US Army Futures and Concepts Center

MDO Experimentation – Implications from the US Army Future Study Program

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The Overall Classification of this briefing is: UNCLASSIFIED

MDO Experimentation

From Multi-Domain Battle to Multi-Domain Operations

2016

MDB v0.2
12 Jul 2016

MDB v0.51
22 Sep 2016

MDB v0.9
18 Nov 2016

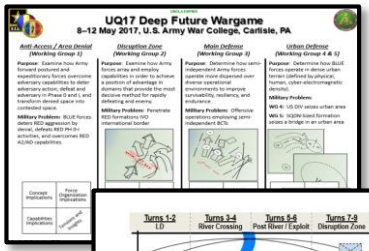
2017

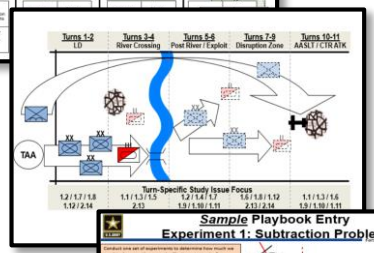
MDB v0.93 09 Jan 2017	MDB v.0.61 07 Jul 2017
MDB No ver. 18 Jan 2017	MDB v.0.70 11 Aug 2017
MDB v0.31 07 Feb 2017	MDB v.1.0 30 Sep 2017
MDB v.0.50 19 Apr 2017	MDB v.1.0 Oct 2017
MDB v.0.51 20 Apr 2017	MDB v.1.0 Dec 2017

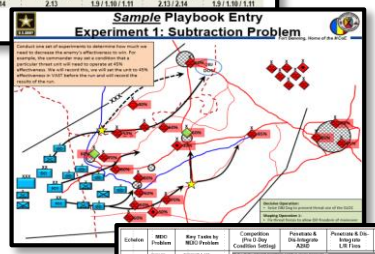
2018

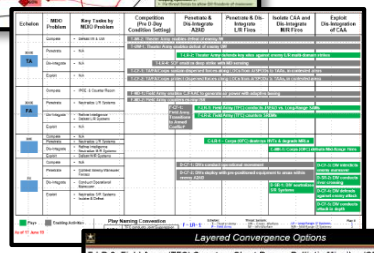
MDO v0.3f 23 May 2018	MDO v0.7e 01 Sep 2018
MDO v0.5j 11 Jul 2018	MDO v0.7g 07 Sep 2018
MDO v0.6h 07 Aug 2018	MDO v0.7k3 27 Sep 2018

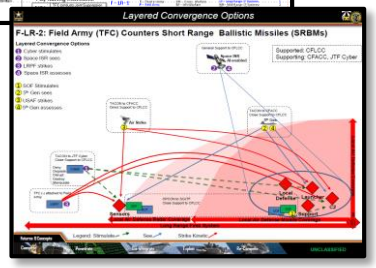
TP 525-3-1
6 Dec 2018











FY16/17 – Framing the Future Environment

- **Russian New Generation Warfare / Deep Future Wargame / Character of Future War**
  - Army's ability to close with and destroy the enemy at risk
  - Russia's development of formations, concepts, and capabilities overmatch U.S. capabilities in range and lethality
  - Emergence of Multi-Domain Battle Concept

FY17 – Initial MDB Experimentation Approach

- **How the Army Fights III / How the Army Fights IV | Unified Challenge 17**
  - Current doctrine does not account for the complexity of the future OE
  - ASCC lacks the capability to conduct both theater army and operational tasks
  - Corps echelons lack forces to transition from competition to conflict

FY17 – Reframing the MDB Experimentation Approach

- **Quicklook III**
  - Determine the conditions and capabilities to win
  - Focus on problem sets, not geographic areas - deliberately target threat IADS and fire complexes
  - Joint Force requires dynamic sensor-to-shooter linkages enabled by artificial intelligence

FY18 – From MDB to MDO, Multi-Service Experimentation

- **TRADOC-ACC TTX Series / Korean Scenario Deep Future Wargame**
  - Multi-service experimentation to determine the conditions and capabilities to win
  - System of systems analysis to target threat IADS and fire complexes
  - Creation of sensor-to-shooter linkages, initial see-strike analysis
  - Initial development of Battle Development Plan – Russia (BDP-R)

FY19 – Operationalizing the Concept, Informing Modernization

- **FSP: ISR-Strike / C2 / Sustainment & Protection TTX | Unified Challenge**
  - Layered convergence options packages – refined BDP-R
  - Identified required AI capabilities and framework to enable MDO
  - Evaluate multinational interoperability requirements impacting calibrated force posture

The Future Study Program tests the ideas, capabilities, and formations to inform the MDO Concept development

What We've Learned

Powering the Army Study Implications

Calibrated Force Posture

- Calibrated Force Posture is key to success in competition and enabling the transition to armed conflict
- Understanding geometry and geography is essential to understanding the problem, choices, and risk associated with disposition of forces; key blue and red ranges dictate positioning
- **Not just forces but also authorities, sustainment capabilities, power generation, integrated networks**
- **Multi-domain operations across the competition continuum requires interoperability with host nation partners**

Multi-Domain Formations

- **Independent maneuver involves forces having the capacity, capability, and authorities to conduct operations in constrained, contested, and hyperactive environments**
- Dispersion is a form of protection but increases demands for distributed sustainment, protection, and power generation
- Dispersed predictive sustainment; vulnerable NIPR-focused networks; do not expect unit requests
- **Everything must be mobile and protected**
- Require multi-domain forces rather than multi-domain nodes
- Interoperable mission command network with "apps" = foundation of Joint MD COP
- **Expect degraded systems everywhere; bandwidth management is key; need "lean" data; severe EW/Cyber impacts across the framework**

Convergence

- **Speed of Action - Scale, speed, and "physics" of simultaneous operations in contested environment drives new approaches to C2, sustainment, protection, and maneuver**
- **AI Imperative – MDO recognizes the potential of AI to enable the speed and accuracy of operations**
- A multi-domain common operating picture changes the ways commanders converge capabilities across domains

Sustaining, Protecting, and Powering MDO

The Challenge: How to generate and sustain combat power to enable friendly forces to immediately contest a *fait accompli* attack.

