Army Unmanned Systems Roadmap Through 2035 (DRAFT)

MAJ Mike Dvorak

ARCIC – 10 APR 2018

Agenda

- Army's Concepts to Capabilities process flow (overarching framework)

- Current day (Robotics portfolio)

- Future assessment (Unified Quest 2018)

- Roadmap to get there (due June '18)

Army's Concepts to Capabilities Overarching Framework

Future Force Development
(Concepts to Capabilities)

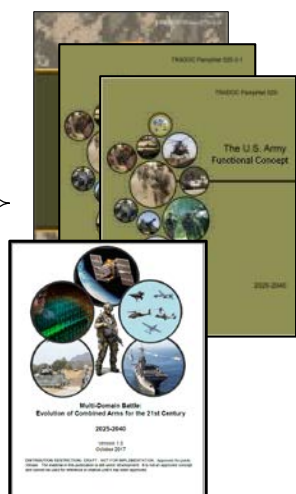| Establish a sound conceptual foundation for Army modernization	Conduct experiments, wargames, and assessments to learn in a focused, sustained, and collaborative manner	Identify capability gaps and mitigating solutions	Deliver integrated DOTMLPF-P solutions to improve combat effectiveness of the current and future force

THINK — LEARN — ANALYZE — IMPLEMENT

Operational Environment

- Strategic Guidance
- Threats, Enemies, and Adversaries:
  - "Best of Breed"
  - Russian New Generation Warfare (RNGW)
- Joint Concepts
- Historical Insights
- Trends
- Projected Missions
- Emerging Technology
- Scenario Analyses

Multi-Domain Battle Concept 1.0

Army Capstone, Operating, and Functional Concepts

The U.S. Army Functional Concept

Multi-Domain Battle: Evolution of Combined Arms for the 21st Century
2025-2040

Required Capabilities

Campaign of Learning

Network Integration Evaluation

Joint Warfighting Assessment

Unified Challenge

Unified Quest

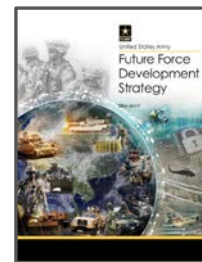**Army and Joint Studies**

Experiments

Wargames

DOTMLPF Solutions

Warfighters' Science & Technology Needs

The United States Army Warfighters' Science and Technology Needs
22 September 2017

Army Warfighting Challenges

Capabilities Needs Analysis

Prioritizing Requirements Through A Risk Informed Assessment

CAPABILITY NEEDED *what must we do?*

GAP *what can't we do?*

CAPABILITY AVAILABLE *what is programmed?*

RESOURCED REQUIREMENT

UNRESOURCED REQUIREMENT ACCEPT RISK

ACCEPT RISK

JCIDS Requirements

POM/SPAR

TAA

Acquisition Programs

THE US ARMY ROBOTIC AND AUTONOMOUS SYSTEMS STRATEGY

United States Army Future Force Development Strategy

Future Force Development Strategy

Army Modernization Priorities

Cross-Functional Teams

Capability Development (CDIDs)

