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Test and Evaluation

TEST RESOURCE PLANNING

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(Maj Robert F. Stierwalt)
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This instruction implements AFR 99-1, *Test and Evaluation (T&E) Process*, which directs the Air Force to manage T&E facilities, including the major range and test facility bases (MRTFB). This instruction defines test resources, the test resource planning process, test resource usage, and responsibilities associated with test resources. DoD Directives 3200.11, *Major Range and Test Facility Base*, September 1980, and 3200.11-D, *Major Range and Test Facility Base Summary of Capabilities*, January 1993, give more detail on available Air Force test resources at MRTFBs.

SUMMARY OF CHANGES

This revision generally updates the test resource planning process.

1. Test Resources. The single manager (SM) for an acquisition program must recognize that requirements for test and evaluation (T&E) exist throughout a system's life cycle. The SM plans and conducts tradeoff analyses to identify and schedule required test resources to support life-cycle T&E.

1.1. Definition. "Test resources" encompasses all resources needed to conduct a test. Test resources include, but are not limited to:

- Test articles
- Test ranges
- Manpower, training, and base operations support (BOS)
- Research, development, test, and evaluation (RDT&E) support
- Military construction (MILCON)
- Flying hours
- Support equipment
- Threat systems (red, blue, and gray)

- Models and simulations
- Instrumentation
- Communications
- Range equipment facilities and range safety
- Data production
- Data protection and security systems
- Weather support, mapping, charting, or geodesy products
- Munitions and targets

1.2. Test Resource Planning. The Air Staff, operating commands, Air Force Material Command (AFMC), and the Air Force Operational Test and Evaluation Center (AFOTEC) conduct test resource planning. Test resource planning consists of five elements:

- T&E master plan (TEMP)
- Central T&E investment program (CTEIP)
- Program introduction (PI) document
- Test resource plans (TRPs)
- T&E investment planning and programming (TIPP)

1.2.1. TEMP. The SM for an acquisition program identifies in the TEMP all test resources needed to support weapons systems acquisition in accordance with AFI 99-101, *Development Test and Evaluation*.

1.2.2. CTEIP. This program is managed by the Office of the Secretary of Defense (OSD) to fund the development of RDT&E capabilities in order to promote commonality and interoperability among the services.

1.2.3. PI Document. SMs identify all test center resources required to support weapons system acquisition in the PI document. AFI 99-101 provides specific information.

1.2.4. TRP. All test resources required to support weapons systems acquisition in accordance with AFI 99-102, *Operational Test and Evaluation*, are identified in the plan by AFOTEC.

1.2.5. TIPP. AFMC manages the TIPP process (figure 1) to identify test resource investments needed to support weapons systems testing. Each fiscal year, AFMC tasks mission area experts, designated as single-face-to-the-customers (SFTC), in five mission areas to identify and document out-year test resource investment requirements.

1.2.5.1. Mission area experts (SFTCs):

- Develop T&E resource roadmaps based on their respective test processes.
- Solicit T&E resource needs (requirements) from across Air Force.
- Validate resource needs and coordinate possible solutions, funding, and scheduling with the originator.
- Give the T&E corporate board, known as the T&E mission element board (MEB), a prioritized list of resource projects in five mission areas:
- Aeronautical, propulsion, and avionics (A/P/A)

- Armament and munitions (A/M)
- Space
- Command, control, communications, computers, and intelligence (C4I)
- Electronic combat (EC)

1.2.5.2. The T&E MEB:

- Consolidates mission area lists into a single-test investment strategic plan (TISP) and allocates available institutional investment funds.
- Submits the TISP (funded and unfunded) to the T&E resource investment board (TERIB) and test infrastructure council (TIC).

1.2.5.3. The TERIB checks for duplication among the three services and proposes possible consolidations.

1.2.5.4. The TIC reviews the plan to determine potential candidates for disconnects or program objective memorandum (POM) initiatives.

