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Understanding the Mission – A “How-To” Guide for MBT&E Practitioners

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Department Manager and Senior Military Analyst
15 March 2011



Purpose and Agenda

- ▶ **Purpose:** To explain the process and logic for specifying an understanding of the mission (MBTE Step 1)
- ▶ **Agenda**
 - ▶ Introduction
 - ▶ Where the Mission fits in the MBT&E framework
 - ▶ Warfighting 101 – Analyzing the Mission
 - > Mission? What Mission??
 - > Analyzing the mission
 - > Decomposing the mission into tasks
 - > Determining conditions and standards (i.e. MoPs and MoEs)
 - ▶ Translating tasks from native language to common language
 - > Authoritative Task Lists
 - > Capturing the results
 - > An alternative approach
 - ▶ Questions to ask



Mission Role in MBTE



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

Army Proven
Battle Ready

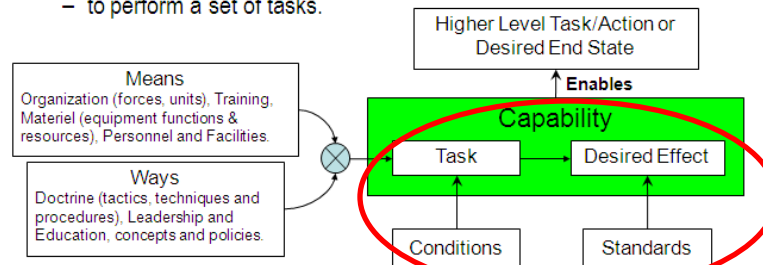
1. Office of the Under Secretary of Defense, Acquisition, Technology and Logistics, Department of Defense Directive Number 5000.1, 12 May 2003.
2. Office of the Joint Chiefs of Staff, Chairman of the Joint Chiefs of Staff Instruction, JCIDS, 1 Mar 08.
3. Memorandum, OSD DOT&E, subject: Reporting of Operational Test and Evaluation Results, 8 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.

Army Proven
Battle Ready



MBT&E Framework – Where's the Mission?



MISSION AND SYSTEM

EVALUATED BY

TESTED BY

Mission Capabilities

(Higher Commander 's mission and tasks)

Task

Desired Effect

MISSION PLANNING

ENABLES

SoS Task Capabilities

(Mission and tasks of unit employing the system)

Task

Desired Effect

SYSTEMS ENGINEERING

Mission? What Mission??

- ▶ **For MBT&E purposes, want to know “What” the unit employing the system under test is supposed to do, and “Why”.**
 - ▶ In the context of at least the next higher level headquarters mission
 - ▶ And a broader operational context (i.e. Operational Environment (OE) and Concept of Operations (CONOPS))
- ▶ **What are some potential sources for the Mission?**
 - ▶ Requirements documents from JCIDS/CBA analysis
 - ▶ Army Functional Concept (AFC) or Concept Capability Document (CCD)
 - ▶ CONOPS based on ongoing operations
 - ▶ Approved Defense Planning Scenarios (DPS) or Army Scenarios based on DPS – Often used for Analysis of Alternatives (AoA)
 - ▶ Lower level, higher fidelity vignettes based on above
 - ▶ Other CONOPS directed or approved for use by appropriate authority (i.e. Test Director, MDA, etc.)

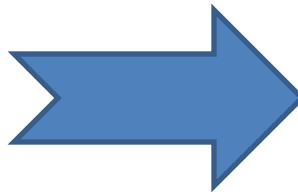


Analyzing the Mission

- FM 5.0, The Operations Process, dated March 2010, describes the Military Decision Making Process (MDMP).
- Mission Analysis is step 2 of the MDMP

