



Mission Based T&E Progress

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Purpose and Agenda

- **Purpose: To review the status of the MBT&E methodology in the following areas:**
 - Implementation,
 - Lessons Learned, and
 - Current Development Focus Areas.
- **Agenda**
 - Background (Why and What)
 - Implementation (How)
 - Lessons Learned (Items to Sustain and Improve)
 - Current Development Focus Areas
 - Conclusions



Why? - Acquisition Initiatives

Common Focus on Mission Capability

DoD

DOD 5000.1 – “The primary objective of Defense acquisition is to acquire quality products that satisfy user needs with measurable **improvements to mission capability**...”¹

JCS

Joint Capabilities Integration and Development System – The primary objective of the JCIDS process is to ensure the capabilities required by the joint warfighter are identified ... **in order to successfully execute the missions assigned.**”²

DOT&E

Director, Operational Test and Evaluation – “The evaluation of operational effectiveness is linked to **mission accomplishment.**”³

Goal: T&E Focused on Mission Capability

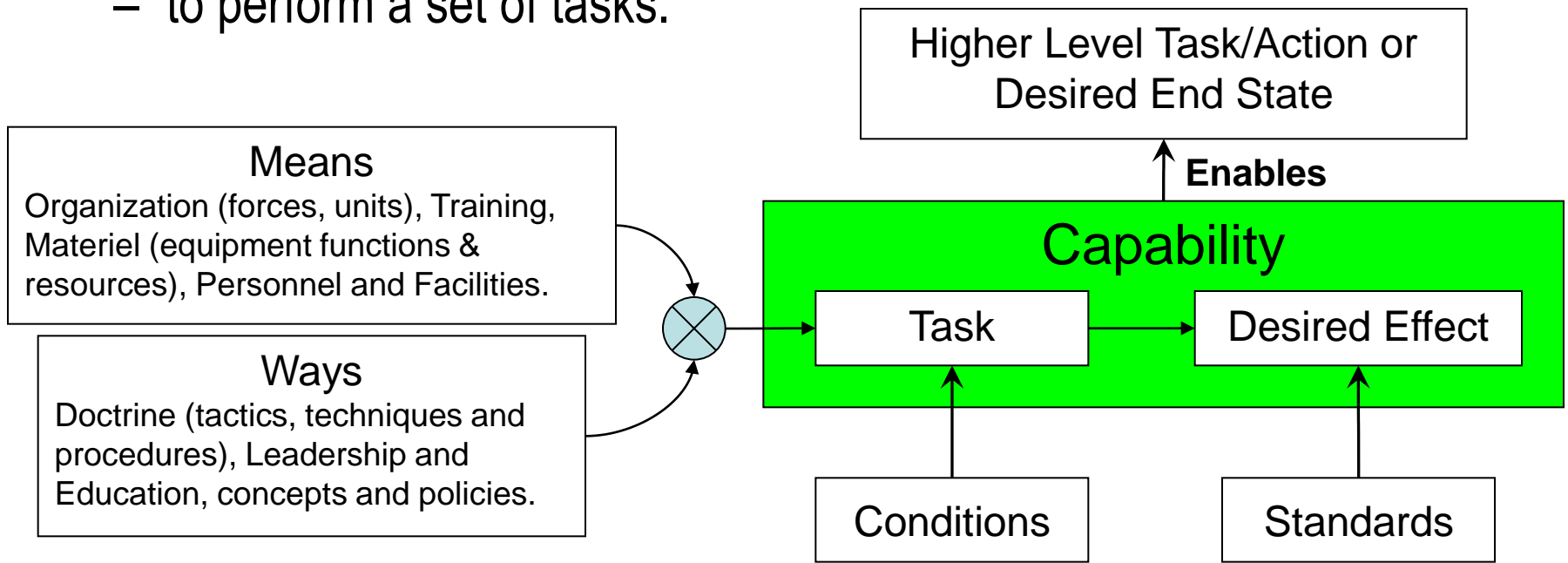
1. Office of the Under Secretary of Defense, Acquisition, Technology and Logistics, Department of Defense Directive Number 5000.1, 12 May 2003.
2. Office of the Joint Chiefs of Staff, Chairman of the Joint Chiefs of Staff Instruction 3170.01G, 1 Mar 09.
3. Memorandum, OSD DOT&E, subject: Reporting of Operational Test and Evaluation Results, 6 Jan 10.



