Assessing the Role of Ultralight Tactical Mobility Capabilities in Conventional Army Operations

Study Overview

Sponsor: Asymmetric Warfare Group
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AWG Asked RAND to Examine Demand & Potential Role of Ultralight Tactical Mobility (UTM) for Army

Project Objective

- Develop concepts and implementation strategies for conventional Army development and sustainment of *ultra-light tactical mobility* (UTM) capabilities
- Based on analysis of historic and current cases

What are UTM Platforms?

- Ground mobility platforms smaller than M998
- Tactical combat or combat support capabilities
- Internally-transportable by CH-47 ***(in combat configuration)***
- Sling-load transportable by UH-60 (4,500 GVW)
- Can include pack animals / animal-mounted mobility

Current UTM Examples

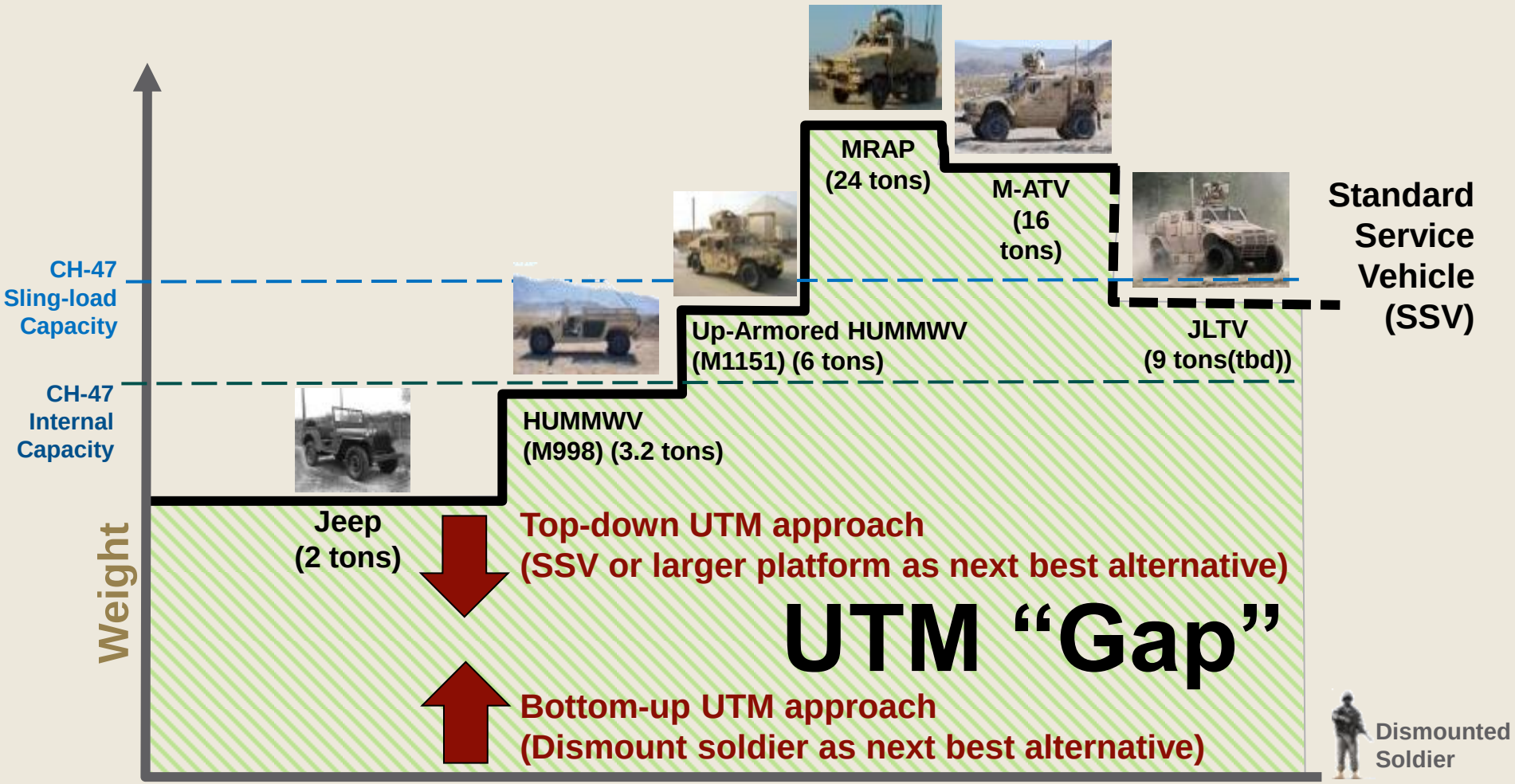





RAND Examined Key Aspects of UTM Employment & Assessed Potential Strategies for Army UTM