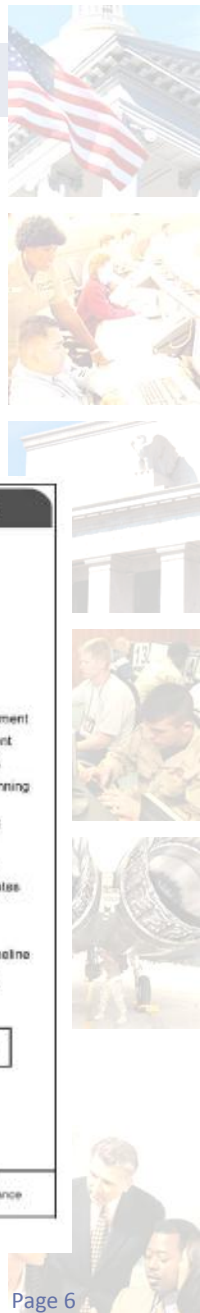
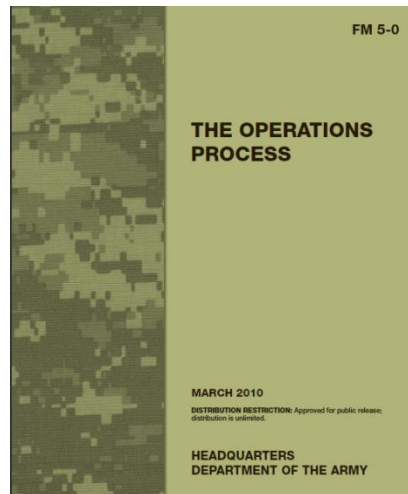
Key Inputs	Steps	Key outputs
<ul style="list-style-type: none"> Higher headquarters' plan or order or a new mission anticipated by the commander 	Step 1: Receipt of Mission	<ul style="list-style-type: none"> Commander's initial guidance Initial allocation of time
		Warning order
<ul style="list-style-type: none"> Higher headquarters' plan or order or a new mission anticipated by the commander Higher headquarters' intelligence products and intelligence organizations Knowledge products from other organizations Design concept (if developed) 	Step 2: Mission Analysis	<ul style="list-style-type: none"> Mission statement Commander's intent Planning guidance Updated CCIRs and EEFls Updated IPB and running estimates Assumptions
		Warning order
<ul style="list-style-type: none"> Mission statement Initial commander's intent, planning guidance, CCIRs, and EEFls Updated IPB and running estimates Assumptions 	Step 3: Course of Action (COA) Development	<ul style="list-style-type: none"> COA statements and sketches Tentative task organization Broad concept of operations Revised planning guidance Updated assumptions
<ul style="list-style-type: none"> Updated running estimates Revised planning guidance COA statements and sketches Updated assumptions 	Step 4: COA Analysis (War Game)	<ul style="list-style-type: none"> Refined COAs Potential decision points War-game results Initial assessment measures Updated assumptions
<ul style="list-style-type: none"> Updated running estimates Refined COAs Evaluation criteria War-game results Updated assumptions 	Step 5: COA Comparison	<ul style="list-style-type: none"> Evaluated COAs Recommended COAs Updated running estimates Updated assumptions
<ul style="list-style-type: none"> Updated running estimates Evaluated COAs Recommended COA Updated assumptions 	Step 6: COA Approval	<ul style="list-style-type: none"> Commander-selected COA and any modifications Refined commander's intent, CCIRs, and EEFls Updated assumptions
		Warning order
<ul style="list-style-type: none"> Commander-selected COA with any modifications Refined commander's intent, CCIRs, and EEFls Updated assumptions 	Step 7: Orders Production	<ul style="list-style-type: none"> Approved operation plan or order

Figure B-1. The steps of the military decisionmaking process



Key Inputs	Process	Key outputs
	<ul style="list-style-type: none"> Analyze the higher headquarters' plan or order Perform initial IPB 	
		Determine specified, implied, and essential tasks
<ul style="list-style-type: none"> Higher headquarters' plan or order Higher headquarters' intelligence and knowledge products Knowledge products from other organizations Updated running estimates Initial commander's guidance COA evaluation criteria Design concept (if design precedes mission analysis) 	<ul style="list-style-type: none"> Begin composite risk management Develop initial CCIRs and EEFls Develop initial ISR synchronization plan Develop initial ISR plan Update plan for the use of available time Develop initial themes and messages Develop a proposed mission statement Present the mission analysis briefing Develop and issue initial commander's intent Develop and issue initial planning guidance Develop COA evaluation criteria Issue a warning order 	<ul style="list-style-type: none"> Approved mission statement Initial commander's intent Initial CCIRs and EEFls Initial commander's planning guidance Information themes and messages Updated IPB products Updated running estimates Assumptions Resource shortfalls Updated operational timeline COA evaluation criteria
		Warning Order

Figure B-2. Mission analysis



Decomposing the Mission into Tasks

▶ I Determine Specified, Implied and Essential Tasks

- The “what” of a mission statement is always a task.
- Analysis of the higher headquarters’ order and commander’s guidance identifies specified and implied tasks.
- In the context of operations, a task is clearly defined as a measurable activity accomplished by Soldiers, units, and organizations that may support or be supported by other tasks.
- Essential tasks are derived from the list of specified and implied tasks, and incorporated in the restated mission.