1.3. Test Resource Usage. The SM for an acquisition program, in conjunction with the responsible test organization (RTO), plans and conducts test programs to take full advantage of existing or programmed Air Force test resources.

1.3.1. Submit waiver request to use any non-Government test facility or resource through HQ AFMC/DOR to HQ USAF/TE.

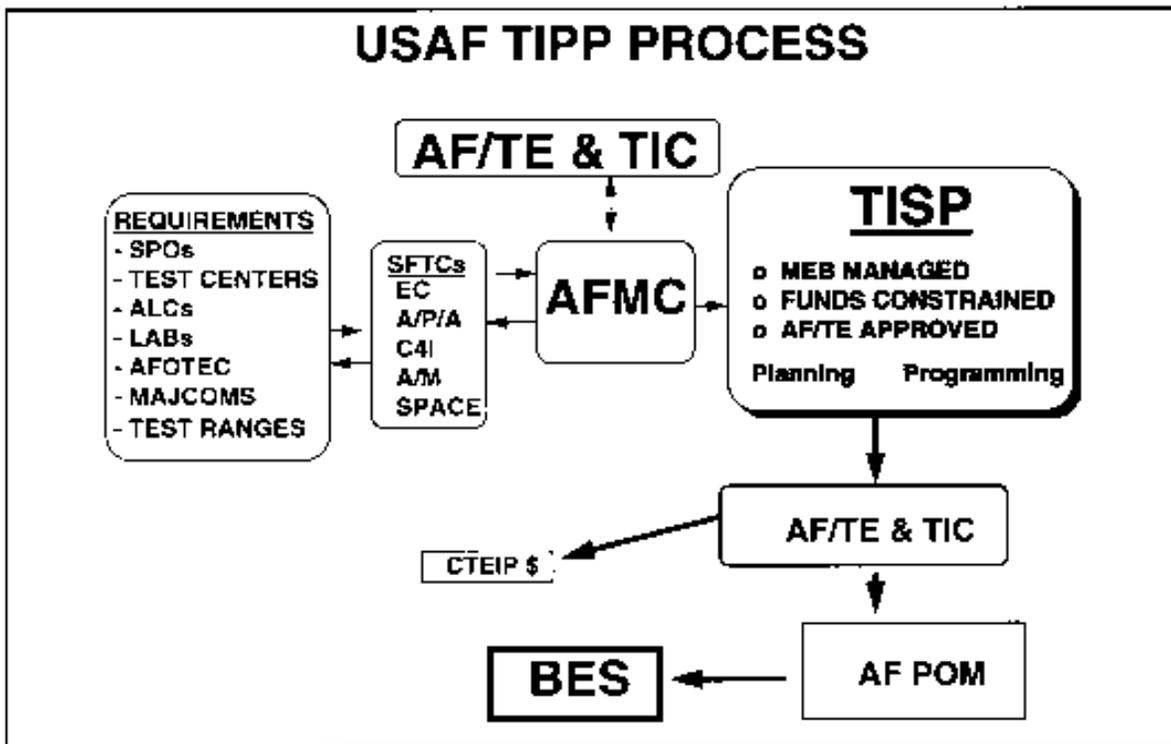
1.3.2. Justify in the TEMP any test and evaluation, including improvement and modernization investments, in non-Government test facilities or resources.

1.3.3. When the Air Force is the lead service, give priority to Air Force, Department of Defense (DoD), or other Government programs in determining the use of currently available test resources.

1.3.4. When Government test resources are not available and the use of contractor resources will not harm your ability to properly evaluate the system under test, you may use existing contractor test resources for qualification, acceptance, and contractor engineering development testing.

1.3.5. When the Air Force is not the lead service for a multiservice T&E program, use the regulations of the lead service and interservice memorandums of agreement to determine test resource usage.

Figure 1. TIPP Process.



2. Responsibilities:

2.1. HQ USAF/TE:

2.1.1. HQ USAF/TE provides corporate management perspectives on T&E resources, for both infrastructure and modernization and improvements with respect to Air Force, OSD, and Government-wide test requirements, to include appropriate derivative guidance for the planning, programming, and budgeting system (PPBS) and POM preparation efforts.