Movement and Maneuver Challenges

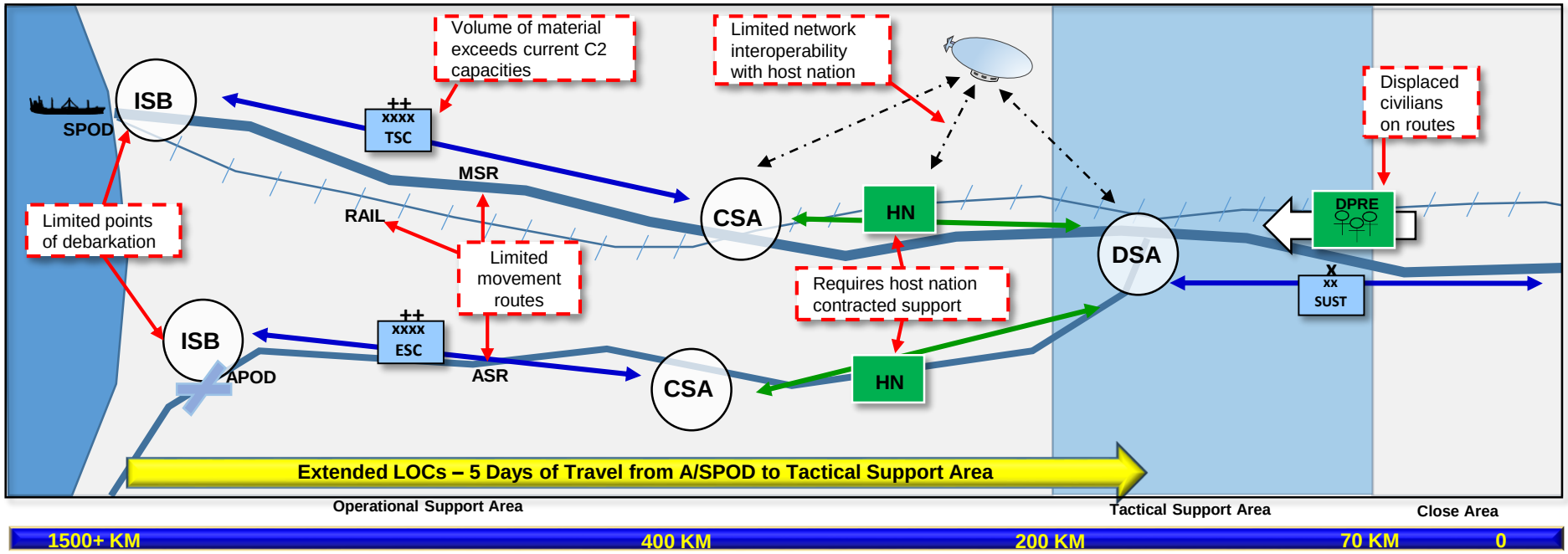
- Limited points of debarkation and movement routes (road, rail, river, air) to sustain forward postured units
- Extended LOCs from ports of debarkation to the tactical support and close areas create time-distance challenges
- Displaced civilians along limited routes inhibit friendly forces movement

Capacity Challenges

- Volume of required sustainment material exceeds C2 capacities of sustainment forces currently in Force Package 1
- Majority of Army's theater line haul, fuel capacity, and distribution in Compo 2/3
- Requires host nation contracted sustainment support throughout the MDO framework

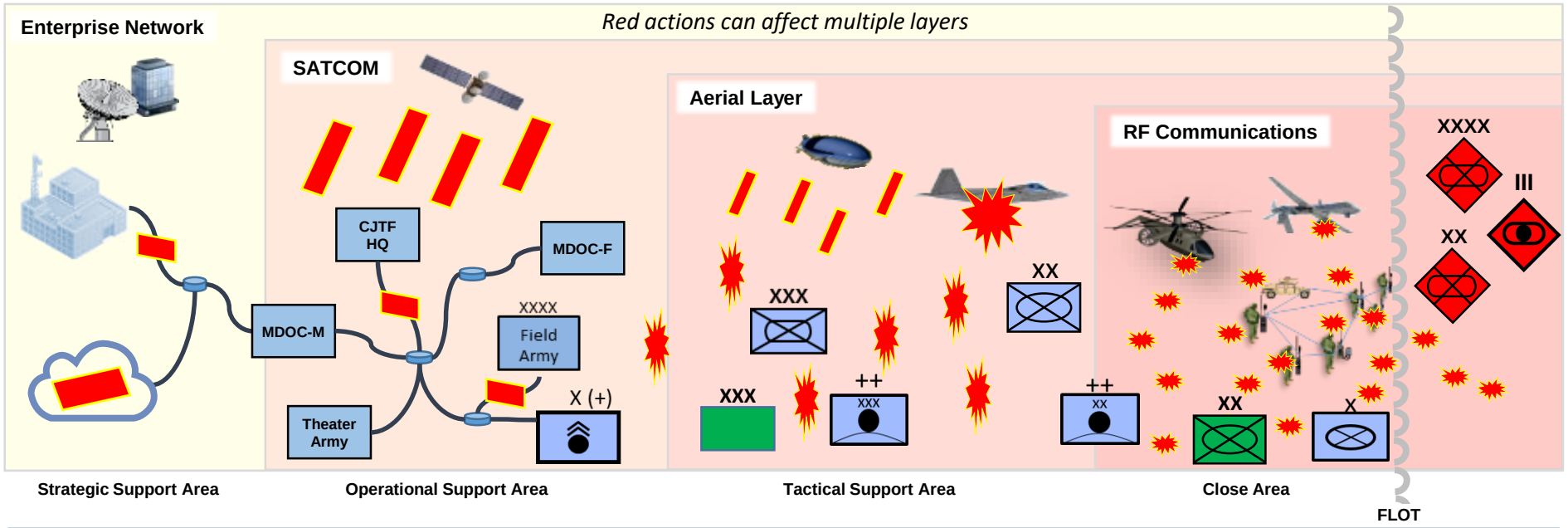
Other Implications

- Limited Army Prepositioned Stocks and Army Supply Points along likely movement routes
- Limited forward deployed engineering capacity to provide bridging, railway, and power generation capability
- Limited network interoperability and resilience to integrate host nation and commercial sustainment capabilities