A specified task is a task specifically assigned to a unit by its higher headquarters

An implied task is a task that must be performed to accomplish a specified task or mission but is not stated in the higher headquarters’ order

An essential task is a specified or implied task that must be executed to accomplish the mission. Essential tasks are always included in the unit’s mission statement



Determining Conditions and Standards

► I Conditions

- Definition: (joint) Those variables of an operational environment or situation in which a unit, system, or individual is expected to operate and may affect performance. (JP 1-02)
- Condition variables that may effect performance are typically identified during the Intelligence Preparation of the Battlefield (IPB) process and further refined as a result of Course of Action (COA) Analysis, or Wargaming.

► I Standards

- Definition: A quantitative or qualitative measure and criterion for specifying the levels of performance of a task.(FM 7-0)
- For Mission Based Testing and Evaluation we want to determine Measures of Effectiveness (MoE) to measure whether a task had or is having the desired effect; and, Measures of Performance (MoP) to determine whether task performance meets or exceeds the minimum criterion for performance.
- Standards are derived from analysis of what it will take to accomplish assigned mission and tasks – normally via the wargaming process.



Translating Tasks into ATL Tasks

▶ Sample task list from mission analysis process

▶ Specified Tasks

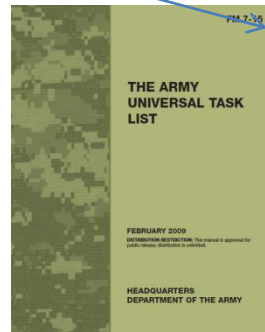
- > Move along Route Charlie
- > Occupy Assembly Area (AA) Mike
- > Secure roads and bridges leading into and out of Town in order to prevent infiltration by insurgents

▶ Implied Tasks

- > Maintain situational awareness
- > Recon Route Charlie
- > Detect, locate and clear IEDs
- > Recon AA Mike
- > Maintain perimeter security
- > Establish traffic control points

▶ Corresponding tasks drawn from AUTL and other ATLs

- ▶ ART 1.3.3 Conduct Tactical Convoy
- ▶ ART 1.5.1 Occupy an Assembly Area
- ▶ ART 7.5.19 Isolate an Enemy Force
- ▶ ART 6.4.2 Maintain constant situational awareness
- ▶ ART 2.3.3.1 Conduct a Route Recon
- ▶ ART 1.6.1 Overcome barriers, obstacles, and mines
 - > ART 6.12.3 Conduct IED Operations
- ▶ ART 2.3.3 Conduct an Area Recon
- ▶ ART 6.5.3.3 Establish Perimeter Security
- ▶ ART 6.5.3.2 Establish Checkpoints



Capturing the Results

- ▶ **How is it done now?**
 - ▶ Manual look up?
 - ▶ Cut and paste from requirement documents?
 - ▶ Captured in PowerPoint, Word Tables, Excel Spreadsheets?
- ▶ **Why this may not be sufficient**
 - ▶ Manual look up
 - > Currency of authoritative sources – ATL's updated regularly
 - > Time consuming process
 - > Increased chance of omission and/or fat-finger errors
 - ▶ Cut and paste from requirement documents
 - > Conditions may have changed since publication
 - > Potential for adopting faulty or incomplete analysis
 - ▶ Captured in PowerPoint, Word Tables, etc.
 - > Suitability for Re-Use and/or collaborative development



An Alternative Approach

- ▶ **Online, collaborative knowledge capture tool**
 - ▶ **Use to support the following functions:**
 - > **Determine and document mission requirements in the form of tasks, conditions and standards for systems under test and associated operational context**
 - > **Develop and document planning for Test and Evaluation events**
 - > **Record and maintain task execution results**
 - > **Record and maintain resulting assessment for each task**
 - ▶ **Participation and permissions limited to members of authorized user groups**



