Mission-Based Test & Evaluation

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Purpose

• Inform T&E community peers of the effort to design and implement a mission-based test and evaluation (MBT&E) methodology.

• Solicit questions and comments from peers to help improve the MBT&E methodology.
Agenda

• **Why** was MBT&E developed?

• **What is MBT&E?**

• **What does MBT&E do?**

• **How** is MBT&E implemented?

• **Where** is MBT&E headed?
Why was MBT&E developed?

• Networked system-of-systems
• Address Acquisition Initiatives
• Provide “feedback” to capabilities integration and development

“We will continue to examine and challenge our most basic institutional assumptions, organizational structure paradigms, policies, and procedures to better serve the Army.”

CG, ATEC Commander’s Priorities for FY 10-15
What is MBT&E?

Mission-Based Test and Evaluation is a methodology that focuses T&E on the capabilities provided to the warfighter. It provides a framework and procedure to:

– link materiel system attributes to the operational capabilities;

– examine the SoS required to enable the operational capability; and

– enable synergistic use of all available data sources.
Framework Building Block

**Capability**\(^1\) – The ability to achieve a *desired effect* [or result, outcome, or consequence of a task\(^2\)] …

– under specified **standards and conditions**
– through a combination of **means and ways**
– to perform a set of tasks.

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1. CJCSI 3170.01F, May 2007
2. Taken from JP 1-02, Mar 2007, definition of effect.
MBT&E Framework

MISSION AND SYSTEM

SYSTEMS ENGINEERING

ENABLES

System-of-System Performance

Attribute → Desired Effect

Capabilities

Task → Desired Effect

EVALUATED BY

Operational Measures

Technical Measures

TESTED BY

Contractor Testing

Developmental Testing

Live Fire Testing

Operational Testing

Models & Simulations

Demonstrated Certifications
MBT&E Framework Example

- MBT&E Planning
  - Task Capability Linked to System Performance
  - All Available Data Used
  - Attributes Linked to Capabilities
  - SoS Identified

MBT&E Execution

Employ Fires to Influence the Win
MBT&E Process

- Process divided into steps.
- Steps divided into 5 major purpose areas.

**UNDERSTAND THE MISSION**
- Mission and task context.

**UNDERSTAND THE SYSTEM**
- Materiel components and attributes.
- Linkages between mission and materiel.

**DESIGN THE TEST AND EVALUATION**
- Test design and evaluation measures.

**DETERMINE THE RESULTS**
- Execute test and evaluation.

**REPORT THE RESULTS**
- Format and report the results.
What does MBT&E do?

• Operational capabilities and limitations.

• Materiel system performance and effect on operational capabilities.

• Effectiveness, suitability and survivability based on task.
Report Example

T&E Plan

- **Level 1 Task**: Navigate to a Destination.
  - **Result**: Crew reaches intended destination.

  - **Operational Measure**: Ability to operate navigation equipment.

  - **System**: Avionics
    - **Function**: Provide communication functions.

  - **Technical Measure**: Compliance with global air traffic management.

- **Level 2 Task**: Control Aircraft.

  - **Operational Test, Simulator**: Interoperability Certification
    - **Impact of System Performance on Task**: System Performance
      - **Lower level task capabilities/limitations**: Radios Not Interoperable
        - **Aircraft Controllable**

  - **Combined task capabilities/limitations**: Navigate Accurately
    - **T&E Plan**
      - **Test Evaluation Example**
        - **Example**
          - Navigate Accurately
            - **VFR Only**
              - **Aircraft Controllable**
How is MBT&E Implemented?

Lessons Learned:
- MBT&E framework providing context of operational capability.
- MBT&E process is executable with current personnel skill set.
- Efficiencies can be increased through:
  - Improved tools (templates, IT, training, etc.); and
  - Combat and materiel developer participation.
Where is MBT&E headed?

• Synchronize with capabilities-based analysis.

• Synchronize with systems engineering.

• Collaborative environment.
Summary

• MBT&E methodology developed.

• Positive results and path forward toward increased efficiencies.

• Aligning the efforts of the capabilities developer, materiel developer, and independent T&E.
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