Mitigating Contested Electromagnetic Spectrums

The Challenge: How to mitigate enemy network ***disruption and degradation*** across the operational framework?



Threat Actions	**Separate the coalition** • Conduct anti-SATCOM • Disrupt fiber networks • Attack and disrupt cyber	**Separate Blue echelons** • Disrupt Blue forward element connections • Interrupt Blue air-to-ground links • Degrade coalition links	**Disrupt/degrade tactical communications** • Conduct spot jamming • Isolate tactical formations • Limit line of sight options
Impact on BLUE	**Separates partners** • Degraded reach (coalition and NTM) • Challenged inter-service and coalition communications	**Separates echelons** • Degraded situational awareness • Challenged convergence • Degraded decision-making	**Hinders mutual support** • Disrupted cross-domain fires • Degraded multi-source Intel integration • Prevented continuous update of COP

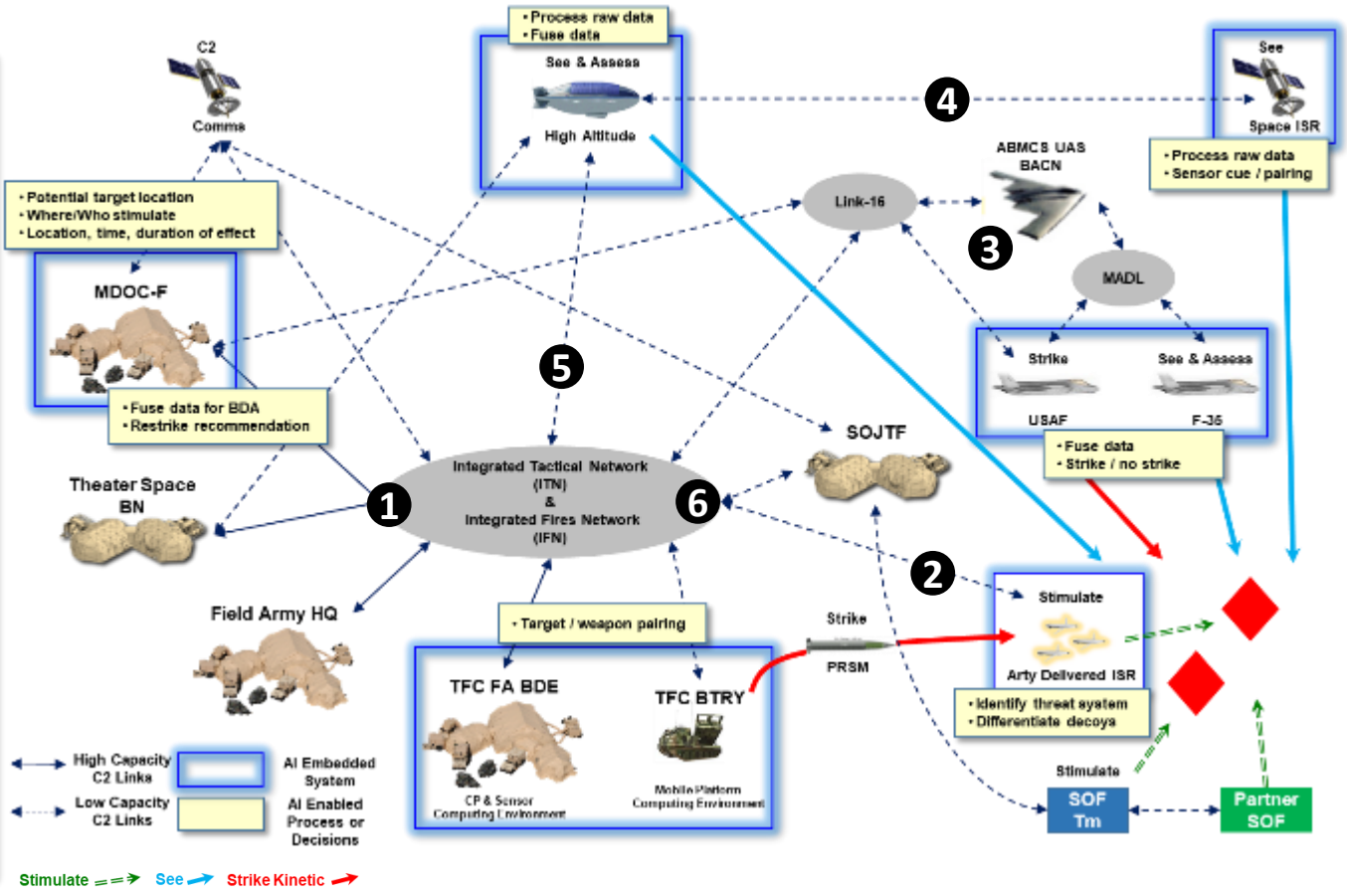
Requirement for an end-to-end network capability with multiple paths to connect forces across echelons and domains

Network Requirements Implications

The Challenge: How to establish a resilient technical architecture to link command nodes, platforms, and processes that are capable of transporting data at speeds required to execute ISR-Strike missions?

