A Practical Look at Architecting an Enterprise for Value Delivery

Lt.Col. Luke Cropsey, Presenter

LAI Web Knowledge Exchange Event

October 20, 2010

We Share A Goal: Enterprise Excellence

AMCOM

Upcoming LAI Web Knowledge Exchange Events

- Oct 28, 2010 Standardizing Product Development Processes, Sidharth Rupani, LAI Alumnus ‘10

- Dec 2, 2010 Organizational Assessment Processes for Enterprise Transformation, Leyla Abdimomunova, LAI Alumna ‘10

"Observations from the Field"

Designing an Enterprise for Value Delivery

Lt Col Luke Cropsey

20 Oct 2010

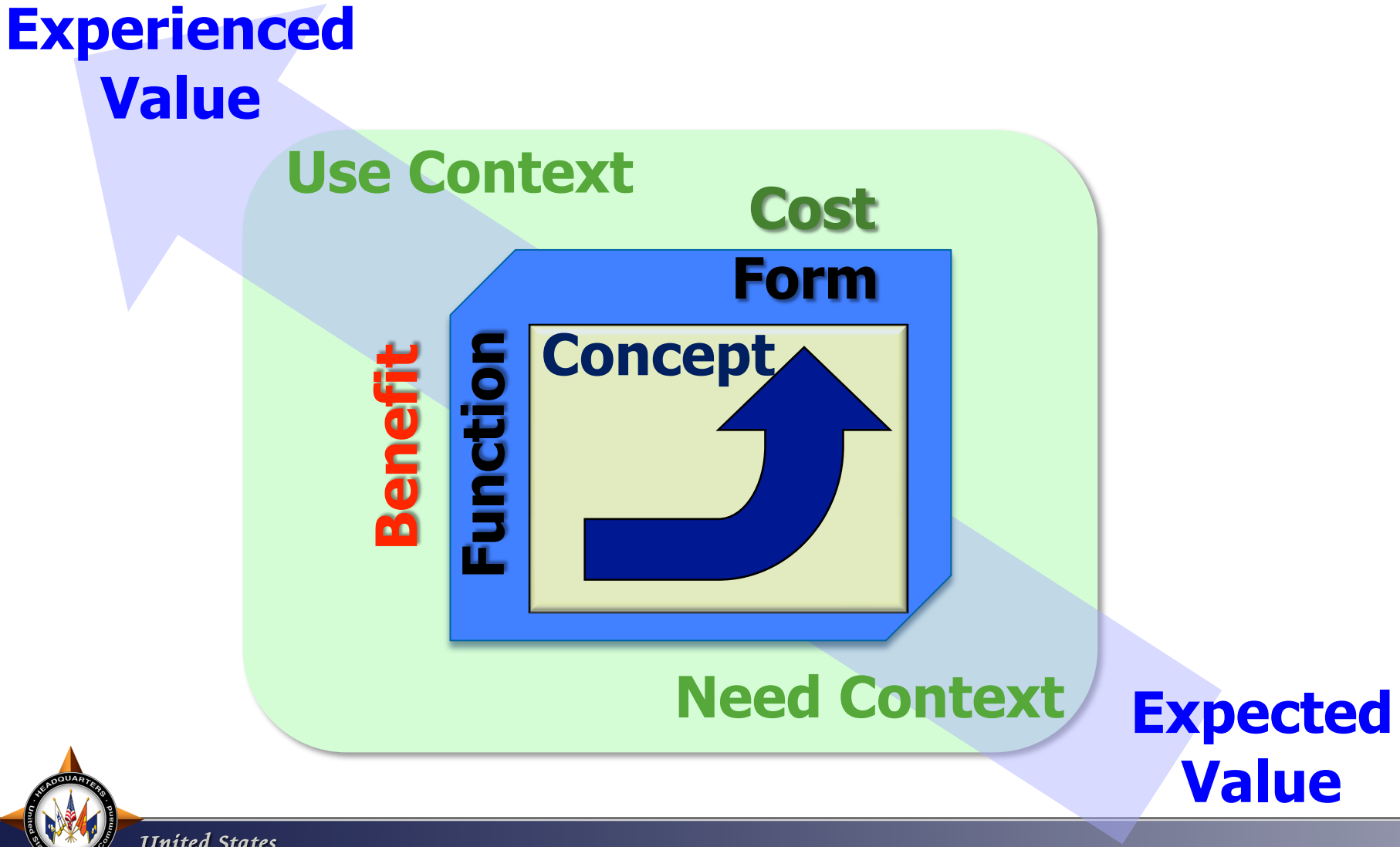
Objectives

- Provide a couple of useful, "low-tech" tools or methods to help uncover value
- Provide a model for thinking about value, context and the interface between technical systems and their associated enterprises
- Provide a few insights and helpful hints comparing and contrasting the original research effort with application in practice

Big Ideas

- Value – Focused Thinking
- Context
- Rigor

A Value-Driven Model



Outline

- Case Study #1 – Integrating Unmanned Aircraft Systems in the National Airspace
- Case Study #2 – Architecting EUCOM Information Operations for Value Delivery
- Observations between Research (Case Study #1) and Practice (Case Study #2)
- Conclusions

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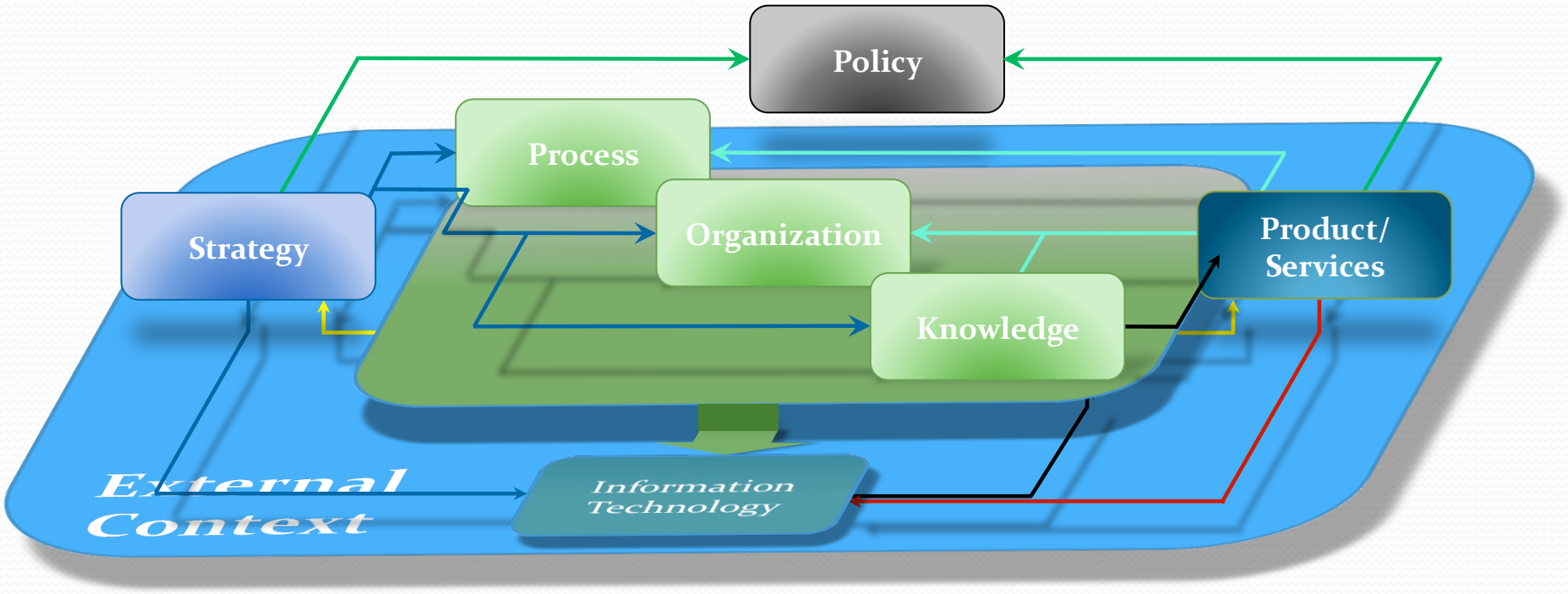
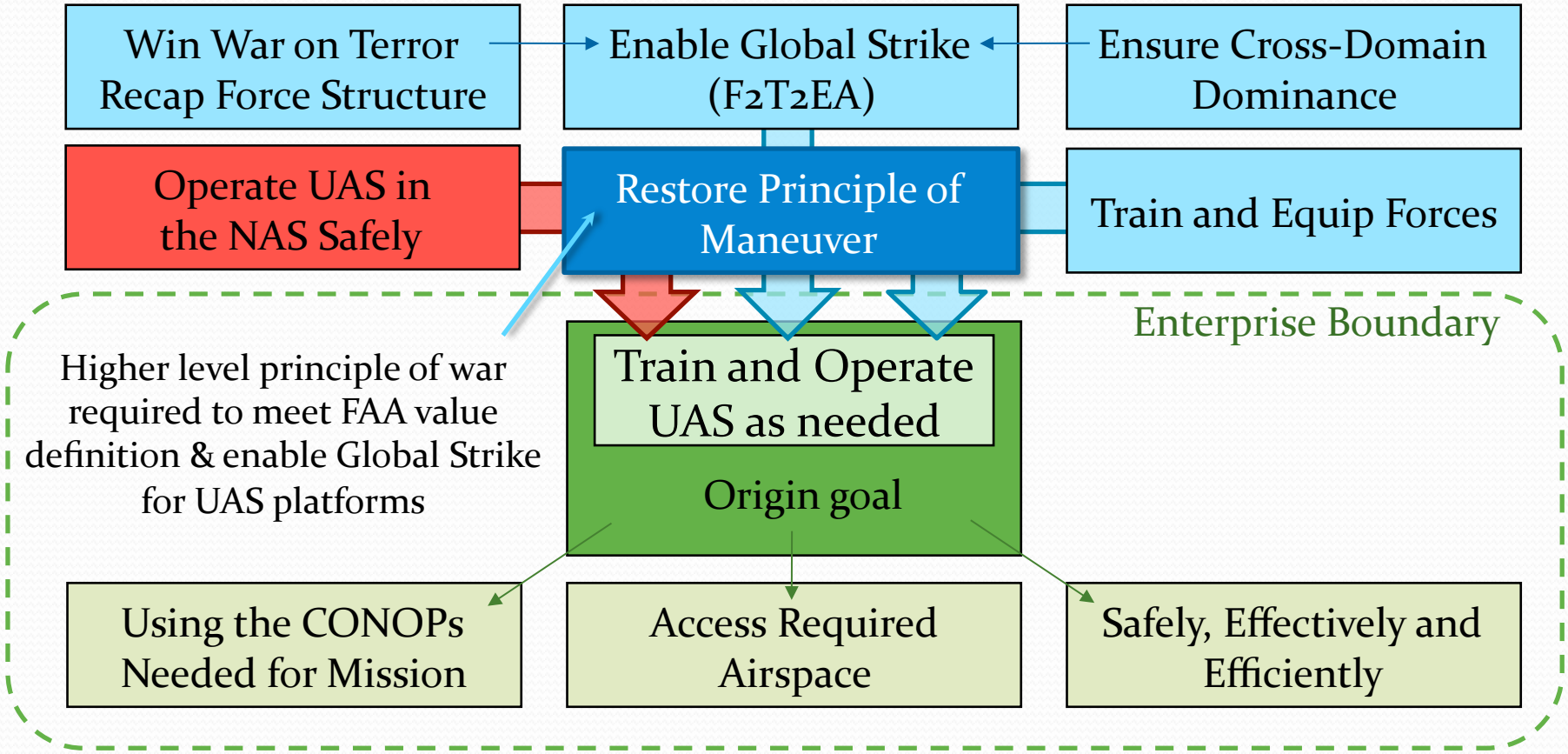
An Enterprise Architecting Framework



Source: Adapted from Nightingale & Rhodes

Enterprise Purpose Context



Source: Crawley

Enterprise Purpose

The purpose of the airspace integration enterprise is to restore the principle of maneuver to operations by integrating UAS into civil airspace using a full spectrum approach of policy, procedures and materiel system equipage while enabling needed UAS training and operational missions and meeting the contextual constraints (political, cultural, organizational, resource, etc) necessary to successfully deliver incrementally meaningful levels of operational flexibility.