How it Works

▶ Determine and document mission requirements – Converting to ATL Tasks

The screenshot displays a mission planning software interface. On the left is a hierarchical tree view of mission tasks. The root is 'NDIA SAMPLE MISSION', which branches into several ART (Army Task) tasks. The first major branch is 'ART 1.3.3 CONDUCT TACTICAL CONVOY', which includes 'Staff Tasks' and 'Subordinate Unit Tasks'. Under 'Staff Tasks', there is 'ART 6.4.2 MAINTAIN CONSTANT SITUATIONAL AWARENESS', which further branches into 'Staff Tasks' and 'Subordinate Unit Tasks'. The 'Staff Tasks' under ART 6.4.2 include: 'ART 5.1.4.1 MONITOR SITUATION OR PROGRESS OF OPERAT...', 'ART 5.3.5.2.1 Collect Friendly Force Information Requirements', 'ART 5.3.5.2.2 Integrate Intelligence Products', 'ART 5.3.5.2.4 Process Relevant Information to Create a Commo...', 'ART 5.3.5.2.5 Display a Common Operational Picture Tailored to', and 'ART 5.3.5.2.6 Store Relevant Information'. Below these are 'Subordinate Unit Tasks' and 'Command-Linked Tasks'. Other major branches include 'ART 2.3.3.1 CONDUCT A ROUTE RECONNAISSANCE', 'ART 2.3.4 CONDUCT SURVEILLANCE', 'ART 6.5.3.4 ESTABLISH OBSERVATION POSTS', 'ART 1.5.1 OCCUPY AN ASSEMBLY AREA', 'ART 2.3.3.3 CONDUCT AN AREA RECONNAISSANCE', 'ART 6.5.3.3 ESTABLISH PERIMETER SECURITY', and 'ART 7.5.19 ISOLATE AN ENEMY FORCE', each with its own sub-tasks.

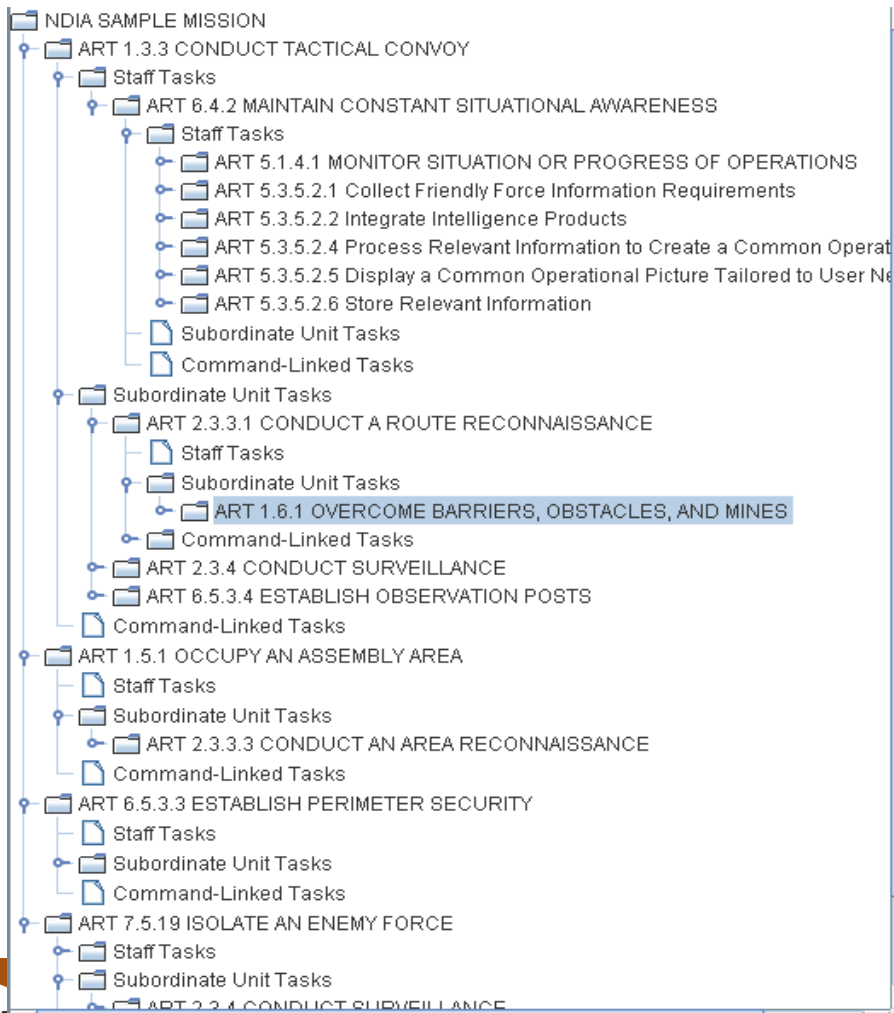
The right side of the interface is a detailed configuration panel for the selected mission. It has tabs for 'Mission', 'Conditions', 'Doctrine *', 'Guidance', 'Notes', and 'MTAs *'. The 'Mission' tab is active, showing the following fields:

- Security Classification:** (U)
- Name:** NDIA SAMPLE MISSION
- Code:** US Army-2011-0001
- Combatant Command:** IBCT INF BN - RIFLE CO [Modify...](#)
- Last Modified:** 2011-03-04 11:40:26.0
- Created:** 2011-03-04 10:41:38.0
- * Subordinate Command:** IBCT INF BN - RIFLE CO/RIFLE PLT/RIFLE SQD [Modify...](#)
- * OPLAN:** [Modify...](#)
- Published:** U
- Level:**
 - Primary Mission (M)
 - Operation (O)
 - Phase (P)
 - Specified Task (S)
 - Implied Task (I)
- * Description:** [Zoom...](#)

Company has been assigned the mission of securing the roads and bridges in and out of a small town in their Area of Operations in order to prevent insurgents from infiltrating or exfiltrating.

How it Works cont.

▶ Determine and document mission requirements – Conditions



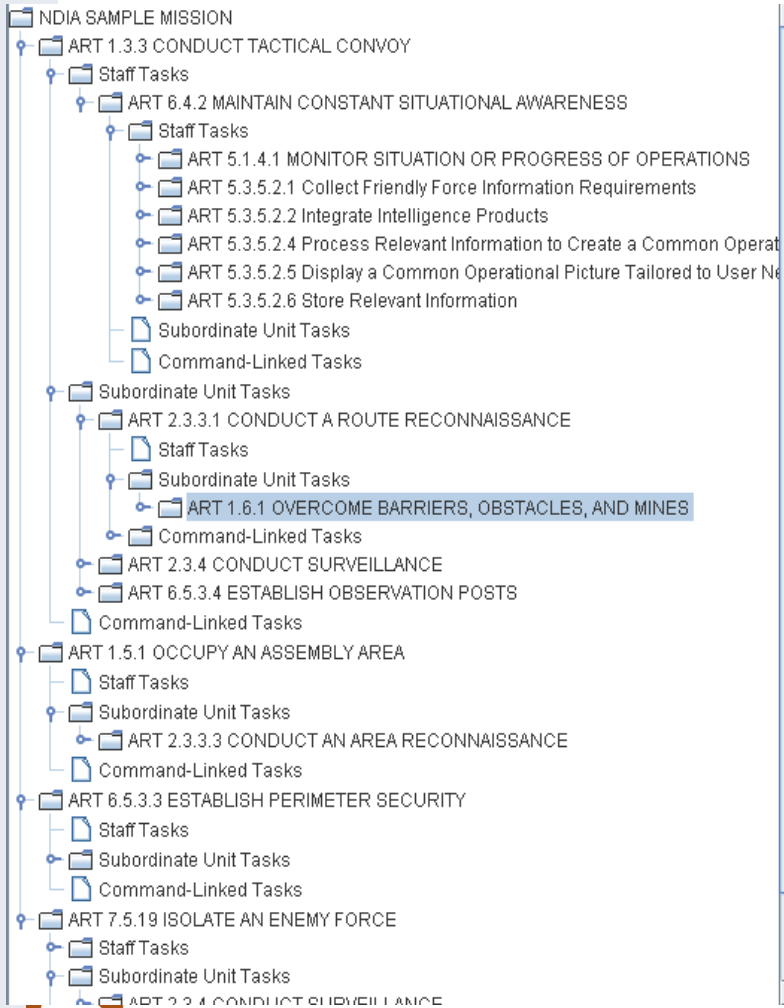
Mission Task	Conditions	Standards	Notes	Observations
Designators				
General				
C 1.1.3.4 Obstacles to Movement	Moderate (some use of obstacles)			
C 1.1.3 Man-Made Terrain Features	Moderate (impact on specific small areas)			
C 1.3.1.1 Season	Summer (hot long days)			
C 1.3.1 Climate	Temperate			
C 1.3.5 RF Spectrum	Moderate (some limiting factors)			
C 2.4.2 Intelligence Data Base	Marginal (intelligence data is neither current nor complete)			
C 2.9.2 Threat Form	Unconventional (guerrilla warfare)			

Change Class... Add...