Actions Required by 2028

1. Extend the Integrated Tactical Network to connect EAB & Joint nodes during planning and execution
2. Develop resilient comms for sensors operating in deep areas and contested EMS
3. Develop links between 5th GEN platforms to air & ground nodes
4. Enable links between ISR platforms for cooperative collection
5. Field a Space & HA-ISR direct down-link capability to key EAB C2 & Fires nodes
6. Develop an Integrated Fires Network to rapidly move data from sensors to shooters

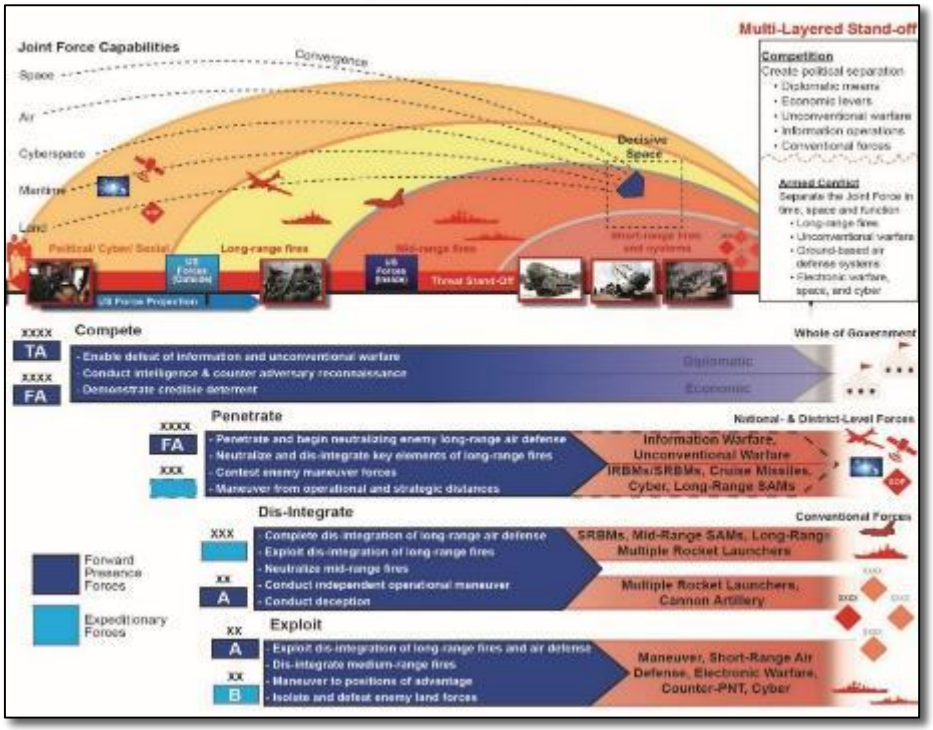


Requirement for an integrated network with AI solutions to rapidly converge Joint capabilities in multi-domain packages

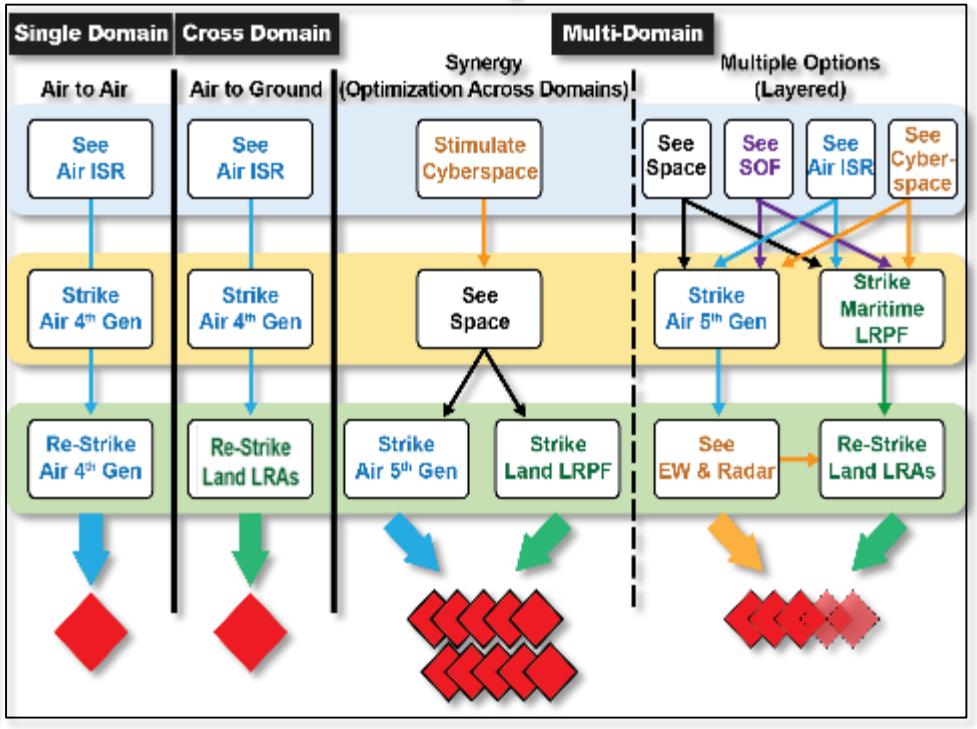
Speed and Scale – the AI Imperative

Multi-domain operations today rely on episodic synchronization … executing capabilities after days and weeks of synchronization.
In future operations against a peer threat it will require rapid and continuous integration … integrating capabilities within minutes and hours.