INTENT

FUNCTION

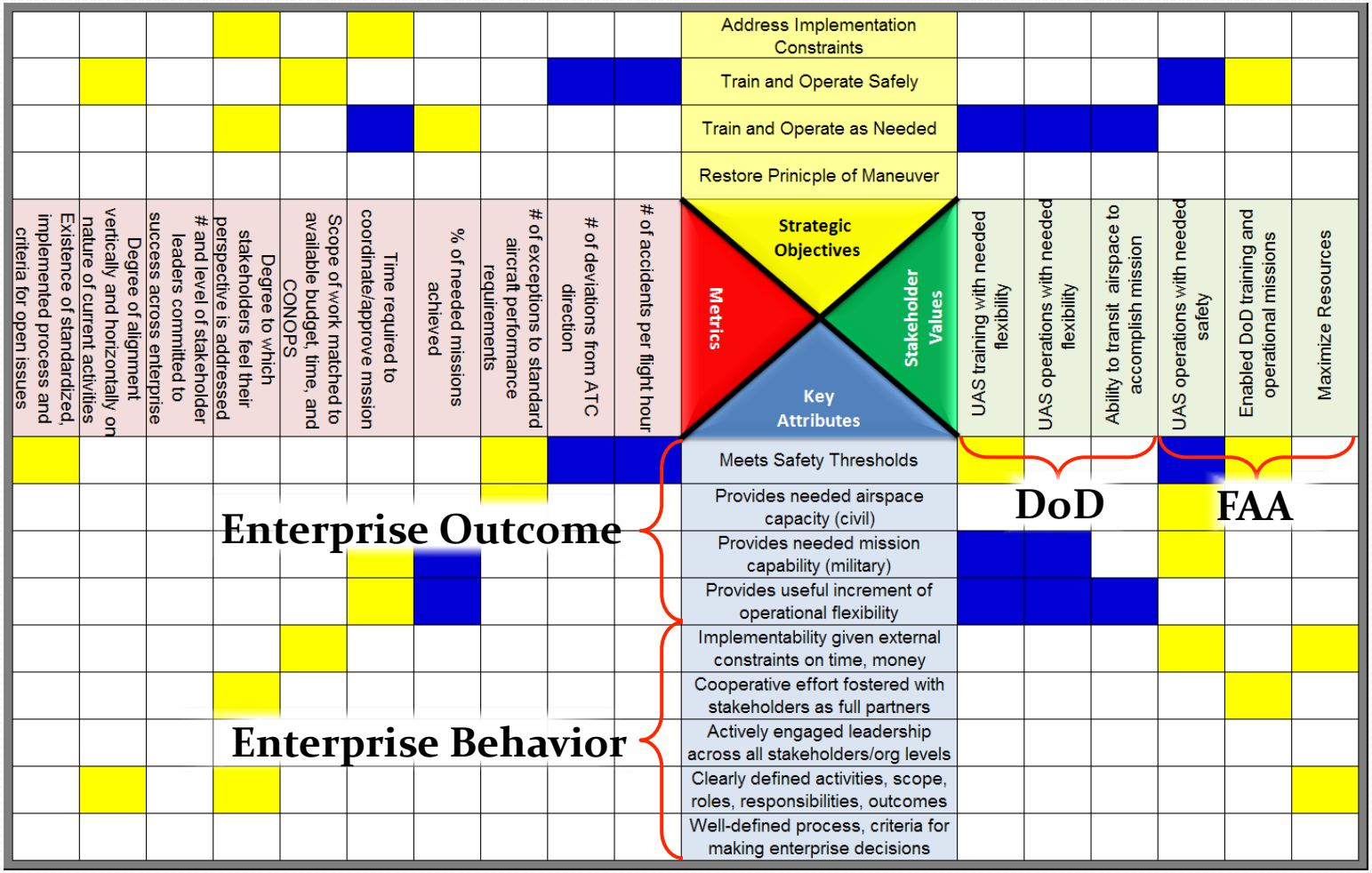
FORM

CONTRAINTS

Goal Check:
- ☑ Complete
- ☑ Consistent
- ☑ Attainable

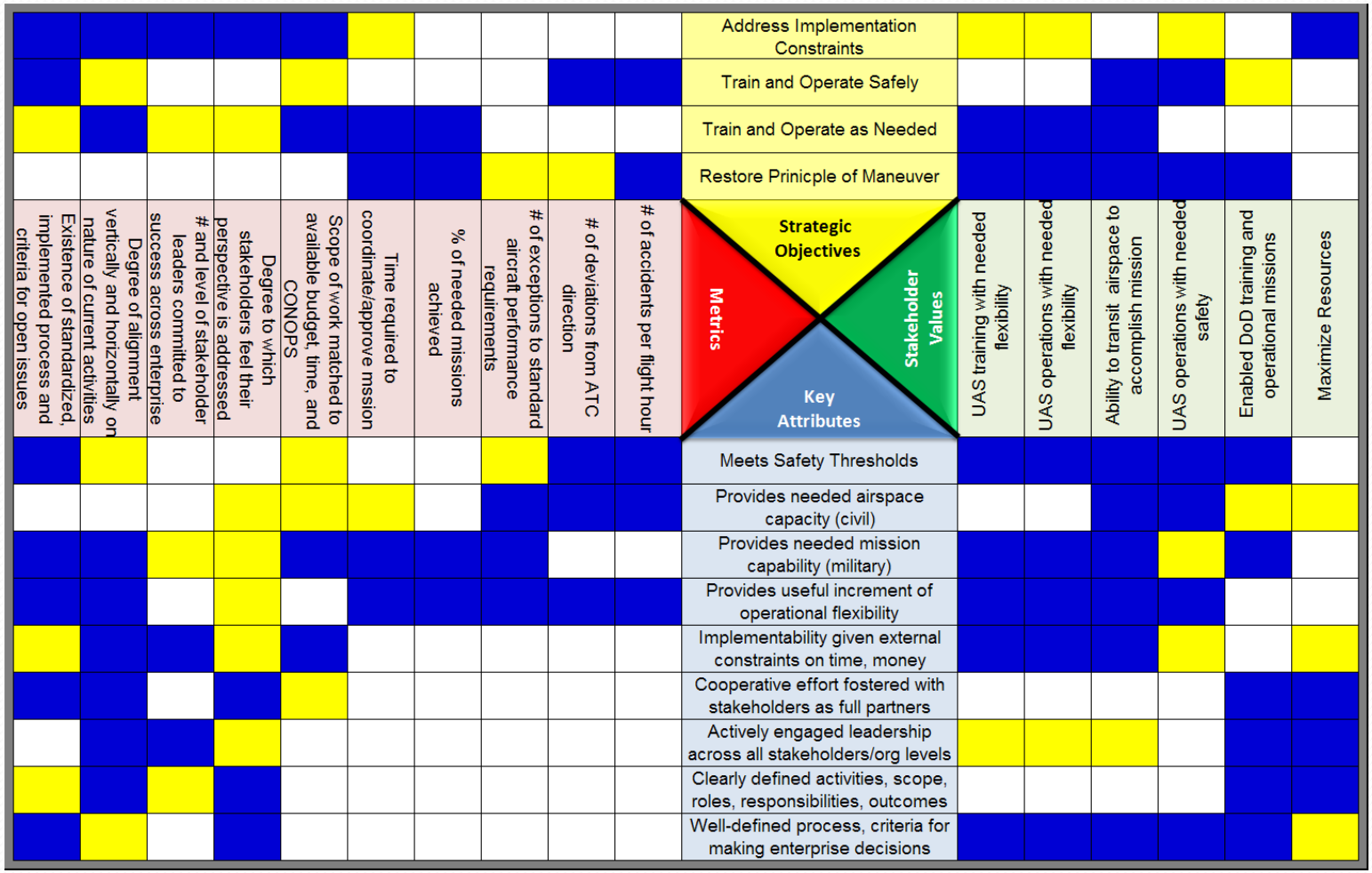
Source: Crawley

Enterprise "As-Is" X-Matrix



Source: Adapted from LAI EVSMA

Enterprise "To-Be" X-Matrix



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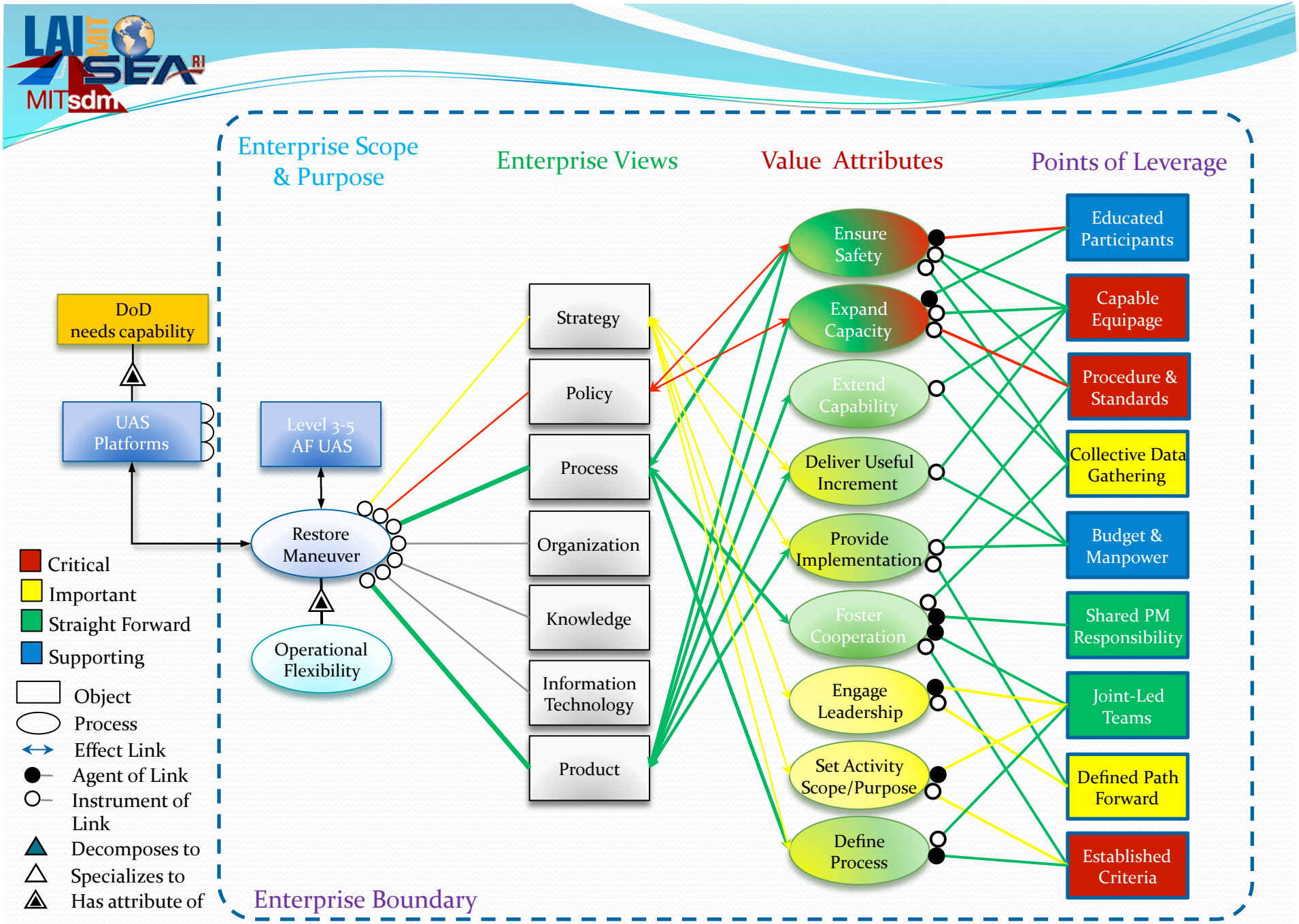
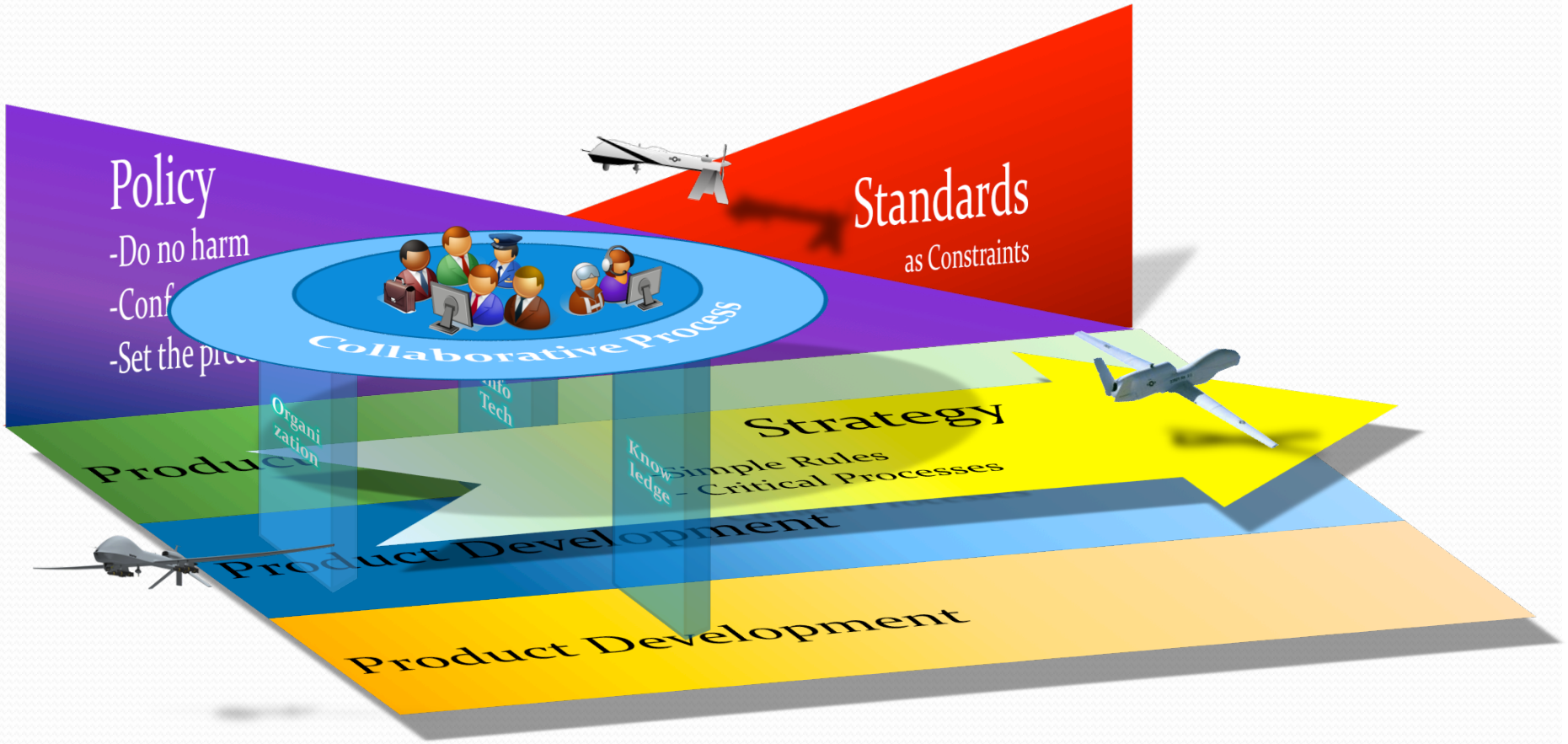
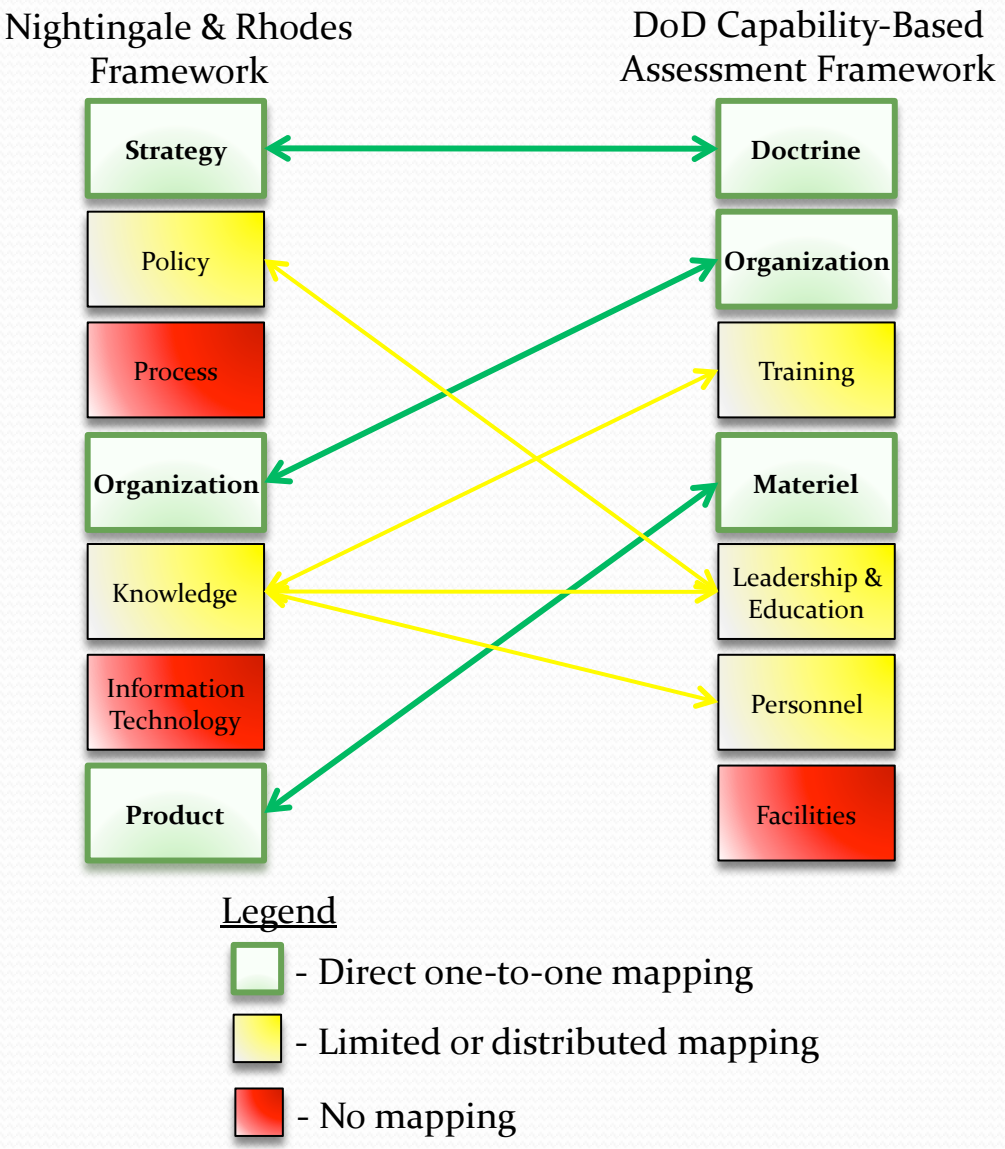

Enterprise Scope & Purpose
Enterprise Views
Value Attributes
Points of Leverage
DoD needs capability
UAS Platforms
Level 3-5 AF UAS
Restore Maneuver
Operational Flexibility
Strategy
Policy
Process
Organization
Knowledge
Information Technology
Product
Ensure Safety
Expand Capacity
Extend Capability
Deliver Useful Increment
Provide Implementation
Foster Cooperation
Engage Leadership
Set Activity Scope/Purpose
Define Process
Educated Participants
Capable Equipage
Procedure & Standards
Collective Data Gathering
Budget & Manpower
Shared PM Responsibility
Joint-Led Teams
Defined Path Forward
Established Criteria
Critical
Important
Straight Forward
Supporting
Object
Process
Effect Link
Agent of Link
Instrument of Link
Decomposes to
Specializes to
Has attribute of
Enterprise Boundary

Architecture 3 – Hybrid





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IO Purpose Statement (JP 3-13)

The purpose of information operations is to achieve and maintain information superiority for the U.S. and its Allies by integrating core, supporting and related capabilities using a full spectrum approach to influence, disrupt, corrupt, or usurp adversarial human and automated decision making while protecting our own.