Analysis	Description
Review of Current & Historical Experience	• U.S. Army, USMC, and foreign counterparts • Identification of applicable trends for Army
Analysis of Factors Influencing Demands	• Mobility, hazard, and threat factors • Risk factors for UTM versus current SSVs
Assessment of Current Demands & Capabilities	• Army, USMC, and SOF units/programs • Conducted in-depth analysis of units w/ UTM demands and capabilities
Development of the *UTM Demand Assessment Process* (UDAP)	• Five-step methodology for assessing UTM demands and comparing UTM with other available alternatives
Identification/Assessment of Potential Army Development Strategies	• Four strategies assessed; DOTMLPF recommendations for identified strategy • Suggested investment strategy based on likely Army-wide impact and associated risk

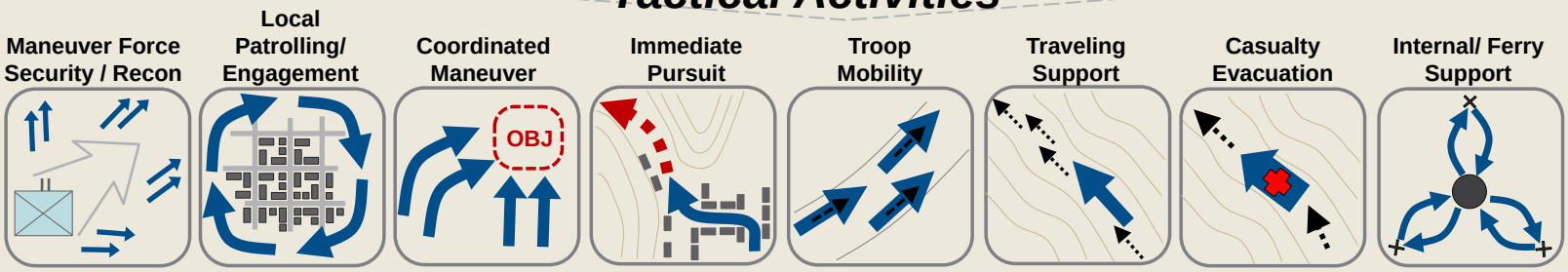
Mobility Trends Have Motivated Two Approaches to UTM Development Based on "Next Best Alternative"



The "next best alternative approach" requires the UTM platform to offer convincing advantages over the mobility method used in the UTM's absence

Army UTM Experience Mirrors Other Services & Militaries

Tactical missions require execution of Tactical Activities



and encounter unique combinations of Operational Factors

- **Constrained Operating Space**
- **Constrained Transport/ Delivery Capacity**
- **Insufficient Road Infrastructure**
- **Partner Capabilities**
- **Extreme Terrain**
- **Threat Avoidance**
- **Operational Signature**
- **Platform Availability**
- **Support Limitations**
- **Surface Conditions**
- **Threat Vulnerability**
- **Risk Vulnerability**
- **Lack of Interoperability**

