each RCN is composed of three essential parts: (1) the Department of Defense Activity Code (DODAAC) for the organization submitting the DR; (2) a two-digit calendar year identifier followed by a four-digit sequence number; and (3) an alphanumeric description assigned to the activity. Below is an example of a RCN for AFOTEC generated DRs:

RCN FA9107010001 TMQ-43 IOTE

The first part of the RCN (FA9107) is the DODAAC for AFOTEC and is used on all DRs submitted during the IOT&E. The second part of the RCN (010001) is the two-digit calendar year (01) when the deficiency was identified followed by a four-digit sequence number, 0001 since this was the first DR submitted. The last part of the RCN is an alphanumeric description assigned to the activity (system under test and type of test, i.e., TMQ-43 IOTE).

4.11.1.2 Originator

The originator is normally a test team member (either DT&E or OT&E) who discovers a deficiency and reports it to the originating point (either the TD or designated representative). During T&E, this includes deficiencies of items under warranty if the item is part of the system under test.

4.11.1.3 Originating Point

The originating point is the TD (or designated representative) who has overall control of the system under test. During combined testing this is normally the test manager from the RTO.

4.11.1.4 Action Point

Appointed by the HQ AFMC SM, the action point has overall management responsibility of the DR process. The action point is normally a member of the SPO. The action point determines the overall process needed to ensure all DRs from a system are reported and placed into the INFOCEN database. The action point is the interface between the support point and the submitting organization. The support point is the activity that assists the action point in processing, investigating and resolving a deficiency.

4.11.1.5 Watch Item Tracking (WIT)

The test team uses the WIT system to track all potential deficiencies that do not warrant immediate reporting as DRs and provide for their validation. For traceability, the team maintains a complete history of essential details. Not all deficiencies are reported as DRs. Watch item

validation occurs when sufficient and proper information is provided to show the condition warrants reporting as a DR. A watch item becomes reportable as a DR after it is staffed and validated by the Test and Evaluation Deficiency Review Board (T&E DRB). Watch items are normally for internal test team use only and are not to be released during testing outside the test team or its parent test organization.

4.11.1.6 OT&E Single POC for DRs and Watch Item Tracking (WIT)

During combined testing and MOT&E, it is highly recommended that the AFOTEC test team members send all WITs and DRs to the AFOTEC TD or designated representative. In this case, the AFOTEC TD (or designated representative) is technically the originating point and should perform all functions of the originating point. This ensures the AFOTEC TD maintains visibility over all problems noted by the test team.

4.11.2 Test Director Responsibilities in the DR Process

The AFOTEC TD should be aware of all deficiencies noted on the system under test. The provisions of T.O. 00-35D-54 delineate how to establish an account and access DR information. Before test, the TD should review all deficiencies noted to date. This helps scope problem areas and lessens the possibility of submitting DRs on problems already identified. Consult SE for actions required to close a safety-related DR. During the test the TD may not be aware of deficiencies sent directly to the action point which were (1) noted by the contractor, or (2) submitted on systems that are already fielded. A periodic review of the INFOCEN database should be established to ensure the AFOTEC TD is aware of all deficiencies.

4.11.3 T&E DR Board (DRB)

The T&E DRB reviews WITs, which may become DRs, determines the initial prioritization of DRs, and reviews the status of released DRs. The T&E DRB is convened by the DT&E/OT&E originating point, chaired by the DT&E/OT&E leads, and staffed by test and evaluation personnel. To ensure a maximum interchange concerning WIT and DR actions and issues, the SM and operating commands may attend. The supporting and participating commands, and system contractor personnel should attend. AFOTEC is a member of the T&E DRB until all AFOTEC testing is completed. Once AFOTEC is no longer involved in a program any active DRs are transferred to the operating commands for tracking and prioritization.

4.11.4 DR Prioritization

Prioritization begins no later than the start of DT&E and continues as long as any test and evaluation is being conducted. All Category (CAT) I

and the top ten CAT II DRs from the T&E DRB prioritization list are briefed to the decision authority at each milestone decision, and at all AF System Acquisition Review Council (AFSARC) program reviews (refer to T.O. 00-35D-54 for definitions of CAT I and CAT II DRs). Since most of the members of the T&E DRB, JRMET, and Materiel Improvement Project (MIP) Review Board (MIPRB) are often the same, it may be advantageous to hold these meetings consecutively. The T&E DRB, JRMET, and MIPRB perform distinct processes and even though the meetings can be held consecutively, they should be held as separate meetings to preclude each distinct process from being diluted.

4.11.4.1 DR Prioritization Techniques

A number of DR prioritization techniques are available, and selection is based on individual program requirements. The method used depends on variables such as type, complexity, and length of test. The most commonly used by AFOTEC are the deficiency analysis ranking technique (DART) and roundtable or committee techniques. Roundtable and committee prioritization sessions are informal or formal meetings where DR ranking consensus is reached through discussion and agreement by all representatives. The DART process is a structured effort and is explained in the following paragraphs.

4.11.4.2 Deficiency Analysis Ranking Technique (DART) Process

Method. The DART process is tailored to the specific requirements of the system under test. It can combine various quantitative analysis techniques to establish the final rank order of DRs. These methods use quantitative analysis techniques to estimate the impact of each identified DR on a specific parameter (e.g., sortie generation rate). DRs can then be prioritized and grouped according to their estimated impacts, and the final weighted values can be included in the overall DART process.

Scoring Variables. First, the T&E DRB members determine what the pertinent variables are, and assign a value (weighting factor) based on its relative importance. Each T&E DRB member assigns a score of 0 to 10 for each variable as it relates to the DR based upon adverse impact. The scores from each variable of the DR are averaged, and the resulting averages are multiplied by the assigned weighting factors. The overall score is obtained by summing these weighted average scores for all the variables. The following variables may be considered in the DART process (full definitions are found in T.O. 00-35D-54):

- Logistics
- Operations Effectiveness
- Safety

- Operations and Support
- Other

Scoring Variable – Logistics. A variable based on either a simulation model or on maintenance effectiveness can be used. For the simulation model variable, the estimated impact is converted to a scale of 0 to 10 to make it compatible with the other DART variables. Maintenance effectiveness is a subjective estimate of the combined impact of the DR upon manpower, RAM, and spares.

Scoring Variable – Operations Effectiveness. This variable is an estimate of the DR's impact on the operation or performance of the system or the effectiveness of the system's operator.

Scoring Variable – Safety. This variable is an estimate of the potential for injury to personnel or damage to equipment. To score this variable, a definite adverse safety potential must be identified for operations or maintenance (if applicable, both ratings are combined for a score). MIL-STD-882 and AFI 91-204, *Investigating and Reporting US Air Force Mishaps*, provide risk assessment categories for DART scoring.

Scoring Variable – Operations and Support (O&S). This variable is an estimate of the DR's relative impact on the cost to operate and support the system. This score is based on the increase or decrease in the O&S cost attributed to the identified DR. This variable is difficult to identify early in a test and should be included only when reliable cost data are available or can be accurately projected.

Scoring Variable – Other. Estimated impacts not listed above may/may not be used. To score other variables, a definite impact must be defined.

Scoring Process. This is the most important part of the ranking process. Each DR must be scored on its own merit and not in relation to any other DR. The scorer must maintain the same standards throughout the scoring process. For example, if the individual scores for a variable have a range of 5 or more, the lowest score is 2 and the highest is 7, the variable will be rescored after discussing the reasons for the different scores. The final DART scores can be used to rank order DRs, either individually or in groups.

Impact Summary. Once the DRs are rank ordered, summarize the impact (using the scoring variables) of the top DRs upon mission performance, system performance, and the test program. Retain this summary for placement in the OT&E final report.

4.11.5 Material Improvement Project Review Board (MIPRB) Process

The MIPRB manages the resolution of MIPs and associated DRs. During test and evaluation, this process is used to close all material improvement projects (MIP). If the MIPRB cannot meet in person, the intent shall be maintained. MIPRB activities include evaluating recommended resolutions, providing direction for additional required actions, and reviewing all DRs and categorizing them. The action point ensures all actions are annotated in the appropriate INFOCEN database. Closure of all CAT I and high priority CAT II DRs agreed to by the TD will be forwarded to senior-level management within the test agencies. Disagreements with MIPRB actions are elevated to the next highest level (e.g., product/logistic center/CC, RTO/CC, AFOTEC/CC).

4.12 Test Readiness Review (TRR)

This briefing, normally given by the test team 30 days prior to test start, provides the status of the program to obtain approval from the AFOTEC/CC/CV, or designated approval authority, for test start. A technical review with the CA may be required prior to the TRR to discuss data evaluation/reporting topics (see paragraph 4.2.1). A complete draft final report outline/strawman should be ready for review at the TRR briefing. When scheduling the TRR briefing, ensure that TS, AS, SE, XP, XO, CA, and CN are invited, and attempt to schedule the meeting with enough lead time so invitees (or their representatives) may deconflict their schedules to attend the briefings. Provide read-ahead copies of briefing slides to the invitees, preferably a few days before the scheduled briefing. Before presenting the briefing to the AFOTEC Commander and staff, the test team pre-briefs XO, CA, XP, TS, and SE to obtain approval to proceed. Coordinate all draft briefings being presented to the CC with the CAG. An electronic copy of the briefing is maintained on the MIN. Direction and agreements of the TRR should be documented. The TRR should address the readiness to proceed with testing for Information assurance, E3, and interoperability as well as compliance with AFMAN 63-119. The comprehensive format for the TRR briefing is on the MIN (see attachment 4) and includes such areas as:

- Introduction
- Program Overview
- Operations
- Evaluation Framework and OT&E Methodology
- Testing to Date, to include certification status
- Readiness for Test Execution
- Other Significant Information

4.12.1 Certification of System Readiness for OT&E

The transition of sending a system from DT&E to dedicated OT&E has historically been risky. Sending a system into OT&E before it is ready could, at the extremes, waste test money or cause the entire system to be canceled. Use of AFMAN 63-119, Certification of System Readiness for Dedicated OT&E templates, is recommended for this certification. AFMAN 63-119 provides a structured mechanism for dealing with these risks. This manual contains templates that form a matrix of interlocking subject areas spanning an entire acquisition program. These templates, when used on a program, are part of the process to certify a system is ready for dedicated OT&E. Use of the certification process is mandatory for reviewing all ACAT programs. However, the templates are not directive and do not supersede existing acquisition guidance. They should be tailored based upon the level of risk associated with the acquisition program.

The templates are flexible, and allow for application to any acquisition program. While all the attachments in AFMAN 63-119 will be considered, attachments 8, 15, and 19 are critical to successful OT&E and apply to all programs. Attachment 8 specifies that the system must *demonstrate readiness for dedicated OT&E in its intended operational environment* using CONOPS strategies and plans. Attachment 15 specifies that *sufficient operationally relevant Developmental Test and Evaluation (DT&E) must be done* before dedicated OT&E begins. Attachment 19 is the foundation to define (for each program) what the *production-representative article* means. Test teams should have early and continuous dialogue with the SPO and the DT community to accomplish the requirements addressed in the templates. AFOTEC ensures any deviations from a true production-representative article are identified and scrutinized for potential limitations to the OT&E.

Test teams are required to annotate the requirement for the SPO and the developmental testers to comply with the templates in AFMAN 63-119 in the TEMP part IV, and advocate for inclusion in part III. If a program does not have a TEMP, test teams define the requirements through the T&E Integrated Product Team, and complete a MOA or other written agreement, that stipulates completion of the templates as part of the DT exit criteria. In order to avoid surprises to the SPO, DT community, or the AFOTEC/CC, to help the SPO produce a quality system, and to reduce the number of “stop test” actions, test team members need to continuously remind the SPO and DT community that AFOTEC expects compliance with, and completion of, the AFMAN 63-119 templates described here. TDs elevate compliance problems to the Det CC (and the AFOTEC XO, CV, and CC as appropriate) as early as possible to resolve OT&E issues. Test teams brief senior AFOTEC leadership on

the status of these templates during the TRR. For multiservice OT&E programs where the AF is not the lead service, AFOTEC uses the templates provided by the lead service.

The SM provides a briefing to the PEO or DAC who must certify the system ready to enter the dedicated phase of OT&E. The TD, at a minimum, represents AFOTEC at the certification briefing. Preparation for OT&E should include frequent communication between the test team and AFMC. Both AFOTEC and AFMC must be satisfied the system being tested is mature enough to progress into OT&E and the logistics support infrastructure (e.g., technical data, support equipment, spares, training, facilities) exists and is operationally realistic.

4.12.2 Certification Acceptance or Non-Acceptance Memo

The AFOTEC Commander acknowledges the certification message and should "accept" or "non-accept" the system before commencing dedicated OT&E. The acceptance memo (non-acceptance memo) officially confirms OTA agreement (or disagreement) with the certifying official's assessments and conclusions, and the memo concurs (or non-concurs) with the decision to begin dedicated OT&E. The certifying official's message and the AFOTEC Commander's acceptance/non-acceptance memo become the de facto corporate Air Force decision to proceed or not with dedicated OT&E.

4.12.3 Acceptance or Non-Acceptance Memo Contents

In drafting the acceptance/non-acceptance letter, consider the system's state of readiness for OT&E, the availability of resources necessary for the conduct of the OT&E, and if operational effectiveness and suitability can be successfully evaluated. Also, discuss the impacts of any unresolved issues, caveats, limitations to test, or waivers in the certification message that bear on the decision to proceed with OT&E. Following the Commander's signature, the acceptance/non-acceptance memo will be sent, as a minimum, to SAF/AQ, AF/TE, the PEO, DAC, PM, HQ AFMC/DO, and the user(s).

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Chapter 5 OT Execution

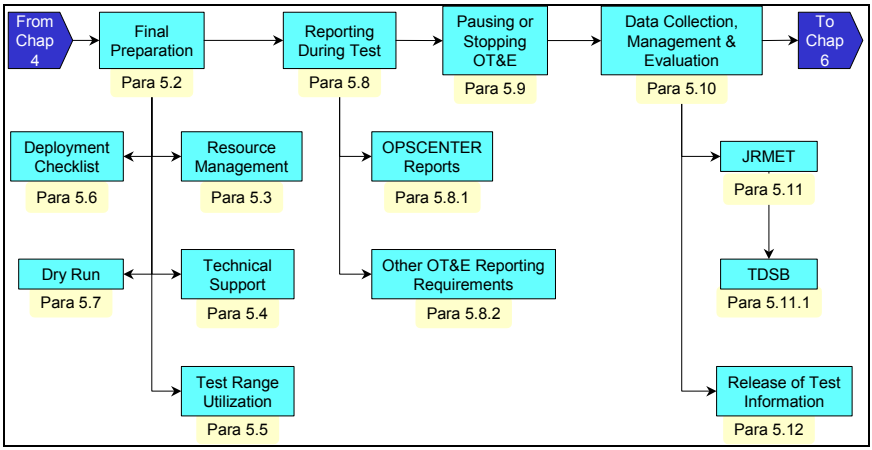

Figure 5.1. Test Execution Overview

5.1 OT Execution Introduction

Typically, OT Execution begins with the AFOTEC/CC or the designated approval authority go-ahead received at the TRR (see figure 5.1). This chapter discusses those activities expected to be accomplished during test execution: resource management, deployment checklist, dry running the test procedures, final preparation before starting test, actual test execution, data management during execution, MIN OPSCENTER reporting requirements, formal OT&E reports during execution, and other considerations during test execution. Any modifications to the test program resulting from changes made during the final execution planning should be reflected in the program's OTPM test program network. The Det/ST PMA assists the TD in revising and loading the OTPM network on the local server to ensure the most current information is available across AFOTEC. Throughout these various activities, test teams have the opportunity to identify areas of improvement in the way a process is executed or a product is developed (see paragraph 1.11.9). AFOTEC ORM tools are used throughout the execution phase (see figure 1.7).

5.2 Final Preparation

At the TRR, the TD certifies readiness for test and requests permission to enter the test execution phase. The execution of the test is the culmination of all of the test planning accomplished to date. **The previous chapters in this pamphlet need to be read first in order to ensure any questions on test planning have been addressed.** The test team should be involved in the test planning process as early as possible. It will help lay out a game plan that will take the test through

each of the required steps, result in valid test data collected to answer the COIs, and support presentation of the results in a clear, concise manner for the decision makers. Delays in entering the OT execution phase should be reflected as a change in the Target Finish Date in the OTPM test program network.

Experience has shown that formal walk-throughs and dry runs of the scenarios/data collection procedures, which include reviewing the data collection forms/questionnaires, are required for successful test execution. This minimizes surprises, since all of the test execution processes will have been exercised. Additionally, coordination with SE ensures all safety and environmental issues are considered.

The test team should understand that a successful test is the shared prize, and they share the "lead" and "support" duties with the DT community based on the situation. Early on, discuss the "shared" responsibilities and possible mediation methods if problems arise. The surest way to lose credibility and bring a test to a standstill is to not present a unified front to customers and support agencies. A healthy and open relationship with the user and developer makes for robust test management, facilitates the exchange of ideas and allows problem resolution at the lowest level (see *Test Data Sharing* in paragraph 5.12.1). Share phone calls, correspondence, trip reports, and meeting minutes regularly. The test team should never assume information received was also received by a counterpart.

5.2.1 TD Test Execution Preparation

The TD briefs all test participants (AFOTEC-assigned, MAJCOM-provided, and other support personnel) and observers on the guidelines for the test. The guidelines should establish the roles, responsibilities, and rules of conduct that they must follow during test execution. The TD needs to establish good communication channels (formal and informal) with the test team and other interested parties who will need to be kept abreast of test progress (e.g., MAJCOM focal points, HQ USAF/TE, the program element monitor (PEM), the SPO, and DOT&E). If the test team should have any controversial test issues, they need to be especially prepared to discuss them and recommend work-arounds, because any questionable test methodologies or results will be reviewed thoroughly and could adversely affect the results of the entire OT&E. DOT&E occasionally sends members from their general support contractor, IDA, to visit high-interest test teams on-site to review such items as test plans, procedures, and data management.

5.2.1.1 Personnel

The TD remains cognizant of the status of test team personnel during the execution phase of OT&E. The team should be staffed per the requirements identified in the TRP (see paragraph 2.6). MAJCOM assigned augmentee personnel serve at the direction of their owning command, and the TD maintains an awareness of their assignment vulnerabilities. This, of course, holds true for the TD's own assigned personnel as well.

5.2.1.2 Establish Guidelines

The TD is responsible for establishing guidelines that clarify the roles, responsibilities, and rules of conduct that test participants and observers must follow during test execution. All test participants and observers must be aware of and understand any guidelines that have been established, either at an executive or test management level, for use during test conduct. Considerations in establishing the guidelines are contained in Public Law (US Code, Title 10), as it relates to contractor involvement (section 2399), who is/is not a "prime" contractor, and individual duties of all participants involved in test execution. Before the test start, the TD briefs all test participants and observers on the established "guidelines" and ensure the guidelines are read and understood by all test team members, especially those team members who are working shifts or are working at geographically separated sites.

5.2.1.3 Establishing External Points of Contact

In addition to formal communications, the TD should open informal channels of communication with MAJCOM focal points, HQ USAF/TE, the PEM, the SPO, and the responsible air logistics center. Before combined testing, the TD should establish an effective relationship with the DT&E TD and contractor's TD. The OT&E TD ensures the data collected during combined testing is suitable for OT&E use and the operational requirements are properly addressed. Contractor involvement is often an issue with data collected during combined testing because of the different degree of independence between developmental and operational testing.

5.2.1.4 Mission Management

The TD is responsible for day-to-day mission management. If more than one test location is used for a mission, the TD should ensure that a designated representative is present at each location. Since test missions and test support resources are valuable assets, the test team optimizes resource use during test events. Only the TD or a designated alternate should cancel missions. The TD reports any catastrophic or critical test failure which could impact continuation (stoppage or

decertification) to the Detachment, who in turn notifies AFOTEC/XO/CV/CC and, as applicable, AFMC/DO, and appropriate headquarters focal points. Such reporting is accomplished within 12 hours via telephone with a follow-up status report. The report includes the current status of test as well as recommendations as to what course of action to take for the remainder of test (e.g., restart test, modify test procedures, end testing).

5.3 Resource Management During Test

The elements of resource management for the test team do not change during test execution, but the hectic pace dictates the TD pay special attention to certain areas. It is important to rely on the resource manager/financial analyst during this time. This allows the test team to devote more time on test events and analysis activities. Resources used to support test execution are reflected in the OTPM test program network. Resources are considered dedicated to test execution and are generally unavailable for reassignment until the test is completed.

TRP Revisions: TRP management is a continuous process, not a one-time event. TRPs are updated, approved, and distributed by December and June each year when a test is scheduled to occur within two years, otherwise once a year is sufficient. TRPs must be signed by Detachment Commanders and be coordinated with the appropriate MAJCOMs, Users, and SPOs whenever they are revised.

5.3.1 Funds Management

The TD, resource manager, and financial analyst track the funding levels in all established accounts. It is very easy to over obligate the travel account with numerous TDY orders being processed for test team augmentees and deployments. The test range account can be quickly depleted with unprojected flight test events and without proper management attention it may not be apparent for months that the account is in the red.

5.3.2 Government Purchase Card (GPC)

The GPC is useful for local purchase of common supply items required for the test team. Avoid use for unnecessary/unauthorized items. Improper purchases with the GPC are violations of law, which could result in punishment, personal repayment of charges, and cancellation of the credit card. Do not hesitate to call the Detachment financial management personnel or the Comptroller to get a financial ruling, if an unusual emergency situation occurs. If you have questions concerning the use of the GPC, call the GPC Program Manager in RMC.

5.4 Technical Support

Contractor personnel are part of the test team but they cannot be directly tasked by the test team beyond the scope of the delivery order. On-site manager or home office officials provide contractor personnel direction based on the work specified in the approved task order. The Contracting Officer and RMC can provide verbal direction to the contractor, if an emergency situation occurs during test execution. However, an amendment to the original task order must follow to officially document the new work on the program (see paragraph 1.11.10).

5.5 Test Range Utilization

Flight test scenarios on a test range are very expensive because the program is paying the costs for the complete mission configuration and post-scenario data processing. Funding on the range's Job Order Number account covers the original test sortie profile. Remember, any changes in range configurations and re-tests will quickly deplete the "test range" bank account. Also, the test team needs to keep accurate records on range activities. Test range cost summaries are extremely slow, so months after flight test events are over the TD needs to ensure charges are accurate.