2.1.2. Set policy for Air Force MRTFB test resource improvement and modernization. (See DoDD 3200.11-D.) As part of this responsibility:

- Issue program management directives for test resource improvement and modernization programs.
- Establish appropriate program elements to budget test resource investments.
- Issue consolidated, corporate T&E strategy for tradeoffs between operations and sustainment of current T&E resources and the improvement and modernization of current or proposed T&E resources.

2.1.3. Guide, direct, and set policy for the TIPP process. Review and approve the TISP as the corporate Air Force planning document for test resource investments.

2.1.4. Identify test resource shortfalls in submitted TEMPs, mission need statements (MNS), and operational requirements documents (ORD).

2.1.5. Chair the TIC.

2.1.6. Manage T&E program elements at the Air Staff. As part of this job:

- Advocate test resource concerns with affected organizations at the OSD and the Air Staff.
- Provide program element monitors for test resource program elements.

2.1.7. Serve as the Air Force focal point for all joint service test resource concerns. In this capacity:

- Serve as Air Force representative and focal point for the OSD CTEIP.
- Submit Air Force test resource investment projects for potential CTEIP funding.
- Support the executive agent for T&E.

2.2. Operating Commands:

2.2.1. Plan, program, budget, and provide the intracommand test resources needed for operational test and evaluation (OT&E), as specified in the TEMP or TRP.

2.2.2. Submit OT&E resource requirements to the AFOTEC for consolidation in the OTIP. (For more information, see AFI 99-102.)

2.2.3. Identify test resource requirements through the TIPP process.

2.3. Air Force Materiel Command (AFMC):

2.3.1. Plan, program, and budget in accordance with the Planning, Programming, and Budgeting System (PPBS) for these DT&E test resources:

- Facilities
- Manpower
- Instrumented threat simulators
- Replacement costs for T&E capital investments
- Real property maintenance
- Base operations support
- T&E support (that is, infrastructure)

2.3.2. Provide oversight of T&E resources within the command through the T&E MEB, chaired by HQ AFMC/DO.

2.3.3. Review draft program management directives (PMD) as submitted by HQ USAF/TE for test resource impacts.

2.3.4. Assist HQ USAF/TE to develop and implement policy for AFMC test resources included in the Air Force portion of the MRTFB.

2.3.5. Manage the TIPP process. Document the results of the annual TIPP process in the TISP and submit to HQ USAF/TE for review and approval.

2.3.6. Submit TIPP process approved projects (solutions) to HQ USAF/TE for submittal to the multiservice TERIB investment review committee and to OSD for potential CTEIP funding.

2.3.7. Advocate test resource funding to ensure that the appropriate headquarters and DoD agencies adequately staff project funding requests.

2.3.8. Assist SFTC offices in defining specific test processes and developing test resource investment roadmaps based on these processes for subsequent submittal for approval to HQ USAF/TE.

2.4. SFTC. The SFTC mission areas and locations are:

- Edwards AFB, California
- Eglin AFB, Florida
- Command, Control, Communications, Computers, and Intelligence (C4I), Eglin AFB, Florida
- Electronic Combat (EC), Eglin AFB, Florida
- Space, Los Angeles AFB, California

2.4.1. Plan test resource investment and modernization efforts to improve the efficiency and cost-effectiveness of Air Force T&E.

2.4.2. Help T&E customers (product centers, system program offices (SPO), DoD agencies, other Government agencies) use the test process properly. (For more information on the SFTC, see AFI 99-101.)

2.4.3. Solicit and validate test resource requirements, or needs, from the T&E community. (See figure 1.)

2.4.4. Serve as T&E mission area expert in test resource planning, test execution, and site selection to support the test process.