What? - Framework Building Block

Capability¹ – The ability to achieve a **desired effect** [or result, outcome, or consequence of a task²] ...

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



1. CJCSI 3170.01F, May 2007

2. Taken from JP 1-02, Mar 2007, definition of effect.

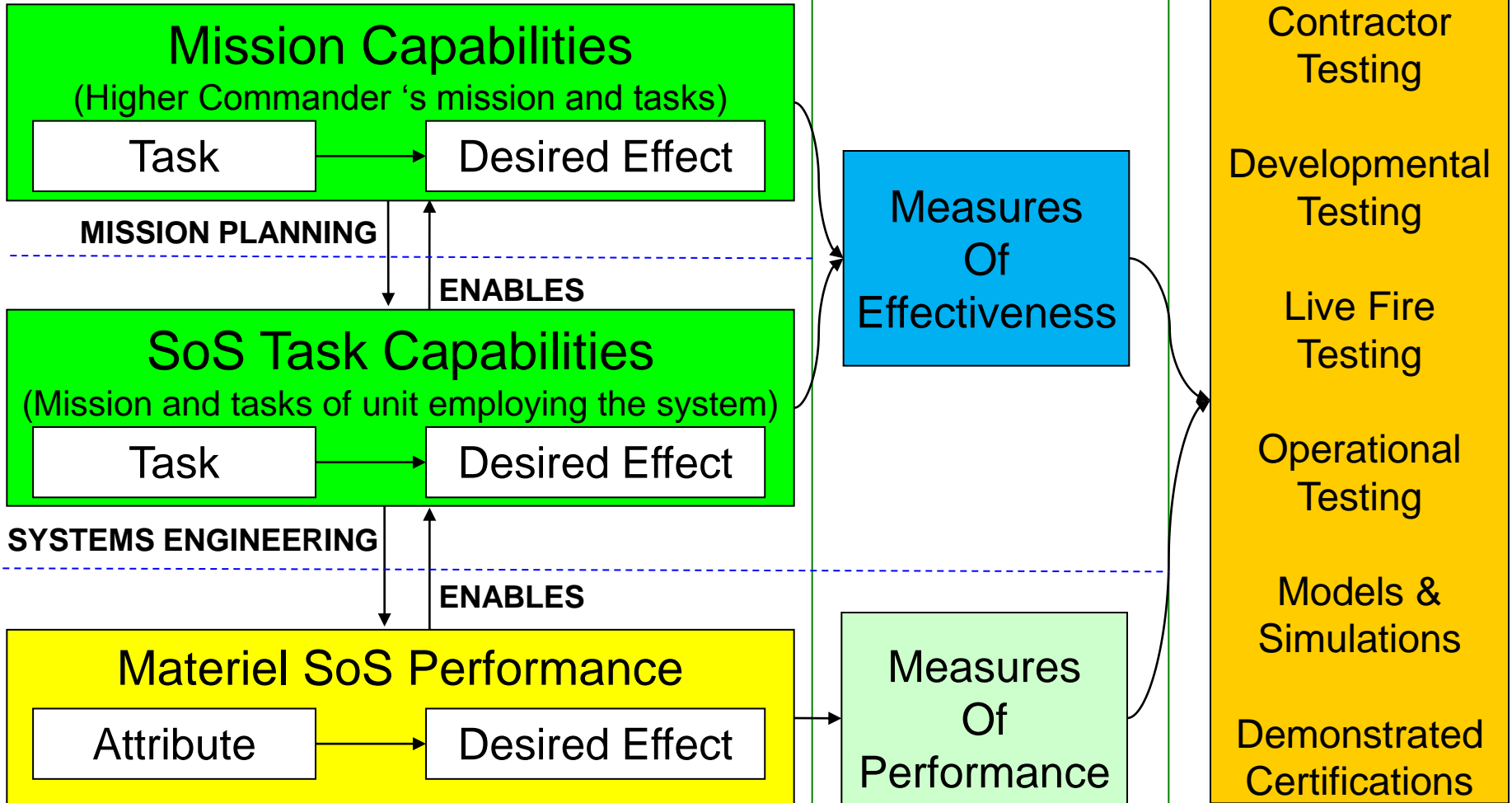


What? - MBT&E Framework

MISSION AND SYSTEM

EVALUATED BY

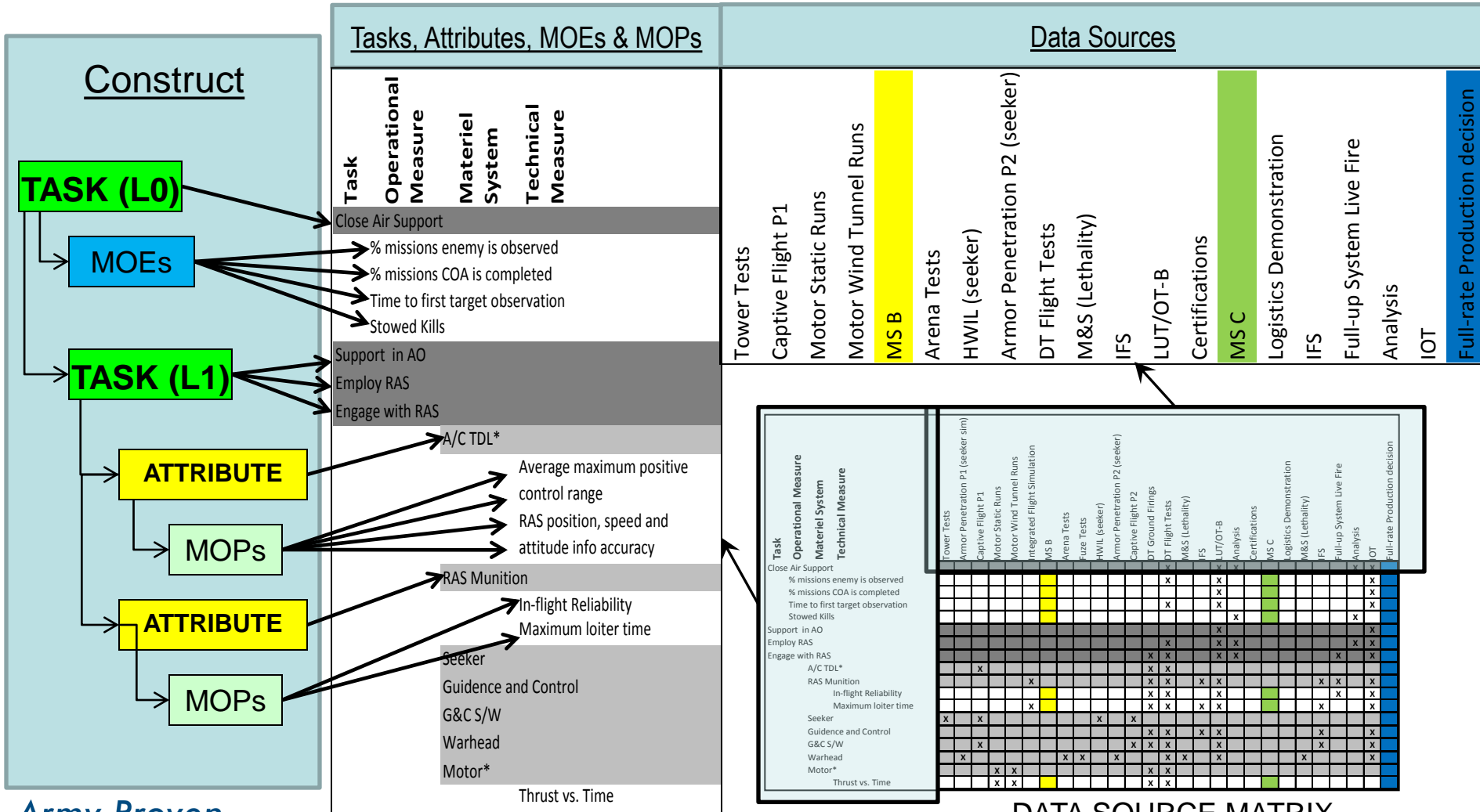
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What? – Putting it all together