5.6 Deployment Checklist

If the test plan calls for deploying to a location separated from the test team's home base, it would be advisable to develop a checklist of items that need to be accomplished prior to the deployment. Figure 5.2 presents an example deployment checklist.

5.7 Dry Runs

The importance of dry runs cannot be overemphasized. The plans for the Dry Run must be discussed at the TRR. Dry runs should be configured exactly as "for score" missions would be configured (e.g., with the same aircraft, systems and personnel). They should take place far enough ahead of "for score" testing so test procedure fixes/changes can be implemented. Even if the test team is using test procedures from an earlier phase, system changes could cause modification to the data collection and analysis system. Data collection and processing should be run exactly as they would be in "for score" testing to ensure data is being collected and processed correctly, this enables exercise of data tools ahead of time and allows for tuning as necessary. Changes in equipment configurations, software, operational procedures, approval authorities, program schedule, personnel, inevitably occur. Allow extra time for these changes so test procedures can be modified and dry runs can be reaccomplished, as required. Baseline for data collection begins

Example Deployment Checklist

	Action Yes	No
Test Execution approved by TRR		
NEPA memo signed by SE		
Safety Annex approved		
Master Requirements Document in place		
Equipment and supplies inventoried and packed		
Transportation and shipping arranged		
En route and field communication plan and procedures established		
Personnel control procedures		
Billeting and messing plan		
Test team safety and deployment brief complete		
MIPR or equivalent accepted by AFOTEC/RM		
GPC cardholder identified		
GPC monies allocated		
Contract Support in place		
Monies allocated to DOs and Forms 9 completed		
Field emergency procedures developed		
Communications means		
Hospital location and phone numbers		
Transport procedures		
Location of first aid kits		
MEDEVAC procedures and call signs		
Reporting channels identified and prepared		
Date and time of first in-field team brief and/or meeting established		

Figure 5.2. Example Deployment Checklist

once any issues are worked out. Data collected during dry runs can be used for analysis and reporting if the dry run shows that no changes are necessary. A discussion of data collection and management follows later in this chapter.

5.8 OT&E Reporting During Test

The Det/ST is responsible for ensuring that all reports (e.g., MIN OPSCENTER, activity, status, significant test events, annual, and interim summary) are timely, factual, concise, complete, accurate, and balanced. TDs should be acutely aware of their responsibility to keep AFOTEC leadership apprised of test direction during the course of the evaluation. Significant concerns should be addressed to ensure that AFOTEC senior leadership is aware of any potential controversy that could surface with the final report. Examples of “controversy” are any rating that is less than a fully “effective” and “suitable,” significant problems identified in the OIA, or any other issue the TD and Detachment Commander/Director feel warrants AFOTEC senior leadership attention. The established reporting process via the MIN provides an avenue to ensure the command section is kept informed of test status; however, in some

cases, direct communication may be required to provide AFOTEC senior leadership with test program feedback, and the expected direction of Operational Test results. If necessary, the TD coordinates with AFOTEC/XOO to establish a meeting/VTC/telephone conference with the XO, CN/CA, CV, XP, AS, TS, Director/Det CC and Technical Advisor. Discussions could include Effectiveness/Suitability and OIA proposed conclusions, as well as any noteworthy issues that may require the Commander's attention.

5.8.1 MIN OPSCENTER Reports

This is the automated means for communicating up the chain of command and keeping the appropriate offices informed of test program progress. TDs should use the MIN reporting option on a regular basis and as appropriate for test status information dissemination. Procedures for submission of Ops Center Reports via Microsoft Outlook and the MIN are contained in the following paragraphs. Table 5.1 summarizes the available OPSCENTER reports. For further information please check the Test Management Training Manual on the MIN (see attachment 4).

Table 5.1. MIN OPSCENTER Reports.

Report Title	Purpose
OPEVENT Report	An OPEVENT report is submitted whenever sufficient detail is available to adequately inform commanders of upcoming significant events.
Daily Report	For deployed operations, daily reports provide daily summaries of test related activities, to include negative reports indicating nothing significant to report (NSTR).
SITREP	Flash reports alert the AFOTEC commander of significant occurrences involving AFOTEC programs, personnel, or resources as soon as possible. Any injuries to test team members or damage to test equipment should also be reported to AFOTEC/SE.
Document Schedule	Document schedule reports inform commanders of significant dates for publishing AFOTEC reports and are submitted whenever sufficient detail is available

5.8.1.1 Ops Center Submission Guidelines

On-Site requirements and off-site requirements differ only in the manner an end user connects to the standard AFOTEC mail system. Off-site submissions require the use of a modem and the ability to obtain and send specific Microsoft Outlook Forms.

Network Account Requirements (unclassified only):

- AFOTEC Domain Account
- RAS Account (Off-Site)
- AFOTEC E-mail Account

Off Site Pre-deployment Checklist:

- Test laptop dialup connectivity before departing the local area.
- Users should optimize e-mail account prior to departure. This entails cleaning their inbox and setting up the inbox assistant to forward large messages to a personal folder while they are TDY. User should synchronize e-mail account prior to departure, if offline folders are used.

Off Site Connection Procedures:

- Dial Up RAS Server and Log on to Network.
- Launch Microsoft Outlook and Synchronize Folder.
- Or Launch Webmail via Internet Connection, if available.

OPCENTER Form Submission Procedures:

-------For both Off-Site and On-Site Submissions ----

- Select OPCENTER Form from Organizational Forms.
- Fill out form. Attach documentation as appropriate. (Off-Site – The transmission of large attachments across phone lines will always be an issue. If report requires numerous attachments (10 or more) split up the submission using two forms.)
- Send form using mail "send" button.

5.8.2 Other Report Requirements

5.8.2.1 Activity Report

An activity report addresses and provides immediate feedback on specific test events and is internal to AFOTEC. Activity reports document the OT&E progress to the managing director/detachment CC. The director/detachment CC passes on selected information to other AFOTEC staff, participating agencies, and the program office. After internal coordination, the responsible director/detachment CC has approval authority for release of information in these reports to outside agencies. Depending on the significance of the issue, the director/detachment CC should consider CV or CC approval before external distribution. For activity reports on significant events, coordination must not delay the submission of the significant event report beyond 24 hours of the event. The requirements for format, submission frequency, content, and distribution of activity reports will vary by

program and should be defined in the OT&E plan. It may be useful to design the report format to allow telephonic "fill-in-the-blank" transmission.

5.8.2.2 Status Report

A status report provides periodic updates and important test findings during OT&E. Usually, a status report is in the form of a letter or message, and its format and content are flexible. It may be periodic (monthly, quarterly, or as required) or be associated with specific (planned test) events. The OT&E plan states the frequency and distribution for the status report. Status reports document the periodic OT&E progress, and the responsible director/detachment CC passes on selected information to other AFOTEC staff, participating agencies, and the program office. Depending on the significance of the issues, the director/detachment CC should consider CV or CC approval before external distribution. Status reports normally include the following:

- A summary of test events attempted, completed, and scheduled for the next reporting period.
- Important factors hindering or assisting successful test conduct.
- Management action being taken or required.
- Significant visitors, TDYs, meetings.

When a test team is at the test location before active testing, status reports should highlight management actions taken or required for successful completion of the test once it begins. Approximately each quarter during the test (or as agreed to with the director/detachment CC), the TD should submit an expanded status report that gives a comprehensive view of the overall progress of the OT&E. This report should include a cumulative review of accomplishments, milestones met, a discussion of operational effectiveness and suitability results, deficiency reports (DR) submitted, along with their status and priority, future test events, projected/anticipated test changes, and problems (solved or unsolved). Problem discussions might include data analysis problems, personnel considerations, logistics, status of test equipment, etc. Discussion of the results should focus on issues the TD plans to include in the final report and should contain only facts. Avoid conclusions and recommendations unless they relate to stopping tests or adding new reporting of early test data. Expanded status reports are not normally required for OT&Es of short duration (6 months or less). A copy of each status report should be distributed to AFOTEC/HO for historical documentation.

5.8.2.3 Significant Event Report

This report includes important details about test events that are defined by senior test management in the TEMP as significant (such as missile launches or live firings). Factors to consider when determining major test events include political sensitivity, public interest, etc. Submit a copy of the internal Air Force report to HQ USAF/TE (for forwarding to OSD) within 24 hours of the events. In addition, for significant test events on OSD oversight programs, a copy of the activity report must be provided to DOT&E and USD(AT&L) within 24 hours of the event by AFOTEC.

5.8.2.4 Annual Report

For test execution phases longer than 1-year, an annual report should be submitted to AFOTEC/CV for relay to HQ USAF/TE and DOT&E. DOT&E may use this report to prepare the annual report to the Congress. If necessary, DOT&E may task HQ USAF/TE to provide program-specific information. In addition to HQ USAF, may request reports to support a major program decision. In all cases, these reports are coordinated and approved by CC before distribution. Include a copy to AFOTEC/HO for inclusion in the OT&E Data Bank.

5.9 Pausing or Stopping the OT&E

If, despite the best collaborative efforts with the SPO and developmental testers, a system's dedicated OT&E must be paused or stopped, this section describes how AFOTEC complies with the requirements of AFMAN 63-119 in declaring that "pause test" or "stop test" event. It addresses how to decertify the system should OT&E have to be stopped; and how to accept the system, once the SPO has fixed the problems that caused the stop-test action and the SPO has recertified it as being ready (again) to enter dedicated OT&E. Test Pause, Stop Test, and Recertification will require modifications to the OTPM test program network. The modification may be as simple as an adjusted Target Finish date or as complex as a partial rework of OTPM test program network tasks.

5.9.1 Pausing the OT&E

There may be occasions that, despite the developer's best efforts, require some form of intervention short of a formal "stop test and decertification." In these instances, a pause in the operational testing may be warranted. The decision to pause the operational testing should not be made lightly and must not be undertaken without appropriate consultation between the TD, the Det CC or Director, and the XO. In addition, there needs to be an ongoing dialog between the acquisition leadership (PEO, Program Office) and the Test Team/Detachment senior leadership prior to the declaration of a pause in the OT&E.

5.9.1.1 Decision Timing

The decision to declare a pause in the operational testing should take into account the timing of where the operational test is in relation to the decision supported by the results of the operational test and whether or not the problem that caused the pause can be fixed in a reasonable amount of time (i.e., the pause and resulting corrective actions cannot jeopardize the decision being supported by the OT&E). If the OT&E is an MOT&E with AFOTEC as the lead OTA, AFOTEC coordinates with the other OTA(s) in making the decision to pause the operational testing. (Note: Pausing a multiservice OT&E may not be an acceptable option to the other OTA(s) and a formal "Stop Test" may be required.)

5.9.1.2 Pause Considerations

If the pause is declared in order to allow the developer to make fixes to the system, the proposed fixes should be examined very carefully to determine the impact on operational testing already completed, future operational testing, and the overall risk assessment. If a pause in the operational testing is declared, appropriate reporting (Significant Event Report, Status Report) occurs so that AFOTEC leadership and appropriate external organizations are made aware of the situation (see paragraph 5.8). The need for multiple pauses may indicate an unstable system configuration and the TD may want to consider a formal "Stop Test."

5.9.1.3 Restarting after a Pause

Following the decision to pause the OT&E, the TD, in consultation with the Det/Dir, establishes criteria to restart the OT&E. A formal TRR is not required prior to restarting the OT&E after pausing, unless the Det/Dir or HQ AFOTEC requires one. If a TRR is required; the TD should re-assess the overall risks with their safety core team member early enough to reconvene the ES&H certification board if needed. The TD and the Det CC/Dir should understand the impacts of any changes to the system configuration made by the developer, and be confident in the system's ability to complete the remainder of the OT&E.

5.9.2 Stop Test and Decertification Actions

There may be occasions when systems may fail to perform as planned, and continuation of OT&E would not be in the best interests of the government. In these cases, either the AFOTEC Commander or the certifying official has the option to decertify the system and return it to the PM for corrective action. If circumstances warrant, and a decision to stop operational testing is contemplated, the TD should immediately consult with the AFOTEC chain of command in order to determine the

appropriate course of action. If safety problems are observed during operations or maintenance activities that endanger personnel or could damage equipment; the TD will pause the test during discussions considering stop test/decertification. In addition, there needs to be an on-going dialog between the acquisition leadership (PEO, Program Office) and the Test Team/Detachment senior leadership prior to the "stop test" declaration. If the OT&E is an MOT&E, and AFOTEC is the lead OTA, the other OTA(s) need to be included in the discussion leading up to the "stop test" declaration for the operational testing. Once a decision to stop the operational test has been made by the AFOTEC Commander, the TD prepares a "stop test – decertification" message. The following guidelines apply for preparing that message:

- The draft message should be sent to the AFOTEC command section, via e-mail, within 24 hours of stopping the test. After the commander signs, it is sent to SAF/AQ, AF/TE, the PEO, DAC, PM, HQ AFMC/DO, and the user(s).
- In the message, the AFOTEC Commander decertifies the system and returns the system to the PM for appropriate corrective action. The decertification must explain clearly why the system is unable to complete the OT&E.

5.9.3 Recertification

Before AFOTEC resumes dedicated OT&E following decertification (whether it was the PEO or the AFOTEC Commander who decertified the system), the certifying official certifies the system again via message after appropriate corrective actions have been taken by the SPO or other responsible party. The applicable certification templates should be revisited and updated, as necessary, to provide the latest information on the system for future certification reviews. As with the original certification process, AFOTEC should be involved in the recertification process so that the results of the recertification will not be a surprise, and will be favorable, well before the next AFOTEC TRR. Following the recertification process, a Certification Message is sent and the system must once again be accepted for restarting the dedicated OT&E. The same guidelines for the original acceptance/non-acceptance memo apply for a recertification.

5.10 Data Collection and Management

5.10.1 Data Management

Collection and use of data is the key to a successful test program. Design data management procedures to assist in the test execution and reporting task by means of sort and print routines for direct inclusion of

data into the required reports. Formatting the descriptive statistical data in plots or histograms is readily accomplished. The test team should ensure the plan for data collection and analysis has been implemented before testing begins. Those data management procedures should be shown in the DMAP (when required) or a similar document. The DMAP or equivalent document outlines in detail all collection, analysis, procedures, quality, and quantity of data required to complete the OT&E (OUEs, EOAs, OAs, all OTs). The test team should understand this document. To avoid data losses, non-repeatable test events are scheduled only after the plan has been through a full dry run. The deputy for analysis/data manager can use a data status matrix (table 5.2) to spot trouble areas and judge the impact of the loss of a data source or test asset. The TD should:

- Schedule full-scale dress rehearsals (dry runs) of the data collection and reduction system. This is scheduled far enough in advance to allow any changes to be made before testing starts.
- Understand data may be available from several different locations (telemetry site, aircraft, radar site, etc.). The method of correlating these data should be rehearsed to ensure the time reference is compatible.
- Ensure data collectors are able to operate instrumentation packages such as aircraft instrumentation or telemetry receiving systems.
- Ensure computer resources are available and functioning properly before testing.
- Ensure participants on the JRMET know their respective roles and are familiar with the data usually presented at JRMET meetings. At least one JRMET meeting should be held before testing begins. Several JRMET meetings may be required to properly plan and dry run the JRMET process (recommended) before testing starts.

5.10.2 Raw Data Collection

Test teams are responsible for acquiring, reducing, ensuring quality of, and controlling test data. Additionally, they develop plans, procedures, and techniques for ensuring the smooth flow of mission data to those responsible for processing, analyzing, and evaluating data. This process is outlined in the OT&E plan and detailed in the DMAP. The data management procedures describe operation of data control centers, methods of data collection, verification, storage, and information retrieval. During combined test, the OT&E test team ensures that the raw data collected are separately processed, analyzed, and reported to

Table 5.2. Sample Data Status Matrix

Shark versus Thrasher Project				
	Data Status			
Test Events (Code No.)	Number Required	Number Remaining	Number Flown	Number Validated
TARGET DETECTION (1.)	24	12	16	12
Condition A (1.a)	12	10	6	2
Condition B (1.b)	12	2	10	10
TARGET ACQUISITION (2.)	24	10	14	14
Condition A (2.a)	12	7	5	5
Condition B (2.b)	12	3	9	9
*	*	*	*	*
*	*	*	*	*
*	*	*	*	*
SAM LAUNCHES (15.)	40	20	32	24
Condition A (15.a)	20	0	32	24
Condition B (15.b)	10	10	0	0
Condition C (15.c)	10	10	0	0
TOTAL	400	206	321	209

ensure independence from DT&E efforts. The test team develops ways of verifying that the collected data are of good quality and quantity and that they clearly address MOPs, MOEs, and resolve COIs. Raw data are self-documenting; e.g., data formats and data element lists are stored on the same media with the data set.

5.10.3 Data Collection Forms

The TD should ensure that data collectors know how to complete data collection forms. The test team should develop standardized operator logs and terminology, list approved terms on a reference sheet, and explain them in a narrative attached to the form. Early consideration should be given to the impact of the operator's workload on their ability to log test data. A pretest data collector scoring conference can ensure uniform scoring of qualitative data collected by means of observations or checklists. Guidelines for data collection follow:

- Before starting the execution phase, if a requirement exists for special or unfamiliar data forms, the deputy for analysis/data manager ensures data collectors completely understand the purpose and use of the forms.
- Observers and data collectors are identified, trained, and assigned to specific positions for which they are operationally or technically qualified. Proper planning, training, and controlling will minimize errors.
- Permanently assigned test team personnel should evaluate each data collection position and its collection forms during pre-

testing, and revise data collection assignments or forms accordingly.

- A training program may be necessary for TDY personnel. This training is typically conducted before and during the final pre-test rehearsal.
- During testing, a briefing should be conducted each day so each data collector is aware of the previous day's problems and test events scheduled for the upcoming day's test. For those test teams which are split into shifts or are geographically separated, the TD should ensure that all information and materials are issued to the participants.
- On return from the test area, the data collectors should debrief the contents of the completed manual data collection forms and, if applicable, automated data collection devices.
- All information collected during the test sequence or mission is labeled, logged, quality checked, and provided to the analysis section for initial evaluation.
- The test team establishes an acceptable and enforceable data processing turnaround time with outside agencies supporting the test to ensure the data are available in a timely manner. The processed data should be available during the conduct of the OT&E to establish actual progress. These progress checks should be measured against schedule, number of test events, and anticipated results. The results are used to determine if additional testing is needed, re-test is necessary, or if the data collected meets criteria to exit test.

5.10.4 Data Quality Assurance

Data is collected, verified for quality and quantity, logged in, and stored. Additionally, test events are monitored and assigned a status. Detailed procedures on individual responsibilities in these areas are presented in the data management procedures. The TD, deputies, and the operations analyst review data sheets and initial data as soon as they are available to ensure there are no missing data elements.

- First-Level Data Verification. The first level of verification includes inspecting data for content, format, and continuity to determine if:
  - Recordings comply with requirements or whether there are gaps where coverage was specified.
  - Items reflect prescribed events, phases, and recorder start and stop times.
  - Collection flow follows a predicted pattern. If not, ensure all deviations are annotated.

- Second-Level Data Verification. The second level of verification is accomplished when the recorded data are checked against what was expected, to determine if:
  - Data values represent the anticipated range of values for the test.
  - The frequency or pattern of data is representative of what could be expected.
  - Parameters intended to be held constant during the test fluctuate.
  - Data set is self-documenting (i.e., data formats and the data elements list are collocated on magnetic media with the data set).

5.10.5 Data Quality Control

A test team member who knows the operational requirements performs quality control. Before entering data in the database, the operations analyst verifies that the complete set of data has been collected and that the data correctly represent the related variable.

5.10.6 Data Evaluation

As testing progresses, the deputies for operations, analysis, and logistics should sort and evaluate the data to determine if the data necessary to answer the MOPs, MOEs, and COIs are being collected and categorized. A continuous evaluation of procedures or methods should help ensure the best available answers are derived.

5.10.7 Organizing Data Collected

Frequently, test teams concurrently conduct tests; collect, reduce, and analyze data; and prepare interim reports. These concurrent workloads in a compressed time frame can result in data being temporarily stored in a disorganized manner and difficult to sort out later. Physical storage space and handling restrictions inherent with large amounts of data must be anticipated. To be useful, data should be identifiable and easily retrievable. Data should be clearly labeled and duplicated as soon as they are collected to prevent loss. One set of data could be filed by mission and the second by MOE/MOP. The deputy for analysis/data manager should establish a centrally located document control point before the test is started. This should be a part of the pretest dry run. Without test data, what do you have for your efforts? Test team members should route all test documents through this point (i.e., incoming data, computer tapes, analytical listings, aircrew notes, and outgoing data). This system provides full accountability for every data item and allows data processing to be done in order of priority. Data considerations are:

- To maintain integrity and continuity of test data, an AFOTEC test team representative should have direct control over OT&E data at all times.
- When testing is conducted at a contractor's facility, an AFOTEC test team representative should be present at the test site.
- Because test mission briefings and debriefings are critical to ensure essential data are being properly collected, recorded, and interpreted, key test team representatives must be present. Cassette recordings of briefings and debriefings may be useful tools in capturing important details. If classified, data must be protected accordingly.

5.10.8 Marking Data for Release

Recipients of any AFOTEC data are not authorized to reproduce and distribute that data without AFOTEC permission. TDs ensure any data that is released prior to AFOTEC/CC approving the Final Test Report is marked, "Level I, II or III test data (as appropriate) - AFOTEC test conclusions are not final, not for release or duplication without AFOTEC permission," see table 5.3.

Distribution Statements
Distribution statements protect documents. They are especially important when time passes and the test team is no longer around. FOIA requests come in and current management has to release documents based on the distribution statement entered at the time the document was created. It's very important that the right distribution statement be used for the right document. All requests for release of a published document are referred to AFOTEC/HO. While a document is in draft form, then requests for that document must be referred to AFOTEC/XO for release approval. More information on the appropriate distribution statement to use can be found in AFOTECI 61-204, *Disseminating Scientific and Technical Information*. Test teams should contact the AFOTEC STINFO for more information.