Solution Frame



Convergence



Key Observations. Conducting MDO versus a near-peer in high-intensity conflict requires:

- Processing high volumes of diverse data at rapid speeds and large scales
- Integrating airspace of increased number of system types
- Autonomous/semi-autonomous operations

Key Issues:

- AI must operate in multiple layers and platforms, across a wide variety of data types to enable MDO tactical tasks
- AI developed by numerous organizations will add complexity and target surfaces that may create risk

Key AI Capabilities:

- Automated / aided target recognition
- Automatic cross-cueing of sensors
- Data fusion of systems and platforms
- Automated airspace management and integration

Battlefield Development Plan (BDP)

Operationalizing the Concept – Applying MDO against Specific Threats

Book 1: Threat "Red Forces"

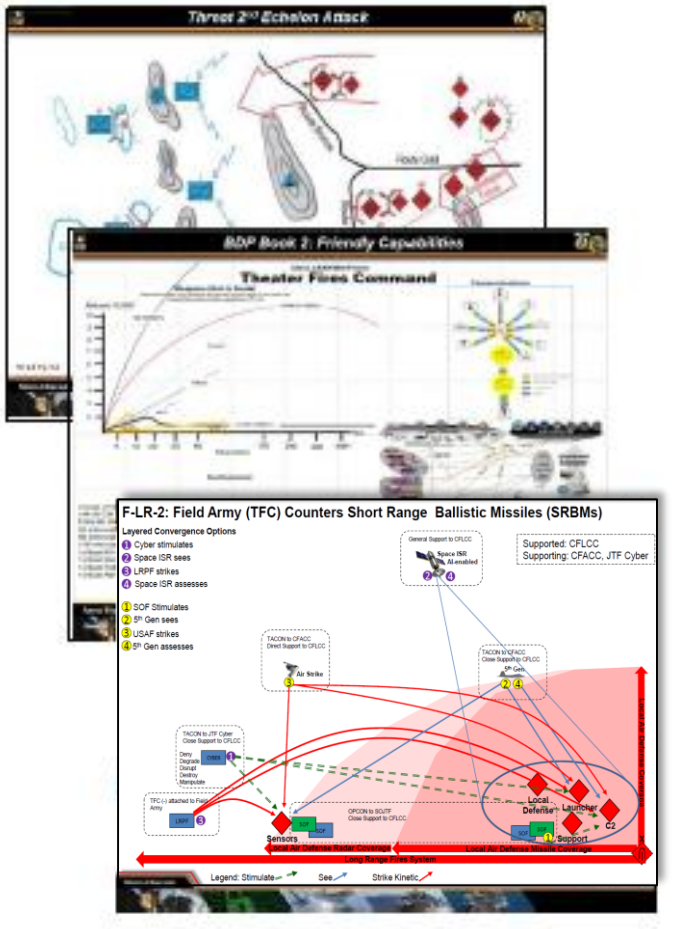
- **Threat Formations, systems, and nodes**
- Analysis of threat strategies and capabilities
- Vulnerabilities and recommendations on how to defeat

Book 2: Capability Sets – "Blue Forces"

- **Future Army and Joint Force organizational capabilities and enablers**
- Structure, tasks, and weapons/equipment for future units (Must by Technical Readiness Level (TRL) 6 by 2028
- Concept of employment with specifications for each capability set enabler

Book 3: MDO Plays – "Blue vs Red"

- **How the capability sets and enablers from Book 2 can defeat threat systems outline in Book 1**
- **Layered Convergence Options** across multiple domains
- Informs MDO Concept refinement, DOTMLPF-P integration and future capabilities development



Future Study Program – Operationalizing MDO

Study Purpose: Establish operational understanding of Multi Domain Operations in the European and Indo-Pacific Theaters and inform senior-leader decisions regarding Army force structure and posture, by examining resource-informed force packages against near-peer threats in the 2028 and 2035 timeframes.

Key Tasks:

1. **Operationalize MDO thru the Battlefield Develop Plan –** analyze MDO capability requirements (MCR) by focusing on:
   - A. ISR-Strike – how to converge capabilities to penetrate and dis-integrate threat systems, at scale
   - B. Mission Command – how formations and capabilities are organized, commanded, and controlled at echelon to enable the Joint Force to penetrate and dis-integrate threat A2/AD, as well as sustainment, protection, & exploitation
   - C. Sustained Operations – how US forces set the theater, sustain and protect operations over extended lines of communication, and enable independent maneuver
2. **Inform the optimum force structure –** what capabilities, and capacities are required to operate as a part of a Joint Force to:
   - A. Set the theater for, sustain, and protect Joint Force assets
   - B. Support Joint Force penetration and dis-integration of threat A2/AD capabilities
   - C. Enable the exploitation of Joint Force freedom of maneuver to defeat the threat in EUCOM and INDOPACOM
3. **Inform calibrated force posture decisions –** where must capabilities be postured as part of a Joint Force to:
   - A. Provide conventional deterrence
   - B. Expand the competition space
   - C. Rapidly transition to armed-conflict to deny a fait accompli attempt
4. Determine initial understanding on how US forces as part of whole of government approach can expand the competition space and deter the escalation to armed conflict
5. Identify artificial intelligence and other emerging technology requirements to enable MDO

Endstate: (1) Revised BDPs; (2) Optimized resource-informed MDO Force Packages and recommended calibrated force posture informed by wargaming and experimentation; (3) Initial conceptual framework on expanding the competition space in EUCOM and INDOPACOM

Future Study Program Way Ahead

FY20 Future Study Program Key Events

Theater Posture Seminar	ISR-Strike TTX	Calibrated Force Posture Exp.	Sustainment & Protection TTX
18–22 Nov 2019	*24–31 Jan 2020*	*1–15 May 2020*	*7–14 Aug 2020*