Link Measures to Data Sources

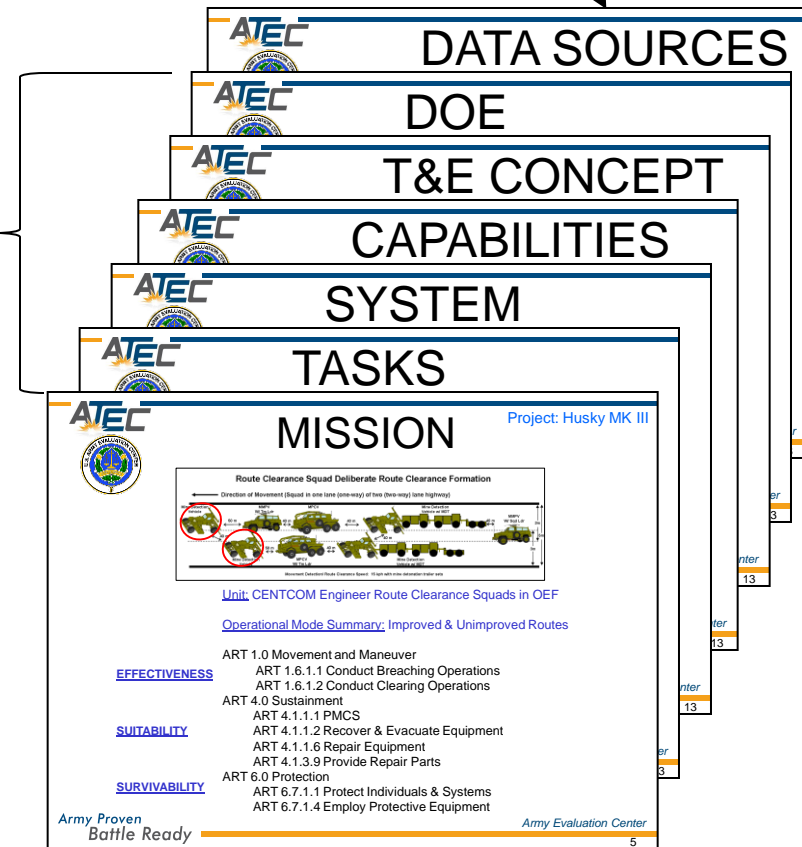


How? – Strategy Development

The T&E Strategy...

- Initial strategy development using MBT&E derived template;
- Links the attributes of the system to mission context; and
- Addresses Critical Operational Issues, Key Performance Parameters in the mission context.

Context for



Mission context driven from evaluation strategy through DT and OT.



How? - Use of Authoritative Task List

MBT&E Process: 1. Develop mission tasks. 2. Link to ATL

Army Universal Task List

T&E Plan

ART 1.4.1 CONDUCT LETHAL DIRECT FIRE AGAINST A SURFACE TARGET

1-54. Engage enemy equipment and materiel, personnel, fortifications, and facilities with direct fire designed to destroy the target. These direct fires may be from fixed- or rotary-wing systems. (FM 3-90) (USACAC)