5.10.9 Data Filing and Storage

In addition to the program case file maintained by the TD, OT&E information/data are commonly stored in three types of files: central administrative files; raw data files and, in the case of an extensive data management system, an automated data file. The amount of data

Table 5.3. AFOTEC Data Descriptions

LEVEL	DESCRIPTION	DATA FORMAT	EXAMPLES	RELEASE
Level I *"Raw/ Uncor-related Data. Data has not been checked for validity or accuracy"*	Data in its original form. Directly recorded results of field or laboratory tests. Includes data in raw form that have been grouped or consolidated, with blank spaces or unnecessary data deleted (the data may have been checked for completeness, but not accuracy).	Data collection sheets (corrected or not). Camera film (may have extra frames deleted). Recording tapes (data or voice, may have extra deleted). Magnetic tape or paper printouts (hand-corrected or not). Questionnaires and tester notes.	Range displays, computer or operator displays, clock times, voice or radio tapes, raw film or video, heads-up display tapes, event duration times, computed DMPI points, raw telemetry data stream tapes or records, databus tapes or records, raw data forms, logbooks.	Accumulated for processing. Should not be released unless labeled or annotated as "Level I, Raw/ Uncorrelated Data." Not normally released to another agency. Not normally published. Frequently discarded after use.
Level II *"Analy-tical/ Ordered Data"*	Data which have been initially checked for accuracy and regrouped or rearranged for convenient analysis. Data include summary or descriptive results from statistical or mathematical reductions. This level includes data that have been summarized without judgments or inferences (only what was observed in test).	Spreadsheets, tables, typed lists, organized and labeled. Edited film or data tapes. Tabulated graphs/ summaries, statistical results, or other management tools or graphs.	Match-ups of conditions with events; correlation of different sets of data; linkage of data sources; any previous examples that have been rearranged or correlated to reflect review; preliminary probability calculations; preliminary judgments of data importance, data potential, or test success.	Not usually published, but used in analysis. Usually stored temporarily. May be published as supplementary information in a supporting data document. Should be clearly labeled as "Level II, Analytical/ Ordered Data." Releasable upon approval at appropriate level.
Level III "*Verified/ Summary Data*"	Data which include results beyond elementary descriptive statistical analysis, combination of data from different sources, and M&S data. This data reaches conclusions and reflects judgment of testing/results.	Results of data when used in M&S Data conclusions or summary results of tests. Statements of position, challenges to validity or analysis.	Computations that are validated and verified, summaries or results, judgments of success, failure or preliminary error analysis, identification and description of deficiencies or corrective action needed.	Level III data are usually included with the OT&E final report, either in the body, in an appendix, or as a separate data document. Releasable upon approval at appropriate level.

needed for a specific test, the frequency with which they are obtained, the extent of the analysis, and reporting turnaround time are factors affecting selection of a data storage approach. Some filing options are:

- Central Administrative File. Maintained according to AFMAN 37-123, Management of Records, and AFMAN 37-139, Disposition of Air Force Records – Records Disposition Schedules, the Central Administrative File is used primarily for storing information of an official nature. Contact AFOTEC/SCSI for additional guidance.
- Raw Data File. This file should contain all hard-copy information. For smaller OT&E efforts, the raw data file may be the primary data storage method. If an automated database is the primary means of storage, the raw data file should be maintained as a backup. It is recommended that raw data files be compressed on magnetic media or similar storage, labeled, self-documented, indexed in the supporting data document, and retained for reuse or reanalysis.
- Automated Database. Data gathered during operational test can be stored on various electronic media. These media allow for rapid addition, deletion, and manipulation of test data to support resolution of test issues. Test teams should select software packages that are readily available for use in analyzing data gathered during operational test.

5.10.10 Data Processing, Reduction and Analysis

Data processing and reduction include all data handling from the source to input into the analysis activity. These actions form the core of the data management system. Specialized tools are available from TS to assist in RAM analysis, questionnaire analysis, human factors analysis, and logistics analysis. The process of monitoring data analysis should be concurrent with test execution. Constant checks should be made to determine that correct data are associated with the right MOEs/MOPs and that analytical techniques stated in the data management procedures are working. Early in a test, analysts need to work closely with operations people to do sanity checks of the performance data. It is critical to be sure that the data are being collected correctly and are making sense in terms of what the operations personnel witnessed in the test. All data reduction tools should be available and exercised before testing -- this is a foot stomper! This should be part of the dry run as well as the TRR briefing. Early data reduction ensures trends are established and support necessary adjustments to future test scheduling - it also allows the team to get a “head start” on final report preparation.

5.10.11 Impact of System Modifications

Modifications during dedicated OT&E should be avoided unless absolutely necessary (i.e., to correct a safety hazard). If the impact of system modifications (software modifications, hardware changes, control and display changes, etc.) is determined to have potential impact on the operational effectiveness or suitability of that system under test, appropriate re-testing should be conducted. Coordinate changes with the DT&E TD and outline them in the data management procedures to ensure differentiation between old and new data sets. Modifications made to a system (and resultant impacts) between DT&E and OT&E or during OT&E must be addressed in the final report.

5.10.12 Test Data Disposition

Maintain original data to allow for reanalysis if necessary and dispose of in accordance with AFMAN 37-139. For AFOTEC tests, all important data not included in the final report is reduced and published in supporting data documents. Usually the raw data may be destroyed when inactivating the test team. Before destroying test data, test team analysts will coordinate what data is destroyed with both their detachment/directorate technical advisor and TS. If follow-on tests are scheduled, key data should be made available to the new test team to avoid redundancy and establish a baseline for future testing. Raw data should be self-documenting (e.g., data formats and data element lists are stored on the same media with the data set). Because of space limitations, it is desirable to first convert large amounts of primary data to microfiche. See AFOTECI 84-101, *Preservation of AFOTEC Information and Records*, for more guidance.

5.10.13 Visual Information Documentation (VIDOC)

VIDOC, including still photos, videotape, and related forms of imagery, is one of the most versatile ways to collect data during test. VIDOC is recorded as necessary for analysis, to illustrate test methods and results in briefings and reports, and for historical purposes. Depending on the nature of the requirements, test team members, Air Combat Camera Service and local base personnel, range facilities personnel, or contractors can prepare VIDOC. For historical purposes, AFI 33-117, *Visual Information Management*, requires the recording of key activities during all OT&E phases. Photos (slides, prints, or negatives) and videos of key test events are forwarded to the Multimedia Production Center (AFOTEC/SC) for use in command level briefings, reports, publications, and possible submission to HQ USAF. All original material is retained in the VIDOC Library. The Visual Information Manager closely monitors the progress of OT&E programs through the MIN, and may contact test

teams to obtain these materials. Contact SC for guidance, training, or on-scene assistance at the test location.

5.11 Joint Reliability and Maintainability Evaluation Team (JRMET)

RAM activities are required for all acquisition programs. Establishment of a JRMET is a key activity for test and evaluation. The JRMET assists in analyzing and categorizing RAM data during DT&E and OT&E. The SPO establishes and chairs the JRMET during DT&E and OT&E. Participants include representatives from the supporting and operating commands, the DT&E and OT&E test teams, and when appropriate, system contractor personnel. If for any reason the SPO chooses to not chair or participate, AFOTEC may chair the JRMET. A charter may be used to define JRMET roles and responsibilities and common definitions. Although the main concern of the JRMET is scoring RAM data, the test team verifies all test data. AFOTEC/TSE maintains a framework for JRMET charters and provides assistance in establishing a JRMET function. Also, TSE periodically conducts a JRMET training course. AFOTECPAM 99-104, *Operational Suitability Test and Evaluation*, provides a more detailed description of the JRMET process.

5.11.1 Test Data Scoring Board (TDSB)

The TDSB is a government-only forum held in conjunction with those tests having a JRMET that compiles, reviews, and scores RAM data that may be used in OT&E computations. The purpose of the TDSB is to remove perception of contractor bias in the data scoring process. The SPO establishes and chairs the TDSB during DT&E and combined DT&E/OT&E. If for any reason the SPO chooses not to chair or participate, AFOTEC may chair the TDSB. During dedicated OT&E, the AFOTEC TD (or designated representative) chairs the TDSB. Participants include representatives from the supporting and operating commands and the DT&E and OT&E test teams, but excludes system contractor personnel—restrictions stated in Public Law (US Code, Title 10) prohibit all system development contractor personnel from TDSB participation. Although the main concern of the TDSB is scoring RAM data, the test team verifies all test data. AFOTEC/TSE provides assistance in establishing a TDSB and periodically conducts TDSB training as part of the JRMET course. AFOTECPAM 99-104, *Operational Suitability Test and Evaluation*, provides a more detailed description of the TDSB process.

5.12 Release of Test Information

AFOTEC test teams should strive to conduct OT&E as an open book test. In most cases, there is no inherent need to keep test plans and results close hold and it is beneficial to share an indicated test direction with the development community. This will provide the SPO and

contractor important insight into potential system deficiencies while also giving them an early start on rectifying any potential problems. Data sharing by on-site observation teams should be on a non-interference basis and cause minimal disruption to test team activities. Test teams should be open to responding to requests for test documentation and results from DoD agencies, while keeping within current established procedures. This does not constitute blanket authorization for release of a final test report; requests for release of a draft test report are elevated to AFOTEC/XO for approval. The release of test data, at the right time, in the right way, should be the normal way AFOTEC conducts business.

5.12.1 Test Information Sharing

AFOTEC testers maintain an atmosphere of openness surrounding the collection of test data, which contributes to the seamless approach. System contractors and SPO personnel may be allowed to observe data collection and contractors may request formal release of the data collected through the SPO. While the test team still has to verify that the data is valid, contractors need to see what problems are found, as they are found, so they can start thinking about how to fix them.

While on-site in an observation role, developing contractors may have access to data from test events. As the controlling authority for data collected during AFOTEC conducted OT events, AFOTEC release of test event data, or any portion thereof, is at the discretion of the TD as approved by the applicable Det CC/Director. TDs need to be aware of who is receiving data and stipulate any restrictions on secondary release per the provisions of AFOTECI 61-204, *Disseminating Scientific and Technical Information*. Data is labeled and contains a distribution statement (see paragraph 5.10). A SPO or a contractor cannot disrupt any test event and may be removed from the test site if their actions interfere with testing. Additionally, the test team must ensure the contractor understands that information/data collected during a test event is raw, and neither verified nor analyzed.

As early as possible prior to test, test teams are encouraged to share test plans/procedures and establish procedures and rules for data sharing in an agreement (ITT/CTF charter, MOA, MOU, etc.). The agreement specifies what data is expected to be collected and under what conditions the contractor/SPO may be present to observe test events. It establishes ground rules for access (i.e., what and when data will be provided, limitations (information subject to the Export Control Act, Privacy Act, classified, source selection-sensitive, proprietary restrictions, or not within data reduction capabilities) and use of raw data). The test team can only share data that is under AFOTEC control; data gained from sources other than direct OT testing might not fall

under AFOTEC control as release authority. TDs coordinate these rules/procedures with their Director/Det CC for approval and include the procedures as part of the TRR briefing. If circumstances prevent the establishment of procedures prior to test execution, ground rules are agreed upon before a test event commences.

Throughout the test and evaluation life of a program, there are times when a Quick Look briefing could be used to convey important information to the user/SPO communities. For example, briefing on trends the test team was seeing during IOT&E will give the SPO ample lead time on what fixes may need to be installed before fielding the system. ***A caution is warranted regarding the content of this briefing; do not present the information in the form of a final evaluation of the system's effectiveness and suitability – this is reserved for the final report itself.*** These types of briefings open the lines of communication during IOT&E with the user/SPO community, and keep them cognizant of AFOTEC's concerns. In the spirit of "no surprises," AFOTEC wants to give developers important insight into potential system deficiencies in order to allow them to get an early start on rectifying any potential problems. Briefers should also exercise sound judgment when determining pre-briefing requirements within the headquarters. The AFOTEC Commander approves all briefings for ACAT I programs or any program on the OSD oversight list before they are presented outside of AFOTEC. In all cases, consultation with the Det/CC is required prior to presenting to the intended recipient. Briefers should tailor the AFOTEC briefing template located on the MIN (see attachment 4) to suit briefing needs.

5.12.2 Handling Information Requests

Firm guidelines cannot be established to cover all situations where a test team might release test information. There are two basic types of requests:

- Data (test results) - see table 5.4.
- Published plans/reports - see paragraph 5.12.5.

Each request for test information should be forwarded to the TD, who may release it after coordinating with the appropriate headquarters staff agencies (see table 5.4). It should be noted that in releasing information, the TD assumes the authority of the AFOTEC commander, and that the TD should use caution and judgment when answering questions and providing test information.

Table 5.4. Data/Information Release Guidance

Requestor	Procedure
Congress or their representa-tives	The AFOTEC/CC is the release authority. The CC determines if Secretary of the Air Force (SECAF) approval is required. If so, the reply must be routed to the SECAF Legislative Liaison (SAF/LL) for release. Refer to AFI 90-401 for details. Otherwise, the AFOTEC/CC determines release. If authorized, the Det/ST releases the data directly to the requestor.
GAO, OMB DOD IG, Audit Agencies	The AFOTEC/CC is the release authority. AFOTEC/RMF is the action office/OPR for oversight visits. AFOTEC personnel cooperate as directed with agency representatives and, through RMF, gain CC authorization for release and keep the CC and staff informed (refer to AFIs 65-401/402)
OSD (Except DOT&E)	AFOTEC/XO is the release authority. OSD must submit a request in writing to AF/TE. AF/TE will in-turn forward the request to AFOTEC. AFOTEC sends response to AF/TE. AF/TE will forward response to OSD.
DOT&E	The TD is the release authority. DOT&E may request and receive any test data/documents, at any time, directly from AFOTEC. After release, the TD informs XO of request and actions taken.
Other DoD Offices & Agencies	The TD is the release authority. Requests must come from an agency/office with a reasonable need for the data. A sponsoring DoD office must approve requests from contractors.
MOT&E	Lead OTA procedures apply. Each participating OTA has the same and equal access to the verified data as the lead OTA. Data is shared among the test team regardless of OTA affiliation, but is not released to other agencies prior to promulgation of the final test & evaluation report
Freedom of Information Act Requests	Public requests to inspect, review or receive copies of U.S. Air Force records are made in accordance with DoDR 5400.7, *DoD Freedom of Information Act Program,* as supplemented. The AFOTEC FOIA officer resides in AFOTEC/SC.
Requests for Information (media)	The AFOTEC public affairs office is the only release authority for all media requests in accordance with AFI 35-101, *Public Affairs Policies and Procedures*.
Requests for Information (non-media)	Requests for government information or records from the public that do not refer to the Freedom of Information Act are sent to the AFOTEC public affairs office.
Security and Policy Review	AFOTEC public affairs, as the AFOTEC CV POC, is the clearance authority for unclassified information of local and regional interest. Security and policy review ensures material proposed for public release does not contain classified material and does not conflict with established Air Force, DoD or U.S. Government policy. This includes speeches, presentations, papers, multimedia material and information proposed for public release including publicly accessible Worldwide Web sites.
Foreign Disclosure	A foreign government or international organization requesting test information has to make an official request through its embassy for release of any test information. AFI 16-201, *Disclosure of Military Information to Foreign Governments and International Organizations* is the governing directive. Test information is not released to foreign governments or international Organizations without coordination/approval by SF, PA, LC, CV and CC. SAF/IAD is the final approving authority for all information released.
Requests for Classified Information	Classified information is not releasable except as specified in DoDR 5200.1 and AFI 31-401, *Information Security Program Management.*
Source Selection-Sensitive OT&E Information	AFOTEC/XO is the release authority. The request is coordinated through AFOTEC/LC and AFOTEC/PA prior to release. Data or information developed through OT&E that could influence a source selection process is protected as source selection-sensitive information according to DoDR 5400.7 as supplemented.

5.12.3 Information Requests on Sensitive Programs

Approval for the release of sensitive, significant or potentially controversial information is secured through the AFOTEC/PA officer. This could include test events with environmental and/or political sensitivity, and major weapon system test events. This information is coordinated between PA and the AFOTEC/CC. NOTE: Privacy Act, and source selection-sensitive information must be coordinated through AFOTEC/LC and AFOTEC/PA prior to release.

5.12.4 Public Affairs Office

Except for releases made through the FOIA office, public release is made through public affairs channels. Detachment commanders and their designated representatives are ultimately responsible for approval of each release. AFOTEC/PA has primary responsibility for public affairs activities involving AFOTEC tests. Media or community queries about a given test, AFOTEC or its programs, and requests for media interviews of AFOTEC personnel or test team members concerning test programs will be referred to AFOTEC/PA. Only those personnel designated as release authorities may release information including information previously approved for public release. Test results or value judgments about tested systems are not given to media or community representatives without coordination/approval from PA, CC, and SAF/PA. AFOTEC/PA is notified as soon as possible of accidents or serious incidents which occur as a result of testing. The Base Public Affairs office with on-scene responsibility requests from the AFOTEC/PA answers to media and community representative questions concerning the test or AFOTEC. If the AFOTEC/PA spokesperson is not available, the PA office with on-scene responsibility can request answers from the TD. The TD back-briefs AFOTEC/PA concerning questions and answers as soon as possible.

5.12.5 Information Requests for Published Plans/Reports

Refer all outside requests for previously published OT&E plans and reports to AFOTEC/HO with information copy to the FOIA officer in AFOTEC/SC (see table 5.4 for more information). Foreign disclosure requests must be coordinated by HQ AFOTEC/SF.

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Chapter 6 OT Reporting

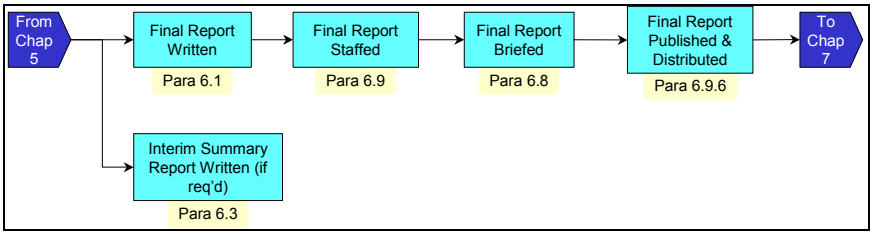

Figure 6.1. Test Reporting Overview

6.1 OT Reporting Introduction

The OT reporting phase formally begins after the last test event; however, the planning and drafting of the report actually begins as early as the test planning phase and should always be in the test team's mind since the report is the final measure of the test (see figure 6.1). This chapter covers those activities associated with test reporting and includes the following: the Interim Summary Report, the IOT&E Final Report, report briefings for OAs, OUEs, and IOT&E, staffing the final report, and final report publication. A single "final report template" for AFOTEC reports is available on the MIN (see attachment 4) and should be tailored to the applicable situation by the test team. The report template is meant to be the starting point for all reports; if the TD determines that another form of presentation makes more sense, it may be used with Det CC and XO approval The OTPM test program network includes a standard final report coordination sequence of tasks. The OTPM test program network and associated Buffer Status Report will provide advanced warning of whether or not the final report can be completed in time to meet the required delivery date. AFOTEC ORM tools are used throughout the reporting phase (see figure 1.7).

6.1.1 Determining Operational Effectiveness and Suitability

AFOTEC does not "grade" test articles - AFOTEC supports the delivery of new, increased combat capability to Air Force and Joint Warfighters as independent evaluators. Our emphasis on capabilities-based operational testing accents the need for an indisputable word picture that thoroughly describes a system's capabilities and shortfalls. Test teams need to understand that the narrative used along with the report ratings and conclusions is very important and must be constructed carefully. The report narrative should not be written in an adversarial tone, but rather in a manner to support the successful fielding of the new combat capability, assuming the test results warrant such a conclusion. When AFOTEC reports conclusions on the operational impacts of the system, both the positive and the negative need to be included. The "Commander's

Memo" is an important part of the report and initially conveys AFOTEC impressions on system effectiveness, suitability and the OIA. It also provides a synopsis of the test structure, significant events, and test team operations. When reporting on DOT&E special interest items, summarize the results/conclusions in the executive summary, and include the results in the main body of the report (i.e., as much as possible try to avoid a separate report annex). AFOTEC test teams may include a recommendation to "produce/buy/field" or "not produce/buy/field the system" in the "Commander's Letter" portion of the I/Q/FOT&E final report. In addition, when reporting a system's operational effectiveness and suitability, the ratings are limited to the following terms (see figure 6.2):

- Effectiveness is rated as "operationally effective," "operationally effective for…" (for evolutionary acquisition), "potentially operationally effective," or "not operationally effective."
- Suitability is rated as "operationally suitable," "operationally suitable if…" (for evolutionary acquisition), "potentially operationally suitable" or "not operationally suitable."

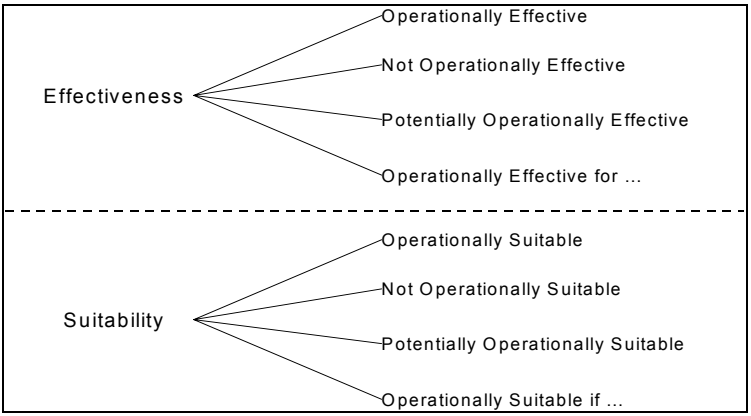

Figure 6.2. Rating Effectiveness and Suitability

Evolutionary acquisitions with incremental blocks, or some completed evaluations, may require use of a reporting technique that only addresses certain aspects of a system's capability. In the case of evolutionary acquisition, while the system may not be completely mature, a viable capability may exist during incremental testing. Additionally, a complete evaluation may reveal a system does not meet user stipulated requirements but has useful capabilities providing certain conditions are met. Reporting terminology such as "Effective for…" and "Suitable if…" may be appropriately used to describe a system capability that may be available under specified conditions. For example, a system may be

rated as "effective for daylight operations only" or "suitable if the developing contractor provides required maintenance." Test reporting recognizes these capabilities and identifies the necessary conditions for their successful use.