2.5. Air Force Operational Test and Evaluation Center (AFOTEC).

2.5.1. Identify test resource investments, including unique test resource investments, required for OT&E.

2.5.2. Publish an OTIP, documenting all test resources and test resource investments, required for OT&E.

2.5.3. Prepare, coordinate, and maintain TRPs used to identify test resource requirements for Air Force-directed OT&E. Submit and coordinate TRPs in accordance with AFI 99-102. Submit TRPs for joint test and evaluation in the same manner.

2.5.4. Submit test resource investment requirements to the mission area experts at the appropriate SFTC office to support the TIPP process.

2.6. Other Air Force Activities. Air Force MRTFB locations, laboratories, air logistics centers, or specialty test sites submit test and evaluation resource requirements to the appropriate SFTC office during the TIPP cycle.

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Attachment 1**GLOSSARY OF RELATED REFERENCES, ABBREVIATIONS AND ACRONYMS,
AND TERMS**

NOTE: The user of this instruction is responsible for verifying the currency of the cited documents.

References

DoD Directive 5000.1, *Defense Acquisition*, February 23, 1991

DoD Instruction 5000.2, *Defense Acquisition Management Policies and Procedures*, February 23, 1991

DoD 5000.2M, *Defense Acquisition Management Documentation and Reports*, February 1991

DoD 3200.11, *Major Range and Test Facility Base*, September 1980

DoD 3200.11-D, *Major Range and Test Facility Base Summary of Capabilities*, January 1993

AFI 10-601, *Mission Needs and Operational Requirements Guidance and Procedures* (formerly AFR 57-1)

AFI 14-206, *Modeling and Simulation*

AFI 16-201, *Foreign Disclosure of Classified and Unclassified Military Information to Foreign Governments and International Organizations* (formerly AFR 200-9)

AFPD 33-1, *C4 Systems* (formerly AFR 700-1)

AFI 36-2201, *Developing Military Training Programs* (formerly AFM 50-2, AFR 50-8, and AFP 50-58V1-6)

AFPD 63-1, *Acquisition System*

AFPD 99-1, *Test and Evaluation*

AFI 99-101, *Developmental Test and Evaluation*

AFI 99-102, *Operational Test and Evaluation* (formerly AFR 55-43 and AFR 80-14)

AFI 99-103, *Electronic Combat (EC) Test Process*

AFI 99-104, *Software Test Process*

AFI 99-105, *Live Fire Test*

AFI 99-106, *Joint Test and Evaluation* (formerly AFR 80-20)

AFI 99-108, *Aerial Targets*

Abbreviations and Acronyms

A/P/A—Aircraft-Propulsion-Avionics

AFMC—Air Force Materiel Command

AFOTEC—Air Force Operational Test and Evaluation Center

BES—Budget Estimate Submission

C4I—Command, Control, Communications, Computers and Intelligence

CTEIP—Central Test and Evaluation Investment Program

CTF—Combined Test Force

DoD—Department of Defense

DoDI—Department of Defense Instruction

DT&E—Development Test and Evaluation

DTEG—Defense Test and Evaluation Steering Group

EC—Electronic Combat

FOT&E—Follow-on Operational Test and Evaluation

IOT&E—Initial Operational Test and Evaluation

JCG(T&E)—Joint Commanders Group for Test and Evaluation

JT&E—Joint Test and Evaluation

LFT—Live Fire Test

LFT&E—Live Fire Test and Evaluation

M/S—Modeling or Simulation, or Both

MAJCOM—Major Command

MEB—Mission Element Board

MNS—Mission Needs Statement

MRTFB—Major Range and Test Facility Base

NASA—National Aeronautics and Space Administration

O&M—Operations and Maintenance

O&S—Operations and Support

OA—Operational Assessment

OSD—Office of the Secretary of Defense

OT&E—Operational Test and Evaluation

OTA—Operational Test Agency

PD—Program Introduction Document

PEM—Program Element Monitor

PEO—Program Executive Officer

PMD—Program Management Directive

POM—Program Objective Memorandum

PTO—Participating Test Organization

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

RTO—Responsible Test Organization

SC—Statement of Capability

SFTC—Single-Face-to-the-Customer

SM—Single Manager

SPO—System Program Office

T&E—Test and Evaluation

TEMP—Test and Evaluation Master Plan

TIC—Test Infrastructure Council

TIPP—Test Investment Planning and Programming

TISP—Test Investment Strategic Plan

TPWG—Test Planning Working Group

TRP—Test Resource Plans

UDS—Universal Documentation System

Terms

NOTE:

The purpose of this glossary is to help the reader understand the terms used in this publication. It is not the glossary's intention to encompass all pertinent terms. Joint Publication 1-02, Department of Defense Dictionary of Military and Associated Terms, 1 May 1988, and AFM 11-1, Air Force Glossary of Standardized Terms, contain standardized terms and definitions for Department of Defense and Air Force use.

Acquisition Program—A Headquarters United States Air Force-directed and funded effort to satisfy a validated deficiency in a user's ability to achieve operational objectives. An acquisition program begins with concept demonstration approval (milestone I) and can involve design, development, production, and modification or any one or a combination of these activities (AFPD 63-1).

Acquisition Life Cycle—Normally, this consists of five phases (conceptual, demonstration and validation, engineering and manufacturing development, production, and deployment). Milestone decisions (program initiation, demonstration and validation, engineering and manufacturing development, and production and deployment decisions) precede each of the first four phases. A program may skip a phase or have program elements in any or all phases (AFM 11-1).

Combined Testing—Simultaneous testing conducted by the development and operational testers when due to cost, schedule, or test item availability they must share test facilities, resources and data.

Developmental Test and Evaluation (DT&E)—T&E 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, and 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. DT&E includes

contractor testing (AFPD 99-1).

Initial Operational Test and Evaluation (IOT&E)—All operational T&E conducted on production or production-representative articles, to support the decision to proceed beyond low-rate initial production. Conducted to provide a valid estimate of expected system operational effectiveness and operational suitability (DoDI 5000.2).

Joint Commanders Group for T&E—Chartered by the joint logistics commanders (JLC) and manages the execution of the "reliance" studies and implementation.

Joint Logistics Commanders (JLC)—Logistics commanders from each service: US Air Force (HQ AFMC/CC), US Army (AMC/CG), US Navy (OPNAV N-40).

Joint Test and Evaluation (JT&E)—Non-acquisition testing (as opposed to multi-service test programs that are acquisition related) sponsored by OSD. JT&E programs involve two or more military services and may include participation by other DoD agencies or the Joint Chiefs of Staff.

Life Cycle Cost—Total cost to the Government of acquisition and ownership of that system over its useful life. It includes the cost of development, acquisition, support and, where applicable, disposal (DoDI 5000.2).

Live Fire Test (LFT)—Test event so identified within an overall LFT&E strategy that involves the firing of actual munitions at target components, subassemblies, subsystems, or subscale or full-scale targets to examine vulnerability or lethality issues, including effects on both material and personnel (AFI 99-105).

Major System—A combination of elements that will function together to produce the capabilities required to fulfill a mission need, including hardware, equipment, software, or any combination thereof, but excluding construction or other improvements to real property. The acquisition community considers a system a major system if the Under Secretary of Defense (Acquisition) estimates it to require an eventual total expenditure for RDT&E of more than \$75 million in fiscal year 1980 constant dollars (approximately \$115 million in fiscal year 1990 constant dollars) or an eventual total expenditure for procurement of more than \$300 million in fiscal year 1980 constant dollars (approximately \$540 million in fiscal year 1990 constant dollars) (DoDI 5000.2).

Mission Need Statement (MNS)—Nonsystem-specific statement of operational capability need, prepared according to format in DoD 500.2M and AFI 10-601. MNS identifies a requirement for a materiel solution to satisfy a mission deficiency.

Multi-Service Test and Evaluation (MST&E)—Test and evaluation (T&E) conducted by two or more DoD components or Government agencies for acquisition by more than one DoD component, or for a DoD component's or agency's system that have interfaces with equipment of another DoD component or Government agency.