INTENT

FUNCTION

FORM

CONTRAINTS

Purpose Check:
- ☑ Complete
- ☑ Consistent
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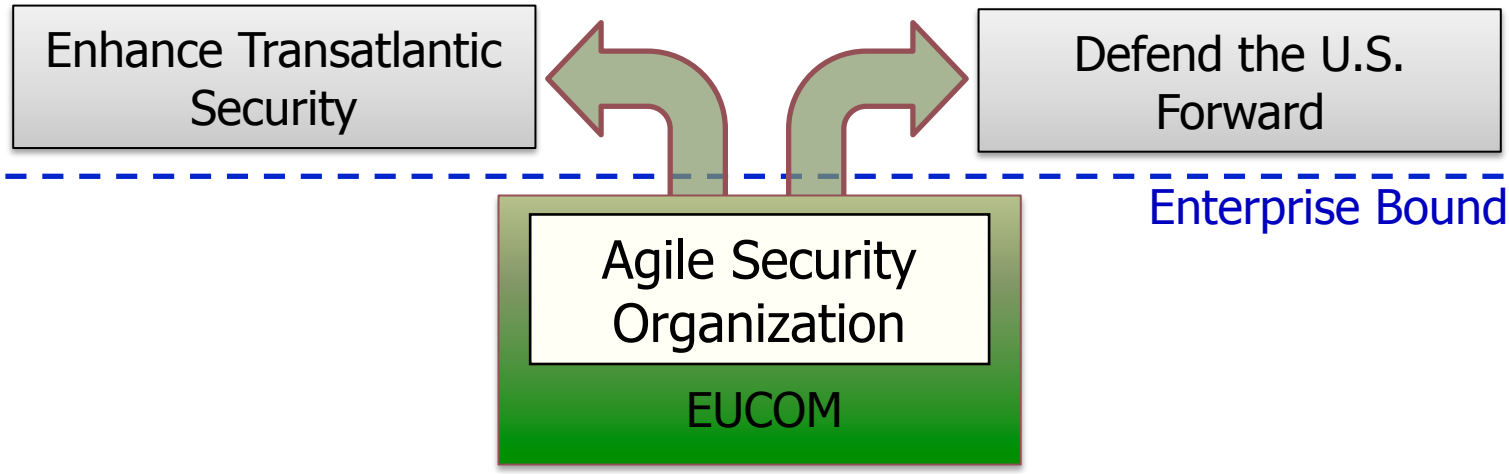
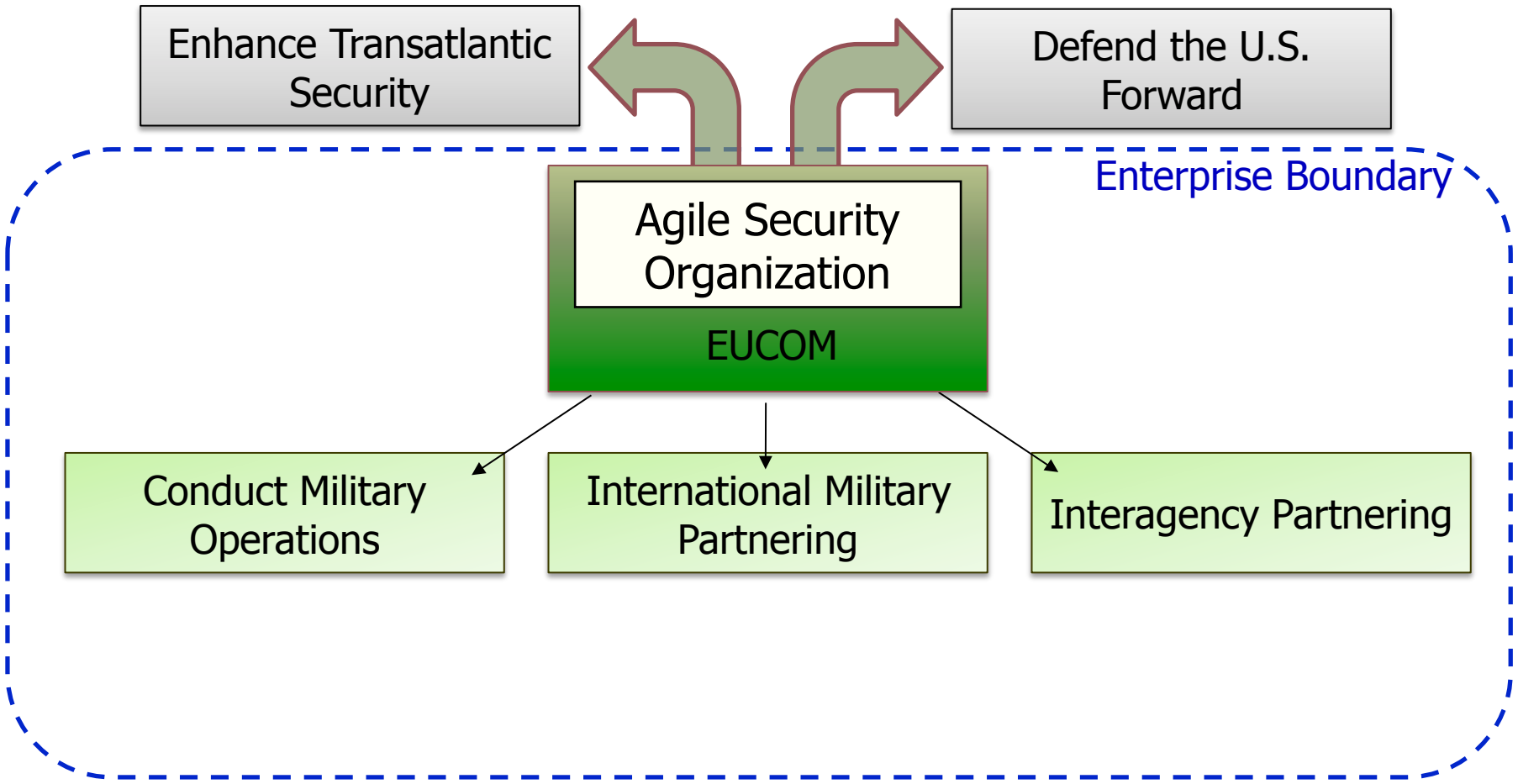
EUCOM Purpose Context



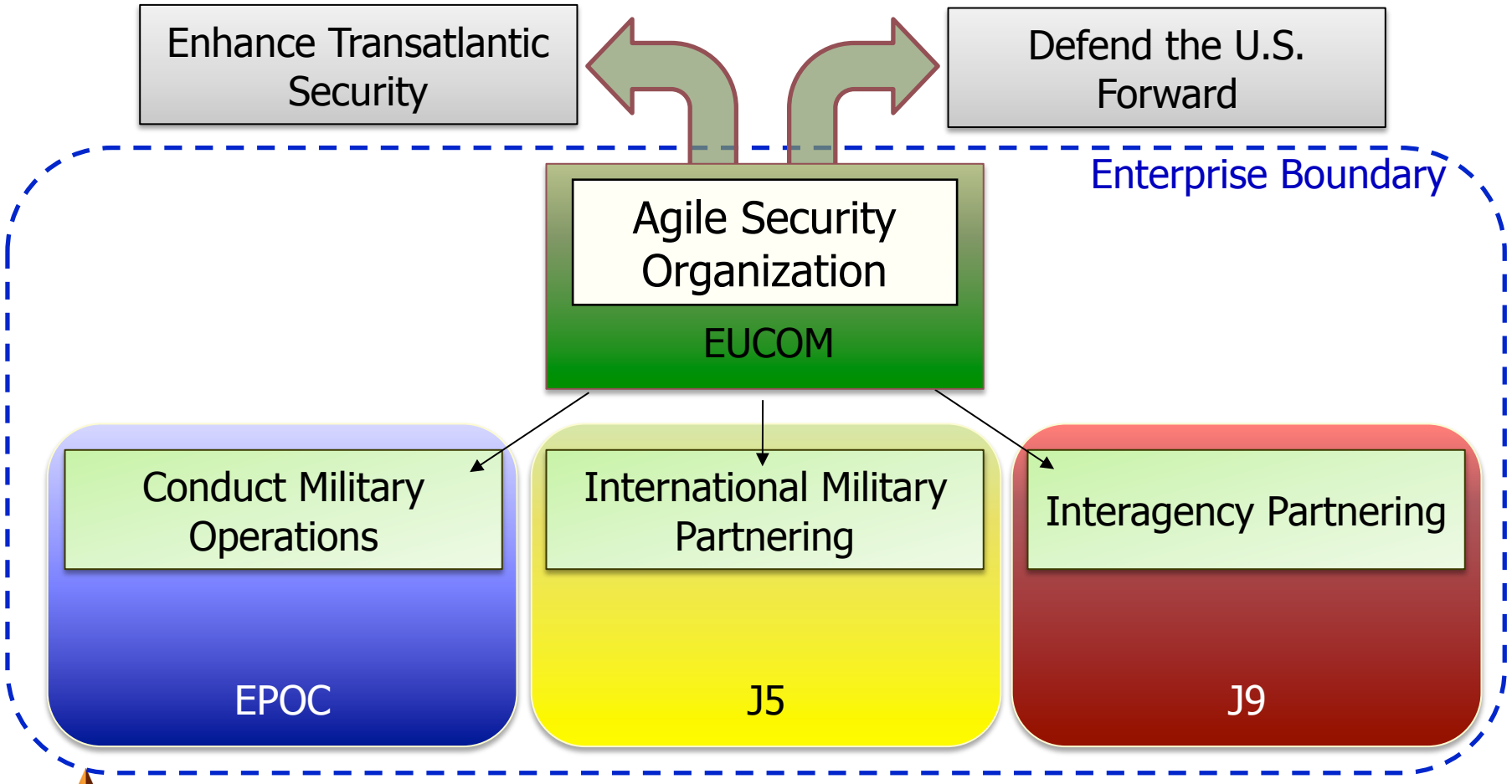
The mission of the U.S. European Command is to *conduct military operations*, *international military partnering*, and *interagency partnering* to **enhance transatlantic security and defend the United States forward**.

We do this *by establishing an agile security organization* able to *conduct full spectrum activities* as part of whole of government solutions to *secure enduring stability in Europe and Eurasia*.