In many cases, the test team may judge the system as not currently effective or suitable. However, the test team may want to relay to the decision makers that the system is "close" and given specific actions by the program office and or user will be effective or suitable. For I/Q/M/F OT&Es, the qualifier "potentially" is not normally used and is allowed only under very specific circumstances. If a test team is considering using "potentially" for rating the results of these activities, prior coordination with XO is required. Elements that should be considered in determining if the SPO/user has the ability to fix the problem are: whether there is a plan in place, to include technical feasibility; whether there is funding in place; and whether the fix has been successfully demonstrated. If, based on the test team's judgment, the program office/user does not have the wherewithal to fix the system problem(s), the rating "not effective" or "not suitable" is appropriate.

Since AFOTEC cannot control factors beyond test (e.g., funds for fixes), test criteria should be stated as user needs at the end of the testing period. When reporting measures that reflect capability requirements (particularly suitability measures) that are not planned to be enforced until after test is complete (e.g., MTBF at IOC+1yr or MC Rate at 10,000 hours), the measures should be based on point estimates of system performance observed during the test period. No rating should be applied, but a narrative based on the test team's judgment should be provided.

If a production, buy, or fielding recommendation is being made, the recommendation will be based on the evaluation of operational effectiveness and suitability, and on the results of the OIA. In addition, these decisions must also involve considerable judgment on the part of the test team. There can be situations where the system under test passes all CPD requirements but is not effective, perhaps due to considerations beyond the control of the system developer. There may also be situations where the system falls short of the CPD requirements, but is judged to be operationally effective. The general question that must be answered in the production/buying/fielding recommendation and rating is: "Can the system perform the military mission for which it will be acquired?" This must be based on all available information, not just an evaluation of CPD criteria. The words used in the report to explain the recommendation and rating conclusions will reflect the consideration of

the performance evaluation of the system, the OIA, and the test team's judgment.

When reporting on EOAs/OAs and OUEs, it is still permissible for the test team to report operational effectiveness and suitability with qualifiers such as, "potentially," "marginally," or "effective/suitable with qualifications." Current higher headquarters directives describe one purpose of the OTA's "early involvement" as assessing the system's potential to meet user requirements. Based on this purpose, if qualifiers are used, the test team is required to explain why they are being used in the assessment. The qualifier should describe whether or not the system is progressing satisfactorily towards operational effectiveness/ suitability.

Throughout the execution and reporting phases of OT&E, the TD keeps AFOTEC command leadership abreast of test status via the AFOTEC MIN OPSCENTER. Any potential negative results need to be highlighted to the XO as soon as they become known. It is vitally important to keep the XO informed on current testing status. Furthermore, good communication with acquisition and user counterparts will ensure everyone is aware of the direction of the results and will preclude any surprises.

6.1.1.1 Rating of COIs/MOEs/MOPs

Test teams use the following guidance when rating results for I/Q/FOT&Es and MOT&Es when Air Force is designated the lead OTA. Ratings of MOEs/MOPs reflect demonstrated performance related to evaluation criteria (see figure 6.3):

- **COIs are rated** based on the adequacy of, and the performance exhibited by, the collected data. Each COI is reported as "Satisfactory," "Unsatisfactory" or "Not Resolved."
- **MOEs/MOPs are rated as follows**:
  - "Met Criteria" describes performance that met or exceeded a stated OT&E criterion or the stated aggregation outcome.
  - "Did Not Meet Criteria" describes performance that did not meet an OT&E criterion or the stated aggregation outcome.
  - "Not Tested" is used when performance has not been tested.
  - "Inconclusive" may be used sparingly when the test team is unable to draw any conclusion due to faulty test methodology, extremely limited sample size, wide distribution of data, or other unanticipated circumstances.

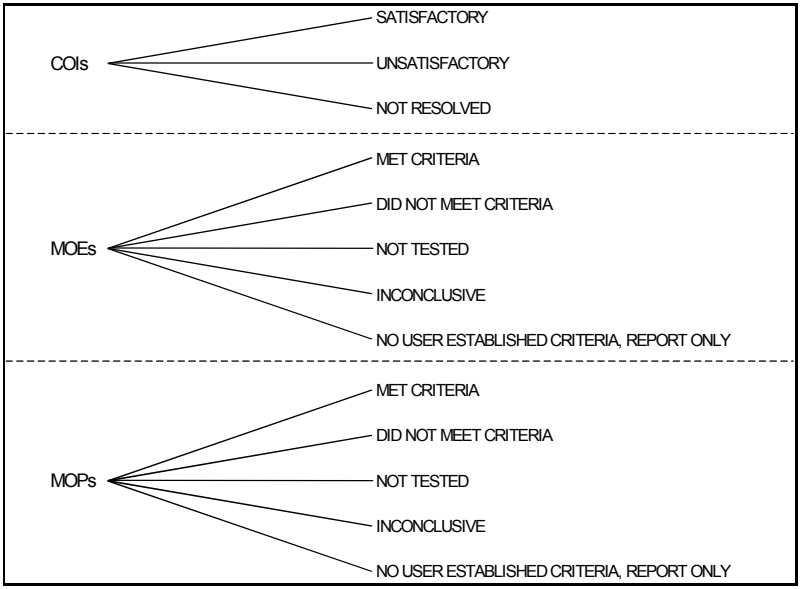

Figure 6.3. OT&E Rating Hierarchy

- "No User Established Criteria, Report Only" is used when the user has not provided or agreed to a criterion for a specific measure that AFOTEC deems necessary to test. These test measures are described as favorable/unfavorable based on the test team's analysis of questionnaires, test respondent comments, or test team observations. The results from this area are given in a narrative statement (e.g., average completion time, distribution of questionnaire ratings, or other summary statistics).

6.1.1.2 Rating of COIs/MOEs/MOPs for EOAs/OAs and OUEs

Do not use the rating system in figure 6.3 when reporting on COIs and measures for EOAs, OAs and OUEs. A test team may only use the assessment rating system outlined in figure 6.4 below during EOAs, OAs and OUEs. The test team supplements each assessment rating by describing why the system's measures are/are not progressing satisfactorily towards meeting the users required performance criteria, or why the measure was not observed. This is in line with current directives, which state EOAs/OAs assess potential operational effectiveness and suitability and a program's progress toward OT&E.

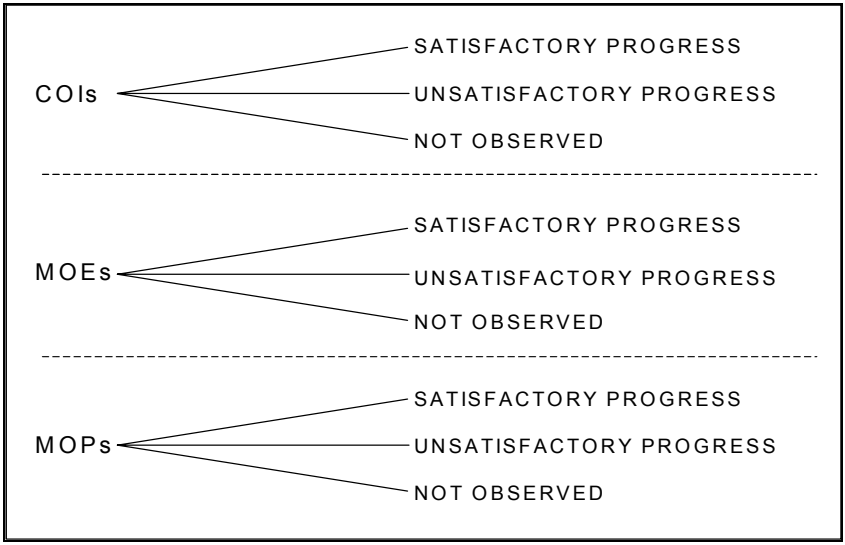

Figure 6.4. EOA, OA, OUE Assessment Hierarchy

For an OUE there is an exception to using the ratings outlined in figure 6.4. If an OUE supports testing of a system that will not have a required follow-on, dedicated OT&E, then the test team may use the ratings in figure 6.3 against the user requirements and test criteria/measures.

6.1.1.3 Rating Measures with Quantitative User Evaluation Criteria

Confidence intervals and hypothesis tests are two useful tools for assigning ratings. In cases where testers have planned to apply formal tests of statistical significance for test measures with "quantitative user evaluation criteria," they should use the following procedure to rate the test results. If the entire confidence interval is above or below a requirement, then test results are consistent with a system that performs above or below that requirement with statistical significance. Report "met" or "did not meet" as appropriate. In the likely event that a requirement falls inside a confidence interval, the test results are still consistent with a system that performs at or near the requirement, and should be reported as "met." The impact of performance at this level should also be reported.

If hypothesis testing or use of confidence intervals is not appropriate, then base the rating of the test measure on the point estimate achieved in test. The measure is reported as "met" if the point estimate falls above the stated user evaluation criteria and "did not meet" if it falls below. An "inconclusive" rating may apply in cases where the test has been conducted, but the results for the given MOE/MOP are not sufficient to

draw a conclusion perhaps due to insufficient sample size, or large uncertainties in the instrumentation.

In all cases, not only does the test team report the statistics associated with testing, but also describes what actually went on during testing. All reported test measures with quantitative user defined evaluation criteria should be accompanied by estimates or displays of uncertainty or variability (such as confidence intervals, or graphs of individual outcomes). Ultimately, a combination of statistics and test team judgment determine the effectiveness and suitability ratings for a system. More information on confidence intervals is available on the TS ATTIC (see attachment 4).

6.1.1.4 Rating Subjective Data Test Results

In most cases, it is statistically invalid to assign confidence intervals to subjective data. Factors such as small sample size, lack of a normal sample distribution, or lack of validated criteria for subjectively stated requirements limit the application of confidence limits to subjective data. Testable operational requirements that rely on subjective data for their evaluation should have their criteria stated as "No established user criteria," results are described in narrative fashion (median, histogram, frequency distribution, and user and test team comments)." These test measures are described as favorable/unfavorable based on the test team's analysis of questionnaires, test respondent comments, and test team observations. Questionnaire data should be quantified as a summary of descriptive statistics (e.g., median, frequency distribution, and histogram) along with applicable comments from the user and test team population. Note that subjective data usually comes from a sample of "experts" -- this adds an unquantifiable but meaningful confidence to the data and the evaluation.

6.1.1.5 Rating Suitability When Operational Requirements Are Not Complete

A system tested by AFOTEC that does not have sufficient suitability requirements documented in the CDD/CPD or other user documents is given an AFOTEC suitability rating in the final OT&E report. This rating is based on core suitability parameters that can be found in AFOTECPAM 99-104, *Operational Suitability Test and Evaluation*. TDs should use these parameters to thoroughly examine system suitability when operational capability requirements are not complete. This approach should only be used as a last resort (when all available sources have been exhausted) and it is not a substitute for user-defined requirements. It is simply a method for the test team to perform a credible suitability evaluation.

6.1.1.6 Statistical Resources

AFOTEC/TSE can provide assistance in applying statistics to planning and rating tests. Consult AFOTEC/TSH for questionnaire data collection and analysis methodologies. Additional references to determining sample sizes and applying confidence bounds are:

- *Mathematical Statistics with Applications*, Wackerly/Mendenhall/ Scheaffer.
- *Applied Linear Statistical Models*, Neter/Kutner/Nachtsheim/ Wasserman.
- Analyst Training and Technical Information Center (ATTIC) on the Test Support Directorate Web page on the MIN (see attachment 4).

6.1.2 Aggregation of OT&E Results

Perhaps the most difficult aspect of OT&E is the aggregation of MOE/MOP results to answer the COIs and arrive at an overall rating for effectiveness and suitability in OT&E final reports. There is no set formula for test teams to aggregate data for making a final rating on COIs/MOEs/MOPs. The question is: Can the system be operated and maintained in a manner that supports operations? This does not require that the system meet all capability requirements to be effective and/or suitable. Nor does it mean that if it meets all capability requirements with stated criteria, it will be declared effective and suitable. Test teams provide a narrative in final reports that explains how the test results were aggregated to the MOE and COI levels, and how a determination of effectiveness and suitability is made. For example, "There were X number of MOPs/MOEs under COI-1: we considered Y of them to be of critical importance. Z percent of the critically important MOPs/MOEs met user criteria: of those that did not, all were within a few percent of meeting criteria, and the deficiency in meeting the criteria was not judged to be operationally significant. Therefore, we rated the system effective." The bottom line for effectiveness and suitability is: "Does the equipment work as intended and can the operator effectively use the system in its intended operational environment?" Aggregations can be done either quantitatively or qualitatively. In addition to the aggregation methodology, test teams will apply professional judgment in arriving at answers to COIs and the effectiveness/suitability questions. Figure 6.5 below is an example aggregation process used by the Det 4 test teams to guide their thought processes on how to deal with measures supporting COIs. This process should be viewed as a notional tool and not directive in nature. How each test team deals with their individual program test measures and to what degree the test measures impact the

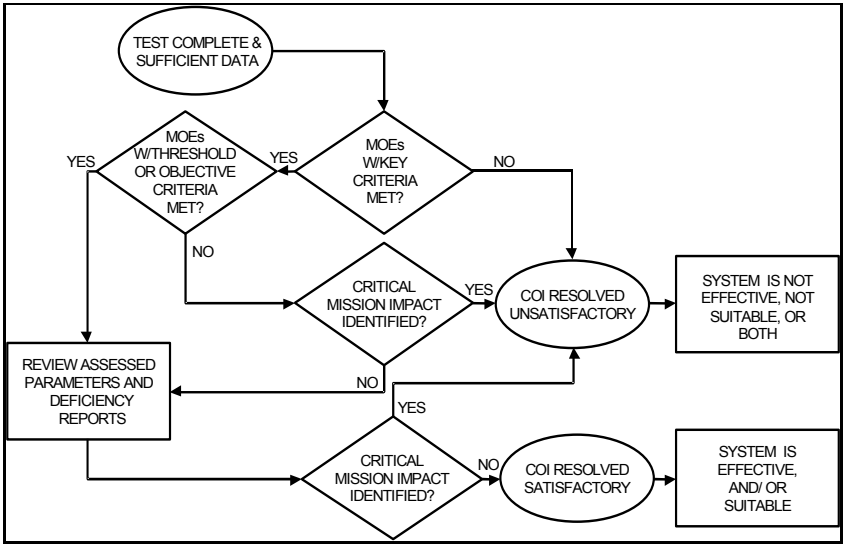

Figure 6.5. *Notional* Aggregation Process Tool

COIs is a complex issue, highly subjective, and should be left up to the test team to decide.

6.1.2.1 Linkage Process

For some programs, the AoA will establish a quantitative linkage between MOPs and MOEs. For some COIs, aggregation will be simple and logical. An MOE or small number of MOPs may allow the test team to answer the COI. For other more complex issues where several MOEs/MOPs support the COI, the core team/test team will need to establish an aggregation method. One approach could mirror the Joint Reliability and Maintainability Evaluation Team (JRMET) process where a round-table approach is used to discuss and evaluate the findings and arrive at an answer for the COI. Another approach might involve various analytical techniques (recommend seeking TSE assistance for what techniques might be used). The approach will vary from test to test, but since it will be a part of the test concept, the core team will have ample opportunity to solicit guidance from the staff.

6.1.2.2 Other Potential Operational Impacts

Professional judgment of the test teams is applied in those cases where "other potential operational impacts" were discovered during test that do not fit into specific parameters tested (or where evaluation criteria are subjective). An example of this might be the system did not meet all user criteria for every parameter tested but was able to accomplish the

mission. In this case, the final report could find that the system was effective and suitable.

6.2 Last Test Event

Upon completion of the last test event, the TD submits an OPEVENT report notifying the Command section of the completed event. This triggers the coordination timeline for the final report.

6.3 Interim Summary Report (ISR)

If the final report is not ready for release 45 calendar days before a milestone or other significant program event, an ISR is required. The requirement for an ISR is coordinated with XO and XP in advance. An ISR is not generated when the formal final report will be released in time to support decision-making. The OTPM test program network indicates the need to produce an ISR. This report summarizes the evaluation of OT&E results in enough detail to support the decision (see figure 6.6). This message or letter report should ideally be 10 to 15 pages and summarize the test team's initial assessment of significant OT&E results and findings. Distribution should be limited to essential addressees; however, expanded external circulation may be directed for programs that have high-level interest or upon request or direction. All classified reports must comply with DoD 5200.1-R/AFI 31-401. Since this report is usually time-sensitive, the review cycle is expedited. If directed, an ISR from the test team to AFOTEC/CC is due within seven calendar days of test completion. The Detachment Commander/Director consults with the CAG who, with XO guidance, determines the required staffing based on required dates. The level of internal staffing for the ISR will normally be to XO, XP, and CA. The Detachment Commander and XO will determine any deviations. The AFOTEC Commander signs the ISR. The test team submits the report to the CAG for staffing and release to appropriate outside agencies.

The test team normally briefs the staff-coordinated report to CC/CV and senior staff (CA, CN, XO, AS, XP, TS) before release of the document. Coordinate all draft briefings being presented to the CC with the CAG. An electronic copy of the briefing will be maintained on the MIN. Briefings should be in the approved AFOTEC briefing format found on the MIN. Although CC may elect not to receive this briefing, it must be available for CC review. To focus discussion, this briefing should be supported with slides that parallel the format and content of the report. For programs using an ISR, a subsequent final report briefing to the AFOTEC/CC may not be required. NOTE: If an ISR will be accomplished, the final report coordination schedule (see Attachment 1) may be modified upon Det CC/ST request and XO approval. The “LTE”

FROM AFOTEC KIRTLAND AFB NM//CC//
TO HQ USAF WASHINGTON DC//TE//
INFO HQ USAF WASHINGTON DC//AQK//
HQ USAF WASHINGTON DC//XO//
Include SPO as an info addressee
Include user as an info addressee

QQQQ
Unclas
Subj: xxx OT&E Interim Summary Report
Distribution Limitation/Destruction Notice Statements. (Refer to AFOTECI 61-204 for specific guidance)
This is an interim summary report only. Analyses are not complete, and actual final results may be different from those reported here.
1.0 Executive Summary: At this time, data analysis and evaluation supports the following: the _____ system is/is not effective. The _____ system is/is not suitable. There were _____ critical operational issues {COI}, _____ which were resolved satisfactorily, ____ which were resolved unsatisfactorily, and ____ which were not resolved. At this time, the following operational impacts were observed: _____
2.0 Background, purpose, and scope.
2.1 Briefly describe who, when, where, and why the test was conducted.
2.2 OT&E background.
2.3 Describe the system tested and how it may be different from what will be fielded.
2.4 Planning considerations, limiting factors, and impacts.
2.5 Contractor involvement.
3.0 Operational effectiveness and suitability summary. There were _____ measures of effectiveness {MOE}; ___ met user criteria, ___ did not meet user criteria, ___ were not tested, ___ were inconclusive, and ___ with no user established criteria. There were _____ measures of performance {MOP}; ___ met user criteria, ___ did not meet user criteria, ___ were not tested, ___were inconclusive, and ___ with no user established criteria.
3.1 COI-1. State COI with rating.
3.1.1 State MOEs/MOPs with evaluation criteria and rating.
3.1.2 Results and conclusions
3.1.3 Recommendations:
3.2 COI-2. ....
4.0 DR status: There were ____ DRs open at the end of OT&E {___ CAT I ___ and CAT II}.

The following CAT I DRs have major impacts on the system:
DR number title
a.
b.
5.0 OIA
6.0 Conclusions:
6.1 Operational effectiveness
6.2 Operational suitability.
7.0 POC is
8.0 Classified by: Declassify on:

Figure 6.6. Example Interim Summary Report Format

for final report coordination/publication timing is the date the ISR is signed by the AFOTEC/CC.

6.4 IOT&E Final Report Formats

The IOT&E Final Report is the culmination of the OT&E process and is the single-most important product produced by AFOTEC. The template for a Final Report can be found on the MIN (see attachment 4). This template contains not only the format for the report, but also contains instructional text regarding content of the report. Document "tips and techniques" listing additional document creation guidance for plans and reports can also be found on the MIN template page For classified reports refer to Executive Order 12958 (as amended) and DoD 5200.1-R. DoD 5200.1-PH for definitive guidance on how to mark classified material. If in doubt about any marking requirement, contact HQ AFOTEC/SF. The following is a list of the major topics contained in the final report:

- Commander's Memo
- Program Overview
- Special Interest Items
- Operations
- Evaluation Framework and OT&E Methodology
- Effectiveness and Suitability
- Operational Impact Assessment

6.5 Finalizing the Report

Before a test report can be entered into AECS for coordination, it must have an accurate distribution statement on the report and a report control number. The AFOTEC Scientific and Technical Information Officer (STINFO) in HO will assist the test team with selecting the right distribution statement for the report. Once that's done, then the History Office will provide the report control number. See paragraph 5.10.8 for more information on the distribution statement requirements.

6.6 OA Report Briefings

EOA/OA reports follow the format of an OT&E report as tailored to the assessment. In some cases a formal report will not be required up front, however, the test team prepares a scripted briefing and the written report follows. OA briefings to OSD and agencies outside the Air Force are briefed to AF/TE first. Briefings presented to DOT&E (and OUSD (AT&L)/TE if required) provide a program overview and operational assessment/recommendation. If OUSD has not already received an OT&E plan briefing, include the test concept. The program office and AFOTEC TD (or other designated briefer) give the briefing at the

Pentagon NLT 30 days before the decision supported by the OA (LRIP or long lead). The user will normally be represented. The briefing goes through an internal review, responsible Detachment Commander/ Director (and command section), and external (SPO, AFMC, operating command, HQ USAF) pre-brief review. Coordinate all draft briefings being presented to the CC with the CAG. An electronic copy of the briefing is maintained on the MIN. Briefings should be in the approved AFOTEC briefing format found on the MIN. Detailed backup slides for specific areas may be provided if desired. A copy of the approved briefing, with script (if used) and backup slides, is provided to HO for historical purposes.

6.7 OUE Report Briefing

The OUE final report should follow the tailored guidelines of the OT&E report format, but be consistent with the information negotiated by the requester in the OUE plan. Data collected may support MOEs/MOPs if appropriate. Deficiencies found during the OUE are documented and prioritized in accordance with T.O. 00-35D-54; however, alternative methods for deficiency reporting may be used if already in existence and if agreed to by the organization requesting the OUE and AFOTEC. Coordinate all draft briefings being presented to the CC with the CAG. An electronic copy of the briefing is maintained on the MIN. Briefings should be in the approved AFOTEC briefing format found on the MIN.