| No. | Scale | Measure |
|-----|---------|--|
| 01 | Yes/No | Direct fires contributed to accomplishing unit mission. |
| 02 | Yes/No | Direct fire attack was conducted per established rules of engagement. |
| 03 | Yes/No | Unit used correct weapon to engage target. |
| 04 | Time | To get complete attack on direct fire target after detecting and identifying target. |
| 05 | Time | To suppress targets. |
| 06 | Percent | Of probability of suppressing a target. |
| 07 | Percent | Of probability of a hit. |
| 08 | Percent | Of probability of a kill given a hit. |
| 09 | Percent | Of missions flown and fired to achieve desired target damage. |
| 10 | Percent | Of available direct fire weapon systems engaging direct fire targets. |
| 11 | Percent | Of direct fire targets not engaged. |
| 12 | Percent | Of enemy performance degraded due to lethal direct fire attack. |
| 13 | Percent | Of lethal direct fire attacks that result in collateral damage. |
| 14 | Percent | Of lethal direct fire attacks that result in friendly or neutral casualties. |
| 15 | Number | Of lethal direct fire attacks that result in collateral damage. |
| 16 | Number | Of lethal direct fire attacks that result in friendly or neutral casualties. |

EFFECTIVENESS

ART 1.4.1: DIRECT LETHAL FIRES
End State: *Target is destroyed*

MOE: % Correct Weapon Settings

MOE: Time to Attack

MOE: Probability of kill

MOE: % Targets Engaged

MOE: % Collateral Damage



How? - Planning

The T&E Plan...

- Focuses on Soldier missions and tasks;
- Links the attributes of the system to mission context; and
- Addresses Critical Operational Issues, Key Performance Parameters in the mission context.

Mission and task capabilities are the highest level of the T&E dendritic.

Mobile Tower System Evaluation Plan

| | |
|--|--|
| CHAPTER 3. EVALUATION DETAILS | |
| 3.1 EFFECTIVENESS..... | |
| 3.1.1 MEA 1 Night Vision Device Compatibility..... | |
| 3.1.2 Mission Task 2 Install the MOTS..... | |
| 3.1.2.2 Task 2.2 Setup and Tear Down..... | |
| 3.1.2.3 Task 2.3. Conduct Minimum Initial Operations..... | |
| 3.1.3 Task 3. Conduct Tower Operations..... | |
| 3.1.3.1 Mission Task 3.1 Retrieve Recorded Communications..... | |
| 3.1.3.2 Task 3.2 Operate Airfield Lighting System..... | |
| 3.1.3.3 Task 3.3. Obtain Airspace Information and Send Messages Via TAIS..... | |
| 3.1.3.4 Task 3.4 Control Aircraft, Vehicles, and Personnel by ATC Light Gun Signals..... | |
| 3.1.3.5 Mission Task 3.5 Communicate Using RF and Landline..... | |
| 3.1.3.6 Task 3.6 Provide Local Wind Speed/Direction/Altimeter Setting..... | |
| 3.2 SUITABILITY..... | |
| 3.2.1 MEA 2 Training and Training Devices..... | |
| 3.2.2 MEA 3 Reliability, Availability, and Maintainability..... | |
| 3.2.3 MEA 4 Integrated Logistics Support (ILS)..... | |
| 3.2.4 MEA 6 System Safety..... | |
| 3.2.5 Task 1 Transport the MOTS..... | |
| 3.2.6 Task 4 Maintain the MOTS..... | |
| 3.2.7 Mission Task 5 Train..... | |
| 3.3 SURVIVABILITY..... | |
| 3.3.1 MEA 5 System Survivability..... | |
| 3.3.1.1 MEA 5.1 Electromagnetic Environmental Effects..... | |
| 3.3.1.2 MEA 5.2 Information Security..... | |
| 3.3.1.3 MEA 5.3 Chemical, Biological, Radiological, and Nuclear Effects..... | |

How? - Reporting

- **OTA Evaluation Report**
- Conclusions focused on **Soldier tasks** and **how the system supports the mission**.
- COIs, Criteria and KPPs addressed, but conclusions are put in the context of the Soldier's mission and tasks.