Future Force Development
for Robotic and Autonomous Systems
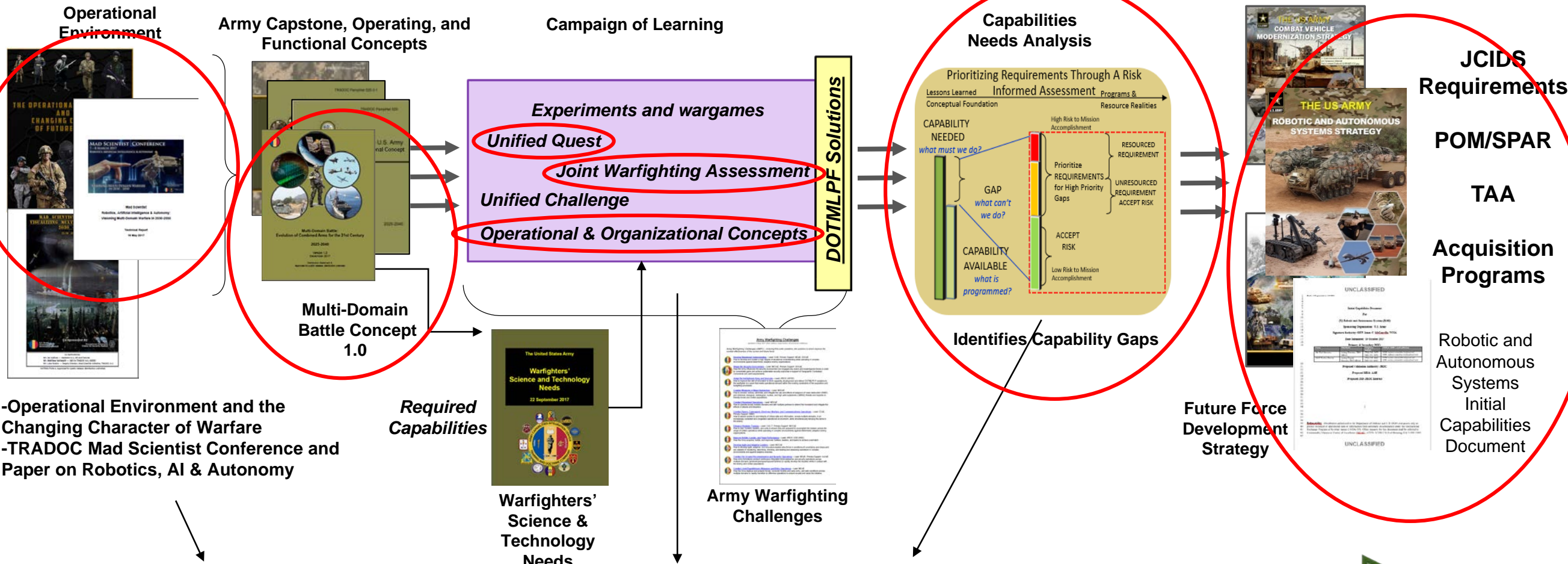## (Concepts to Capabilities)

| Establish a sound conceptual foundation for Army modernization | Conduct experiments, wargames, and assessments to learn in a focused, sustained, and collaborative manner | Identify capability gaps and mitigating solutions | Deliver integrated DOTMLPF-P solutions to improve combat effectiveness of the current and future force |

THINK — **LEARN** — **ANALYZE** — **IMPLEMENT**

Operational Environment

Army Capstone, Operating, and Functional Concepts

Campaign of Learning

Capabilities Needs Analysis

Experiments and wargames

Unified Quest

Joint Warfighting Assessment

Unified Challenge

Operational & Organizational Concepts

DOTMLPF Solutions

Multi-Domain Battle Concept 1.0

Prioritizing Requirements Through A Risk Informed Assessment

Lessons Learned / Conceptual Foundation — Programs & Resource Realities

CAPABILITY NEEDED *what must we do?*

GAP *what can't we do?*

CAPABILITY AVAILABLE *what is programmed?*

High Risk to Mission Accomplishment

RESOURCED REQUIREMENT

Prioritize REQUIREMENTS for High Priority Gaps

UNRESOURCED REQUIREMENT ACCEPT RISK

ACCEPT RISK

Low Risk to Mission Accomplishment

Identifies Capability Gaps

JCIDS Requirements

POM/SPAR

TAA

Acquisition Programs

Robotic and Autonomous Systems Initial Capabilities Document

-Operational Environment and the Changing Character of Warfare
-TRADOC Mad Scientist Conference and Paper on Robotics, AI & Autonomy