6.8 IOT&E Final Report Briefing

As a part of the Final Report coordination process, the Final Report briefing should be prepared by the test team. This briefing summarizes the results and conclusions from the test and should be prepared with the thought in mind that external organizations will want to be briefed on the test results. The briefing should be balanced, including both favorable results and deficiencies. The comprehensive briefing format is found on the MIN (see attachment 4) and includes areas such as:

- Introduction
- Program Overview
- Operations
- Evaluation Framework and OT&E Methodology
- Effectiveness and Suitability
- Operational Impact Assessment
- Other Significant Information

Since time constraints do not always permit publishing final reports before a major milestone or decision to commit funds, a formal briefing may be used in support of the decision. The briefing summarizes OT&E

results as an executive-level presentation. Coordinate all draft briefings being presented to the CC with the CAG. An electronic copy of the briefing is maintained on the MIN. Briefings should be in the approved AFOTEC briefing format found on the MIN. The AFOTEC Commander first approves briefings required by OSD or other external agencies before they are presented outside of AFOTEC. The OTPM test program network should include any required briefings, both internal and external to AFOTEC. Note: formal approval by the AFOTEC Commander of the written final report is not required before briefing AF/TE or DOT&E.

6.8.1 The Briefing Trail

The briefing trail begins with internal briefings that lead to an AFOTEC/CC-approved and coordinated presentation. Before presenting the briefing to the AFOTEC Commander and staff, briefers should pre-brief XO, CA, XP, AS, and TS. When scheduling the final report briefing, ensure that TS, AS, XP, XO, CA, and CN are invited, and attempt to schedule the meeting with enough lead time so invitees (or their representatives) may deconflict their schedules to attend the briefings. Consistent with the Commander's "no surprises" policy, the test team should encourage participation in the AFOTEC/CC/CV presentation by the user and developer communities. The Commander is interested in their perspectives on the AFOTEC conclusions and their plans for incorporation of the AFOTEC recommendations. Provide read-ahead copies of briefing slides to the invitees two days before the scheduled briefing. Next, the briefing is presented to the SPO to provide OT&E findings and enable the SPO, in turn, to provide recommended solutions or alternatives (on OT&E findings) in their own AFSARC and DAB briefings. This "harmonizing" of briefings enables the decision maker to consider all aspects of the system and the alternatives available. Subsequently, a tailored briefing of about 30 minutes is presented to the concerned MAJCOM/CCs (HQ AFMC and the using command). After the MAJCOMs, the Air Staff is briefed, usually in a series of briefings: working level, director level, AF/TE, AFSARC, Major Automated Information Systems Review Council (MAISRC), if applicable, and if required, briefings to the CSAF and SAF. DAB or AFSARC briefings must always be scripted. These Air Staff briefings are most effective when they are given in conjunction with the SPO's presentation. Finally, for DAB programs, the briefings are provided to the principals responsible for test and evaluation. The DOT&E then prepares an assessment for OUSD(A&T), SECDEF, and the Congress. This assessment addresses the results and adequacy of the test and discusses future/follow-on testing.

6.9 Staffing the Final Report

Final report development represents one of AFOTEC's key processes, and it is important to understand each office's role within the final report staffing process. The intent is to optimize the final report routing process through the headquarters. TDs and the CAG share responsibility to ensure reports move through the coordination process expeditiously (see attachment 1). The AECS provides daily visibility on reports in coordination. This visibility assists TDs as they track their reports. The AFOTEC Commander signs all final reports unless otherwise delegated in the tasking order. The TD should contact AFOTEC/SC Graphics to coordinate final report requirements, obtain printing instructions and arrange for a production schedule. Reports are printed after they are signed by AFOTEC/CC. All reports for ACAT I, ACAT IAM, or any program on the OSD oversight list (regardless of ACAT level) are provided to DOT&E (via AF/TE) at least 45 days prior to the associated milestone or fielding decision.

Note: Final report coordination for MOT&Es can take an extended period of time. Therefore, it is important for test teams to keep lines of communication open with MOT&E developer and user counterparts. Informal coordination with appropriate players will keep everyone on track and preclude any surprises when the formal coordination cycle is executed. Your open communication with the rest of the players will "grease the skids" and ease the formal process. For MOT&E programs, action officer level coordination and two-letter coordination should each be done simultaneously/in parallel in order to get the "whole team's" inputs. See attachment 1 for details on coordination and coordination timelines.

6.9.1 Technical Advisor Role

With the ever-changing acquisition environment, reduced resources, and expanding AFOTEC roles, it is imperative that AFOTEC optimize its final report routing process, while maintaining both technical and administrative quality. The AFOTEC Technical Director expects the Detachment Technical Advisor to ensure that each report is technically accurate and supportable and has been reviewed by the detachment's Technical Editor prior to the document being forwarded to the headquarters for coordination. Emphasis will be placed on using final report templates to establish the foundation of the final report prior to test start. **A complete draft final report outline/strawman should be ready for review at the TRR briefing.** Work on filling out the remainder of the final report as test events are completed to shrink the timeline from last test event to submission of the final report to AFOTEC for staffing and signature.

6.9.2 Technical Editor Role

The role of the detachment technical editor is to ensure the report is in the proper format and edited for administrative accuracy prior to submission to the headquarters. The technical editor should have complete knowledge of current report formatting policies and ensure the final report meets all requirements prior to submission. Format, bookmarks and indices of report products must be standard to facilitate a smooth and timely conversion and distribution process.

6.9.3 Reviewing Reports

To aid in effectively managing the compressed reporting schedule, it is important to know exactly what final report products need to be reviewed, when they need to be reviewed, and each office's required actions. Prior to AFOTEC/CC approval (required for all final reports), the CV, CA, XO, XP, TS, SE, and AS review the final reports. Coordination of reports from ST may be limited due to special access limitations. The coordination process at the headquarters should be primarily done for content review. Formal coordination actions are accomplished in two review phases; review and commenting on a draft during "2 Letter" coordination, and approval of the final draft during "Command Section" coordination (see attachment 1). The goal of 2-Letter coordination and subsequent comment resolution is to resolve all issues prior to final copy coordination. Comment resolution is the responsibility of the TD, and is done with the respective comment submitter. Every attempt should be made to resolve ALL issues prior to entering the document into Command Section coordination. Only XO may opt to send a document to CC with unresolved issues.

6.9.4 Report Medium

The final report will be in electronic format and posted on the MIN. As these files are updated during coordination, old versions will be replaced with current versions; only the most current version will be maintained on the MIN. Classified documents will be coordinated using the SIPRNET with an unclassified tasker entered into AECS.

6.9.5 Report Timeline Exceptions

Obviously, coordination will take longer on some programs such as classified programs. If the timelines outlined in attachment 1 are not achievable, contact XO early in the reporting process to develop an agreeable alternative.

6.9.6 Final Report Publishing

Once the commander has signed the final product, it is sent to AFOTEC/SC for pdf conversion and distribution. No changes may be

made without commander approval. Keeping in mind the timeline for coordination of the report, the following procedures are followed to produce and publish the Final Report:

- The TD, in conjunction with the Det/Dir Technical staff, is responsible for quality control of the report up to the time of the Commander's signature. The TD ensures the technical and editorial correctness of the product prior to transfer to AFOTEC/SC. With signature, the report content and format is finalized and SC assumes responsibility for conversion to the PDF format and maintenance of report integrity. No change may be made to the signed product, except for conversion, without direction of the Commander. The TD obtains HQ concurrence to include any additional material with the final report on the distributed CD. This request should be briefed to, and approved by, the AFOTEC/CC at the final report briefing. The CAG coordinates with SC for inclusion of additional material to be incorporated on the distributed CD-ROM. Additional material may include briefings, videos of test activities, interviews, additional test photos, etc. All additional files should be available to the CAG prior to the final report briefing.
- The test team creates the Final Report using existing PC-based template and standard software (e.g., Word, PowerPoint). The Detachment/Directorate technical staff ensures the final report complies with appropriate AFOTEC template and technical editing standards.
- As changes occur through the review and coordination process, the test team replaces the master Word file(s) with the most current version. Upon resolution and incorporation of HQ comments, a Command Section tasker is submitted by the TD in AECS. For classified documents, master files (original and subsequently updated report files and associated staff summary sheets (AF Forms 1768)) are sent for coordination via SIPRNET/e-mail attachment to the XOO action officer for the respective Det/Dir.
- Following final review and approval/signature by the Commander, the report and all attachments, annexes, and appendices are considered final; no further changes are authorized without the Commander's approval. The CAG notifies AFOTEC/SC to retrieve the MIN file for distribution and tracks the production and distribution of the final report. The CAG forwards the signed signature page hard copy to AFOTEC/HO for archive.
- AFOTEC/SC converts the master report file into an electronic pdf file prior to distribution. Standards include a bookmark for all

sections listed in the table of contents. SC ensures links created in the master report file appear in the .pdf file. Prior to distribution SC coordinates with the TD and technical advisor to obtain final approval of the .pdf file and CD labeling.

- The basic report with attachments, annexes and appendices are included in an autorun pdf file copied to a compact disc (CD) for distribution per the information on the distribution list. SC forwards final report CDs, along with a copy of the distribution list, to the Information Distribution Center for mailing. NOTE: see the Test Report template located on the MIN (see attachment 4) for any applicable additive distribution requirements. Only offices without MIN access are sent files via CD; all other offices may retrieve the final report from the MIN.

Chapter 7 OT Closeout

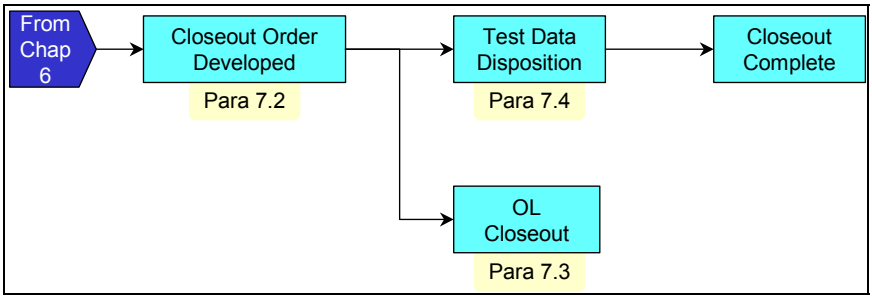

Figure 7.1. Test Closeout Overview

7.1 OT Closeout Introduction

The closeout phase is required for the completion of a program as well as the closing of a detachment operating location (see figure 7.1). Closeout for programs may be necessary for several reasons, ranging from the OT&E effort being complete to the resources not being available to accomplish further evaluation.

7.2 OT Program Closeout

Once a program has moved out of scope/cost via a tasking order, a Closeout Order (approved by XO) is required to terminate a program. Closeout begins when XO approves the closeout order and ends when the Det/ ST certifies that all actions are completed (this is done with a memo for record and sent to XO). The template for a closeout order and the MFR is available on the AFOTEC MIN (see attachment 4). Note: for programs that do not mature beyond an IO, the Det CC can initiate closure with a letter to XO.

7.3 Unit Closeout

As part of Program Closeout activity, a unit may be inactivated after the last OT activity is completed. A unit may also need to be closed when it is determined that it is no longer needed. The TD or OL Chief is responsible for ensuring an inactivation report is submitted within 30 days to CC for approval. The template for this report is available on the AFOTEC MIN (see attachment 4).

7.4 Test Data Disposition

The following information is repeated from the *Data Collection and Management* area in paragraph 5.10. Maintain original data to allow for reanalysis if necessary and dispose of in accordance with AFMAN 37-139. For AFOTEC tests, all important data not included in the final report is reduced and published in supporting data documents. Usually the raw

data may be destroyed when inactivating the test team. Before destroying test data, test team analysts coordinate what data will be destroyed with both their detachment/directorate technical advisor and TS. If follow-on tests are scheduled, key data should be made available to the new test team to avoid redundancy and establish a baseline for future testing. Because of space limitations, it is desirable to first convert large amounts of primary data to microfiche. See AFOTECI 84-101, *Requirements for OT&E Case Files and Other Historical Information*, for more guidance.

7.4.1 Funds Closeout Procedures

Following are some of the items for which TDs, OL chiefs, or detachment commanders should initiate appropriate action. The resource manager is the POC for assistance with the following:

- Request and Authority to Cite Funds (AF Forms 616).
- Travel Orders - Ensure all orders processed are posted to the AF Form 616. Close out the AF Form 616, sign, attach copies of travel orders, and forward to the servicing comptroller/FMFPT function (with a copy to AFOTEC/RMRF).
- Vicinity Travel Claims - Ensure all team members have filed their claim for vicinity travel on SF 1164. Processed SFs 1164 must be posted to the AF Form 616. Close out the AF Form 616, sign, and forward to the servicing comptroller/FMFPT function (with a copy to AFOTEC/RMRF). Be sure to attach copies of all SFs 1164 listed on the AF Form 616 before forwarding to the servicing comptroller/FMFPT function.
- Contracts - Ensure that contracts for services and supplies are terminated. Receiving reports for services and supplies should be provided to the supporting Accounting and Finance Office so they can make payments to the vendors. Processed contracts must be posted to the AF Form 616. Close out the AF Form 616, sign, attach copies of all contracts (and modifications), and forward to the servicing comptroller/FMFPT function.
- Toll Calls - Prepare AF Form 406, Miscellaneous Obligation Reimbursement Document (MORD), to cover the last billing plus any other charges related to termination of services. Send the MORD to the servicing comptroller/FMFPT function and a copy to AFOTEC/RMF.
- GSA Rental Vehicles - Obtain receipts for any charges related to rental of vehicles, mileage at time of turn-in, and last date used and submit to AFOTEC/RMF.
- Supplies/Equipment Accounts - Cancel "due-outs" if these items are no longer required. If items cannot be canceled or are

required, ensure sufficient funds remain in the account to have them issued. Notify AFOTEC/RMRS and obtain redistribution instructions on all supplies and equipment. Obtain copies of the most recent Organizational Cost Center Report (OCCR) MO3, A&F Stock Fund Due-Out Report M36, and Daily PFMR/OCCR Update and Reconciliation D11 from the support Accounting and Finance and forward to AFOTEC/RMF.

- MIPRs/Project Orders - For each document issued, determine if the total amount has been used in support of the OL. If not, find out how much will be required to cover obligations through the date of inactivation and report this information to AFOTEC/RMF for each document. This information is needed to decrease the amounts cited on the documents, and the unused funds will become available for AFOTEC to use elsewhere.
- Civilian Personnel - Contact the support civilian pay section at Accounting and Finance to obtain the accruals through the last day of employment. Report this information to AFOTEC/RMF so that the MORD recorded at the Kirtland Accounting and Finance Office can be adjusted accordingly.

ATTACHMENTS

ATTACHMENT 1 - COORDINATION PROCESS & DOCUMENT REVIEWS

Coordination Process

A1-1 All documents requiring XO or CV or CC approval/signature must be coordinated via the AFOTEC Electronic Coordination System (AECS). In addition, the appropriate 2-letter coordination must also have been done via AECS so that command section can access the views/opinions expressed by 2-letters. AECS can also be used for other types of coordination requirements as shown in Table A1-1.

A1-1.1. AECS is an automated suspense tracking system managed by the Commander's Action Group (CAG). AECS is available on the MIN, and has the capability to task, review comments, and track their status as the document flows through coordination. All comments made in AECS are exportable to a Microsoft Excel spreadsheet. Important! Action officers should first review the Document Review guidance to determine the approval required and then select the appropriate coordination within AECS.

Table A1-1. Types of AECS Coordination

Action Officer	Coordination between individuals prior to 2-letter coordination. For example, a test director could use this when tasking core team members to review a document.
Standard HQ 2-letter	Coordination level for most test documents. Reviewers are XO, XP, CA/CN, AS, TS, SF, HO and SE. **Note: HO's review is only for validating the distribution statement on the plan/report.**
General 2-letter	Tailorable coordination for selecting various 2-letter offices.
All KAFB	Coordinating a documenting applicable to KAFB locations only.
All 2-letters	Coordination required for staffing policy letters and publications. Additionally, proposed policy documents must have been presented before the AFOTEC Policy Review Board before they can be staffed through AECS.
Command section	Includes XO, CA/CN, CV and CC. Following 2-letter coordination, the document goes to command section coordination. The first step is a 2-day review by the O-6s that have previously coordinated on the document. Only a review of the comments made by other 2-letters will be done. The CAG will determine the affected directorates.

A1-1.2. Along with providing a quality check of the document, the CAG will assist POCs with getting their document through the command section and helping with problems encountered with AECS.

Briefing Guides and Templates

A1-3. Briefing Guides. Briefing guides reflect the information desired/required by XO and CA. If areas of the briefing guide do not apply to your program, you may exclude them but you should always be prepared to answer why you did if asked.

A1-4. Templates: Templates reflect the format and structured required for your documents. As with the briefing guides, test teams should use each template and tailor as necessary for the program. Both the test plan and test report have an information sheet containing "Tools and Techniques" to answer those additional questions test teams may have that are not available on the actual template. This information sheet is co-located with the plan and report templates.

Classified Documents

A1-5. AECS may be used to task reviewers to coordinate on a classified document, but the tasker itself must be unclassified. A separate classified file is created and stored on the SIPRNET, and then appropriate information (see below) is entered in the tasker's SUMMARY information in AECS:

- Appropriate document title.
- Indicate who the file was sent to (via SIPRNET) and referred to in the tasker's summary information paragraph. Use name and organization only and NOT the specific SIPRNET address.
- Appropriate background, purpose, and recommendation information.

The tasker POC must ensure that adequate controls are in place so that classified information is not entered into AECS, including comments, resolution, and feedback. All of these activities should be done outside of AECS.

Document Review

A1-6. External Documents. The document review process for documents originating outside AFOTEC is managed by XO. If the TO has been published, then XO sends the request direct to the detachments. If the TO has not been published, then the responsibility

remains with AS to coordinate with the appropriate 2-letter offices and detachments. When a program is not listed, the tasker will be sent to AS. ST is the OPR for all special access program (SAP) documents.

A1-6.1. Normal suspense actions go to the appropriate corporate account, and the respective XOO focal points. Where AFOTEC does not have a particular program listed on the MIN (either in AS or a detachment), then XOO will determine who should be tasked.

A1-6.2. Program documents for MOT&Es are signed by each of the OTAs. For MOT&Es where AFOTEC is the lead service, obtain signatures of the other OTAs first before requesting CC approval/signature on a program document.

A1-7. AFOTEC Test Program Related Documents. For each document listed below (see table A1-2), the approving official is identified first, and then the coordination required for each.

Table A1-2. Document Review/Coordination

Document Title	Review/Coordination Process
Involvement Order	XO approval → AS drafts and staffs and coordinates through AECS for 2-letter coordination.
Tasking Order	CV approval → AS, with the support of the core team, drafts and staffs. The final TO is submitted through XO and CA/CN to CV for approval. Amendments to existing TOs are managed by the executing detachment
Closeout Order	CV approval → XO drafts and staffs through AECS for 2-letter coordination. This CO directs the detachment to begin formal closeout activities (see chapter 7).
Policy Letters	CC approval → all new and proposed policy must be reviewed by the AFOTEC Policy Review Board to determine impact on OT&E activities. Action officers may contact AFOTEC/XPY for policy letter advice, or RMSC for procedural advice (guidance contained in AFOTECMAN 33-360, Volume I, Publications Management Program).
Support Agreements (including base level, MOAs, MOUs, charters)	CV approval → contact XPY (SAM) for staffing procedures
Closeout MFR	XO approval → this MFR is submitted whenever closeout activities are complete. The OPR staffs the report through AECS for HQ 2-letter coordination for final XO approval.

Table A1-2 (continued). Document Review/Coordination

Document Title	Review/Coordination Process
Accreditation Plans and Reports	If CA/CN or CC approval is required, the Det/CC submits the plan/report through AECS for 2-letter coordination. If Det/CC approval, the TD submits the plan/report to the CA/CN staff and TS for review and comments. Once all comments are incorporated, the Det/CC signs.
Inactivation Report	CC approval → this report is submitted whenever the final report has been completed for a program, or upon inactivation of an OL. The report is submitted 30 working days after test activity completion or unit inactivation. The OPR staffs the report through AECS for HQ 2-letter coordination for final CC approval.
Test Plan (OA, OUE, IOT&E, etc.)	Test plans going outside AFOTEC for approval must be signed by AFOTEC/CC. Programs on the OSD oversight list must be briefed to AF/TE, and then DOT&E at least 120 days before test start. Test plans are entered into AECS for 2-letter coordination (XP, TS, AS, XO, SE, SF, HO and CA/CN). Coordination through command section should be accomplished before briefing AFOTEC/CC. For MOT&E plans, the OPR forwards the final plan to the applicable service OTAs for coordination. Signature/coordination/comments by service OTAs are then returned to the OPR.
Final Report (including briefing requirements)	See tables A1-3 and A1-4.
NTA Final Reports	NTA programs are authorized to use a client-approved format and approval process. However, these documents are processed through AECS for HQ Command Section information. The AFOTEC Commander approves the document for release by the Det 1 CC. Standard HQ Command Section processing time is 3 full work days
Initial Request to Activate a Unit	AFOTEC/CC approval → Each of the following offices coordinate in AECS before the package is submitted as a Command Section tasker: DP. LC, PA, RMC, RME, RMF, SC, XPY, SE, SF, XOT, TS, XO, DPX.