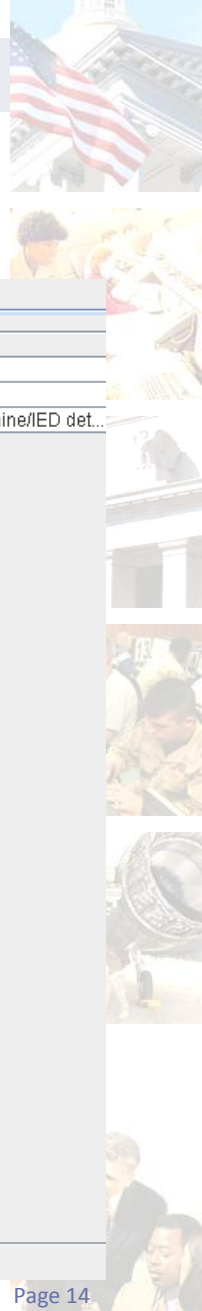


How it Works cont.

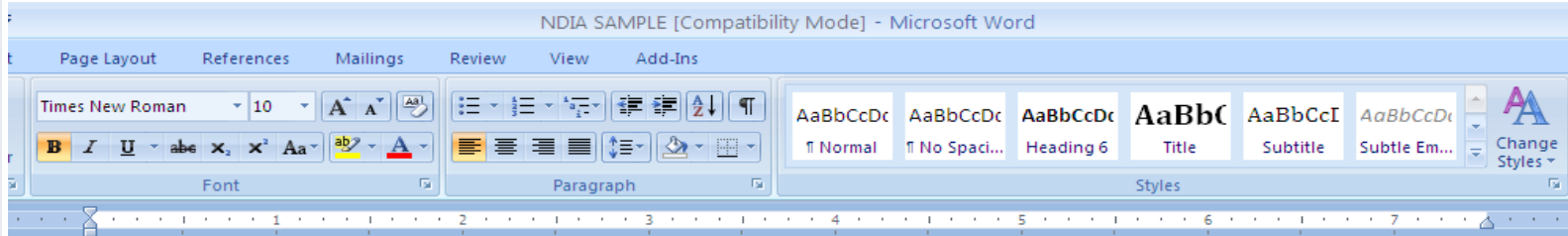
▶ Determine and document mission requirements – Standards



Mission Task		Conditions	Standards	Notes	Observations	Doctrine *	TPAs *
M#	Sec. Class.	Criterion	Scale	Measure			
1	(U)	20 min	Time	(U) To conduct reconnaissance of obstacle			
2	(U)	60 min	Time	(U) To complete obstacle clearing			
3	(U)	0	Number	(U) Of friendly/neutral casualties caused by mine/IED det...			



Mission Task Report in TEO Format



Mission: (U)NDIA SAMPLE MISSION

Task: (U)ART 1.3.3 CONDUCT TACTICAL CONVOY

Responsible Organization: IBCT INF BN - RIFLE CO

Description: 1-52. Conduct tactical convoys by employing one or a combination of three types of column formations: open, close, and infiltration. Tactical convoys are combat operations in which forces and materiel are moved overland from one location on the battlefield to another while maintaining the ability to aggressively respond to enemy attempts to impede, disrupt, or destroy elements of the convoy. (FM 55-30) (ALMC)

Standards:

M#	Criterion	Scale	Measure
M1	(U)	Y/N	(U) The SIR that prompted the conduct of reconnaissance was answered.
M2	(U)	Y/N	(U) Reconnaissance system/force orients on the reconnaissance objective.
M3	(U)	Y/N	(U) Recon system/force reports all information rapidly and accurately.
M4	(U)	Y/N	(U) Recon mission completed no later than time specified in the order.
M5	(U)	Y/N	(U) Support requirements for each reconnaissance asset are identified.
M6	(U)	Y/N	(U) Unit maintains continuous reconnaissance by employing multiple means.
M7	(U)	Time	(U) From receipt of tasking until reconnaissance assets are in place.
M8	(U)	Time	(U) To provide answers to IR/PIR to requesting agency.



How it Works cont.