Required Capabilities

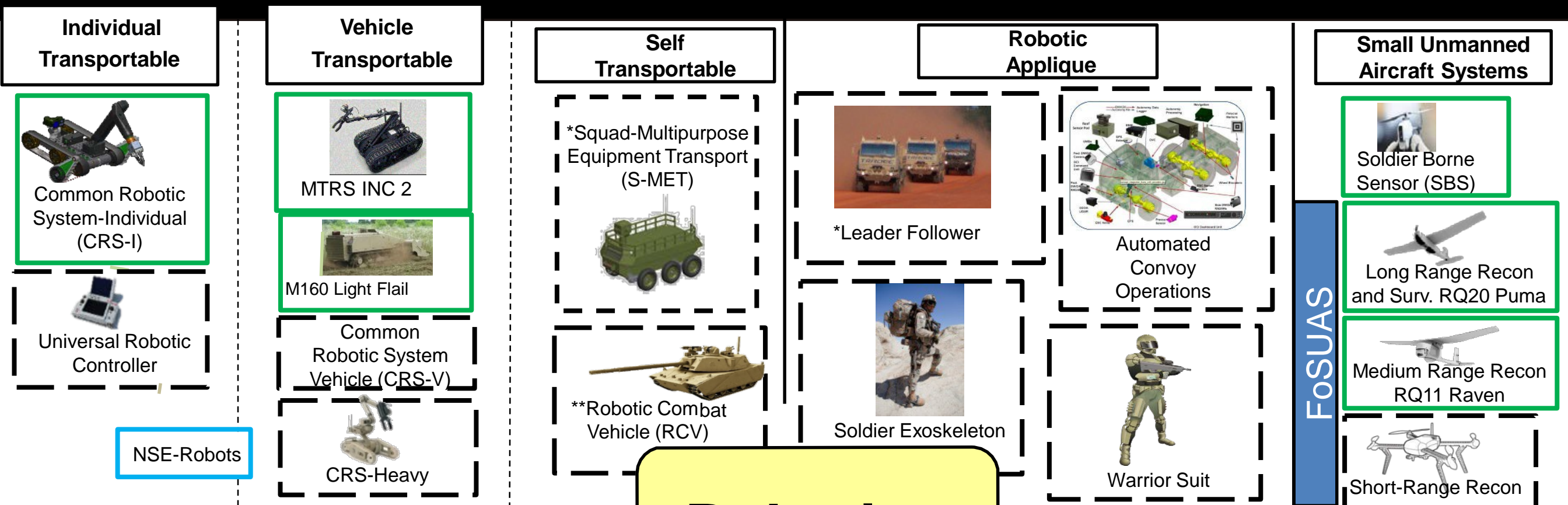Warfighters' Science & Technology Needs

Army Warfighting Challenges

Future Force Development Strategy

Army Modernization Priorities

Cross-Functional Teams

Capability Development (CDIDs)

Current day Robotics Portfolio

DA G8 Robotics Portfolio Overview

Individual Transportable

Common Robotic System-Individual (CRS-I)

Universal Robotic Controller

NSE-Robots

Vehicle Transportable

MTRS INC 2

M160 Light Flail

Common Robotic System Vehicle (CRS-V)

CRS-Heavy

Self Transportable

*Squad-Multipurpose Equipment Transport (S-MET)

**Robotic Combat Vehicle (RCV)

Robotic Applique

*Leader Follower

Automated Convoy Operations

Soldier Exoskeleton

Warrior Suit

Small Unmanned Aircraft Systems

Soldier Borne Sensor (SBS)

Long Range Recon and Surv. RQ20 Puma

Medium Range Recon RQ11 Raven

FoSUAS

Short-Range Recon

Robotics

Small Unit Power

Platoon Power Generation

Soldier Power Generation

Universal Battery Charger (UBC)

Universal Battery Charger

Soldier Power Integration

Battery Modernization & Interface Standardization

Emerging Programs	12
Actively Managed	12
Programs in Sustainment	1
Total Programs	**25**

