Military Systems Analyses in an Ill-Posed World: Illustrating a Solution

Presented to: NDIA T&E Conference
Date: 7/22/2014
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Purpose

Build on preceding presentation by illustrating and explaining application of the concept
Outline

• Key Take Away from First Presentation
• A Potentially Ill-Posed Problem
• A Use Case to Illustrate
• Development and Discussion of Products and Their Usefulness
• “So What” for T&E
OWNFOR and OPFOR Interact over Time

Red on Blue Task Interactions

Blue on Red Task Interactions

Networks
What do we want to know?

• Sample Question Set
  – How do Joint Light Tactical Vehicle (JLTV) Mission Role Variants (MRV) contribute to Effectiveness, Suitability, and Survivability (ESS)

  • What are the operational and system requirements?
  • How were they derived?
  • Do JLTV MRVs satisfy system and operational requirements?
  • Do JLTV MRVs contribute to mission effectiveness of the units to be fielded?
Sample Operational Context

Vignette from JLTV CONOPS: Multiple Urban Centric Center of Gravity Assaults

**Situation**
- Rapid advance. Urban assaults
- Hybrid threat in urban areas

**Mission**
JLTVs provide protected mobility during urban assaults.

**Concept of Operation**
- Support forces w/ mobility for C2
- Reduce logistical footprint while supporting sustainment and transportation.
Systems Used for Vignette

• JLTV Cat B Fire Team Carrier (FTC)
• JLTV Cat B C2 On the Move (C2OTM)
• JLTV Cat A General Purpose (GP)
### Sample System Use Case (JLTV B FTC)

**4200 Pounds Trailer Tow Capacity**

**4500 Pounds Cargo Capacity**

**Average Duration = 4 days; 80 operating hours; 400 miles at GVW on internal fuel capacity**

#### Threats. In the IBCT, this mission requires that the crew be provided with protection against anticipated threats:

<table>
<thead>
<tr>
<th>Missions</th>
<th>Small Arms</th>
<th>RPG</th>
<th>EFP</th>
<th>Mine Center</th>
<th>IED Side</th>
<th>IED Center</th>
<th>Over-Head</th>
<th>Mine Wheel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Urban Centric (Assaults)</td>
<td>High</td>
<td>High</td>
<td>Medium/Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Stability and Reconstruction</td>
<td>High</td>
<td>High</td>
<td>Medium/Low</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
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</tr>
</tbody>
</table>

#### Threat Likelihood by Missions

- **Missions**
  - Multiple Urban Centric (Assaults)
  - Stability and Reconstruction

- **Small Arms**
  - High

- **RPG**
  - High

- **EFP**
  - Medium/Low

- **Mine Center**
  - Medium

- **IED Side**
  - Medium

- **IED Center**
  - Medium

- **Over-Head**
  - High

- **Mine Wheel**
  - Medium

- **Over-Head**
  - High

- **Mine Wheel**
  - Medium

- **Mine Wheel**
  - Medium/Low
Static Mission Decomposition

Infantry Brigade Combat Team (IBCT)

- ART 7.1 Conduct Offensive Operations
  - ART 5.2.1 Conduct Command Post Operations
  - ART 5.1.1 Plan Tactical Operations Using MDMP
- ART 5.3.5 Establish Tactical Info Networking System
- ART 5.1.3 Execute Tactical Operations
  - ART 5.1.3.1 Perform Ongoing Functions
  - ART 5.1.3.2 Perform Planned Actions...
- ART 7.1.2 Conduct an Attack

IBCT SUB UNIT TASK ASSIGNED TO INFANTRY BATTALION

- Shows Tasks Needed to Execute Mission
- May Include Logical Relationships
- Not Time Related
Infantry Battalion Mission Decomposition

ART 4.1
Provide Logistics Support
- ART 4.1.1
  Provide Maintenance Support
- ART 4.1.2
  Provide Supplies
- ART 4.1.6
  Provide Distribution

ART 2.3
Perform Intel, Surv, and Recon
- ART 2.3.3.3
  Conduct Area Recon
- ART 2.3.4
  Conduct Surveillance

ART 7.1.2
Conduct an Attack
- ART 7.5.26
  Support by Fire

ART 1.5.2
Occupy Assault Position
- ART 1.5.5
  Conduct Landing Zone Ops
- ART 1.2.2.3
  Employ Bounding Overwatch
- ART 1.2.2.7
  Conduct Actions on Contact
- ART 1.3.4
  Conduct an Approach March
- ART 1.4.1
  Conduct Lethal Direct Fire

ART 1.8
Employ Obscurants
- ART 3.3
  Provide Fire Support
- ART 4.3
  Provide Health Service Support
IBCT COMMAND AND STAFF TASKS

Linkage from IBCT to Infantry Battalion

ART 7.12 Conduct an Attack

IBCT SUB UNIT TASK ASSIGNED TO INFANTRY BATTALION
Mission Task List with Task Information

Security Classification: (U)

Responsible Organization: IBCT Current Ops

Linked Mission:

Code: ART 5.3.5.2.5

Name: Display a Common Operational Picture Tailored to User Needs

Task List:
AUTL FM 7-15 (11 Jun 2008)

Interoperable Task:
No

JTF Task:
No

Description:
5-06. Present relevant information in audio or visual formats that convey the COP for decisionmaking and exercising other C2 functions. The COP format should be easily understandable to the user and tailored to the needs of the user and the situation. (FM 6-0) (USACAC)
Single Platform Task Network

Tasks
- Load Fire Team for Movement
- Move in Combat Formation
- Occupy Defensive Position
- Move in Combat Formation
- Accelerate through kill zone
- Dismount Fire Team

Interactions
- Warn Order
- Move Order
- Arrive Danger Area
- Risk Assessed
- Ambush Triggered
- Kill Zone Cleared

Platform History
Single Platform Task Network

- Shows Tasks Needed to Execute Mission
- Includes task linkages
  - Time related
  - Includes context

Interactions

Platform History

Load Fire Team for Movement

Move in Combat Formation

Occupy Defensive Position

Move in Combat Formation

Warn Order

Move Order

Arrive Danger Area

Risk Assessed

Ambush Triggered

Kill Zone Cleared
Multiple Platforms Task Network

1. Load Fire Team for Movement
2. Move in Combat Formation
3. Occupy Defensive Position
4. Move in Combat Formation
5. Conduct Lethal Direct Fire
6. Identify and locate threat forces
7. Conduct Non Lethal Direct Fire
8. Report Situation

TIME

Report Received

Monitor Situation

Send Warn Order

Move in Combat Formation

Monitor Situation

Coordinate and Direct Actions

Report Situation

Load Fire Team for Movement

Move in Combat Formation

Occupy Overwatch Position

Conduct Surveillance of Danger Zone

Identify and locate threat forces

Conduct Lethal Direct Fire

TIME

Warn Order

Move Order

Arrive Danger Area

Risk Assessed

Ambush Triggered

Kill Zone Cleared
Collective Task Network

Collective Tasks

ART 1.2.2 Employ Combat Formations

ART 1.2.4 Conduct Counter Ambush

Supported by multiple system tasks
Basis for Mission Thread Process

• Inputs
  – Mission Task List
  – Force/Equipment List and Task Organization
  – Operational Vignette

• Tools
  – SMEs
  – Wargaming techniques

• Outputs
  – Execution/Synchronization matrix recording:
    • Sequence of tasks and desired outcomes
    • Relationship between desired outcomes and subsequent tasks horizontally and vertically
    • Performance requirements based on analysis of time, distance, etc.
Basis for Mission Thread Process cont.

• Seldom done as part of requirements process
• Outputs may be captured but underlying logic is not
• T&E and other stakeholder communities need “how” and “why”, and not just “what” of requirements.
Typical Use of Tasks – Necessary but Not Sufficient

AUTL tasks supported by JLTV and associated capabilities.

What’s missing?

What’s the mission?

Where and when are these tasks and capabilities needed?

What is the environment?

Why these capabilities?

What’s the impact if the system can’t deliver?
System Task Analysis

Task -- ART 5.3.4.3 Monitor Situation or Progress of Operations

Purpose – Determine if and when the High Value Target arrives

Conditions – Time sensitive (no more than 2 hours on the ground)
- TAI observed by external assets
- TAI 15 KMs from unit location

Standard – Information received and processed w/in 15 minutes of event
- Operator alerted within 5 seconds of message/imagery receipt

System Assigned to Task – JLTV B C2OTM

Supporting Task – ART 2.3.4 Conduct Surveillance (of TAI)

Context:

- Mission - be prepared to conduct attack in order to capture/kill High Value Target
- Company CO can launch platoon(s) if he thinks there is time and risk is acceptable.
- Platoons can move w/in 15 minutes of order and travel time is 30 minutes.
- CO will not launch platoon(s) if information is more than 30 minutes old.
Collective Task Analysis

**Task** -- ART 1.2.4 Conduct Counter Ambush Actions

**Purpose** – Minimize casualties and maneuver to position of advantage

**Conditions** – Urban environment
- Limited fields of fire and maneuver space due to buildings
- Threat armed with rifles, MGs and RPG

**Standard** – Vehicles and personnel out of kill zone within one minute
- Threat ambush force suppressed

**Unit Assigned to Task** – JLTV equipped light infantry platoon

**Supporting Tasks** – ART 1.4.1 Conduct Lethal Direct Fire (JLTV B Fire Team); Accelerate through Kill Zone (JLTV B Fire Team)

**Analysis** – Ambush a major concern.

- Reporting key for situational awareness.
- Ability to survive initial blast and keep moving key in constricted urban setting.
- Inter-vehicle communication key to coordinated response and fratricide avoidance.
- Protect soldiers from small arms fire until they can move out of danger area.
So What for T&E?

- Guide for development of T&E Plan
  - Data Collection
  - M&S
  - Support
  - Integration
- Basis for stakeholder integration/comms
- Means to move O.T. to left
- Transparent communication of plan, results and justification for resource requirements
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