| Route Clearance and Proofing System | |
|---|-----|
| <u>CHAPTER 2. CONCLUSIONS</u> | 2-1 |
| <u>2.1 EVALUATION OF OPERATIONAL CAPABILITY</u> | 2-1 |
| <u>2.1.1 Effectiveness</u> | 2-1 |
| <u>2.1.1.1 ART 1.6.1.1. Conduct Breaching Operations</u> | 2-1 |
| <u>2.1.1.2 ART 1.6.1.2. Conduct Clearing Operations</u> | 2-2 |
| <u>2.1.2 Suitability</u> | 2-2 |
| <u>2.1.2.1 ART 4.1.1.1. Perform PMCS</u> | 2-2 |
| <u>2.1.2.2 ART 4.1.1.2. Recover and Evacuate Disabled Equipment</u> | 2-3 |
| <u>2.1.2.3 ART 4.1.1.6. Repair Equipment</u> | 2-3 |
| <u>2.1.2.4 ART 4.1.2.2. Conduct Terminal Operations</u> | 2-4 |
| <u>2.1.2.5 ART 4.1.2.3. Conduct Mode Operations</u> | 2-5 |
| <u>2.1.2.6 ART 4.1.3.9. Provide Repair Parts (Class IX)</u> | 2-5 |
| <u>2.1.3 Survivability</u> | 2-5 |
| <u>2.1.3.1 ART 6.7.1.1. Protect Individuals and Systems</u> | 2-5 |
| <u>2.1.3.2 ART 6.7.1.4. Employ Protective Equipment</u> | 2-5 |

All T&E results are related to the mission.

2.1.1.1 ART 1.6.1.1 Conduct Breaching Operations

- End State: “creation of lanes through or over an obstacle to allow an attacking force to pass.”

- Result: “The SYSTEM supports this task by detecting the threat obstacle, marking the threats (for interrogation) and towing the clearing set to ‘proof’ the lane. The SYSTEM ... is a significant improvement over dismounted IED detection, marking and proofing.”



Items to Sustain - Planning

- MBT&E strategies being developed.
 - Linking all T&E requirements to missions / tasks.
 - Leveling of expectations in T&E IPT.
- Mission context enhancing T&E design.
 - Mission context (desired results, conditions, standards) leads to integrated T&E.
 - Evaluation measure design focused on operational capability.
 - DT designed using operational techniques and procedures.
- SoS description aligned with PM's Work Breakdown Structure.
 - Facilitates sharing of T&E data during contractor testing.
 - Aligns Warfighter tasks with contractor requirements.

**Mission context and SoS description -
keys to integrated T&E strategy**



Items to Sustain - Reporting

- Mission Task to System Attribute Linkages.
 - Understanding how system technical performance impacted desired capabilities.
 - “Accumulated” evaluation of effectiveness, suitability and survivability.
- Conclusions more than a restatement of test results.
 - MBT&E Capabilities = **task + desired result**.
 - Conclusions telling “what the data means” in terms of capabilities.

Answering the “so what” question in the Warfighter’s terms



Items Being Improved - Planning

- Linkages between tasks and system attributes are being developed.
 - Impact: Additional time to develop and coordinate linkages.
 - Mitigation: T&E IPT developing during project execution.
 - Path ahead: Develop linkages as capabilities based analysis is being conducted.
- Reference missions and tasks are being developed.
 - Impact: Additional time to develop, coordinate and “validate” reference missions.
 - Mitigation: Direct coordination with TRADOC School Houses.
 - Path ahead: Develop set of reference mission/tasks per Warfighting Function.



Items Being Improved - Reporting

- Mission/task standards (threshold/objective requirements) are being developed.
 - Impact: Qualitative results solely based on military judgment.
 - Mitigation: T&E IPT developing “expected” mission/task performance.
 - Path Ahead: Develop task, conditions and standards in requirements.
- Roll-up of system and operational performance into overall assessment of ESS is being developed.
 - Impact: ESS still based on met/not met technical requirements. Impact of sustainability/survivability on effectiveness not determined.
 - Mitigation: Providing capabilities and limitations as rationale for ESS assessment. Continue to use links to COIs and KPPs in parallel.
 - Path Ahead: Align Critical Operational Issues/Criteria with mission and tasks.