* Has Directed Requirement
** Pending Directed Requirement

Actively Managed   **Programs in Sustainment**   **Emerging Programs**

UNCLASSIFIED

Requirements Status – 6 APR 2018

Proponent / Center of Excellence	RAS Capability	Program Status
Maneuver CoE - TPO-MRAS	Maneuver RAS ICD	Going to 4-star paper AROC
CFT - NGCV	NGCV - Unmanned	Draft CDD (at NGCV CFT)
Maneuver CoE - TPO-MRAS	Robotic Combat Vehicle - Light	Draft CDD
Maneuver CoE - TPO-MRAS	Soldier Borne Sensor (SBS)	CPD (approved in 2017)
Maneuver CoE - TPO-MRAS	Squad Multipurpose Equipment transport (SMET) Inc 1	Directed Requirement + Draft CPD
Maneuver CoE - TPO-MRAS	SMET Payloads Inc 1 (e.g. DEMS for EN)	None (follows SMET platform POR)
Maneuver CoE - TPO-MRAS	Common Robotic System-Individual (CRS-I) Inc 1	CDD approved in 2016 (Draft CPD)
Maneuver CoE - TPO-MRAS	Universal Robotic Controller (URC)	CDD approved in 2016 (Draft CPD)
Maneuver CoE - TPO-MRAS	Rucksack Portable UAS (LRRS, MRM, SRR)	CPD (approved in 2013)
Maneuver CoE - TPO-MRAS	Lightweight Recon Robot (LR2-throwable)	Draft CPD
Maneuver CoE - TPO-MRAS	Family of Integrated Tactical Sensors (FITS)	Draft CPD
Maneuver CoE - TPO-MRAS	Exoskeleton	CDD in 2019
Explosive Ordnance Disposal	Man Transportable Robot System (MTRS) Inc 1	Non-standard Equipment (approved)
Explosive Ordnance Disposal	Common Robotic System-Heavy (CRS-H) Inc 1	AROC: 3-Star ACB to be scheduled
Explosive Ordnance Disposal	Enhanced Robotic Payloads (ERP)	Draft CDD (DA Staffing)
Maneuver Support CoE	Man Transportable Robot System (MTRS) Inc 2	CPD (approved)
Maneuver Support CoE	M160 Light Flail	CPD (approved)
Sustainment CoE	Leader-Follower (LF)	Directed Requirement + Draft CPD
Sustainment CoE	Joint Tactical Autonomous Aerial Resupply System (JTAARS)	Draft CDD (At SCoE) LOE 9-20 JUL @ Fort A.P. Hill

Future assessment (Unified Quest 2018)

Phasing an Operation Based on Predominant Military Activities
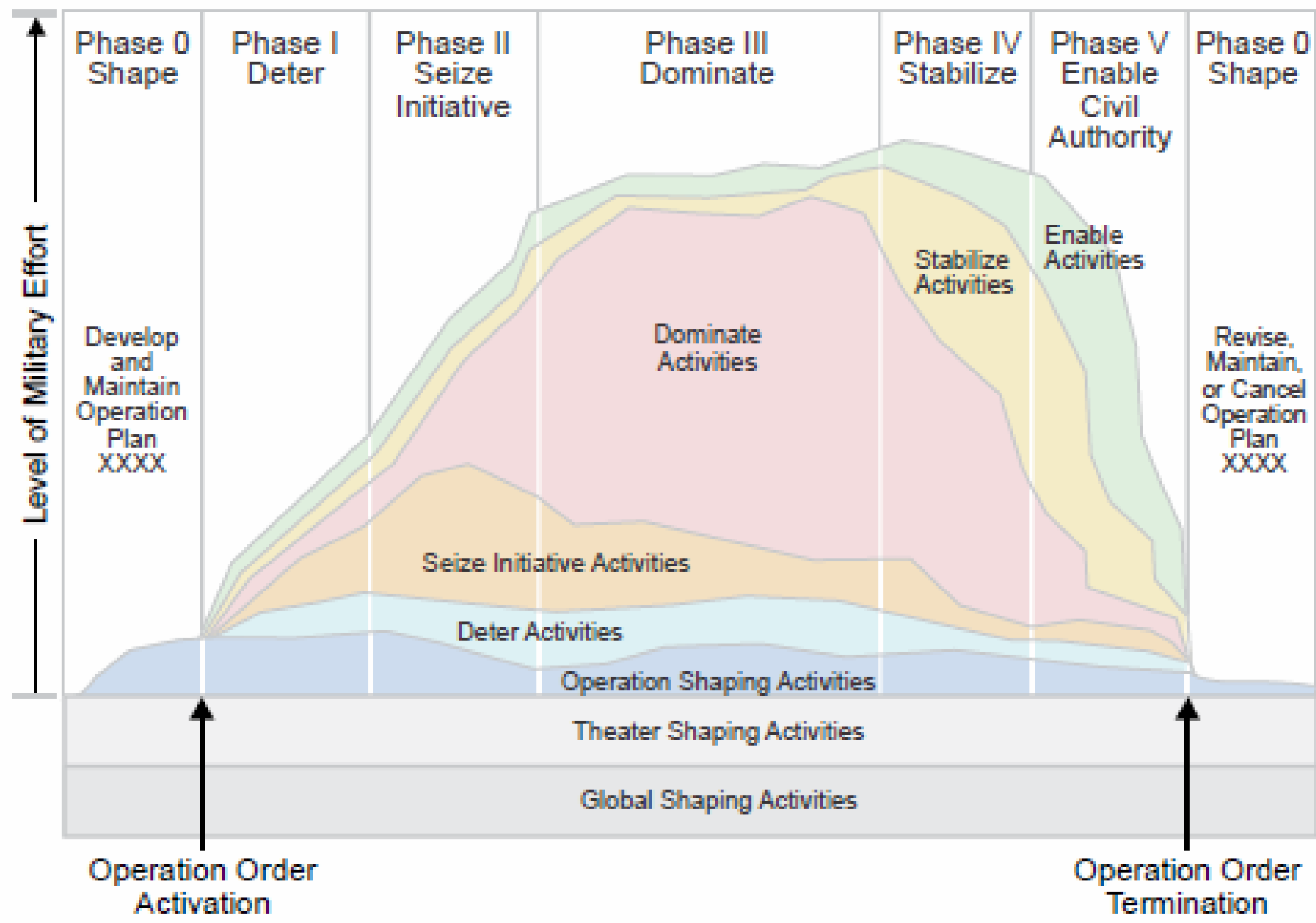
Joint Publication 3-0