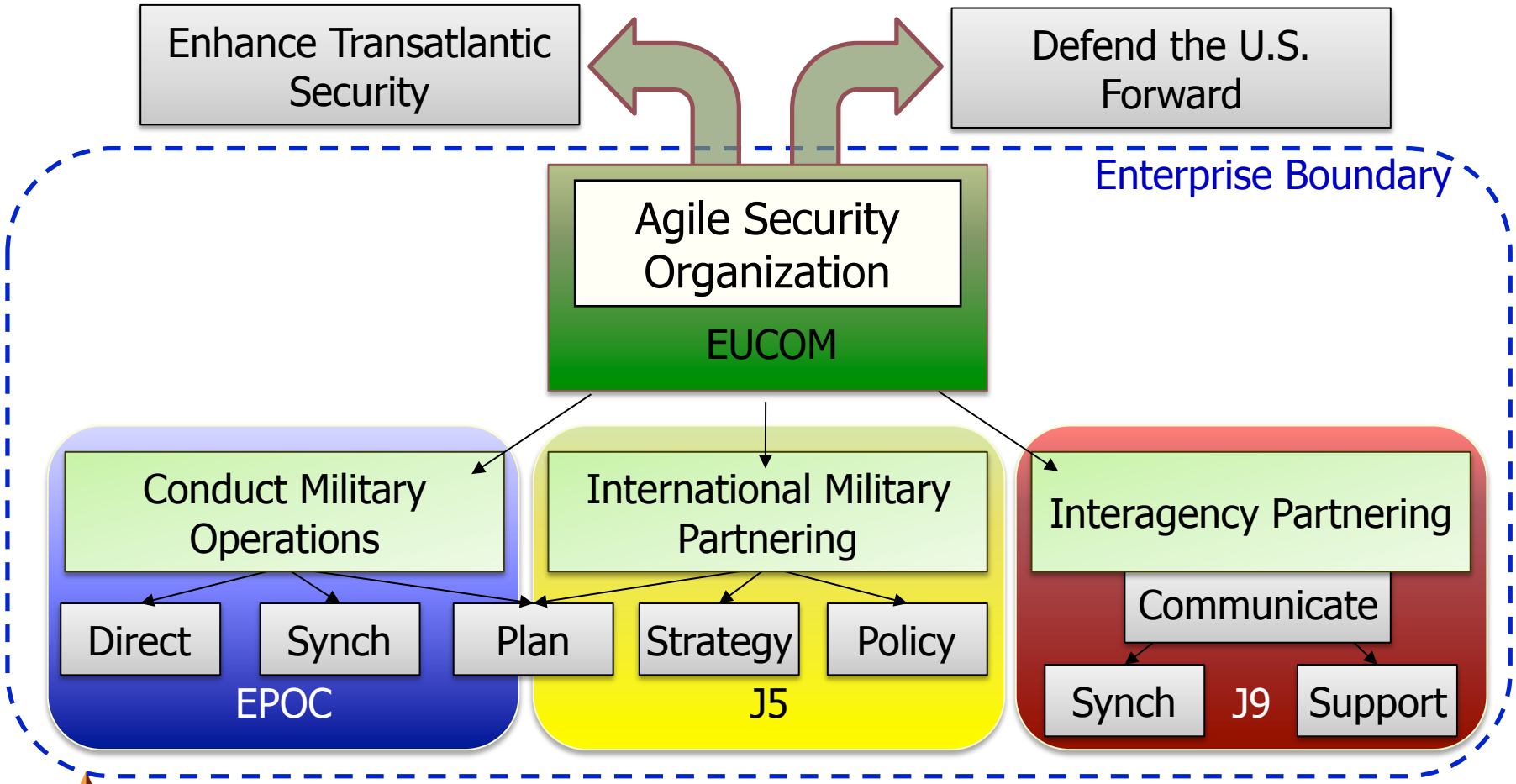
EUCOM Purpose Context



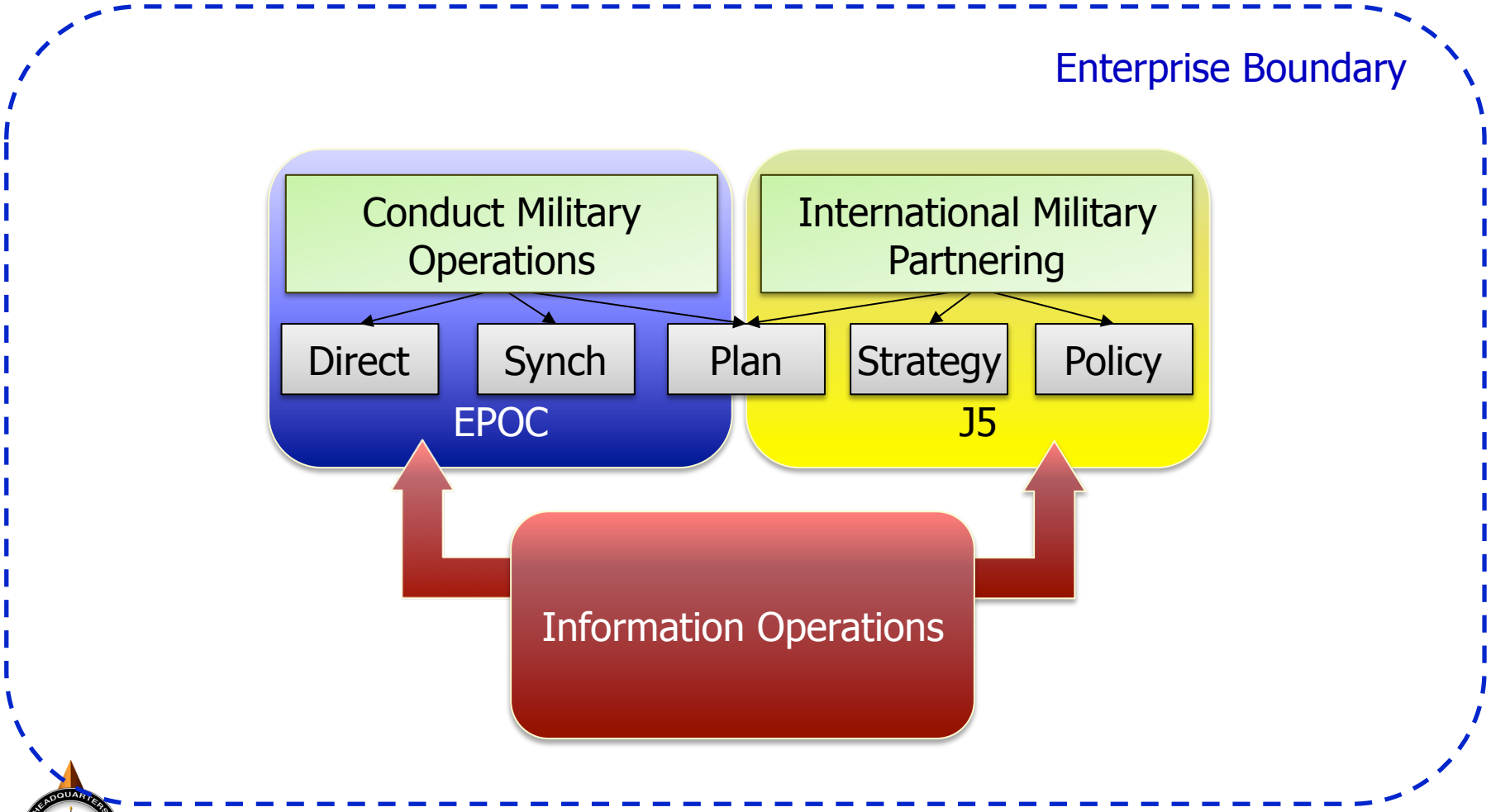
EUCOM Purpose Context



EUCOM Purpose Context



IO Purpose Context



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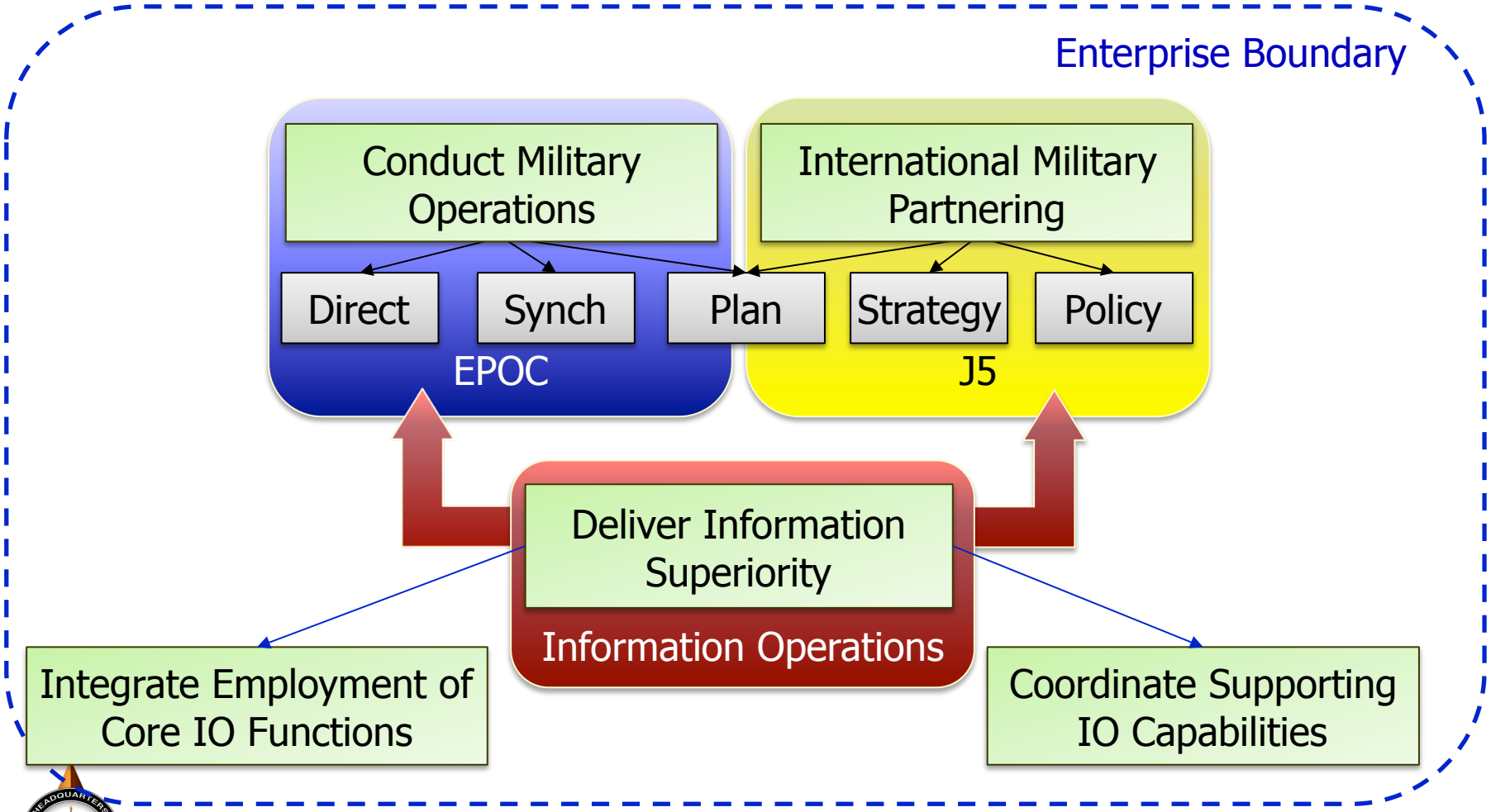


IO Purpose Context

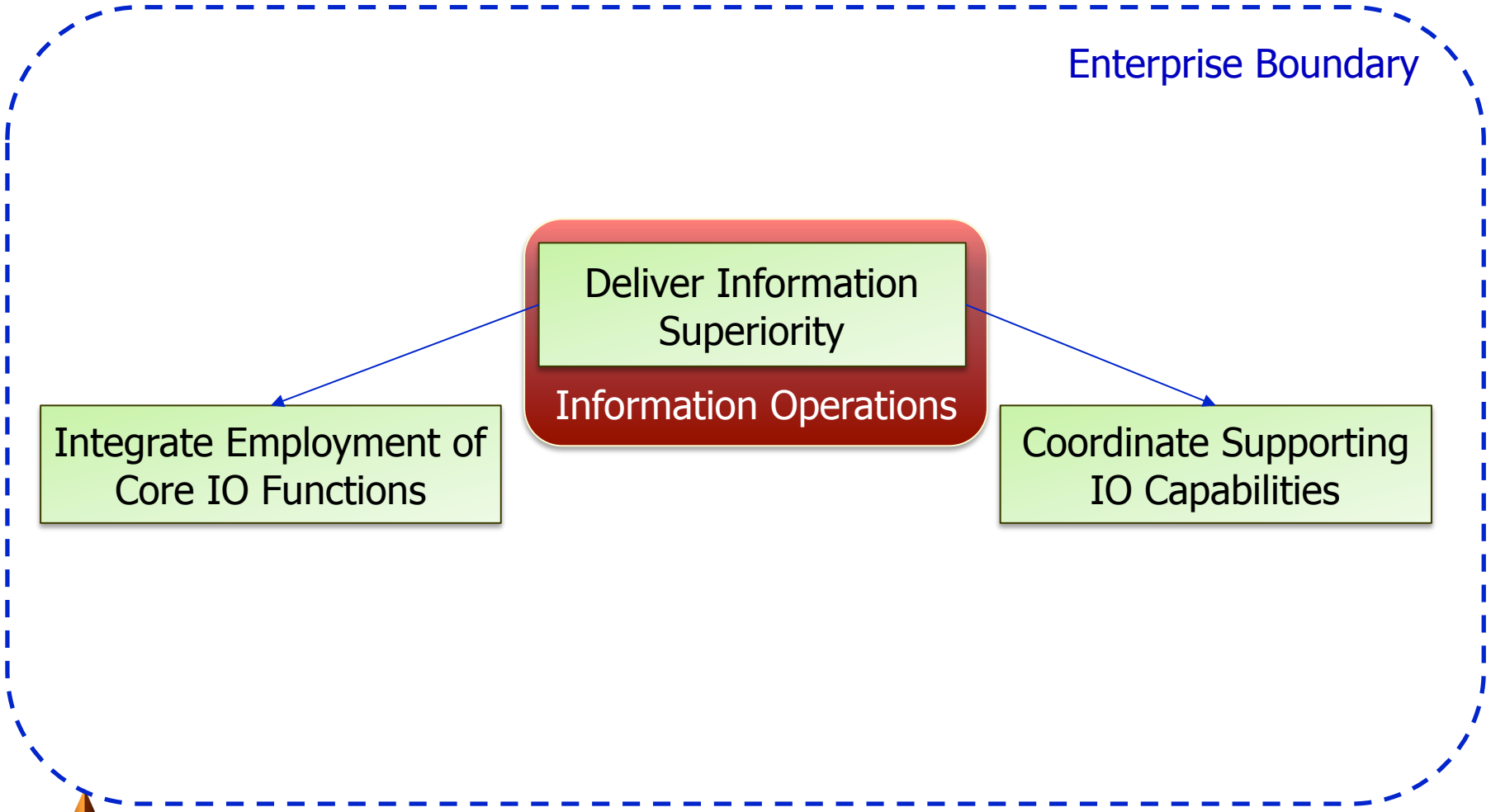
Enterprise Boundary

Information Operations

Information operations (IO) are described as the *integrated employment* of electronic warfare (EW), computer network operations (CNO), psychological operations (PSYOP), military deception (MILDEC), and operations security (OPSEC), *in concert with specified supporting and related capabilities*, to **influence, disrupt, corrupt, or usurp** adversarial human and automated decision making while **protecting** our own.