Table A1-3. Coordination Process for AFOTEC Reports (Non-MOT&E)

ITEM	ACTION
Projected dates (days are work days)	OPR provides two dates – projected LTE and known full-rate production decision, fielding decision or IOC. Submit to CAG corporate account and update MIN (due when known).
LTE + 15 days	OPR inputs final report into AECS for 2-letter coordination (XP, TS, AS, XO, SE, HO, SF, and CA).
LTE + 19 days	Comments by reviewers are submitted to the OPR via AECS
LTE + 23 days	OPR inputs final report into AECS for Command Section coordination (which includes a two-day O-6 level review of the final document after completing 2-letter coordination).
LTE + 31 days	OPR resolves final report issues with XO, CA, or CV (if required). Each OCR "approves" the document via AECS. CC is notified automatically that document is ready for "signature."
LTE + 33 days	Submit final report briefing read-ahead to CAG, XO, CA, XP, TS, AS, and SE.
LTE + 35 days	Hold pre-briefing (XO chair) of final report briefing. Invite AS, TS, XP, and CA.
LTE + 36 days	Present final report briefing to CC/CV and Senior staff; CC/CV approves final report or provides comments via AECS.
Signature + 5 days	Approved final report made ready and distributed

Table A1-4. Coordination Process for AFOTEC MOT&E Reports

ITEM	ACTION
Projected dates (days are work days)	OPR provides two dates – projected LTE and known full-rate production decision, fielding decision or IOC. Submit to CAG corporate account and update MIN (due when known).
LTE + 15 days	OPR inputs final report into AECS for 2-Letter coordination (XP, TS, AS, XO, SE, HO, SF, and CA).
LTE + 19 days	Comments by reviewers are submitted to the OPR via AECS.
LTE + 20 days	Return to XO for review of comments and resolution (include comment resolution matrix).
LTE + 23 days	OPR forwards final report to applicable service OTAs for coordination.
LTE + 44 days	Coordination/comments by service OTAs are returned to the OPR (this includes OTA Commander's signature).
LTE + 51 days	OPR inputs final report into AECS for Command Section coordination (which includes a two-day O-6 level review of the final document after completing 2-letter coordination).
LTE + 59 days	OPR resolves final report issues with XO, CA, or CV (if required). Each OCR "approves" the document via AECS. CC is notified automatically that document is ready for "signature."
LTE + 61 days	Submit final report briefing read-ahead to CAG, XO, CA, XP, TS, AS, and SE.
LTE + 63 days	Hold Pre-briefing (XO chair) of the final report briefing, invite AS, TS, XP, and CA.
LTE + 64 days	Present final report briefing to CC/CV and Senior staff; CC/CV approves final report or provides comments via AECS.
Signature + 5 days	Approved final report made ready and distributed.

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ATTACHMENT 2 - GLOSSARY

Accreditation. The official determination that a model or simulation (or other test capability) is acceptable for a specific purpose. (DODD 5000.59)

Acquisition. The procurement of real property or services by any means exclusive of lease agreements. The process consists of planning, designing, producing, and distributing a system or equipment. Acquisition in this sense includes the concept definition or exploration, demonstration and validation (including prototype development and test), full-scale development or LRIP, full-rate production or initial deployment, and operations support.

Acquisition Category (ACAT). Acquisition categories determine the level of review, decision authority, and applicable procedures. They facilitate decentralized decision making and execution, and compliance with statutory imposed requirements. There are three ACATs based on research, development, test and evaluation (RDT&E) and/or procurement costs stated in FY 2000 dollars:

- ACAT I programs are major defense acquisition programs (MDAP) requiring eventual expenditure for RDT&E of more than $365 million, or procurement of more than $2.19 billion.
- ACAT II programs are major systems requiring eventual expenditure for RDT&E of $140 million, or procurement of more than $660 million.
- ACAT III programs are those systems not meeting the requirements for ACAT I or ACAT II programs.
- There are three sub-categories of ACAT I programs:
  - ACAT ID means the program is subject to Defense Acquisition Board (DAB) oversight, and the Milestone Decision Authority (MDA) is USD(A&T).
  - ACAT IC means the MDA is the component head, or Service Acquisition Executive (SAE).
  - ACAT IA programs are major automated information systems (MAIS) requiring program costs for any single year in excess of $32 million, total program costs in excess of $126 million, or total life-cycle costs in excess of $378 million, or those designated by ASD(C3I) to be ACAT IA.
- There are two sub-categories of ACAT IA programs:
  - ACAT IAM means the MDA is ASD(C3I).
  - ACAT IAC means the MDA is the component DAC.

Acquisition Community. All personnel involved in the conceptualization, initiation, design, development, test, contracting, production, deployment, sustainment, logistics, support, modification, and disposal of weapon and other systems, supplies, or services to satisfy DoD needs, and intended for use in or in support of military missions.

Acquisition Decision Memorandum (ADM). A memorandum signed by the milestone decision authority that documents the decisions made and the exit criteria established as the result of a milestone decision review or in-process review. (Defense Acquisition Deskbook)

Acquisition Logistics. Technical and management activities conducted to ensure supportability implications are considered early and throughout the acquisition process to minimize support costs and to provide the user with the resources required to sustain the system in the field. (Defense Acquisition Deskbook)

Acquisition Phases. The logical parts of an acquisition program, separated by milestone decision points, during which broadly stated mission needs are progressively translated into well-defined system-specific requirements. The number of phases shall be tailored to meet the specific needs of individual acquisition programs. The five acquisition phases are:

- Concept Refinement
- Technology Development
- System Development and Demonstration
- Production and Deployment
- Operations and Support

Acquisition Process. The system of discrete, logical phases separated by major decision points called milestones. The acquisition process begins when broad mission capability needs are identified which cannot be satisfied with non-materiel solutions. (AFI 63-101)

Acquisition Program. A directed, funded effort that is designed to provide a new or improved materiel capability in response to a validated need.

Acquisition Program Baseline (APB). A succinct document that details cost, schedule, and performance (including support) parameters, and program breach information. It establishes the commitment between

the program manager and the Milestone Decision Authority. (AFI 63-101)

Acquisition Risk. The chance that some element of an acquisition program produces an unintended result with adverse effect on system effectiveness, suitability, cost, or availability for deployment. AFOTEC's role is to help reduce acquisition risk through value added participation in the acquisition process.

Acquisition System. A single uniform system whereby all equipment, facilities, and services are planned, designed, developed, tested, acquired, maintained, and disposed of within the DoD. The system encompasses establishing and enforcing policies and practices that govern acquisitions, to include documenting mission needs and establishing performance goals and baselines; determining and prioritizing resource requirements for acquisition programs; planning and executing acquisition programs; directing and controlling the acquisition review process; developing and assessing logistics implications; contracting; monitoring the execution status of approved programs; and reporting to Congress. (DoDD 5134.1)

Advanced Concept Technology Demonstration (ACTD). A means of rapidly demonstrating the use of advanced technologies to address urgent military needs. ACTDs are designed to rapidly transfer technology from developers to users. Demonstrations are jointly developed and implemented with the operational user and development communities as key participants. The fundamental goals are to provide a sound basis for investment decisions, and provide residual operational capabilities. ACTDs are partially funded by OSD.

Advanced Distributed Simulation. A set of disparate models or simulations operating in a common synthetic environment in accordance with the DIS standards. The ADS may be composed of three modes of simulation: live, virtual and constructive, which can be seamlessly integrated within a single exercise.

Aggregation of Results. The compilation of MOP and MOE results to answer COI, effectiveness, and suitability questions. Also, aggregation is used to determine if the system can successfully support the operational task. For some tests, the aggregation method may be identified in the Analysis of Alternative (AoA). Aggregation methods may be simple and logical or may be complex and require novel methods using professional judgment.

Air Force Acquisition Executive (AFAE). The principal Air Force advisor to the defense acquisition executive on all matters pertaining to the Department of Defense Acquisition System. The Secretary of the Air Force will designate the AFAE.

Analysis. The detailed examination and application of disciplined techniques (for example, mathematics or statistics) to anything complex to understand its nature or determine its essential features.

Analysis of Alternatives (AoA) An analysis of the estimated costs and operational effectiveness of alternative materiel systems to meet the need and the associated program for acquiring each alternative.

Automated Information System (AIS). A combination of computer hardware and software, data, or telecommunications that performs functions such as collecting, processing, transmitting, and displaying information. Excluded are computer resources, both hardware and software that are physically part of, dedicated to, or essential in real time to the mission performance of weapons systems.

Availability (Ao). A measure of the degree to which an item is in the operable and commitable state at the start of a mission when the mission is called for at an unknown (random) time. (Defense Acquisition Deskbook)

Battlelab Initiative (BI). Innovative or revolutionary operations or logistics concepts capable of improving the Air Force's capability to execute its core competencies. They may drive later changes to Air Force organization, doctrine, training, requirements, or acquisitions. BIs are not a formal part of the acquisition process or formal operational tests, but are "demonstrations" under the direction of the sponsoring battlelab(s). BIs require inputs from operational testers who will assist in demonstration planning and execution. AFOTEC is the primary source of OT&E expertise in support of BIs. AFOTEC will program for BI activities to include demonstration resource support. Battlelab demonstration activities are conducted using client-provided Operation and Maintenance (O&M) (3400) or Procurement (e.g., 3010, 3020 or 3080) funds. More information about BIs is found in AFI 10-1901, Air Force Battlelab Responsibilities, Processes, and Documentation.

Battlespace. The environment, factors, and conditions that must be understood to successfully apply combat power, protect the force, or complete the mission. This includes the air, land, sea, space, and the included enemy and friendly forces; facilities; weather; terrain; the

electromagnetic spectrum; and the information environment within the operational areas and areas of interest. (Joint Pub 1-02)

Beyond Low Rate Initial Production (LRIP) Report. An assessment of the adequacy of the operational test and evaluation and the effectiveness and suitability of a weapon system for combat, prepared by the Director, Operational Test and Evaluation (DOT&E), and submitted to the DAE and then to the Congress.

Capability-based Requirements. Capability-based requirements state "what" the system needs to do instead of "how" to build the system and how subsystem allocations are made. This definition allows the System Development team, in conjunction with the user, flexibility to define a best-value system to meet warfighter requirements and develop operationally oriented performance requirements with a minimum number of KPPs. Requirements-setting authorities must take special efforts to exclude requirements not directly contributing to warfighter needs.

Capability Development Document (CDD). The warfighter's primary means of providing authoritative, measurable and testable requirements for the system development and demonstration (SDD) phase of an acquisition program. The CDD provides the operational performance attributes necessary for the acquisition community to design a proposed system and establish a program baseline. The CDD states performance attributes, including Key Performance Parameters (KPPs) that will guide the development and demonstration of the proposed increment. (CJCSI 3170.01C)

Capability Production Document (CPD). The warfighter's primary means of providing authoritative, measurable and testable requirements for the production/fielding phase of an acquisition program. A CPD is finalized after critical design review and is validated and approved prior to the Milestone C acquisition decision. The CPD provides the operational performance attributes necessary for the acquisition community to produce a specified quantity of a single increment of a specific system. The CPD states performance attributes, including Key Performance Parameters (KPPs), to guide the production and deployment of the current increment. Since a CPD applies to only a single increment of a program's development, the performance attributes and KPPs shall apply only to the increment described in the CPD (or, in a single step to full capability, to the entire system). (CJCSI 3170.01C)

Capstone TEMP. A TEMP that addresses the test and evaluation of a defense system comprised of a collection of "stand alone" component

systems which function collectively to achieve the objectives of the defense system. (Defense Acquisition Deskbook)

Client Requirements Document (CRD). Used as a record of agreement between AFOTEC and the client for non-traditional test activities (NTA) or client-funded OT activities. It lists the expected level of support and deliverables, along with the schedule and funding requirements needed. The CRD is used as a guide for AFOTEC and the client in the management of a particular effort. It is not, however, a contractual, legal, or fiduciary document.

Closeout Order. Issued by XO and ends with a Det/ST letter confirming completion of closeout, the Closeout Order initiates completion of program closeout. Several actions may be contained in this document, see Chapter 5 for a complete listing.

Combined Test Force (CTF). See also "Integrated Test Team" An integrated test and evaluation product team empowered to evaluate a weapon system by collocating its major members at one primary test site. The requirements, resources, test objectives, and leadership of various test efforts are integrated to achieve higher levels of efficiency, but without degradation of either DT or OT test objectives. Although CTFs conduct collaborative and/or concurrent testing, separate independent operational assessments/ evaluations/reports are required. Additionally, a dedicated phase of OT&E is normally supported by appropriate elements of the CTF in order to support the beyond LRIP and/or fielding decision for the acquisition program. Also referred to as integrated testing in some multiservice programs. As a minimum, representatives from the DT&E and OT&E communities, contractors, and operating commands will be members.

Combined Testing. See also "Integrated Testing." Testing conducted by the developmental and operational testers when there are clear cost and/or schedule advantages. The high cost or lack of sufficient test articles may provide an overall benefit for DT&E and OT&E teams to share test resources and data. Combined testing usually ends with a phase of dedicated OT&E. Increasingly, AFOTEC is doing combined test with the development contractor. The restriction for contractor involvement in Title 10 applies only to dedicated OT&E.

Commercial and Non-Developmental Item

- Commercial Item- Any item, other than real property, that is of a type customarily used by the general public or by nongovernmental entities for purposes other than governmental. Any item that evolved from such an item through advances in

technology or performance and that is not yet available in the commercial market place. (See Title 41 §403(12), or Federal Acquisition Regulation Part 201, for a complete definition.)

- Commercial off the Shelf- Subset of commercial item, any previously developed item that requires no modification to be placed into government use.
- Non-developmental Item- Any commercial item. Any previously developed item of supply that is in use by a department or agency of the United States. Any item of supply that requires only minor modification or modification of the type customarily available in the commercial marketplace in order to meet the requirements of the procuring department or agency. (See Title 41 §403(13), or Federal Acquisition Regulation Part 201, for a complete definition.)

Compatibility. The capability of two or more items or components of equipment or materiel to exist or function in the same system or environment without mutual interference. (CJCSI 6212.01A)

Concept of Operations (CONOPS) Verbal or graphic statement, in broad outline, of a commander's assumptions or intent in regard to an operation or series of operations. The concept of operations frequently is embodied in campaign plans and operation plans. In the latter case, particularly when the plans cover a series of connected operations to be carried out simultaneously or in succession. The concept is designed to give an overall picture of the operation. It is included primarily for additional clarity of purpose. Also called commander's concept (Joint Pub 1-02).

Core Team. Working team established and tasked to perform the activities of AFOTEC's discovery and scope/cost Business Management Processes. The core team is usually comprised of representatives from AS, TS, XO, XP, SC, Det/ST, and others. The team is initially designated by the IO.

Covered System. A term used to denote systems that must undergo live fire test and evaluation (LFT&E) and which are on OSD's LFT&E Oversight List. A vehicle, weapon platform, or conventional weapon system that includes features designed to provide some degree of protection to users in combat; and that is a major system (Title 10 §2366).

Critical Operational Issue (COI). A key operational effectiveness or operational suitability issue that must be examined in operational test and evaluation to determine the system's capability to perform its

mission. A COI is normally phrased as a question to be answered in evaluating a system's operational effectiveness and/or operational suitability. (Defense Acquisition Deskbook)

Dedicated OT&E. Required for ACAT I and II programs, carried out independently by the OTA to determine operational effectiveness and suitability of the system before full-rate production. Typically performed at the end of an I/QOT&E program (which may encompass combined testing) dedicated OT&E requires a certification process between the developing and operational test agency.

Defense Acquisition Board (DAB). The senior DoD acquisition review board, chaired by the Office of the Under Secretary of Defense for Acquisition and Technology (USD(AT&L)). The Vice Chairman of the Joint Chiefs of Staff is the Vice Chair. Assists the DAE with milestone and program reviews, policy formulation, and acquisition resource recommendations. It is the primary forum for DoD components to provide advice and assistance concerning acquisition matters through the DAE to the Secretary of Defense.

Defense Acquisition Deskbook. An automated repository of information consisting of an electronic Desk Reference Set, a Tool Catalog, and a Forum for the exchange of information. The Reference Set organizes information into two main categories: mandatory guidance and discretionary information. (Defense Acquisition Deskbook)

DAB Committees. Advisory review groups subordinate to the DAB. The number of committees is determined by USD(AT&L). The purpose of the committee is to review DoD component programs before a DAB review in order to make an independent assessment and recommendation to the board regarding the program.

Data Injectors and Stimulators. Devices and test drivers that inject or radiate signals into the sensor system(s) of operational equipment to imitate the effects of platforms, munitions, and environments that are not physically present. (see DOD 5000.59-M: stimulation, stimulators)

Defense Acquisition Executive (DAE). The principal advisor to the Secretary of Defense on all matters pertaining to the DoD Acquisition System. USD(AT&L) is the DAE.

Deficiency. A condition that prevents successful mission accomplishment or degrades a system's operational effectiveness or operational suitability. (TO 00-35D-54)

Deficiency Analysis and Ranking Technique (DART). One of several methods used to prioritize active deficiency reports. The DART process consists of test team members, including representatives of the using command, and uses weighted values in a matrix approach. (TO 00-35D-54)

Deficiency Report (DR). A report used to identify, document, and track system deficiency and enhancement data while a system is in advanced development, test and evaluation, or operational transition. (TO 00-35D-54)

Dependability. A measure of the degree to which an item is operable and capable of performing its required function at any (random) time during a specified mission profile, given item availability at the start of the mission. (DSMC Glossary)

Deployability. The ability of a unit, weapon system, or element thereof, to relocate to a desired area of operations or to a staging area without unacceptable delays.

Descriptor. Each factor has a single set of descriptors identifying distinct categories. Categories are developed to distinguish among several levels at which the factor may be experienced. (AFDD 1-1)

Designated Acquisition Commander (DAC). The individual who functions as the MDA on programs not assigned to a PEO. The commanders of product centers and air logistics centers act in this capacity. DACs, like PEOs, are accountable to the Service Acquisition Executive. (AFPD 63-1)

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 or correction. Decision-makers use DT&E results to minimize design risk, whereas OT&E evaluates military utility, and system effectiveness and suitability. DT&E usually includes contractor testing (AFPD 99-1).

Digital M&S. All models and simulations implemented on digital computers, typically consisting of varying degrees of abstraction (e.g., analytical, process, queuing, engagement, mission, or campaign models).

DITSCAP (Department of Defense Information Technology Security Certification and Accreditation Process). A standard process, set of activities, general tasks, and a management structure to certify and accredit Information Systems (IS) that will maintain the information assurance and security posture of the Defense Information Infrastructure (DII). The process consists of Definition, Verification, Validation, and Post Accreditation Phases. All information relevant to the certification and accreditation is collected into the System Security Authorization Agreement (SSAA). The SSAA is a formal agreement among the Designated Approving Authorities (DAAs), Certifier, user representative, and program manager.

Early Involvement. Typically starting before Milestone A, involvement by AFOTEC intended to inject operational test and evaluation issues and concerns as soon as possible in the acquisition program. The intent is to achieve cost and schedule savings by recommending system design improvements benefiting operational effectiveness and suitability. An element of early involvement is AFOTEC's participation in HPTs for capability requirements documents. Early involvement continues through the start of dedicated OT&E to reduce program risk.

Early Operational Assessment (EOA). An operational assessment conducted prior to, or in support of, Milestone B. An EOA assesses the most promising design approach sufficiently early in the acquisition process to assure it has the potential to fulfill user requirements.

Effectiveness. See Operational Effectiveness.

Electromagnetic Environmental Effects (E3). The impact of the electromagnetic environment upon the operational capability of military forces, equipment, systems, and platforms. It encompasses all electromagnetic disciplines, including electromagnetic compatibility/ electromagnetic interference (EMC/EMI); electromagnetic vulnerability (EMV); electromagnetic pulse (EMP); electronic protection (EP); hazards of electromagnetic radiation to personnel (HERP), ordnance (HERO), and volatile materials (HERF); and natural phenomena effects of lightning and p-static (precipitation static).
(Joint Pub. 1-02)

Electronic Countermeasures (ECM). That division of electronic warfare involving actions taken to prevent or reduce an enemy's effective use of the electromagnetic spectrum. It includes electronic jamming and deception. (Joint Pub 1-02)

Evaluation. The review and analysis of qualitative or quantitative data obtained from design review, hardware inspection, testing, or operational usage of equipment.

Evaluation Criteria. Standards by which accomplishments of required technical and operational effectiveness and/or suitability characteristics or resolution of critical operational issues may be assessed. (Defense Acquisition Deskbook)

Evaluation Framework. The Evaluation Framework, also known as the OT&E framework, forms the foundation for AFOTEC's OT&E efforts. The EF documents the core team's rationale in estimating the resources required to test the system and is a support document for the Tasking Order. As such, it captures the battlespace the system is intended to operate in, and the requirements to be tested, each linked to a specific COI for traceability and any Special Interest Item considerations. In addition, it contains the OIA issues, test design tables (objectives, measures, factors and descriptors), and the test event matrix generated during the ITD process.

Evolutionary Acquisition. An acquisition strategy that defines, develops, produces or acquires, and fields an initial hardware or software increment (or block) of operational capability. It is based on technologies demonstrated in relevant environments, time-phased requirements, and demonstrated manufacturing or software deployment capabilities. These capabilities can be provided in a shorter period of time, followed by subsequent increments of capability over time that accommodate improved technology and allowing for full and adaptable systems over time. Each increment will meet a militarily useful capability specified by the user (i.e., at least the thresholds set by the user for that increment); however, the first increment may represent only 60% to 80% of the desired final capability.

There are two basic approaches to evolutionary acquisition. In one approach the ultimate functionality can be defined at the beginning of the program, with the content of each deployable increment determined by the maturation of key technologies. In the second approach the ultimate functionality cannot be defined at the beginning of the program, and each increment of capability is defined by the maturation of the technologies matched with the evolving needs of the user. (USD AT&L memo, 12 Apr 02)

- **Spiral Development.** An iterative process for developing a defined set of capabilities within one increment. This process provides the opportunity for interaction between the user, tester,

and developer. In this process, the requirements are refined through experimentation and risk management, there is continuous feedback, and the user is provided the best possible capability within the increment. Each increment may include a number of spirals. Spiral development implements evolutionary acquisition.

- **Increment or Block.** 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 thresholds and objectives set by the user.

Exit Criteria. Program specific accomplishments that must be satisfactorily demonstrated before an effort or program can progress further in the current acquisition phase, or transition to the next acquisition phase. Exit criteria may include such factors as critical test issues, the attainment of projected growth curves and baseline parameters, and the results of risk reduction efforts deemed critical to the decision to proceed further. Exit criteria supplement minimum required accomplishments (e.g., beyond LRIP report, CAIV objective, APB parameters) are specific to each acquisition phase. (Defense Acquisition Deskbook)

Factor. A factor is a variable of the environment or situation that affects task performance. (AFDD 1-1).

Follow-on Operational Test & Evaluation (FOT&E). Continuation of IOT&E or QOT&E activities past the Full-Rate Production decision. FOT&E answers specific questions about unresolved COIs and test issues, or completes areas not finished during the I/QOT&E. It ensures the initial system acquisition process is complete.