Execute FY20 FSP Experiments

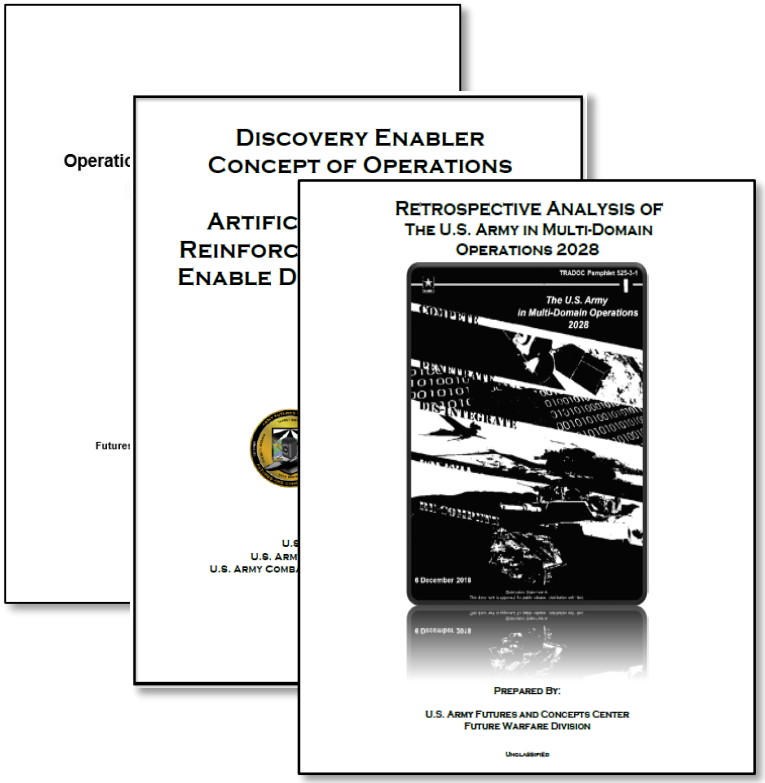
- Calibrated Force Posture Experiment
- **Sustainment & Protection TTX**
- Science & Technology Focused Excursions
- Technical Validation Workshops

Inform Army Modernization

- Refining Development of the MDO Aim Point Force
- Refining Battlefield Development Plans
- Published Retrospective Analysis of MDO
- Published FY16-19 FSP Reports
- Published AI and RAS White Papers
- Published first S&T CONOP – Reinforcement Learning

Develop FY21 Future Study Plan

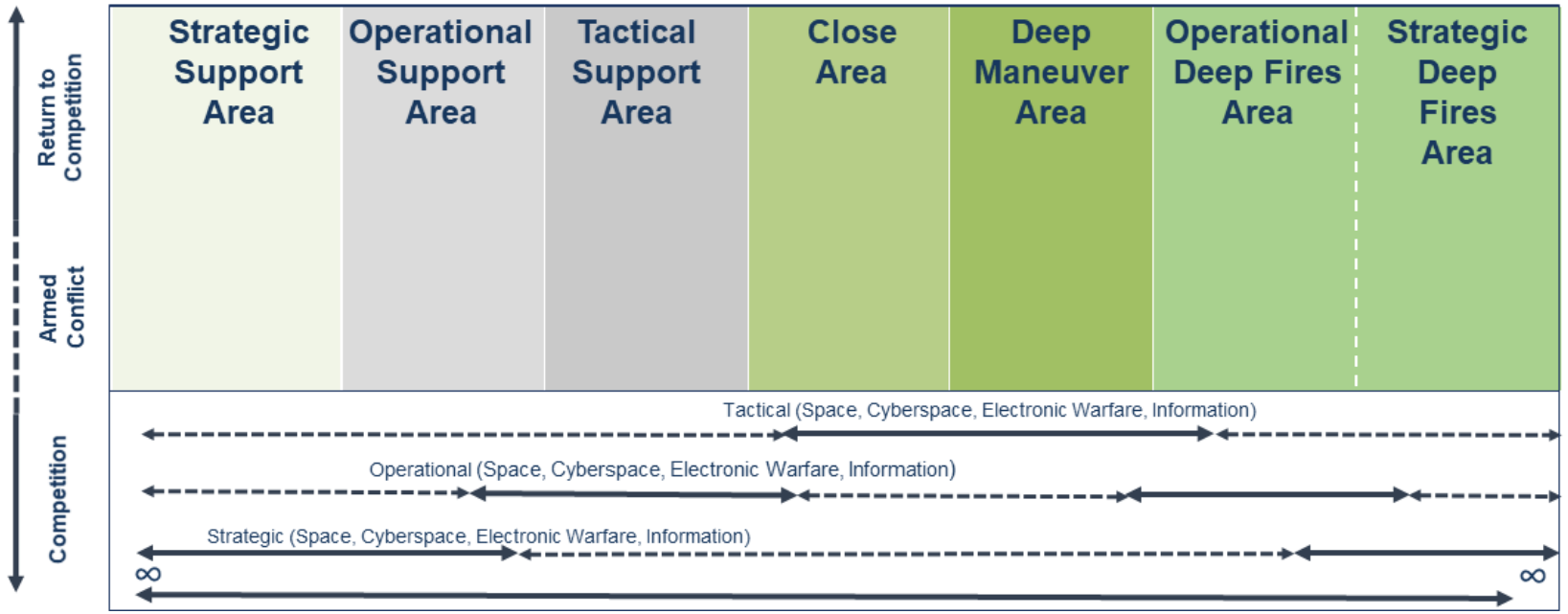
- Examine MDO during competition
- Determine how the Army contributes to expanding the competition space



***Find Future Warfare Study reports supporting the Multi-Domain Operations concept development at: https://dodtechspace.dtic.smil.mil/dodtechspace/groups/fwd-support-to-MDO-development**