The purpose of this doctrine is to provide **joint force commanders (JFCs)** and their staffs *guidance to help prepare, plan, execute, and assess IO* in support of joint operations. **The principal goal is to achieve and maintain information superiority for the US and its allies**.

IO Purpose Context



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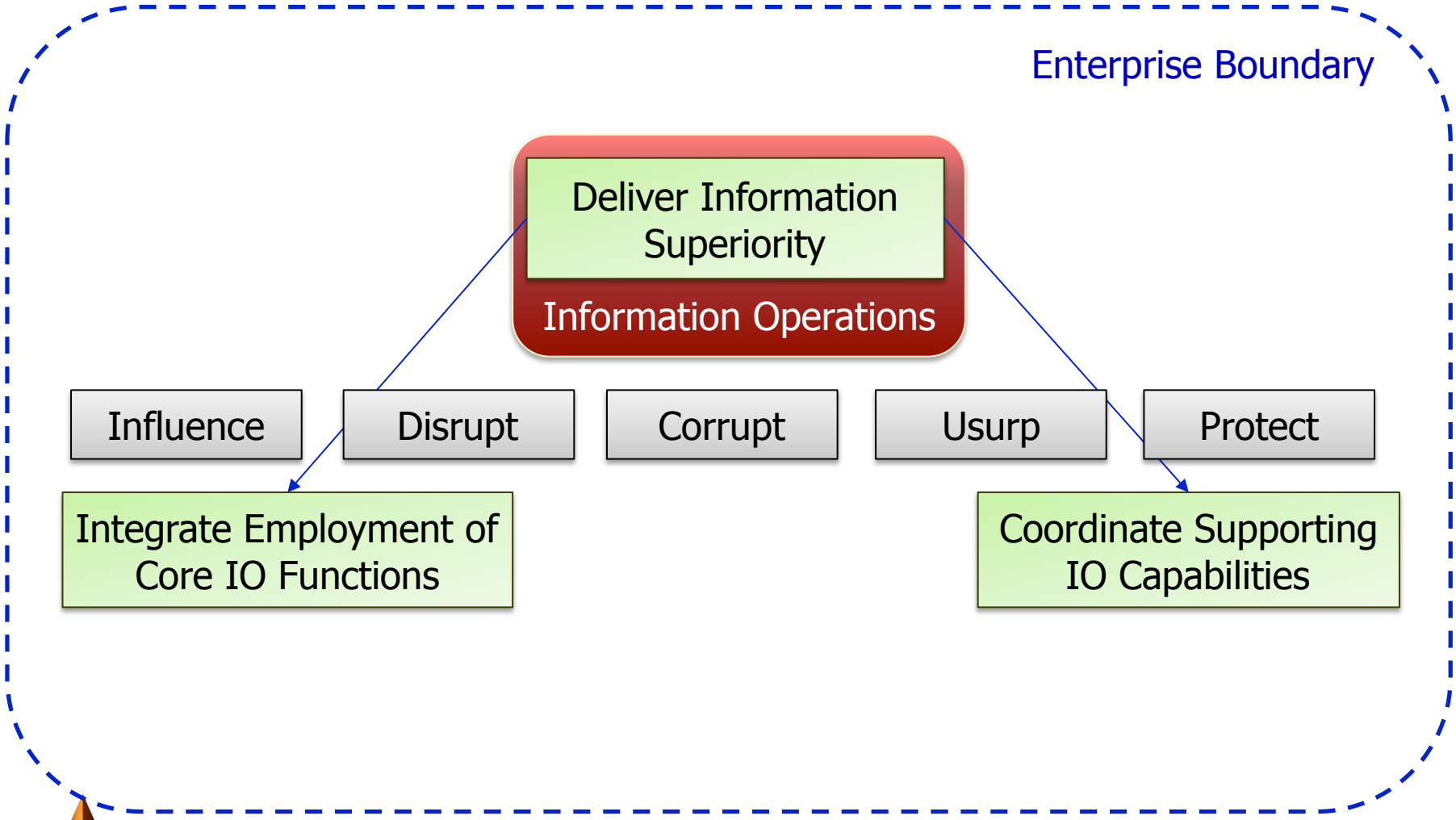

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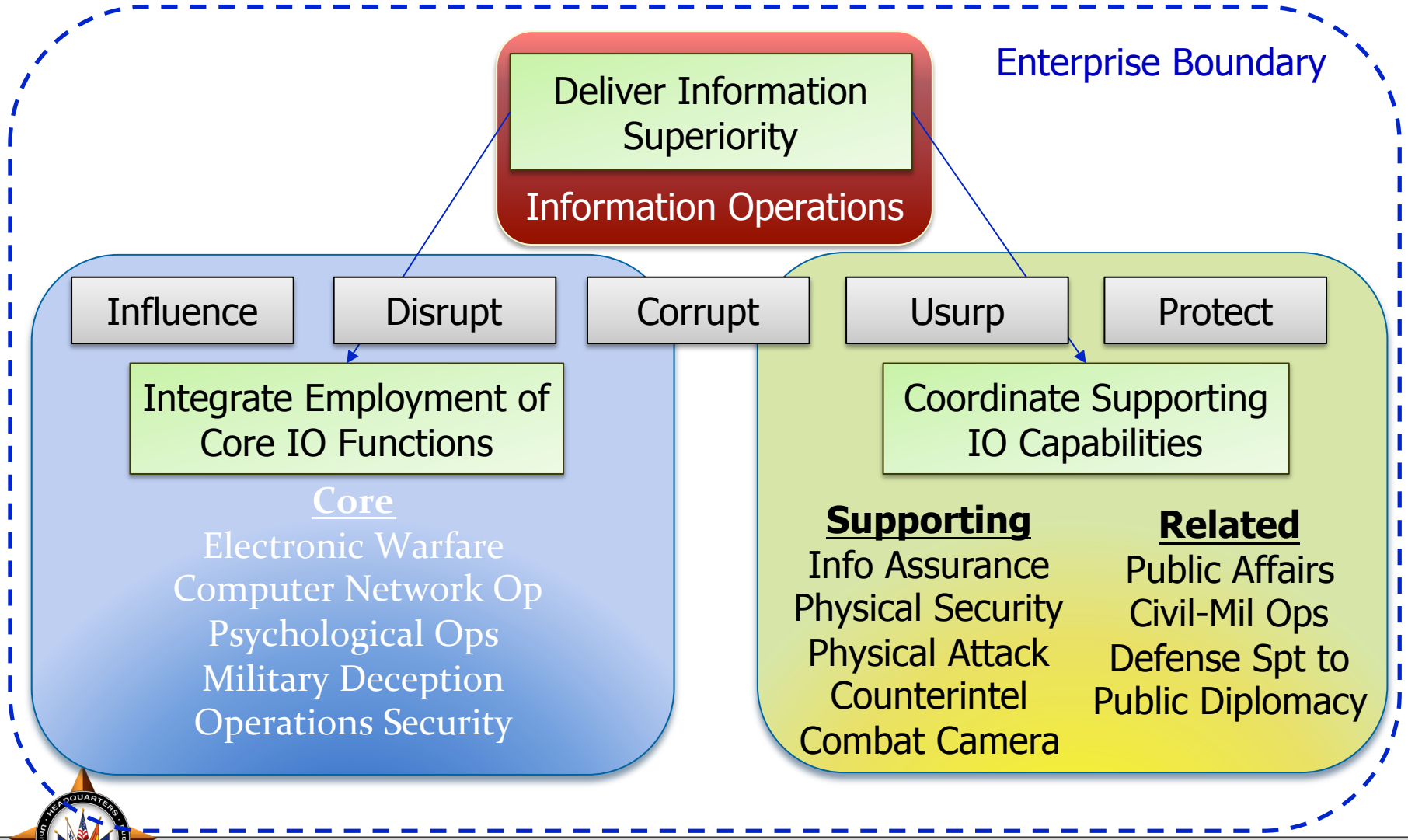


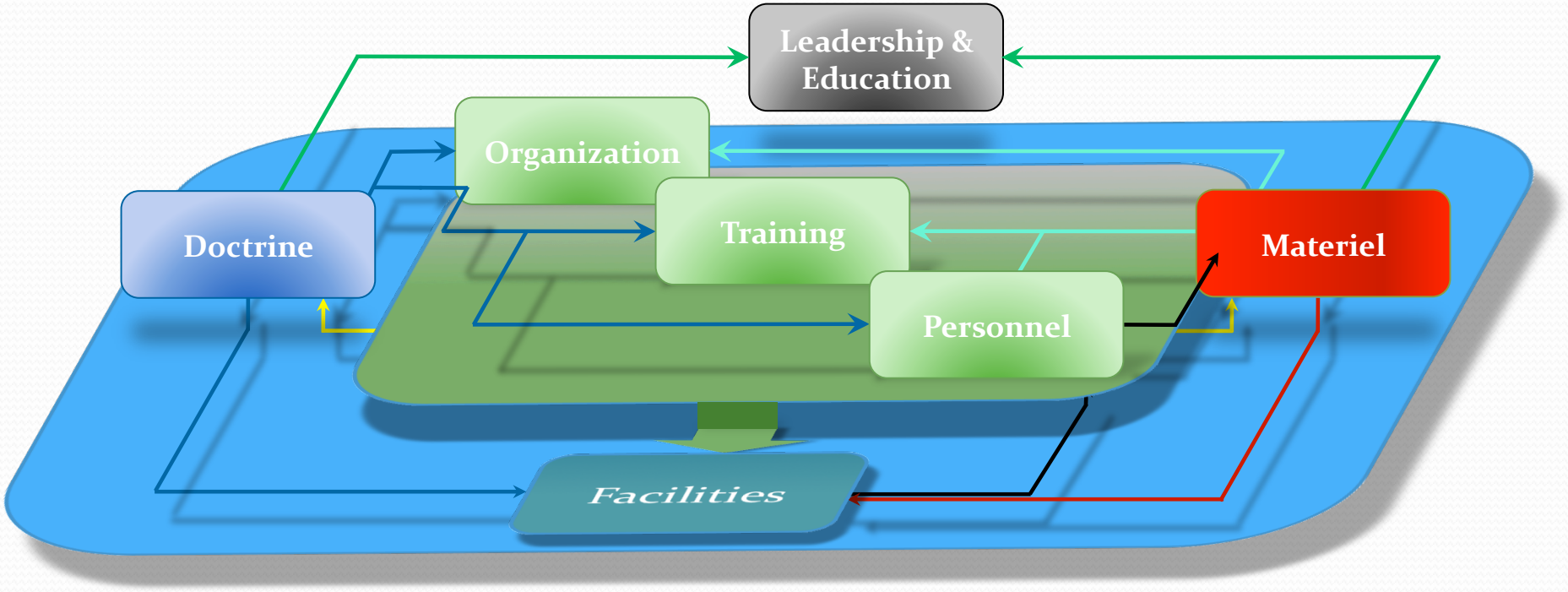
IO at a Combatant Command

Commander, United States Strategic Command's (USSTRATCOM's) specific authority and responsibility to coordinate IO across area of responsibility (AOR) and functional boundaries does not diminish **the imperative for other combatant commanders to employ IO. These efforts may be directed at achieving national or military objectives incorporated in theater security cooperation plans, shaping the operational environment for potential employment during periods of heightened tensions, or in support of specific military operations**. It is entirely possible that in a given theater, the combatant commander will be supported for select IO while concurrently supporting USSTRATCOM IO activities across multiple theater boundaries.