Force Development Evaluation (FDE). Evaluation, demonstration, exercise, or analysis of fielded, operational systems during the sustainment portion of the system life cycle. FDE focuses on the MAJCOMs' operational employment and sustainment of fielded systems.

Foreign Comparative Test (FCT). An OSD-funded program that allows each Service to test foreign-developed systems, components, equipment items, or technologies. The goal is to determine if foreign items meet validated needs and requirements, and if they are viable candidates for a competitive acquisition. (AFI 99-114)

Full-Rate Production. The period encompassing the process of uniting facilities, hardware and software, personnel, and procedural publications

necessary for manufacturing and delivering an acceptable integrated system to the using and supporting commands.

Full Operational Capability (FOC). The full attainment of the capability to employ effectively a weapon, item of equipment, or system of approved specific characteristics, which is manned and operated by a trained, equipped, and supported military unit or force. (Defense Acquisition Deskbook)

Hardware-in-the-Loop (HITL). Testing that involves system or subsystem hardware in an open or closed-loop mode against high fidelity targets and threat simulations. It allows testers to test developmental and production systems under controllable, repeatable, non-destructive conditions.

High Performance Team (HPT). The HPT is the preferred method to develop an ICD Stage I/ICD Stage II, CDD, or CPD, and is used unless waived by AF/XOR at the RSR. An HPT consists of a lead (normally the sponsor), core and support team members. The HPT accelerates the documentation process and increases the potential for a quality document. Its overarching objective is to capture, articulate, and document the operator's operational requirements in minimum time, while achieving stakeholder buy-in. AFOTEC is a core member of HPTs.

HITL/SWIL (Hardware/Software in the Loop). System and mission simulators where external stimuli (e.g., from hardware, software, or human intervention) are used to demonstrate the capability to operate the system or subsystem within an environment simulating actual operating conditions.

Human Engineering. The application of knowledge of human beings' capabilities and limitations to the planning, design, development, and testing of aerospace systems, equipment, and facilities to achieve optimum personnel safety, comfort, and effectiveness compatible with systems requirements.

Human Factors. The systematic application of relevant information about human abilities, characteristics, behavior, motivation, and performance. It includes principles and applications in the areas of human engineering, anthropometrics, personnel selection, training, life support, job performance aids, and human performance evaluation. (Defense Acquisition Deskbook)

Human Systems Integration. A disciplined, unified, and interactive approach to integrate human considerations into system design to

improve total system design to improve total system performance and reduce costs of ownership. The major categories of human considerations are manpower, personnel, training, human factors engineering, safety, and health. (Defense Acquisition Deskbook)

Implementing Command. The lead command or agency designated by the Service Acquisition Executive to manage an acquisition program.

Increment or Block. (See Evolutionary Acquisition).

Information Assurance (IA). Measures that protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation. This includes providing for restoration of information systems by incorporating protection, detection and reaction capabilities. (DoDD 8500.1) Availability (in this context) relates to the timely, reliable access to data and information services for authorized users. Integrity is the quality of an information system reflecting the logical correctness and reliability of the operating system; the logical completeness of the software and software implementing the protection mechanism, and the consistency of the data structures and occurrence of the stored data. In a formal security mode, integrity is interpreted more narrowly to mean protection against unauthorized modification or destruction of information. Authentication is a security measure designed to establish the validity of a transmission, message, or originator, or a means of verifying an individual's authorization to receive specific categories of information. Confidentiality is assurance that information is not disclosed to unauthorized entities or processes. Non-repudiation is assurance the sender of data is provided with proof of delivery and the recipient is provided with proof of the sender's identity, so neither can later deny having processed the data. (also DoDD 8500.1, and NSTISSI No. 4009)"

Information Warfare (IW). Actions taken to achieve information superiority by affecting adversary information, information-based processes, information systems, and computer-based networks while defending one's own information, information-based processes, information systems, and computer-based networks. (Defense Acquisition Deskbook)

Initial Capabilities Document (ICD). Describes capability gaps that exist in joint warfighting functions as described in the applicable joint concepts and integrated architectures. The ICD defines the capability gap in terms of the functional area, the relevant Range of Military Operations, and time. The ICD must capture the results of a well-framed

functional analysis. The ICD documents the evaluation of materiel approaches that are proposed to provide the required capability. The ICD further proposes a recommended materiel approach based on analysis of the different materiel approaches. The ICD describes how the recommended approach best satisfies the desired joint capability. (CJCSI 3170.01C)

Initial Operational Capability (IOC). The first attainment of the capability to employ effectively a weapon, item of equipment, or system of approved specific characteristics, with the appropriate number, type, and mix of trained and equipped personnel necessary to operate, maintain, and support the system. (Defense Acquisition Deskbook)

Initial Operational Test and Evaluation (IOT&E). Operational test and evaluation conducted on production or production-representative articles, to support the decision to proceed beyond LRIP for a weapon system program, or to deploy the tested capability for an AIS system. OT&E determines the operational effectiveness and suitability of a system under realistic operational conditions, including combat; determine if thresholds in the approved CPD and critical operational issues have been satisfied; and assess impacts to combat operations. (Defense Acquisition Deskbook)

Integrated Diagnostics. The process of efficiently using the most effective combination of a system's automated, semiautomated, and manual diagnostics resources to identify and unambiguously isolate the cause of any malfunction.

Integrated Logistics Support (ILS). A composite of all support considerations necessary to ensure the effective and economical support of a system for its life cycle. A disciplined, unified, and iterative approach to the management and technical activities necessary to:

- Integrate the needed level of support into system and equipment design.
- Develop support requirements that consistently relate to readiness objectives, to design, and to other support requirements.
- Get the required support.
- Give the required support during the operational phase at a minimum cost.

Integrated Logistics Support Plan (ILSP). An Air Force management plan for the integrated logistics support (ILS) process. This plan includes ILS elements that are integrated with each other and also with program

planning, engineering, designing, testing, and evaluation during production and operation. It integrates support elements with the mission elements of a system throughout its life cycle.

Integrated Testing (formerly known as Combined Testing). Testing conducted by the developmental and operational testers when there are clear cost and/or schedule advantages. The high cost or lack of sufficient test articles may provide an overall benefit for DT&E and OT&E teams to share test resources and data. Integrated testing usually ends with a phase of dedicated OT&E. Increasingly, AFOTEC is doing integrated test with the development contractor. The restriction for contractor involvement in Title 10 applies only to dedicated OT&E.

Integrated Test Team. The ITT is established to involve all T&E stakeholders in a program as early as possible and to facilitate coordinated and integrated test planning. The ITT replaces the Test Plan Working Group (TPWG) and may also be referred to as a T&E WIPT. The ITT is the body that develops the required T&E documentation for the program (T&E Strategy, TEMP, etc.) and continues through on integrated test execution and reporting. A charter outlining roles and responsibilities of members may be developed for the ITT (follow support agreement guidance). Typically, the AFOTEC SFTC is the OT&E representative on the ITT.

Integration. The arrangement of *systems* in an architecture so that they function together in an efficient and logical way. (CJCSI 6212.01A)

Interoperability. The ability of systems, units, or forces to provide and receive services from other systems, units, or forces, and to use the services so interchanged to enable them to operate effectively together. The conditions achieved among communications-electronics systems or communications-electronics items when information or services can be exchanged directly between them and/or their users. (Defense Acquisition Deskbook)

Involvement Order. Developed by AFOTEC/AS and approved by XO, this document formally moves a program from the discovery to the scope/cost phase. The Involvement order directs formation of the core team and establishes the AFOTEC single face to the customer.

Joint Program. Any defense acquisition system, subsystem, component, or technology program involving formal management or funding by more than one DoD component during any phase of a system's life cycle.

Joint Reliability and Maintainability Evaluation Team (JRMET). The team responsible for collecting, analyzing, and categorizing R&M data during DT&E and OT&E. It is chaired by the single manager (or designated representative) and includes representatives from the supporting and operating commands, the DT&E and OT&E test teams, and, when appropriate, system contractor personnel as nonvoting members. See AFOTECPAM 99-104, *Operational Suitability Test and Evaluation*, for more information.)

Joint Test and Evaluation (JT&E). JT&E candidate programs are nominated by the Services, and directed and funded by OSD. JT&E programs evaluate technical or operational concepts that are applicable to more than one Service. They usually do not result in the acquisition of systems.

Key Decision Point (KDP). As a DoD Space MDAP enters and/or moves through the NSS acquisition process it will reach Key Decision Points (KDPs) where DoD Space MDA approval is required prior to proceeding with the program (Ref: OMB Circular A-109). The KDPs are placed at specific program maturity assessment points occurring between the acquisition phases. KDPs provide the DoD Space MDA with a structured opportunity to determine whether or not the program is sufficiently ready to proceed into the next acquisition phase. While programs may typically proceed through all three phases, it is also possible for a program to skip Phase A and start instead with a KDP-B for Phase B or a KDP-C for Phase C. (NSS 03-01)

Key Performance Parameters. KPPs are those system attributes considered essential for successful mission accomplishment. The CDD should only contain a limited number of KPPs (approximately 8 or fewer) that capture the parameters needed to reach the overall desired capabilities for the system. Failure to meet a CDD KPP threshold can be cause for the system selection to be reevaluated, the program to be reassessed or terminated, or the content of production increments modified. Interoperability will be a KPP in every increment of a program.

Lead Service. The Service designated by USD(AT&L) to be responsible for management of a system acquisition involving two or more DoD components in a joint program.

Lethality. The ability of a munitions system (or laser, high power microwave) to cause damage that results in the loss or degradation of the ability of a target system to complete its designated mission(s).

Life Cycle Cost. The total cost to the government of acquisition and ownership of a system over its useful life. It includes the cost of development, acquisition, support and, where applicable, disposal. (Defense Acquisition Deskbook)

Live Fire Test and Evaluation (LFT&E). A test within the OSD approved LFT&E strategy involving the firing of actual munitions at target components, subsystems, subassemblies, or system-level targets (which may or may not be configured for combat) to examine personnel casualty, vulnerability and/or lethality issues. (Title 10 §2366)

Live, Virtual, and Constructive Simulation. The categorization of simulation into live, virtual, and constructive is problematic, because there is no clear division between these categories. The degree of human participation in the simulation is infinitely variable, as is the degree of equipment realism. This categorization of simulations also suffers by excluding a category for simulated people working real equipment (e.g., smart vehicles). (DOD 5000.59-P)

- Live Simulation. A simulation involving real people operating real systems. (DOD 5000.59-P)
- Virtual Simulation. A simulation involving real people operating simulated systems. Virtual simulations inject human-in-the-loop in a central role by exercising motor control skills (e.g., flying an airplane), decision skills (e.g., committing fire control resources to action), or communication skills (e.g., as members of a C4I team). (DOD 5000.59-P)
- Constructive Model or Simulation. Models and simulations that involve simulated people operating simulated systems. Real people stimulate (make inputs) to such simulations, but are not involved in determining the outcomes. (DOD 5000.59-P)

Logistics Supportability. The degree to which the planned logistics support allows the system to meet its availability and wartime usage requirements. Planned logistics support includes the following: test, measurement, and diagnostic equipment; spare and repair parts; technical data; support facilities; transportation requirements; training; manpower; and software. (Defense Acquisition Deskbook)

Logistics Test and Evaluation (LT&E). The test methodology, criteria, and tools for evaluating and analyzing the ten Integrated Logistics Support (ILS) elements as they apply to a system under test. The objective is to influence the design through applying the ILS elements as early as possible in the acquisition cycle. LT&E integrates the evaluation and analysis efforts of R&M, human factors engineering, and logistics test, and is an integral part of the DT&E report.

Low-Rate Initial Production (LRIP). The minimum number of systems (other than ships and satellites) to provide production representative articles for operational test and evaluation, to establish an initial production base, and to permit an orderly increase in the production rate sufficient to reach full-rate production upon successful completion of operational testing. (Defense Acquisition Deskbook)

Maintainability. The ability of an item to be retained in or restored to specified conditions when maintenance is performed by personnel having specified skill levels, using prescribed procedures and resources, at each prescribed level of maintenance and repair. (Defense Acquisition Deskbook)

Maintenance Concept. A description of maintenance considerations and constraints for a system. It is introduced for design consideration, refinement, and revision in the conceptual phase of each new system or equipment or modification. When it is refined and agreed upon, it becomes a maintenance plan.

Major Automated Information System (MAIS). An AIS acquisition program that is (1) designated by ASD(C3I) as a MAIS, or (2) estimated to require program costs in any single year in excess of $30 million in FY 1996 constant dollars, total program costs in excess of $120 million in FY 1996 constant dollars, or total life-cycle costs in excess of $360 million constant dollars. MAISs do not include highly sensitive classified programs (as determined by SECDEF). (Defense Acquisition Deskbook)

Major System. A combination of elements that will function together to produce the capabilities required to fulfill a mission need. The elements may include hardware, equipment, software, or any combination thereof, but excludes construction or other improvements to real property. A system shall be considered a major system if it is estimated by USD(AT&L) to require an eventual total expenditure for RDT&E of more than $140 million in FY 2000 constant dollars or for procurement of more than $660 million in FY 2000 constant dollars (Title 10 §2302(5) and Defense Acquisition Deskbook).

Materiel Improvement Project (MIP). A planned effort to investigate and resolve deficiencies, adverse trends, or to evaluate proposed improvements or enhancements. An MIP may be established whenever a deficiency, improvement, or enhancement is determined to warrant further investigation or consideration and is used to monitor and control actions related to it. (TO 00-35D-54)

Mature System. A system is considered mature when its reliability and maintainability (R&M) characteristics cease to improve significantly with continued use. Systems, subsystems, and components all mature at various rates for varying lengths of time. Unless otherwise specified, a system will be considered to have mature R&M characteristics 2 years after the IOC date.

Measure of Effectiveness (MOE). A measure of operational success that must be closely related to the objective of the mission or operation being evaluated. For example, the number of enemy submarines sunk or enemy tanks destroyed may be satisfactory MOEs if the objective is to destroy such weapon systems. However, if the real objective is to protect shipping or an infantry battalion, then the best course of action might be one that results in fewer friendly submarines or tanks actually killed. A meaningful MOE must be quantifiable and measure to what degree the real objective is achieved. (Defense Acquisition Deskbook)

Measure of Performance (MOP). A measure of performance reflects a system's technical capabilities and may be expressed in terms of speed, payload, range, time on station, survivability (susceptibility, vulnerability, and recoverability), or other distinctively quantifiable performance feature. (Defense Acquisition Deskbook)

Memorandum of Agreement (MOA). An agreement that defines areas of responsibility and agreement between two or more parties, normally at headquarters or MAJCOM level. MOAs normally document the exchange of services and resources and establish parameters from which support agreements may be authorized. (AFI 25-201)

Memorandum of Understanding (MOU). An umbrella agreement that defines broad areas of mutual understanding between two or more parties, normally at MAJCOM or higher level. (AFI 25-201)

Milestone (MS). Major management decision points in the system acquisition decision process requiring Office of the Secretary of Defense and (or) DoD component program review. Milestones include both Defense Acquisition Board (DAB) and DoD component equivalent program reviews.

5000 Model Milestones:

A Entry into Technology Development
B Entry into System Development and Demonstration
C Entry into Production and Deployment

Milestone Decision Authority (MDA). The individual designated according to criteria established by USD(AT&L), or by ASD(C3I) for AIS programs, to approve entry of an acquisition program into the next phase. (Defense Acquisition Deskbook)

Mission Assurance Category (MAC). Reflects the importance of information relative to the achievement of DoD goals and objectives, particularly the warfighter's combat mission. MAC are primarily used to determine the requirements for availability and integrity (see definition of information assurance). (DoDD 8500.1)

Modeling and Simulation (M&S). A model is a physical, mathematical, or otherwise logical representation of a system, entity, phenomenon, or process. A simulation is a method for implementing a model over time. Also, it can be a technique for testing, analysis, or training in which real-world systems are used, or where real-world and conceptual systems are reproduced by a model. (DoDD 5000.59)

Modification. A change to a system that is still in production. A "major modification" is a modification that in and of itself meets the criteria of an ACAT I or II, or is designated as such by the MDA.

Multiservice Operational Test and Evaluation (MOT&E). OT&E conducted by two or more services on systems to be acquired by more than one service or to be interoperable between services.

Nondevelopmental Item (NDI). NDIs are:

- Any item commercially available in the marketplace.
- Any previously developed item of that is in use by a department or agency of the United States, a state or local government, or a foreign government with which the United States has a mutual defense cooperation agreement.
- Any of the above items that requires only minor modification to meet the requirements of the procuring agency.
- Any of the above items of supply that is currently being produced but is not yet in use or is not yet available in the commercial marketplace (Title 41 ¤403).
- Any commercial-off-the-shelf (COTS) item.

Non-traditional Assessments. Test and assessment activities that fall outside the traditional (DoDI 5000.2) acquisition process. NTAs can include: pre-acquisition activities (ACTD, ATC, FCT, NDI); warfighter assessments (battlelab and Combatant Commander initiatives, joint and service experiments); doctrine/TTP development (JT&E); exercise activities (JCS, Combatant Commander, service, federal); federal

activities (homeland security, FBI, INS, Customs, FEMA, National Guard).

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 identifiable (CJCSI 3170.01 and AFI 10-601).

Operating Command. The command primarily operating (using) a system, subsystem, or item of equipment. Generally applies to those operational commands or organizations designated by HQ USAF to conduct or participate in operations or operational testing. (AFI 10-601)

Operational Assessment (OA). Analysis of potential operational effectiveness and suitability made by an independent operational test activity, 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 independent OT&E necessary to support full production decisions. An OA conducted before Milestone B is referred to as an early operational assessment (EOA).

Operational Concept. A statement about intended employment of forces that provides guidance for posturing and supporting combat forces. Standards are specified for deployment, organization, command and control, basing, and support from which detailed resource requirements and implementing programs can be derived.

Operational Effectiveness. The overall degree of mission accomplishment of a system when used by representative personnel in the environment planned or expected (e.g., natural, electronic, threat) for operational employment of the system considering organization, doctrine, tactics, survivability, vulnerability, and threat (including countermeasures, initial nuclear weapons effects, and nuclear, biological, and chemical contamination (NBCC) threats). (Defense Acquisition Deskbook)

Operational Impact Assessment (OIA). Identifies potential impacts to the outcome of the battlefield operation to include: potential force employment considerations, CONOPS issues, operational impacts due to introduction of the system into battlefield operations.

Operational Measure. A measure provides the basis for describing varying levels of performance. It is directly related to an operational objective. (AFDD 1-1) The term "operational" focuses on the operational objective and distinguishes these measures from technical performance measures.

Operational Objective. Warfighter activities or tasks depicted by the nodes of an necessary conditions chart within a given piece of the operation. Commonality of "who, what, where, when, and why," between nodes help define an operational objective.

Operational Reliability. The probability that an operationally ready system will react as required to accomplish its intended mission or function as planned, excluding the effects of enemy action, may be specified as an estimated or an achieved reliability.

Operational Requirement. The validated need of an operational user. Initially expressed in broad operational capability terms in the format of a MNS (now ICD). It progressively evolves to system-specific performance requirements in the ORD. (CJCS MOP 77)

Operational Risk Management (ORM). Operational risk management is a decision-making process to systematically evaluate possible courses of action, identify risks and benefits, and determine the best course of action for any given situation. ORM enables commanders, functional managers, supervisors, and individuals to maximize operational capabilities while limiting all dimensions of risk by applying a simple, systematic process appropriate for all personnel and functions both on- and off-duty. Appropriate use of ORM increases both an organization's and individual's ability to accomplish their mission, whether it is flying an airplane in combat, loading a truck with supplies, planning a joint service exercise, establishing a computer network, or driving home at the end of the day. Application of the ORM process ensures more consistent results, while ORM techniques and tools add rigor to the traditional approach to mission accomplishment, thereby directly strengthening the Air Force's warfighting posture.

Operational Sufficiency. Addresses the **breadth** of the employment conditions included in the set of test events. The test is said to be operationally sufficient if it provides the decision maker and warfighter with results that are drawn from test events executed across sufficient battlespace conditions to adequately characterize the capabilities of the system during typical employment. Employment factors and descriptors are important considerations.

Operational Suitability. The degree to which a system can be placed satisfactorily in field use with consideration given to availability, compatibility, transportability, interoperability, reliability, wartime usage rates, maintainability, safety, human factors, manpower supportability, logistics supportability, natural environmental effects and impacts, documentation, and training requirements. (Defense Acquisition Deskbook)

Operational Task. An individual military operation that is accomplished in support of an operational objective.

Operational Task Element. Major components (an individual or unit) assigned to support operational task accomplished.

Operational Test (OT) Activity. Refers to all OT&E as well as operational assessment (OA), early operational assessment (EOA), operational utility evaluation (OUE), and test support for advanced concept technology demonstrations (ACTD), battlelabs (BL) and other non-traditional acquisition programs.

Operational Test Agency (OTA). Each Service has one designated operational test agency: 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); and the Marine Corps has the Marine Corps Operational Test and Evaluation Activity (MCOTEA). The command or agency designated in the PMD or other appropriate program directive as responsible for managing the independent OT&E of a system.

Operational Test and Evaluation (OT&E). 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 USC Section 139)

Operational Test Program Management (OTPM). OTPM is the TD's primary tool used to ensure that the TD has an executable plan, to assist the TD in keeping track of the program's progress, and to assess the level of risk in the program. In addition, OTPM is the methodology by which AFOTEC senior leadership gains insight into the OT&E planning, execution, and reporting activities occurring across AFOTEC. The following are several OTPM-specific terms:

- AS Network. The OTPM network that reflects the tasks required to move a program from IO to TO.
- Buffer Status. The MIN-based OTPM report that provides advanced warning of whether or not a network will meet its required delivery date.
- IO to TO network. The OTPM network that reflects the tasks required to move a program from IO to TO; see AS Network.
- Project Management Advisor (PMA). The AS PM or Detachment Member who is trained to support OTPM implementation in their area of responsibility.
- Target Finish Date. The anticipated date for TO issue for an AS Network or the required delivery date for a Test Program Network.
- Initial OTPM Test Program Network. The first program OTPM network developed prior to the ITD.
- Test Program Network. The OTPM network that reflects the tasks required to move a program from test planning to test execution to test reporting.