Operating—Command—Command primarily operating a system, subsystem or item of equipment. Generally, the term applies to those operational commands or organizations designated by Air Force Headquarters to conduct or participate in operations or operational testing (AFM 11-1). Interchangeable with the term "using command."

Operational Test Agency (OTA)—Command or agency designated by the program management directive (PMD) or other appropriate program directive as responsible for managing the independent OT&E of a system.

Operational Test and Evaluation (OT&E)—Testing and evaluation conducted in as realistic an

operational environment as possible to estimate the prospective system's military utility, operational effectiveness, and operational suitability. In addition, OT&E provides information on organization, personnel requirements, doctrine, and tactics. Also, it may provide data to support or verify material in operating instructions, publications, and handbooks (AFM 11-1).

Participating Command—Air Force Headquarters designated command or agency to support and advise the program manager.

Participating Test Organization (PTO)—An organization required for specific support requirements during DT&E.

Program Executive Officer (PEO)—Military or civilian official who has primary responsibility for directing several acquisition category I programs and for assigned acquisition category II, III and IV 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 (DoDI 5000.2).

Program Management Directive (PMD)—Official Air Force document used to direct acquisition or modification responsibilities to the appropriate MAJCOM, PEO, DAC or technology executive officer (TEO) for a specific system and subsystem development, acquisition, concept direction study, or modification. States program unique requirements, goals and objectives, especially those to be met at each acquisition milestone or program review (HOI 800-2).

Qualification Test and Evaluation (QT&E)—Test and evaluation performed in place of developmental test and evaluation on programs for which there has been no research and development effort, and on certain modifications to existing systems (AFPD 99-1).

Requirement—An established need that justifies the timely allocation of resources to achieve a capability to accomplish approved military objectives, missions, or tasks.

Responsible Test Organization (RTO)—The lead organization responsible for DT&E or QT&E.

Supporting Command—The command assigned responsibility for providing logistics support; it assumes program management responsibility from the implementor (AFR 800-2).

System Acquisition Process—A sequence of specified decision events and phases directed to achieve program objectives and to acquire systems. It extends from validating a requirement through deploying the system or terminating the program.

System Capabilities—Measures of performance (such as range, lethality, maneuverability, etc.) for a system to accomplish approved military objectives, missions, or tasks.

System Characteristics—Design features (such as weight, size, shape, etc.) needed for a system to accomplish approved military objectives, missions, or tasks.

- **Critical System Characteristics**--A special category of characteristics (DoDI 5000.2), including electromagnetic pulse hardening, transportability, interoperability, electronic counter-countermeasures, etc. These characteristics are historically design, cost, and risk drivers; and, therefore, they require early identification for cost-performance tradeoff.

T&E Resource Investment Board (TERIB)—The mission of the TERIB is to "normalize and integrate T&E investment plans and to compile and recommend to the Board of Operating Directors (BoOD) a T&E resource master plan and investment strategy. The primary function is to provide technical recommendations on resultant T&E issues."

Test—Any program or procedure designated to obtain, verify or provide data for the evaluation of: research and development (other than laboratory experiments); progress in accomplishing development objectives; or performance and operational capability of systems, subsystems, components, and equipment items (AFR 55-43).

Test and Evaluation Master Plan (TEMP)—The top-level, summary test management document covering all phases of testing. It is a stand-alone Milestone review required document. Subsequent to its initial issue as a preliminary TEMP at Milestone I, the single manager and the testers update the TEMP at each major milestone or any time there is a significant change to the test program (DoDI 5000.2).

Test Infrastructure Council (TIC)—The TIC is chaired by HQ USAF/TE and membership includes SAF/AQX, SAF/FMB, HQ USAF/PE, HQ USAF/XOR, HQ AFOTEC/CC, HQ AFSPACECOM/XP, HQ ACC/XP, and HQ AFMC/DO. The TIC approves all Air Force T&E investments.