Initial Value Identification Interviews

- Integrate Planning
- Produce Results
- Educate Staff and Components
- Vet Priorities
- Establish Venue for Vetting Priorities
- Conduct IO Assessments
- Evaluate IO Capabilities
- Identify and Exploit Opportunities

Formalizing DOTMLPF



Source: Adapted from Nightingale & Rhodes

Enterprise Analysis Framework

- Doctrine
- Organization
- Training
- Materiel
- Leadership & Education
- Personnel
- Processes
- Facilities

DOTMLP^{2}F

EA Framework Analysis

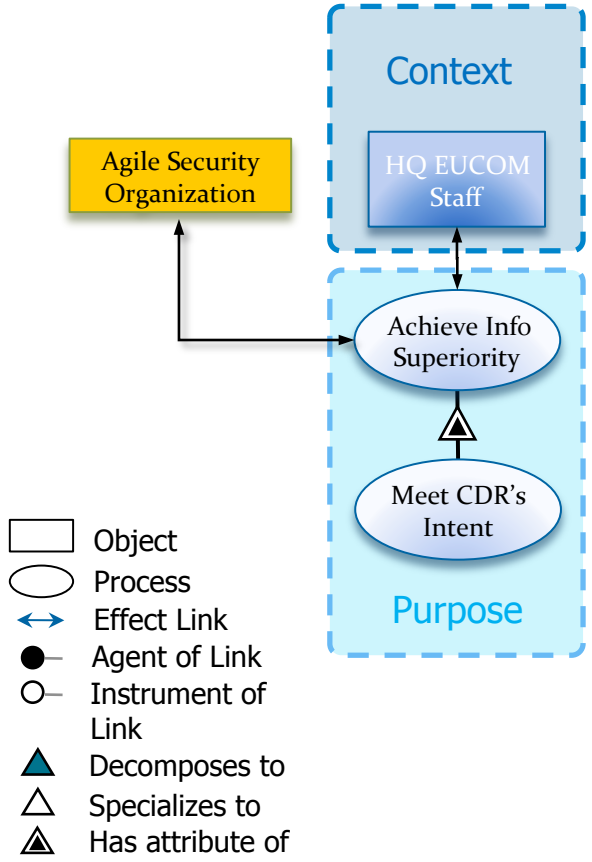
Not Considered
(Constraint from Ldrshp)

Primary
Leverage
Points

Framework

Enterprise View	Values: Integrated Planning	Produced Results	Educate Staff & Components	Vet Priorities	Establish Venue	Conduct IO Assessments	Evaluate IO Capabilities	ID/Exploit Opportunities	Total Impact
Doctrine									0
Organization	9	9	1		9	3	3	3	37
Training	1	3	9	1		3	3		20
Materiel									0
Leadership & Education	1	3	9	3	3	9	1	9	38
Personnel	3	3				3	3	9	21
Processes	9	9	3	9	9	3	3	1	46
Facilities									0
Total	23	27	22	13	21	21	13	22	

IO Architecture Development



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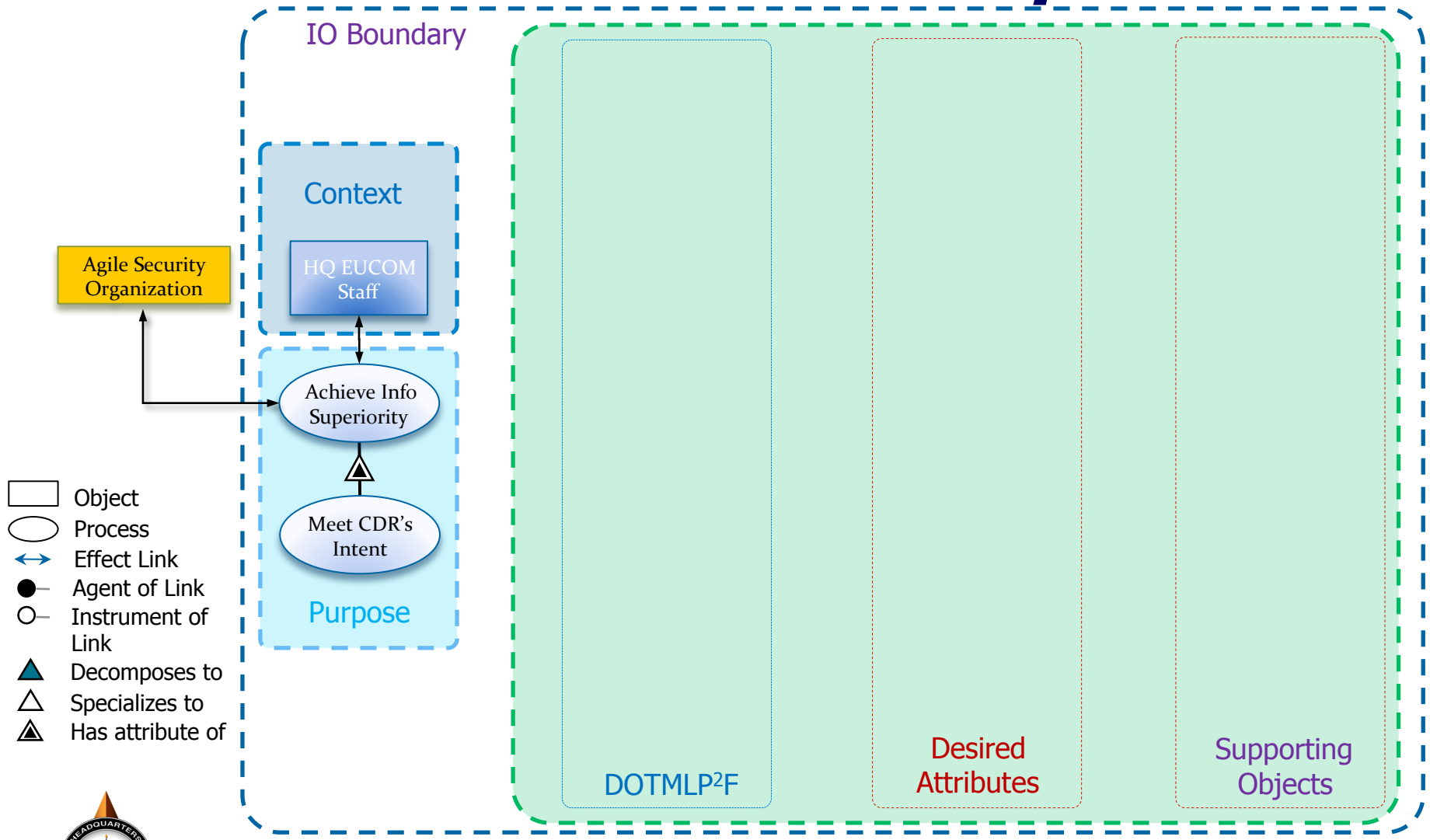

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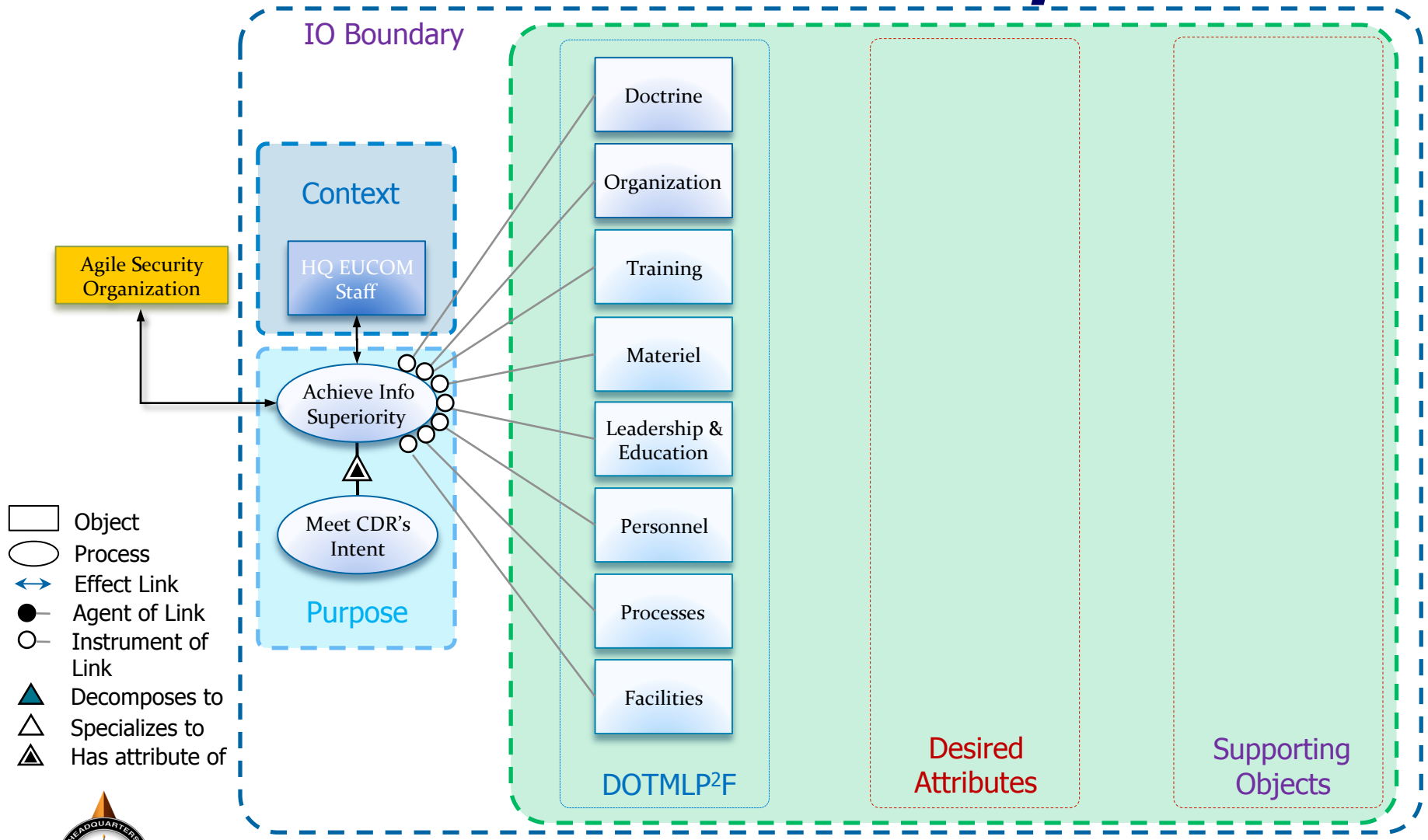

