

# ***Air Force Operational Test and Evaluation Center***





# **AFOTEC Modeling & Simulation Accreditation Process**

**AFOTEC/TSE  
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# AFOTEC ACCREDITATION PROCESS -- OVERVIEW



- OT&E POLICY
- DoD M&S POLICY
- M&S in OT&E
- RECOMMENDED PRACTICES
- AFOTEC ACCR POLICY
- AFOTEC ACCR PROCESS
- SUMMARY





# OT&E POLICY



## Title 10, US Code

- OT&E is
  - “the field test, under realistic combat conditions ... and the evaluation of the results of such test”
- OT&E is not
  - “based exclusively on computer modeling, simulation, or an analysis of ... information contained in program documents”



## DoD M&S POLICY



### DoDI 5000.2R

- **“Test planning shall consider M&S.”**
- **“Test results shall also be used to develop and improve models and simulations.”**
- **“When actual testing is not possible to support an operational assessment, such assessments may utilize computer modeling and/or hardware in the loop, simulations (preferably with real operators in the loop), or an analysis of information contained in key program documents ...”**



# DOT&E M&S POLICY



## DOT&E M&S Policy Letter

- Test planning
- Data analysis and evaluation
  - Augment test results
  - Extend test results
  - Enhance test results
- Tactics development and employment techniques
- Early operational assessment of expected capabilities



# M&S IN OPERATIONAL TEST



OT

Real Environment

Real  
Test Item

Live  
Simulation



# M&S IN OPERATIONAL TEST



OT

**Real Environment**

**Real  
Test Item**

**Live  
Simulation**

**Possible OT**

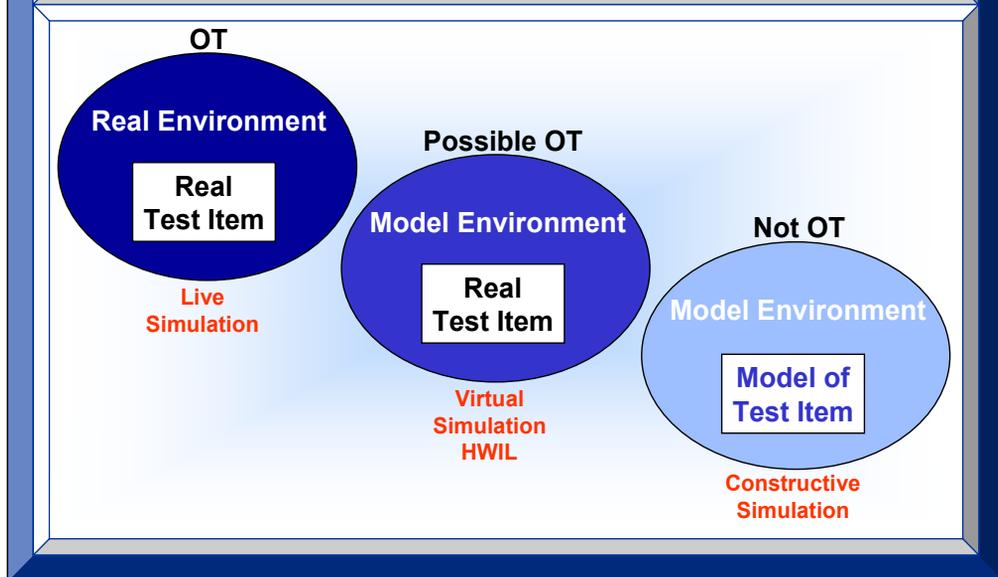
**Model Environment**

**Real  
Test Item**

**Virtual  
Simulation  
HWIL**



# M&S IN OPERATIONAL TESTS





## CONSIDERATIONS



- **Process should closely tie VV&A to scope/cost and to test planning**
  - Allow resource issues to be identified and worked earlier
  - Keep focus on the critical measures and the critical components of the measures
  - Accreditation should limit surprise results short term
  - Accreditation should improve processes in the long term



## CONSIDERATIONS



- **Process must be affordable and provide value**
- **Activities should be inherent to a good test design process**
- **Should allow for early identification of key factors that drive results**
  - **Can be a by-product of a facility trade study**
  - **Can be from previous experience**
  - **Can be from discussion within team**

*“VV&A should not become a monster”-- CN*



# AFOTEC ACCREDITATION POLICY



- **Any Test Capability -- It's not just M&S anymore -- Applies to all models, simulations or other test capabilities**
  - Virtual & constructive M&S; HWIL/SWIL, HITL/MITL; OAR targets, threats or range simulations; data injectors & stimulators -- or federates
- **Whole Test Process -- Must consider everything required to answer a COI/MOE/MOP**
  - Test design, analysis procedures, test capabilities, & SUT interactions
- **All OT Flavors -- Will be accomplished in any OT effort using M&S/test capabilities to resolve a COI/MOE/MOP**
  - EOAs, OAs, OUEs, I/Q/F/MOT&Es
- **Integrated Team Effort -- Requires many experts working together**
  - Test manager, test team, analyst, test planner, as well as SMEs for SUT, facility, instrumentation, etc.