Questions & Comments

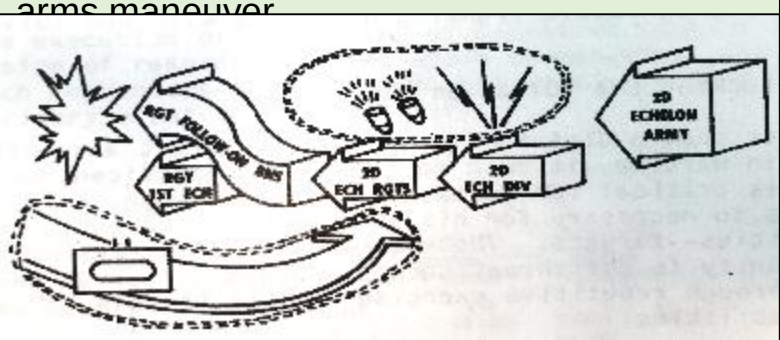
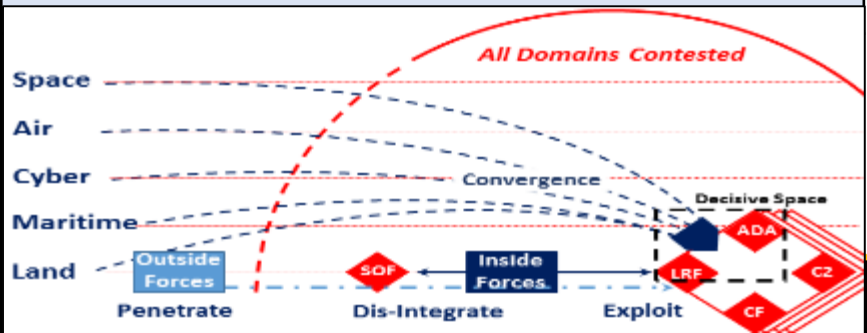
Multi-Domain Operations Framework



The battlefield has expanded in:

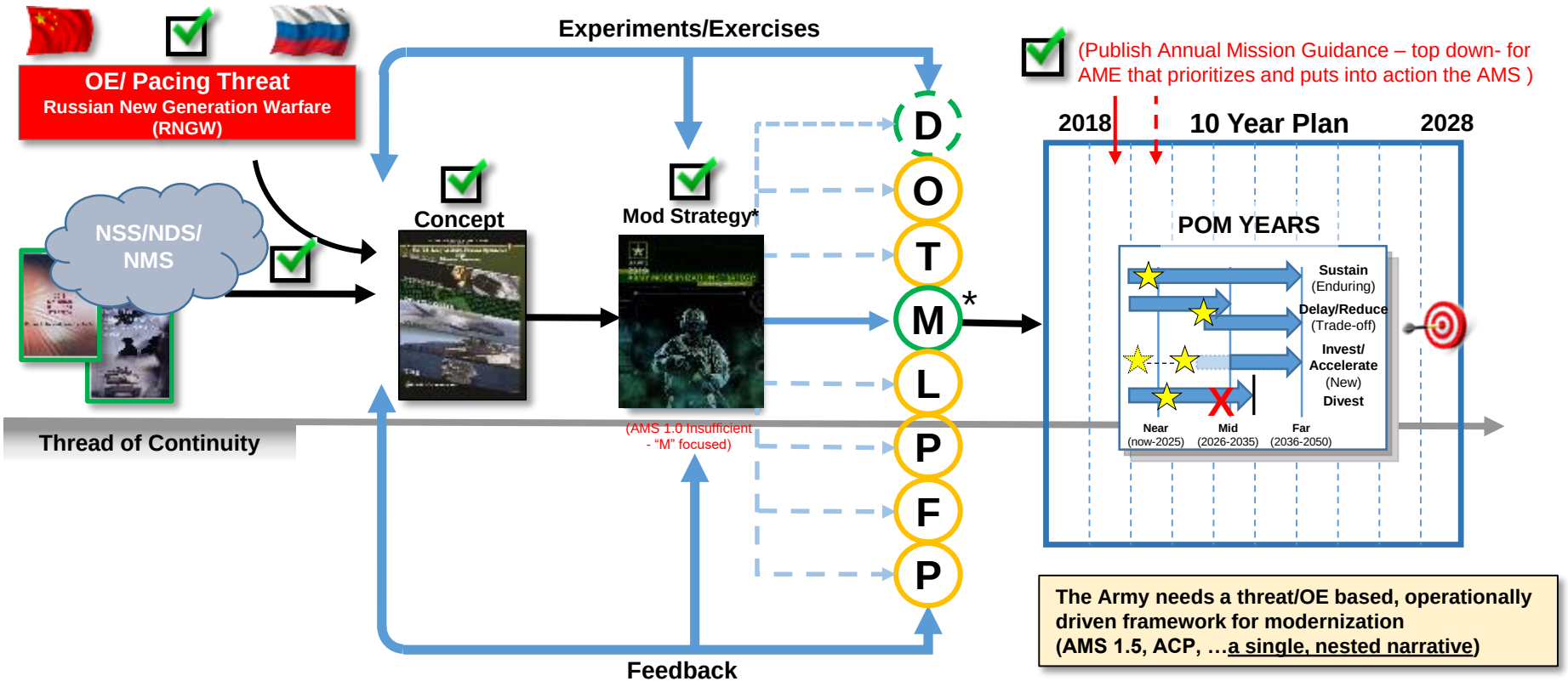
- Time or phases not traditionally defined by the United States as ‘war’
- Domains – space, cyberspace and the electromagnetic spectrum – which are limitless
- Distance and space, eliminating sanctuaries and allowing the simultaneous engagement of the entire depth of the battlefield
- Actors, which include states, proxies, and violent extremists