Current MBT&E Development Focus

- **Developing better understanding of the mission context.**
 - How will the Warfighter execute the mission?
 - What is needed to execute the mission?
 - Under what operational conditions are the capabilities needed?
- **Incorporating mission analysis into the requirements development process.**
 - What are the key Warfighter capabilities (task + desired result) needed for the mission?
 - How do you know that the capabilities are supporting mission accomplishment?
 - How do the attributers, KPPs, and COIs support assessment of capabilities?
- **Incorporating relationship between Systems Engineering and war fighter Task.**
 - How do the SoS components support the tasks?
 - What level of technical performance is necessary to support task accomplishment?

Collaboration between Combat Developer, Materiel Developer and Independent T&E.

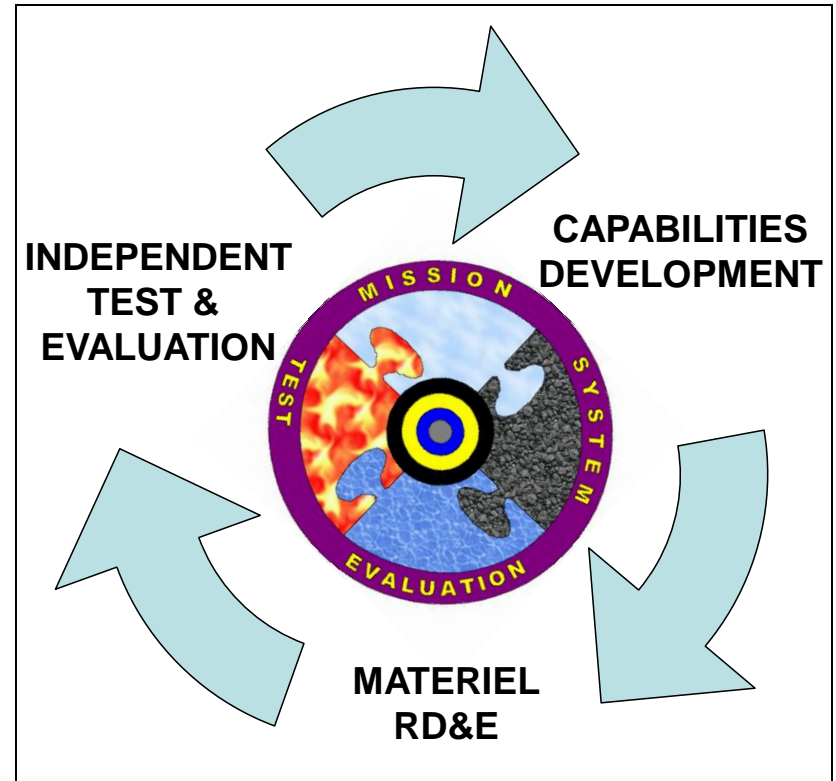


Conclusions

- **Implementation of MBT&E is showing:**
 - Mission and task capabilities are highest level (focus) of T&E strategy = results related to mission.
 - Providing conclusions in Warfighter's terms.
 - Mission context driven into DT and OT conduct = integrated T&E programs.
- **Items to Sustain:**
 - Use of ATLS, and especially the AUTL, as source of evaluation metrics.
 - SoS description aligned with PM's Work Breakdown Structure.
 - Use of mission context and SoS description to drive T&E requirements.
- **Items Being Improved:**
 - Linkages between Warfighter tasks and system attributes.
 - Reference missions and tasks and mission/task capabilities standards.
 - Procedures to roll-up system and operational performance into mission accomplishment.

Desired End State

- Synchronized with Combat Developer.
- Synchronized with systems research, development and engineering.



Collaborative environment defined by a common framework.



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