that can preclude SSVs and motivate (or dissuade) employment of UTM capabilities



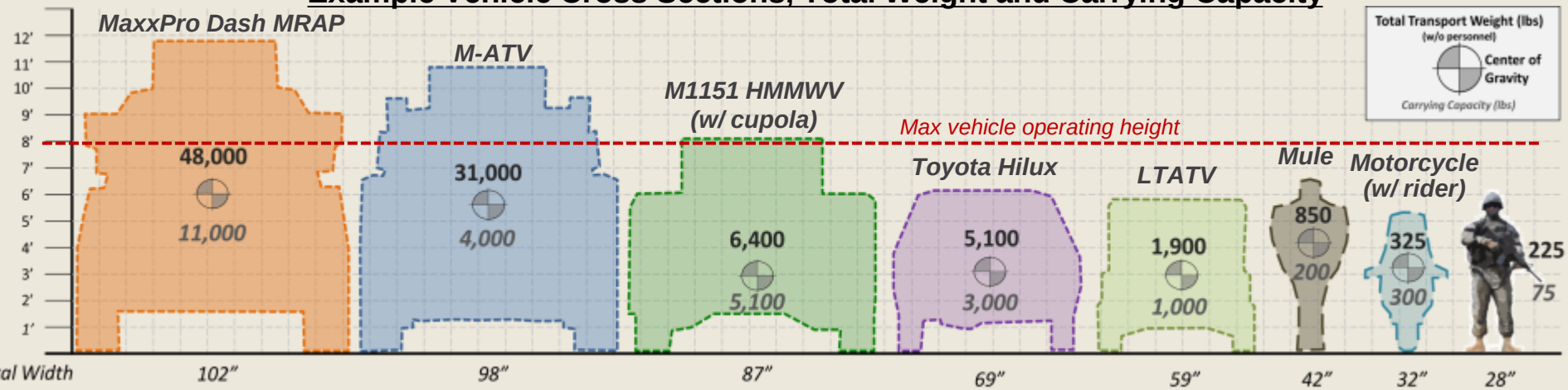


SSVs' Size and Weight Precludes Use in Many Urban and Rural Confined Spaces Where Tactical Forces Operate

- Increasing likelihood of operations in populated areas is increasing the effect of constrained spaces on tactical mobility
- Currently, the only mobility alternative to SSVs is dismounted operations
- Weight is a limiting factor when crossing bridges, culverts, and unimproved roads is required

Vehicle Operating Envelop for Constrained Urban Alleys

Example Vehicle Cross Sections, Total Weight and Carrying Capacity



UTM Platforms Are Much More Deliverable and Devisable for Tactical Operations than Current SSV Platforms

Delivery Platform / Method	Transportability at Combat Weight (with estimated number of vehicles)										
	Army SSVs					Example UTM Platforms					
	Maxx Pro Dash	M-ATV	JLTV-A	M1151 UAH	M998 HMMWV	Toyota Hilux 4 x 4	LTATV	M-Gator A1	Polaris ATV	Christini Motor-cycle	Pack Animal (mule)
C-130J		1 (note 1)	2	2	2	2	4	4	10	20	(note 8)
Advanced Low Velocity Airdrop System(ALVADS)		1 (note 4)	1 (note 4)	1 (note 4)	1 (note 4)	1 (note 4)	1 (note 4)	1 (note 4)	n/a	n/a	(note 8)
PLS Pallet			1	1	1	1	4	2	4	12	(note 8)
CH-47 Slingload			1 (note 2)	2	2	1 (note 5)	2 (note 6)	2 (note 6)	4 (note 7)	12 (note 7)	n/a
CH-47 Internal				1 (note 3)	1 (note 3)	1	3	3	4	12	(note 8)
Dual-Row Airdrop System (DRAS)				1	1	1	1	2	4	8	n/a
UH-60 Slingload					1	1 (note 5)	2 (note 6)	2 (note 6)	4 (note 7)	12 (note 7)	n/a
20 ft Shipping Container					1	1	2	2	4	12	(note 8)
463L Pallet								1	2	4	n/a
UH-60 Internal									1	2	n/a
Container Delivery System (CDS) A-22 Container									1	2	n/a

- **The motorcycle's primary advantage over other UTMs is the ability to deliver or transport numerous platforms in confined spaces**

In Absence of Quantitative Data, Concerns About Increased Severity of Attacks Have Prevailed

	Probability of Attack/Damage (versus current SSVs)	Severity of Attack/Damage (versus current SSVs)
Increasing Factor	▪ **Perceived as a "softer" target (i.e., easier to inflict casualties)** ▪ **Operated primarily in reduced trafficability areas (i.e., broken terrain, thick vegetation, etc.)** ▪ **Usually requires more physical and mental stamina to operate** ▪ Generally less opportunity to delegate key functions (navigation, C2/reporting, observation, etc.)	▪ **Little / no protection against attacking fires (IEDs, direct fire, etc.)** ▪ **Generally fewer physical restraints to mitigate impact from accidents**

Decreasing Factor	▪ **Generates more enemy uncertainty about presence, number & location of forces**
	  ▪ Allows opportunity to use a wider variety of available routes
	▪ **Has reduced visible and audible signature**
	  ▪ Less likely to attract detection and/or attention
	▪ **Increased sensory connection with environment (observation, hearing, etc.)**
	▪ **Enables improved access to and rapport building with populace**
	▪ **Reduces number of aircraft required for delivery and sustainment of mobility for Airborne IBCT**
	  ▪ Operational mobility and flexibility
		▪ **Generally fewer personnel per vehicle**
		▪ **UTM vehicles/equipment cheaper to replace**