Operational Utility Evaluation (OUE). Highly streamlined, flexible OT&E activities designed to obtain quick-look assessments of military worth. They are used anytime testing does not fall into one of the other major categories of OT&E. OUEs are highly flexible in planning and reporting formats, and adjustable to customer needs. They are conducted outside the normal scope of operational testing activities, and are limited in time, scope, and resources. They may be used any time the required information cannot be obtained from OT&E, but will not be used in lieu of IOT&E, QOT&E, or FOT&E.

Operations Security (OPSEC). A process of identifying critical information and analyzing friendly actions attendant to military operations and other activities to:

- Identify those actions that hostile intelligence systems can observe.
- Determine indicators hostile intelligence systems might obtain that could be interpreted or pieced together to derive critical information in time to be useful to adversaries.
- Select and execute measures to eliminate or reduce to an acceptable level the vulnerability of friendly actions to exploitation by adversaries. (JCS PUB 1-02)

Oversight Program. An acquisition program on OSD's Annual T&E Oversight List that is published by OSD. Generally, the list includes ACAT I (MDAP) programs, ACAT II (major system) programs, and any

other program designated for T&E oversight. The master list designates oversight for three types of testing: DT&E, OT&E, and LFT&E. These programs require some additional documentation, and have additional review and approval requirements. (DoDI 5000.2)

Participating Command. A command or agency designated by the AFAE to support the weapon system being developed and to advise the program manager. The supporting command is also a participating command. (AFI 10-601)

Performance. Those operational and support characteristics of the system that allow it to effectively and efficiently perform its assigned mission over time. The support characteristics of the system include both supportability aspects of the design and the support elements necessary for system operation.

Preplanned Product Improvement (P3I). A phased acquisition approach that incrementally satisfies operational requirements in order to address the cost, risk, or relative time urgency of different elements of the system being developed. The deferred elements are developed in parallel or subsequent efforts. P3I includes enhancements planned for ongoing systems that go beyond the current performance envelope.

Production Article. An article that is in final form, employs standard parts (or nonstandard parts approved by the agency concerned), and is representative of final equipment.

Program Element Monitor (PEM). The individual within the office of primary responsibility in the Air Staff or Secretariat who is designated to exercise overall monitorship over a program element, including preparation of program change proposals and the review, evaluation, and maintenance of all pertinent data on the element.

Program Executive Officer (PEO). A military or civilian official who has primary responsibility for directing several acquisition category I programs and for assigned acquisition category II and III programs. PEOs review and assess changes reported in assigned programs, the significance of the problems reported by the program manager, the program manager's proposed action plans, and the level of risk associated with such plans. PEOs also serve as decision authorities for assigned programs. A PEO has no other command or staff responsibilities within the component, and only reports to and receives guidance and direction from the DoD component acquisition executive. (Defense Acquisition Deskbook)

Program Management Directive (PMD). The official Air Force document used to direct acquisition or modification responsibilities to the appropriate MAJCOM, PEO, or DAC for a specific system and subsystem's development, acquisition, concept direction study, or modification. The PMD states the program's unique requirements, goals, and objectives, especially those to be met at each acquisition milestone or program review. (HOI 800-2)

Program Manager (PM). The individual designated by the implementing command as having single-point management responsibility for an acquisition program. The program director may delegate specific program authority to system program office staff members as long as the authority is documented in management instructions or official correspondence.

Prototype. A model suitable for evaluation of design, performance, and production potential. (Joint Pub 1-02) The Air Force also uses prototypes during development of a technology or acquisition program for verification or demonstration of technical feasibility. Prototypes may not be representative of the final production item.

Qualification Operational Test and Evaluation (QOT&E). The operational testing performed on programs instead of IOT&E for which there is no RDT&E-funded development effort.

Qualification Test and Evaluation (QT&E). The testing performed on systems, and on modifications to existing systems, for which there is no RDT&E-funded development effort. (AFPD 99-1)

Readiness. The ability of a system to deploy and employ without unacceptable delays and to deliver the output for which they were designed. (Joint Pub 1-02)

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. Recoverability is considered a subset of survivability. (Defense Acquisition Desk book)

Regression Testing. The continuation of IOT&E or QOT&E activities past the production decision. Regression testing answers specific questions about unresolved COIs and/or test objectives, and completes areas not finished during the IOT&E or QOT&E. These unfinished areas are officially deferred by the Milestone Decision Authority (MDA) for further OT&E by the OTA.

Reliability. The ability of a system and its parts to perform its mission without failure, degradation, or demand on the support system. (Defense Acquisition Deskbook)

Requirements Correlation Matrix (RCM). A three-part matrix or spreadsheet required by the Air Force to provide an audit trail of system capabilities and characteristics identified in the ORD. It lists thresholds and objectives; identifies user recommended key performance parameters; provides supporting rationale justifying each threshold; and preserves rationale for changes in requirements as the system matures. (AFI 10-601)

Responsible Test Organization (RTO). The lead government entity that is qualified and responsible for DT&E.

Risk. A measure of the inability to achieve program objectives within defined cost and schedule constraints and has two components: (1) the probability of failing to achieve a particular outcome, and (2) the consequences of failing to achieve that outcome. (Defense Acquisition Deskbook)

Selected Acquisition Report (SAR). A standard, comprehensive summary status report on major defense systems for management within DoD that is submitted to the Office of the Secretary of Defense (OSD) for transmittal to the Congress and other government agencies.

Service Acquisition Executive (SAE). A single official within a DoD component who is responsible for all acquisition functions within that component.

Single Face to the Customer (SFTC). The designated AFOTEC representative assigned by the detachment or directorate to initiate and maintain early and continuous dialogue with external agencies such as the program office, MAJCOM/user, DOT&E, etc. The SFTC is usually designated upon receipt of an involvement order.

Single Manager (SM). A government official (military or civilian) responsible and accountable for decisions and overall management (to include all cost, schedule, performance, and sustainment) of a system, product group, or materiel group. Also known as system program director, program manager, product group manager, or materiel group manager. (AFMCPAM 800-60)

Source Selection-Sensitive. A term applying to information whose improper release may adversely impact the competition between defense contractors.

Spiral Development. (see Evolutionary Acquisition).

Suitability. See Operational Suitability.

Supportability. The degree to which system design characteristics and planned logistics resources, including manpower, meet system peacetime readiness and wartime utilization requirements. (Defense Acquisition Deskbook)

Support Equipment. All equipment (mobile or fixed) required to support the operation and maintenance of a materiel system. This includes associated multi-use end items, ground handling and maintenance equipment, tools meteorology and calibration equipment, test equipment, and automatic test equipment. It includes the acquisition of logistics support for the support and test equipment itself. (Defense Acquisition Deskbook)

Supporting Command. The *command* (usually Air Force Materiel Command) responsible for providing logistics support for a system. (AFI 21-102)

Survivability. The capability of a system and its crew to avoid or withstand man-made hostile environments without suffering an abortive impairment of its ability to accomplish its designated mission. Survivability is comprised of susceptibility, vulnerability, and recoverability. (Defense Acquisition Deskbook)

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, and probability of the enemy fielding a threat.) Susceptibility is considered a subset of survivability.

Sustainment. Activities that sustain systems during the operations and support phases of the system life cycle. Sustainment activities include any investigative test and evaluation (T&E) 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. The T&E conducted during sustainment follows the same guidance as for the T&E conducted during the acquisition process.

System Maturity Matrix (SMM). An acquisition management tool used to aid management in tracking a program's technical progress and risks. The SMM links user requirements and system specifications with anticipated T&E results. It provides a metric for program monitoring and reporting so true progress toward verification of capabilities and requirements can be assessed. The SMM is coordinated with the user and OTA, and approved by the PEO or DAC. The SMM is not a substitute for a valid requirements document.

System Program Office (SPO). The organization comprised of technical and business management and administrative personnel assigned full time to a system program director. The office may be augmented with additional personnel from participating organizations.

System Threat Assessment (STA). A document prepared by the intelligence community that services as the single authoritative reference for threat data regarding an ACAT II or III program. It describes the lethal and nonlethal threats against the proposed system and the threat environment in which the system will operate.

System Threat Assessment Report (STAR). A document prepared by the intelligence community that serves as the single authoritative reference for threat data regarding an ACAT I program. It describes the lethal and nonlethal threats against the proposed system and the threat environment in which the system will operate.

Targets, Threats, and Ranges.

- Target. An aircraft, ship, or ground vehicle that emulates the signature, performance, and vulnerability of a threat weapon system when engaged by US sensors and weapons. Note, targets may be many other things besides emulations of a weapon system that are engaged by sensors and weapons. While the issues of accurate signature, performance and vulnerability are necessary; the definition must be broad enough to include anything planned for surveillance or attack with the system under test, e.g., bridges, bunkers, runways, C4I nodes, SAM sites, or factories. Attacks do not have to use lethal force, but may include jamming and other non-lethal means. Similarly, not all targets are "attacked" in the literal sense, i.e., surveillance. A reconnaissance asset (UAV, KH-xx satellite, JSTARS radar) may photograph or image a target in some other way without employing weapons.

- Threat Representation. Simulator, target, or model used to represent opposing weapon systems.
- Ranges. Instrumented open-air ranges that permit tests in a real-world, dynamic environment, e.g., Naval Air Weapons Center/China Lake, Nellis Open Air Range, or White Sands Missile Range.

Tasking Order. Developed by AFOTEC/AS and approved by CV, this document details those products and services provided by the detachment/evaluation team/special test, as determined by the scope/cost process. The tasking order will have enough detail to supply the TRP and the draft TEMP.

Technical Order (TO). An Air Force publication that gives specific technical direction and information concerning the inspection, installation, operation, safety modification, and maintenance of Air Force items and equipment.

Technical Adequacy. Addresses the **relevance** of the technical information produced by the test in relation to the purpose of the test (i.e., the operationally relevant questions being addressed by the test activity). A test is technically adequate if the test data evaluation provides the user/warfighter with sufficient effectiveness and suitability information to make fielding and employment decisions. The purpose of the test, the set of test events, and the type of test are important considerations, as well as data collection during test events executed across a representative range of battlespace conditions for the system under test.

Technical Credibility. Addresses the **depth** of the technical information produced by the test. Technical credibility can be determined only after test completion. A technically credible test provides the decision maker and the warfighter with an indication of decision risk. Decision risk should be addressed by characterizing the weapon system capabilities with the likelihood of an operational event happening and the consequences of the event's occurrence. Sample size, confidence bounds, and repeatability are important considerations.

Test Concept (TC). A document that describes the focus areas, COIs, major MOEs, and associated test methodology of an OT program during the scope/cost or early test planning phases. Use to support test resource TEMP, OT&E plan, test resource plan, reviews, and justification of long-lead test capability items.

Test and Evaluation (T&E). The term "test" denotes any project or program designed to obtain, verify, and provide data to evaluate, research, and develop (other than laboratory experiments); progress in accomplishing development objectives; performance and operational capability of systems, subsystems, and components; and equipment items. The term "evaluation" denotes the review and analysis of data produced during current or previous testing and data obtained from test conducted by other government agencies and contractors, from operation and commercial experience, or combinations thereof.

Test and Evaluation Master Plan (TEMP). The basic planning document for all T&E related to a particular system acquisition and used in planning, reviewing, and approving T&E. The TEMP is required for all major defense acquisition programs, all OSD oversight programs, all HQ USAF programs directed by a PMD, and may be required for an OSD-directed information system program. The TEMP integrates critical issues, associated measures (MOE/MOP), evaluation criteria, system characteristics, responsibilities, resources, and schedules for T&E.

Test Data Scoring Board. Government-only forum that compiles, reviews, and scores R&M data to be used in OT&E computations.

Test Director (TD). The detachment-designated person responsible for leading/ coordinating/completing all test activities to include the planning phases of Involvement, Scope/Cost, Test Planning, Test Execution, Test Reporting and Test Close Out

Test Readiness Review (TRR). A review by the program's management structure, including the TD, AFOTEC/CC or designated approval authority, and other concerned participants. The purpose of the TRR is to determine that the test team is ready to execute the test plan.

Test Resource Plan (TRP). The basic resource management document used throughout the OT&E planning process. It identifies resources required to support testing and is the basis for budget submissions, manpower plans, and procurement lead-time.

Test Team. The group of effectiveness and suitability evaluators assigned to the test director for the purposes of planning, executing, and reporting the OT&E. The test team is part of the core team for the program.

Threshold. A minimum acceptable operational value for a system capability or characteristic below which the utility of the system becomes questionable. The minimum acceptable value that, in the user's

judgment, is necessary to satisfy the need. If threshold values are not achieved, program performance is seriously degraded, the program may be too costly, or the program may no longer be timely. The spread between objective and threshold values shall be individually set for each program based on the characteristics of the program (e.g., maturity, risk).

Transportability. The capability of materiel to be moved by towing, self-propulsion, or carrier via any means such as railways, highways, waterways, pipelines, oceans, and airways. (Joint Pub 1-02)

User Requirement. Operational requirement.

Verification, Validation & Accreditation (VV&A). (1) Verification: The process of determining that a model or simulation (or other test capability) implementation accurately represents the developer's conceptual description and specifications. For model and simulation, verification also evaluates the extent to which the model and simulation has been developed using sound and established software-engineering techniques. (2) Validation: The process of determining (a) the manner and degree to which a model and simulation (or other test capability) is an accurate representation of the real-world from the perspective of the intended uses of the model and simulation, and (b) the confidence that should be placed on this assessment. (3) Accreditation: An official determination that a model or simulation is acceptable for a specific purpose, and is based on a five-step process: identify test issues; review validation documentation; compare test capabilities and validation information with test issues; identify potential shortfalls; and develop and execute strategy to address shortfalls (assess risk).

Vulnerability. The characteristics of a system that cause it to suffer a definite degradation (loss or reduction of capability to perform the designated mission) as a result of having been subjected to a certain level of effects in an unnatural (man-made) hostile environment. Vulnerability is considered a subset of survivability. (Joint Pub 1-02).

ATTACHMENT 3 – ACRONYM LIST

Acronym	Meaning
A & AS	Advisory and Assistance Service
ACAT	Acquisition Category
ACTD	Advanced Concept Technology Demonstration
ADM	Acquisition Decision Memorandum
AECS	AFOTEC Electronic Coordination System
AF	Air Force
AFIWC	Air Force Information Warfare Center
AFMAN	Air Force Manual
AFOTEC	Air Force Operational Test and Evaluation Center
AFOTECI	AFOTEC Instruction
AFOTECPAM	AFOTEC Pamphlet
AFPC	Air Force Personnel Center
AFROC	Air Force Requirements Oversight Council
AoA	Analysis of Alternatives
ATD	Advanced Technology Demonstration
ATO	Air Tasking Order
BMP	Business Management Process
CAG	Commander's Action Group
CDD	Capability Development Document
CONOPS	Concept of Operations
COI	Critical Operational Issue
COTR	Contracting Officer's Technical Representative
CPD	Capability Production Document
CRD	Client Requirements Document
CTF	Combined Test Force
DAC	Designated Acquisition Commander
DAS	Data Analysis System
DIA	Defense Intelligence Agency
DISA	Defense Information Systems Agency
DMAP	Data Management and Analysis Plan
DO	Delivery Order
DoD	Department of Defense
DOT&E	Director, Operational Test and Evaluation
DSMC	Defense Systems Management College
DT	Developmental Test
DT&E	Developmental Test and Evaluation
E3	Electromagnetic Environmental Effects
EEIC	Element of Expense Identification Code
EF	Evaluation Framework
EOA	Early Operational Assessment
EPR	Enlisted Performance Report
FBI	Federal Bureau of Investigation
FCT	Foreign Comparative Test
FDE	Force Development Evaluation

Acronym	Meaning
FEMA	Federal Emergency Management Agency
FMA	Foreign Materiel Acquisition
FMB	Financial Management Board
FOC	Full Operational Capability
FOT&E	Follow-on Operational Test and Evaluation
GMS	General Management Support
GOS	General Operations Support
GPC	Government Purchase Card
HITL	Hardware in the loop
HOI	Headquarters Operating Instruction
IA	Information Assurance
ICD	Initial Capability Document
ILS	Integrated Logistics Support
ILSP	Integrated Logistics Support Plan
IO	Involvement Order
IOC	Initial Operational Capability
IOT&E	Initial Operational Test and Evaluation
IPT	Integrated Product Team
ISR	Interim Summary Report
ITT	Integrated Test Team
JCS	Joint Chiefs of Staff
JITC	Joint Interoperability Test Center
JRMET	Joint Reliability and Maintainability Evaluation Team
KDP	Key Decision Point
KPP	Key Performance Parameter
LRIP	Low-Rate Initial Production
LSA	Logistics Support Analysis
M&S	Modeling and Simulation
MAJCOM	Major Command
MDA	Milestone Decision Authority
MDAP	Major Defense Acquisition Program
MIN	Management Information Network
MITL	Man in the Loop
MOA	Memorandum of Agreement
MOE	Measure of Effectiveness
MOP	Measure of Performance
MORD	Miscellaneous Obligation Reimbursement Document
MOT&E	Multiservice Operational Test and Evaluation
MOU	Memorandum of Understanding
MTBF	Mean Time Between Failure
NC	Necessary Conditions
NCC	Necessary Conditions Chart
NIWA	Naval Information Warfare Activity
NSA	National Security Agency
NSS	National Security Space
NTA	Non-traditional Assessment
NTTR	Nevada Test and Training Range

Acronym	Meaning
OA	Operational Assessment
OAR	Open Air Range
OAS	Office of Aerospace Studies
OCR	Office of Collateral Responsibility
OIA	Operational Impact Assessment
OL	Operating Location
OPR	Office of Primary Responsibility
OPR	Officer Performance Report
ORM	Operational Risk Management
OSD	Office of the Secretary of Defense
OT	Operational Test
OTA	Operational Test Agency
OT&E	Operational Test and Evaluation
OTS	Operational Test Support
OUE	Operational Utility Evaluation
PCO	Procuring Contracting Officer
PDP	Product Delivery Process
PEO	Program Executive Office
PEP	Product Evaluation Process
PID	Program Introduction Document
PM	Program Manager
PMD	Program Management Directive
POC	Point of Contact
POM	Program Objective Memorandum
PPBS	Planning, Programming, and Budgeting System
PRB	Policy Review Board
QOT&E	Qualification Operational Test and Evaluation
RALOTT	Risk Assessment Level of Test Tool
RAM	Reliability, Availability, and Maintainability
RCM	Requirements Correlation Matrix
RCS	Radar Cross Section
RFP	Request for Proposal
RM&A	Reliability, Maintainability and Availability
ROM	Rough Order of Magnitude
RRB	Requirements Review Board
RRG	Requirements Review Group
RTO	Responsible Test Organization
RTS	Rapid Test Support
SAMP	Single Acquisition Management Plan
SCG	Security Classification Guide
SFTC	Single Face to the Customer
SOC	Statement of Capabilities
SPO	System Program Office
SMC	Space and Missile Center
SMM	System Maturity Matrix
SOW	Statement of Work
SSO	Special Security Office

Acronym	Meaning
STA	System Threat Assessment
STAR	System Threat Assessment Report
SUT	System under Test
SWIL	Software in the Loop
T&E	Test and Evaluation
TC	Test Concept
TD	Test Director
TEMP	Test and Evaluation Master Plan
TO	Tasking Order
TO	Technical Order
TOC	Theory of Constraints
TPWG	Test Planning Working Group
TRAP	Test Resource and Analysis Planning
TRM	Test Resource Manager
TRP	Test Resource Plan
TRR	Test Readiness Review
TSP	Test Support Plan
TTP	Tactics, Techniques, and Procedures
V&V	Verification and Validation
VV&A	Verification, Validation and Accreditation
WIPT	Working-level Integrated Product Team

ATTACHMENT 4 – MIN REFERENCE LIST

Below is a list of all the documents and web pages identified in this pamphlet. With each item is their actual location on the MIN.

Table A4-1. MIN References

Pamphlet Document/Web Page	MIN Path
DoD 5000 Series Documents Interim Defense Acquisition Guidebook	Plans and Policy → Policy
DOT&E Policy Letters on: Information Assurance, Electromagnetic Environmental Effects (E3), and Interoperability	Plans and Policy → Policy → HHQ Policy and Memoranda
Test Management Training Manual	IT Services → Help Documents
AFOTEC Support Contracts Statements of Work (SOW)	Org Webs → RM → RMC → Contracts
Product Evaluation Process (PEP)	Plans and Policy → Product Evaluation
Involvement Order (IO), Tasking Order (TO), and Closeout Order (CO) templates	Plans and Policy → Templates → Order Templates
Analyst Training and Technical Information Center (ATTIC)	Org Webs → TS → ATTIC
Information Assurance (IA) Template	Plans and Policy → Templates → IA paper Assessment Guidelines
IA-related information on the MIN	Org Webs → AS → Training Page
Briefing guides for various required AFOTEC briefings	Plans and Policy → Templates → Briefing Guides
MOA on MOT&E	Plans and Policy → Policy → Memoranda of Agreement
Training procedures and instructions	Training → T&E Univ → T&E Training Center
Unit Activation/Inactivation	Plans and Policy → Policy → Unit Activation
Test Capability Roadmap	Org Webs → TS → Infrastructure and Range (TST) → Products and Services
Test Capability Shortfall Matrix	Org Webs → TS → Infrastructure and Range (TST) → Products and Services
Safety and Environmental information	Mission Support → Safety Zone

Table A4-1 (continued). MIN References

Pamphlet Document/Web Page	MIN Path
Templates for AFOTEC Test Plan and AFOTEC Test Report	Plans and Policy → Templates → Test Plan Template Plans and Policy → Templates → Test Report Template
Questionnaires	Org Webs → TS → Human Factors (TSH) → Software Tools and Pubs
AFOTEC Briefing Template	Plans and Policy → Templates → AFOTEC Briefing Template
AFOTEC Electronic Coordination System (AECS)	Mission Support → AECS
Guidelines for Conducting OT&E for Software-Intensive Increments	Plans and Policy → Policy → HHQ Policy and Memoranda
Contract Support Information	Org Webs → RM → RMC → COTR Information
Det 1 Equipment Database	Org Webs → Det 1 → Mission Support/Field Support → Inventory Management and Reservation System
AFOTEC Marketing Briefing	Command Info → Center Briefings
Lessons Learned	Plans and Policy → Product Evaluation