JOINT OPERATIONS

- The six general groups of activities provide a basis for thinking about a joint operation in notional phases.
- Phasing can be used in any joint operation regardless of size.
- Phasing helps joint force commanders and staffs visualize, plan, and execute the entire operation and define requirements in terms of forces, resources, time, space, and purpose to achieve objectives.

Figure V-7. Phasing an Operation Based on Predominant Military Activities

Army Multi-Domain Battle Convergence
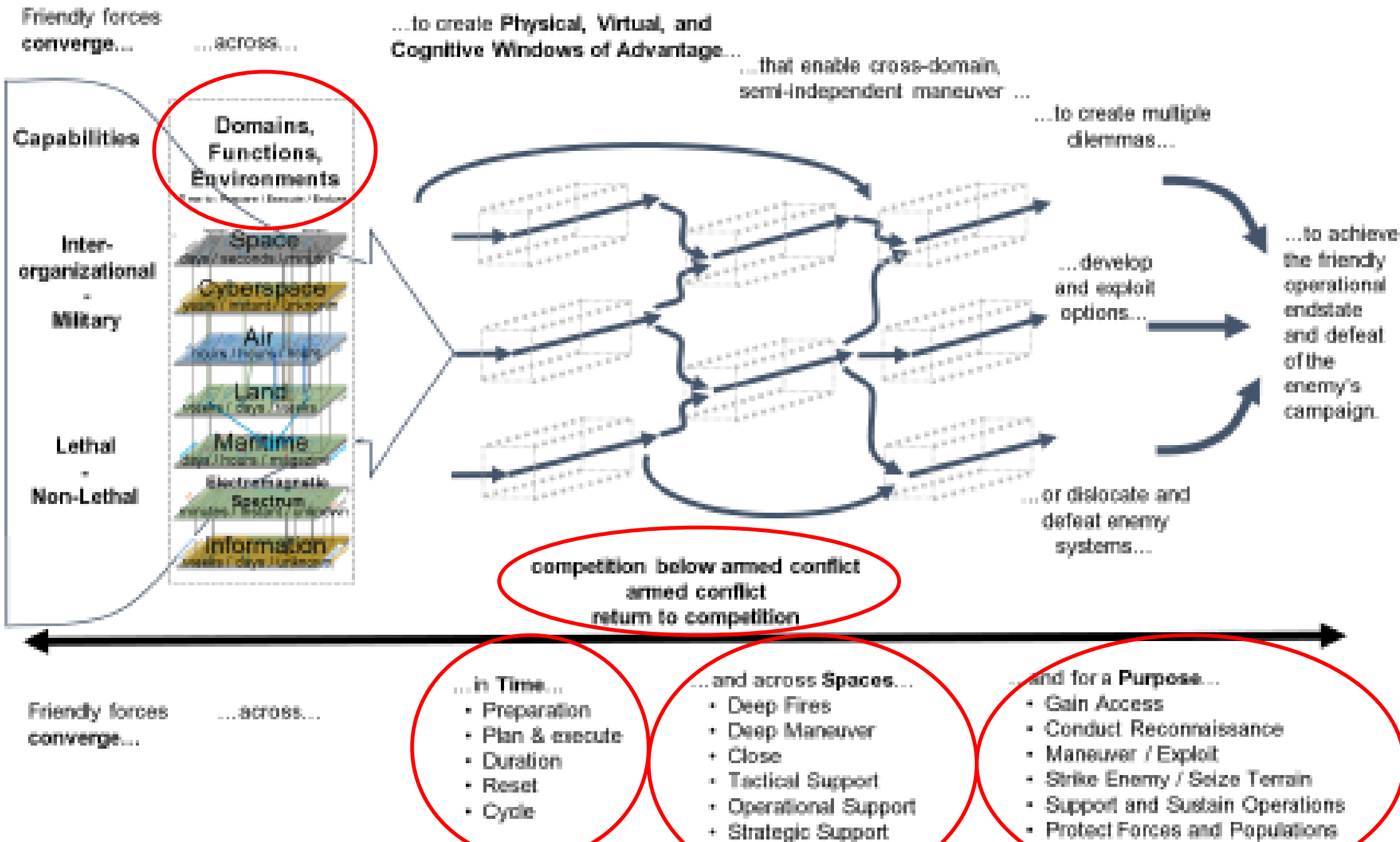
Figure 7. Convergence