Modeling and simulation (M&S) and other test capabilities are used often by AFOTEC in support of OT&E test planning, execution, analysis, and reporting. We use models in OT&E to supplement actual test data. A model can never completely replace testing and, IAW DoD policy, a model can not be the sole source of information to answer a critical operational issue (COI).

This presentation looks at current DoD and AF policy, the scope of current accreditation policy at AFOTEC, recommended practices to ensure accreditation, and suggests several challenges to the accreditation process.



# AFOTEC ACCREDITATION PROCESS -- VV&A



## ACCREDITATION TEAM



- Guide Process
- Write Accr Plan
- Certify Data
- Ensure V&V
- Documentation

## SENIOR MGMT REVIEWS



- Approve Test Concept
- Approve Accr Approach
- Determine Accr Authority
- Approve Accr Plan
- Apprv Recommendation

Title 10  
DoD 5000.2

DOT&E Guidance  
AFI 16-1003  
AFOTEC 99-103

## VERIFICATION

*Ensuring the TC / TP Accurately Represent the Developer's Conceptual Description & Specs*

- Assumptions
- Data Sources
- Code/Process Walk-thru
- Preliminary Runs

## VALIDATION

*Ensuring the TC / TP Accurately Represent Real World, Intended Uses of the SUT*



- External Coordination
- Sensitivity Analyses
- Compare with Field Results

## ACCREDITATION

*Management Certification That the TC / TP Are Acceptable for a Specified Application?*



- Team Recommend
- Det/Director's Coord
- CC/CN Accred



## ACCREDITATION PROCESS ACCREDITATION PLANS & REPORTS FORMAT



- Title and Signature Page -- Use current format for AFOTEC test plans and reports.
- Executive Summary -- One page summary of pertinent points detailed in the following sections
- 1.0 System Background -- Brief description of the system and test program
- 2.0 Intended Uses of the Test Process and Associated Test Capability -- ***“What operational testing issue or question is being addressed?”*** -- State the intended uses for this OT&E and the specific metrics it will answer
- 3.0 Test Process Elements -- ***“What parts of the test process are most important to answering this issue or question?”*** -- Describe those elements of the test capability most important to its use (e.g., range setup requirements, data source and certification, validated CONOPS, verified simulation code, validated assumptions list, risk assessment)
- 4.0 Accreditation Approach and Supporting V&V Activities -- ***“What will be or has been done to ensure the test process is “good enough” for its intended use?”*** -- Describe V&V data and associated acceptance criteria; summarize of V&V activities to support accreditation decision
- 5.0 Limitations and Impacts -- ***“What are the limitation(s) of the test process and associated test capabilities, and the impacts on its intended use?”***

System Background -- Include the type of test (e.g., OA, IOT&E, FOT&E, MOT&E, etc.); test category (e.g., ACAT I, II, III), DOT&E oversight status, and milestone decision supported.

Intended Uses of the Test Capability -- Application of a test capability should be aimed at a specific purpose(s). State the intended uses for this OT&E; state the test measures it will answer.

Test Capability Elements -- Describe the test capability, why selected, and how its use benefits answering the test issues and questions. Given the test capability will support specific questions, describe only those elements of the test capability most important to its application.

Accreditation Approach -- 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. This section should contain the most detailed plans and detailed information on how the comparisons will be (have been) made.

Limitations and Impacts -- Describe test capability limitations and the impacts as they relate to the intended uses to support OT&E. Include enough detail such that the accreditation authority can assess whether the model should still be used for the intended purpose(s).



## AFOTEC ACCREDITATION PROCESS -- SUMMARY



- **Implements intent of DoD and OT&E guidance**
- **Provides a framework for test process development**
- **Increases visibility to management**
- **Ensures credible, usable products in support of OT&E**

*“Good enough is the key in V&V” -- CN*