► Develop and document planning for test events

The screenshot shows a software window titled "Event: Test Event 1". On the left is a tree view with "Test Event 1" selected, containing sub-items: "Training Audiences", "Forces", and "Linked Participants". The main area has a tabbed interface with the following tabs: "Event" (selected), "Purpose", "Description", "Methods *", "Milestones", and "Goals *". Above these are several other tabs: "Coordinating Organizations *", "Experimentation *", "Locations", "Plans *", "Costs *", "Transportation *", "Shortfalls *", "More Event Data *", "Equipment *", "Sim Support *", "POCs", "Remarks", "Facilities *", and "Component Interoperability *". The "Event" tab is active, displaying the following fields:

- Overall Security Class: (U)
- Event Number: US Army-2011-0001
- Event Name: Test Event 1
- Scheduling Command: Army
- Sponsoring Organization: Army
- JELC dates: Sec. Class: (U), Start: 2 Mar 2012, End: 2 Jun 2013
- Inclusive dates: Sec. Class: (U), Start: 3 Mar 2013, End: 17 Apr 2013



How it Works cont.

▶ Record and maintain task execution results

The screenshot displays a mission planning interface. On the left is a hierarchical tree of tasks under the heading 'NDIA SAMPLE MISSION'. The selected task is 'ART 1.6.1 OVERCOME BARRIERS, OBSTACLES, AND MINES'. On the right is a table for recording task execution results.

Mission Task	Conditions	Standards	Notes	Observations	Doctrine *	TPAs *
	M#	Sec. Class	Observed	Scale	Measure	
	1	(U)	90min	Time	(U) To conduct reconnaissance of obstacle	
	2	(U)	120min	Time	(U) To complete obstacle clearing	
	3	(U)		Number	(U) Of friendly/neutral casualties caused by mine/IED det...	

Buttons at the bottom of the table include 'Add...', 'Details', and 'Remove...'. Below the table, there are tabs for 'Conditions', 'Standards', and 'Issues'.

How it Works cont.

▶ Record and maintain task assessment results

The screenshot displays a software interface for recording and maintaining task assessment results. On the left is a hierarchical tree structure under the heading "NDIA SAMPLE MISSION". The tree includes several main categories, each with sub-categories for "Staff Tasks", "Subordinate Unit Tasks", and "Command-Linked Tasks". One task, "ART 1.6.1 OVERCOME BARRIERS, OBSTACLES, AND MINES", is highlighted in blue. On the right is a data table with columns for "Mission Task", "Conditions", "Standards", "Notes", "Observations", "Doctrine *", and "TPAs *". Below the table are buttons for "New...", "Modify", "Delete...", and "Publish...".

Mission Task	Conditions	Standards	Notes	Observations	Doctrine *	TPAs *
1	(U)	P	Britt Bray		6 Mar 2011	U

Questions to Ask

- ▶ **To properly describe mission context for Systems under test**
 - ▶ **What is the source scenario/vignette/CONOPS for the mission?**
 - > Is it the same CONOPS used to develop requirements for the system?
 - > If not, why not? Valid reasons might include guidance from on high, changes in assessment of current and/or future operating environment, etc.
 - ▶ **Are tasks already identified in one or more of the requirements documents (i.e. FAA, FNA, ICD, OMS-MP)?**
 - > As the independent evaluator, are you satisfied that all relevant tasks are included?
 - > Do the tasks include conditions and standards? If not, where do they come from?
 - ▶ **Are the tasks decomposed to level where they can be mapped to system attributes and functions?**
 - > Are they linked to other tasks and the mission? If not, how will you determine and justify an assessment of mission impact?



Summary

- ▶ **Major Points:**
 - ▶ Understanding the Mission is essential to MBT&E. Selecting the right Mission is also essential
 - ▶ The process for analyzing and specifying the Understanding of the Mission using a common, authoritative language is well defined and doctrinally based
 - ▶ Automated tools are available to assist in capturing, maintaining, managing and sharing results of Mission Analysis and conversion to ATL tasks as well as other T&E related functions
- ▶ **Recommendations/Way Ahead:**
 - ▶ Adopt and codify a “how-to” guide for specifying Mission Understanding
 - ▶ Evaluate and select existing GOTS and COTS tools to facilitate knowledge capture
 - ▶ Coordinate and collaborate with Joint and Service requirement communities (e.g. JFCOM/JS J7, TRADOC ARCIC, TRAC, etc) to clarify desired format for Scenario/CONOPS products



QUESTIONS?

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