Difference Between ALB & MDO

Element	AirLand Battle	Multi-Domain Operations
Operational Environment	Single Pacing Threat (Soviet Union)	Multiple Threats across the OE with similar operation approaches (Russia and China)
Focus	Formations (Second Echelon)	Systems (Anti-Access and Area Denial Systems)
Operational Context	Forward postured force in prepared defense	CONUS-based force executing offensive action through strategic and operational maneuver
Central Idea	Engage throughout the depth of the battlefield; defeat the Second Echelon	Compete in all domains; when necessary, penetrate and dis-integrate enemy anti-access and area denial systems and exploit the resultant freedom of maneuver to achieve strategic objectives (win) and force a return to competition
Domains	Land, Air (synchronization)	Land, Air, Maritime, Space, Cyber (synergy)
Echelon	Corps/Division and below (Operational/Tactical)	Inter-Agency, Theater and below (Strategic/Operational/Tactical)
Phases	Phased operations in armed conflict	Across competition continuum
Combined Arms	All Branches must be synchronized/employed to enable combined arms maneuver	All Services/Inter-Agency partners must be integrated to enable combined arms maneuver
Concept		

Modernization Framework

"The Army of 2028 will be ready to deploy, fight and win decisively against any adversary, anytime and anywhere, <u>in a joint, multi-domain, high-intensity conflict,</u> while simultaneously deterring others and maintaining its ability to conduct irregular warfare"
- SEC Mark Esper, GEN Mark Milley



The Army needs a threat/OE based, operationally driven framework for modernization (AMS 1.5, ACP, …<u>a single, nested narrative</u>)

*Note: AMS 1.5 must address a comprehensive DOTMLPF-P modernization plan; the current AMS is "M" focused while CAC has sought to maintain doctrinal change commensurate with capability.

Ideally, the AMS becomes an Army guidance document driving the entire enterprise across the ACOMs…potentially serving as the modernization chapter to the ACP (LOE #2 of the Army Strategy)

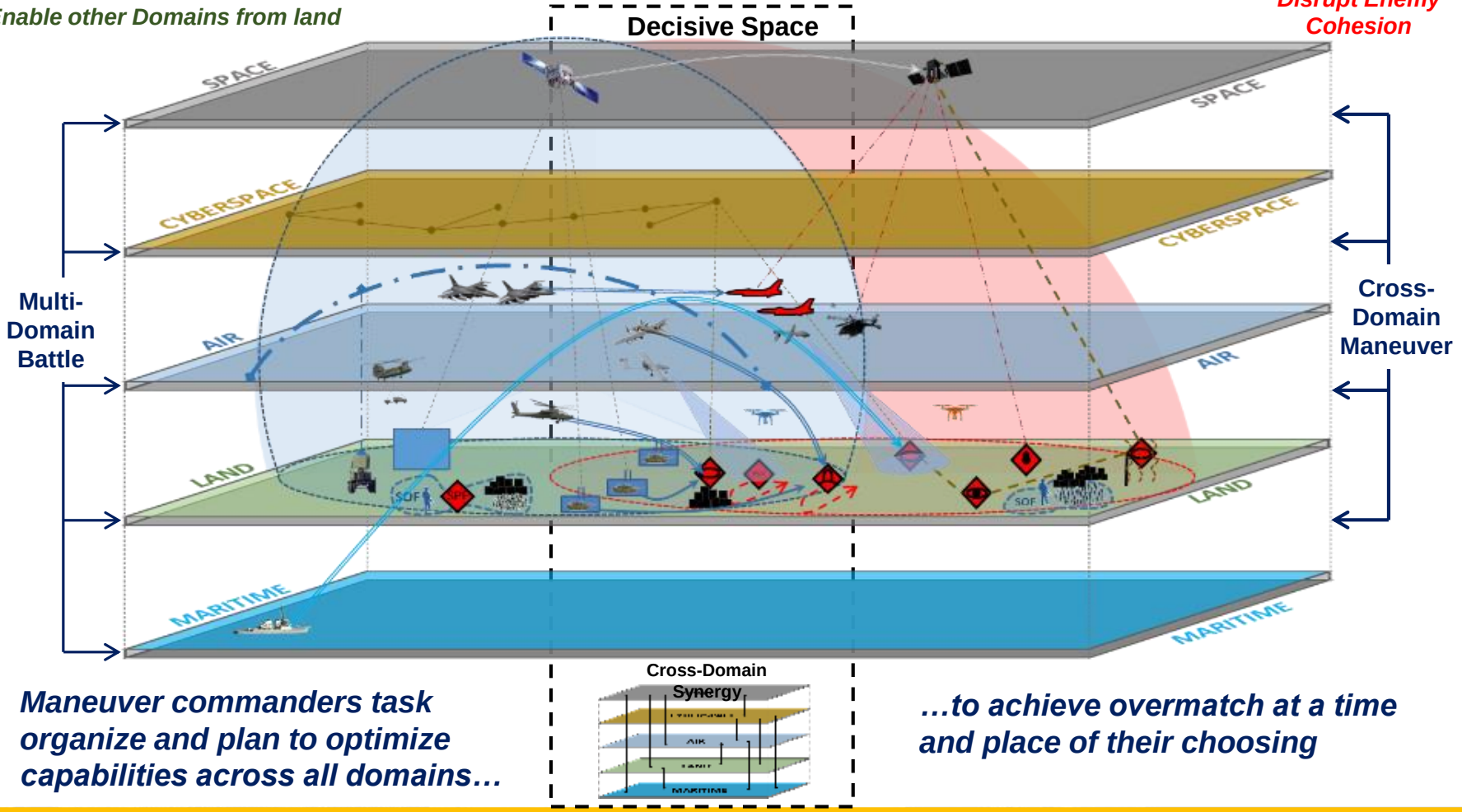
MDO Defeats "Stand-off"

Ground forces must possess the ability and authorities to access and employ organic and joint, interorganizational and multinational capabilities across all domains (Land, Air, Cyberspace, Space, Maritime), as well as the electromagnetic spectrum and information environment.

Seize, Retain, And Exploit the Initiative

Enable other Domains from land

Disrupt Enemy Cohesion



Maneuver commanders task organize and plan to optimize capabilities across all domains…

…to achieve overmatch at a time and place of their choosing