Increasing Factor

Resulted in prohibition of UTM use by GPF in OIF/OEF

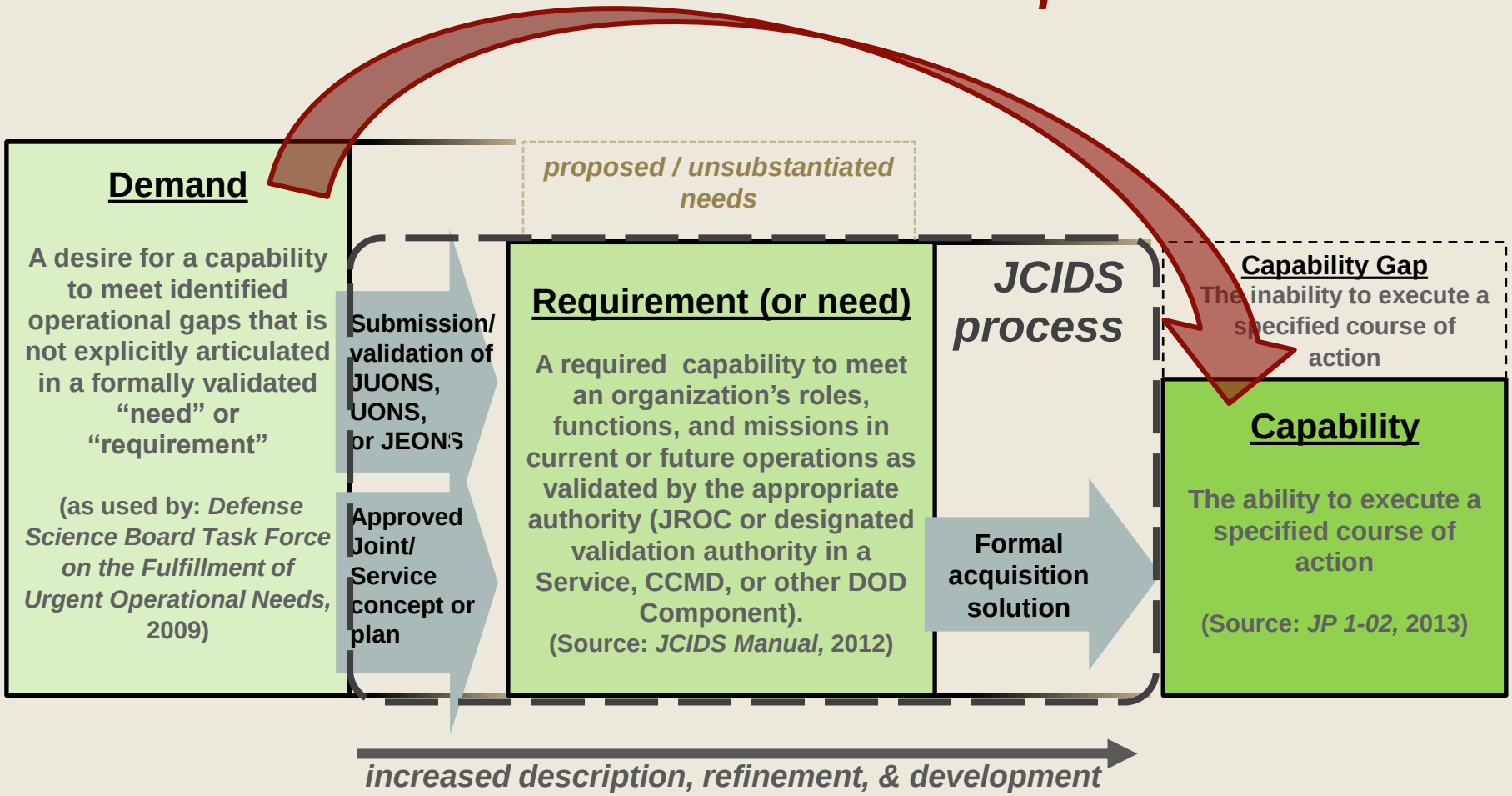
Decreasing Factor

Despite varied assertions, detailed analysis & modeling od not exist to assess how these factors will interact in an operational setting

JCIDS Process has Heavily Influenced the Current Status of Army UTM Capabilities

Informal / nonstandard acquisition solution (IMPAC, local purchase, etc.)