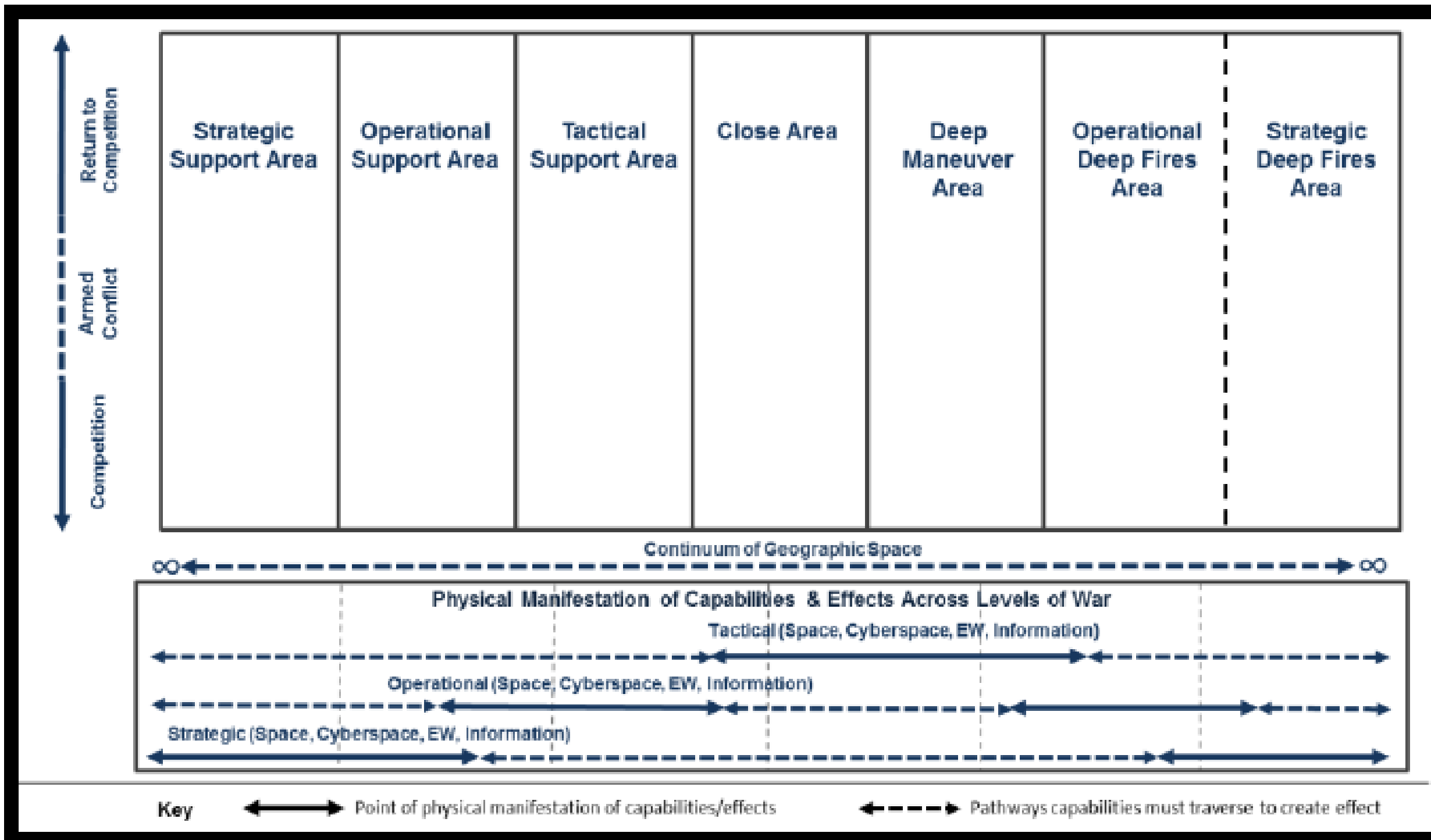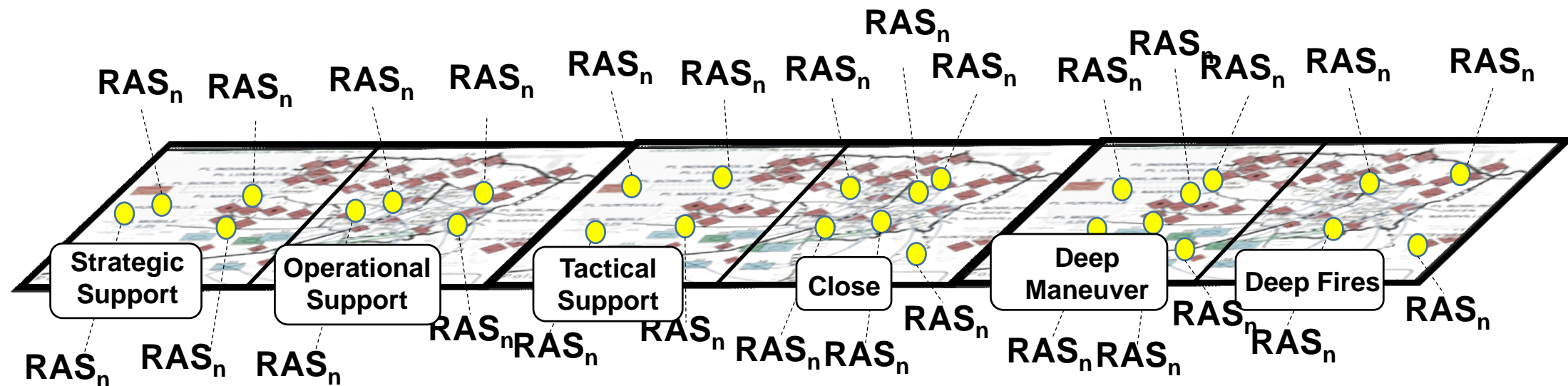# Multi-Domain Battle Op. Framework

Figure 2. The Multi-Domain Battle Operational Framework

Operationalizing RAS in Support of MDB
Unified Quest 2018

- For each RAS_n, in each physical space, describe:
  - Formation/Organization tasks RAS accomplish in the specific physical layer space
  - Task interdependencies
  - Vulnerabilities
  - Operational benefits (based on pre-determined metrics and standards)
  - Operational employment issues

Roadmap to get there

Army UxS Roadmap (draft)

2018
Robotics
Portoflio

2035
(Unified
Quest)

2052
(End of
SPAR)

UGS

Small
Medium
Large

UAS

Small
Medium
Large

UMS

Small
Medium
Large

Due in June '18

-Capabilities

-Technical readiness

-Resourcing

-Acquisition Programmatics

-Challenges

Questions