Current UTM capability development method



RAND Identified & Assessed Four Strategies for Army Development of UTM Capabilities

- **This study should inform Army comparison and selection of an appropriate UTM development / sustainment strategy:**

STRATEGY 1: Status Quo/ Ad Hoc UTM Development

STRATEGY 2: Economical Investment in Foundational UTM Capabilities

STRATEGY 3: Optimal Platform / Platform Mix for All Army Needs

STRATEGY 4: Develop UTM Capability for Every Potential Need

- **Recommended Strategy**
- **Resource-conscious approach to addressing UTM needs**
- **Focuses on basic resources and capabilities for flexible UTM development and application**
  - Doctrine / concepts
  - Training
  - Testing /experimentation
- **Ensure basic resources exist to rapidly scale UTM capabilities when needed**

The Army Can Identify Units Requiring UTM Capabilities Based on Their UTM Need Profile

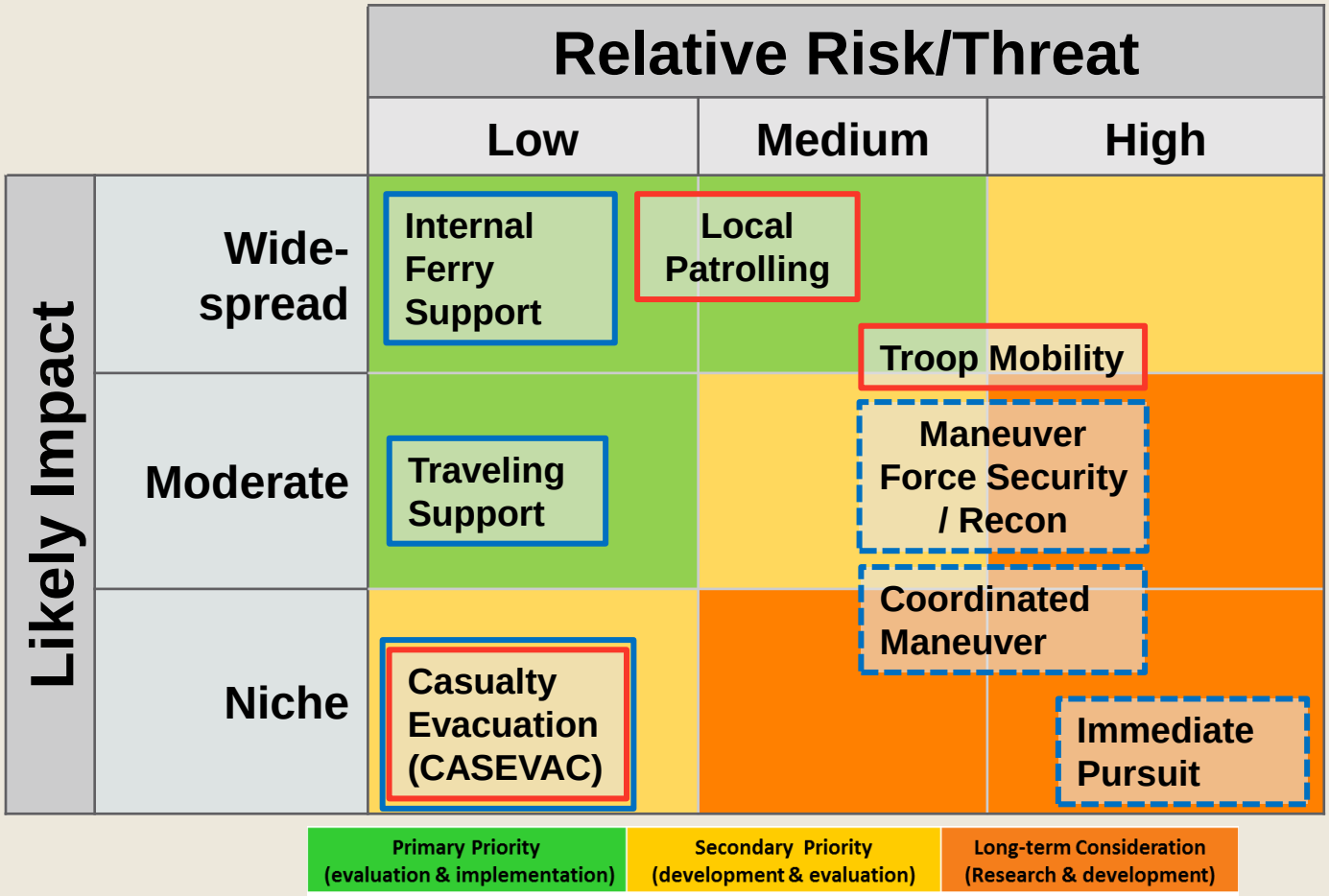
- **Army can determine what level of UTM capability units require based on:**
  - Assigned mission(s)
  - Contingency mission
  - Geographic focus area
  - Expected opportunity for pre-mission training & preparation

- **Based on the unit's need profile, the Army can determine what level of UTM capability the unit requires:**

	Capability Level 1	Capability Level 2	Capability Level 3	Capability Level 4
Level of UTM Knowledge / Experience	Basic conceptual understanding of UTM concepts	Limited understanding of UTM concepts	Limited execution of UTM concepts	Routine execution of UTM concepts
Level of Training	No specialized training	Few trained personnel (master drivers)	Some trained units (recon platoon, etc.)	All units trained
Level of Equipping	No "on-hand" UTM equipment	No on-hand UTM equipment	Some on-hand equipment	All required equipment on-hand

Key Inputs:
- **Knowledge**
- **Training**
- **Sustainment**
- **Platforms**

Potential Impact, Risks, & Emerging Technologies for Tactical Activities Should Guide Army UTM Investment Priorities



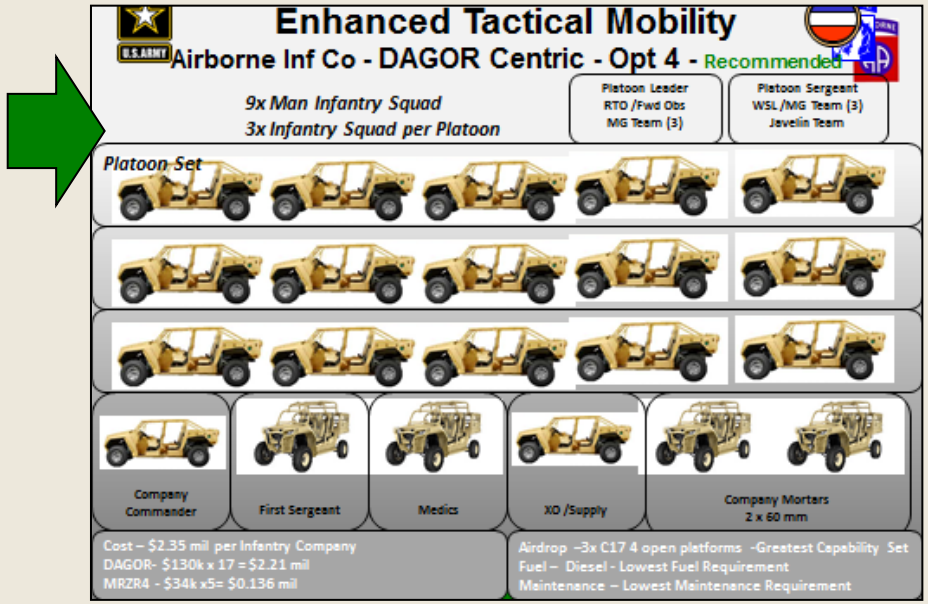
TAs that inherently require human occupants and according considerations

TAs where remote or autonomous control can potentially replace human operators (near future)

TAs where remote or autonomous control can potentially replace human operators (far future)

UTM Study Completion is Informing Renewed Army Attention to Need for UTM Capabilities

- **In late 2013, 82nd Airborne submitted ONS for UTM set for GRF**
- **In April 2014, the *Joint Concept for Entry Operations* (JCEO) identified new capability requirements for initial entry forces (IEF) :**
  - Offset landing from enemy to infrastructure using existing and planned assault lift assets
  - Vehicles that can be lifted/moved by existing and programmed assault lift
  - Low-signature capabilities to form/support IEF
- **In response to ONS and JCEO, FORSCOM is procuring a BCT set of UTM vehicles**
  - — Interim solution for long-term "Ultralight Combat Vehicle (UCV)" requirement



The Study Provides a Structure for Broad Army Consideration of UTM Demands & Needs

Spectrum of UTM applications

Maneuver

Primary employment of UTM as an *engagement platform* to conduct tactical tasks (weapons employment, reconnaissance, engagement, etc.)

Mobility

Primary employment of UTM as a *carrier platform* to enhance mobility by moving personal or cargo to point of need

Support

Primary employment of vehicle as a *cargo platform* to execute support functions

Ultra-Light Combat Vehicle (ULCV)
(new MCOE development program)

Demonstrated opportunity space:

- Nonstandard CASEVAC
- Initial C2 node
- Aviation FARP/DART
- Support to dismounts

While the Army has focused on maneuver and mobility applications, support applications are more prevalent in current use and have greater opportunity to avoid major threats

Questions / Comments