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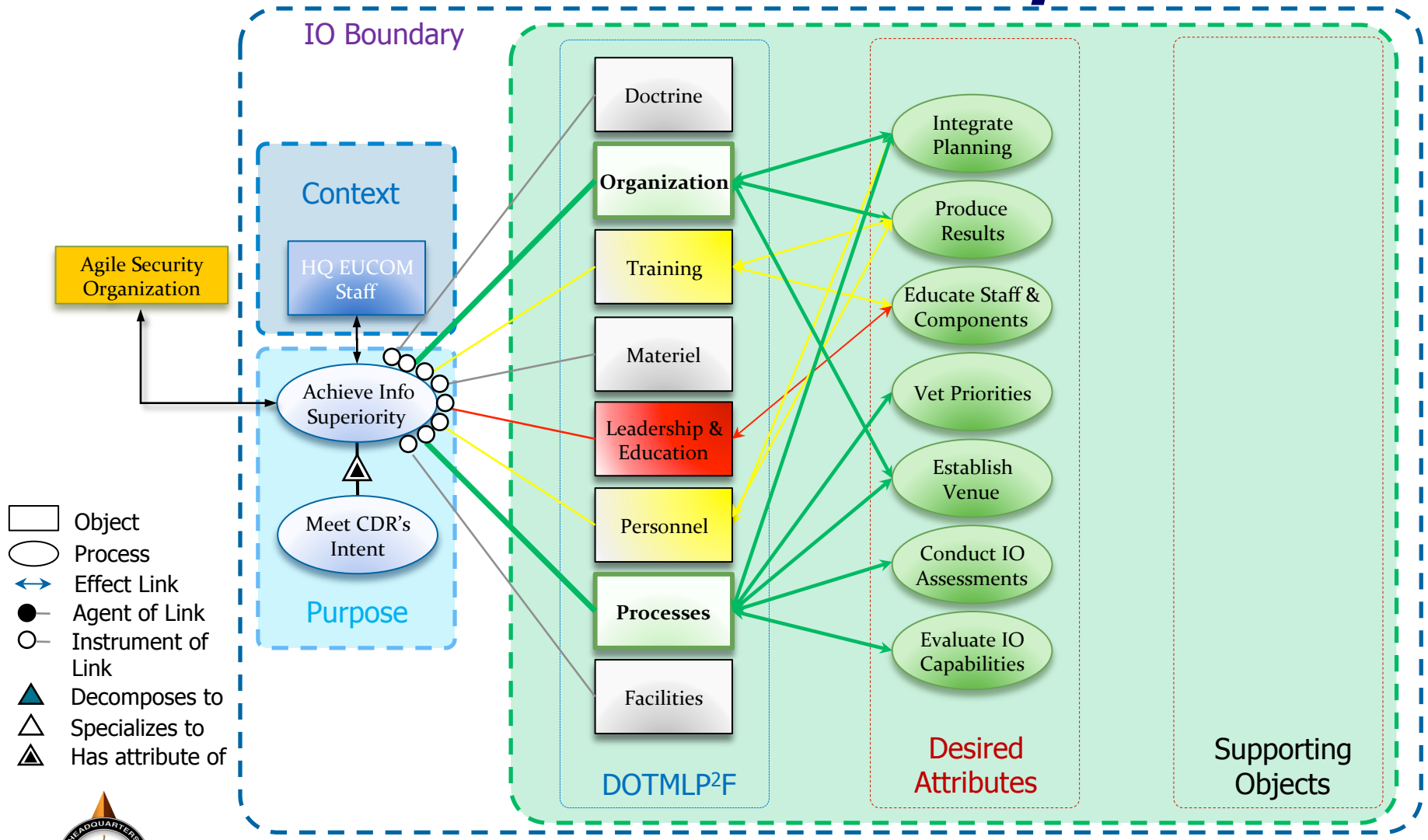
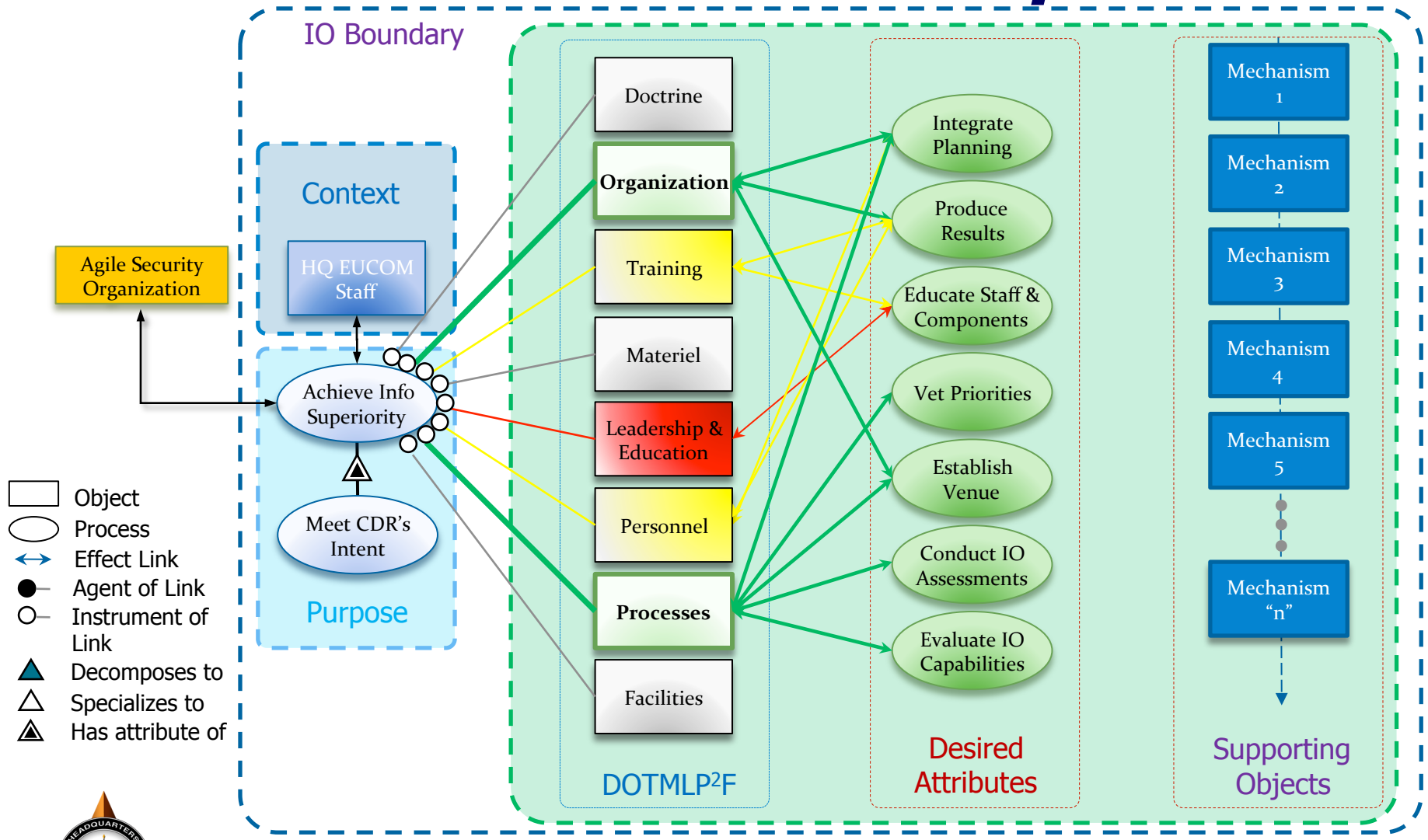
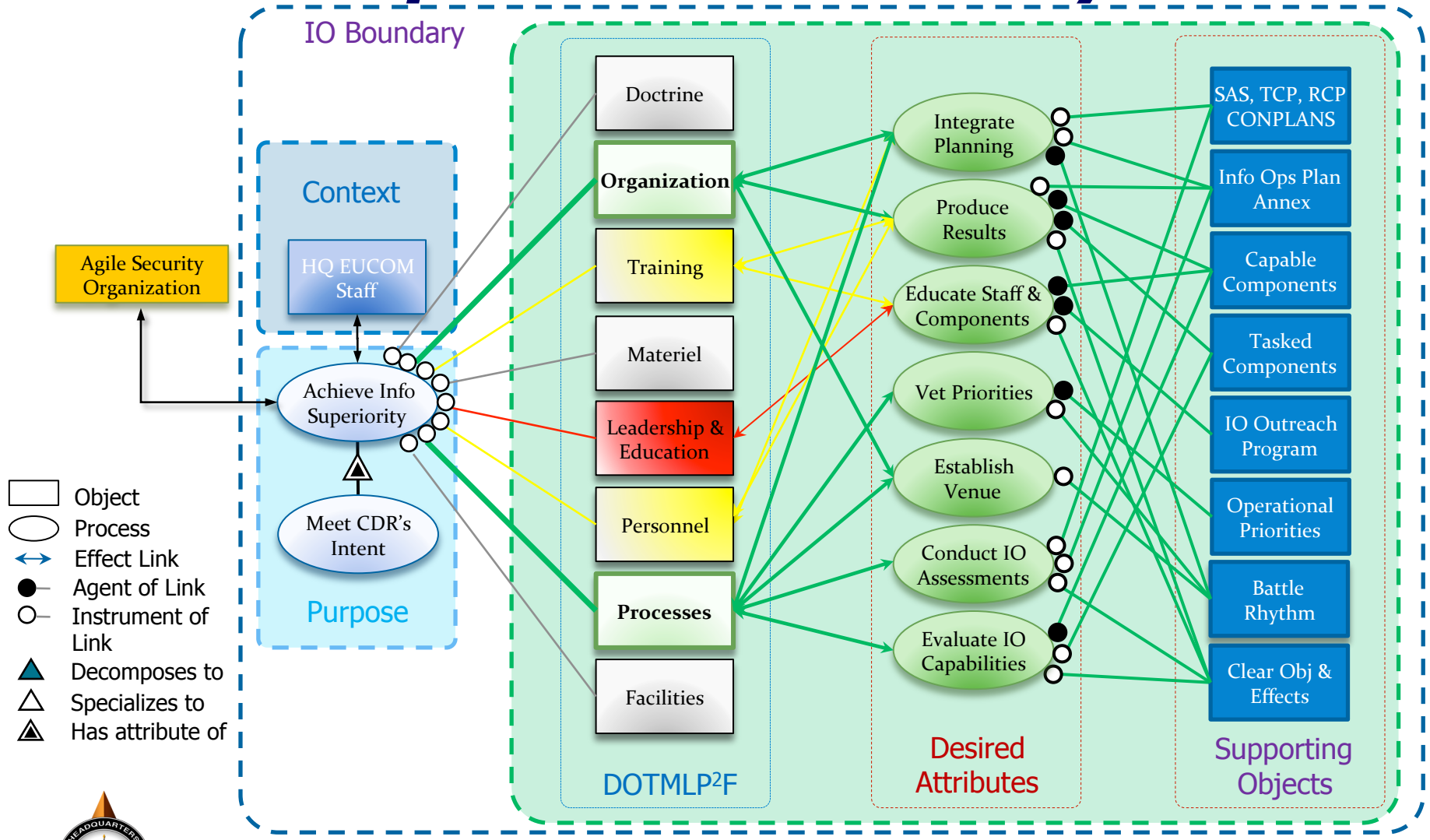


IO Architecture Development



Completed Initial Analysis



Back Brief Results

- Disconnects between doctrine, leadership, and action officers on what info operations really is/means
- Lack of consensus on attribute definitions
- Lack of consensus on relative attribute weights
- Inability of participants to think in value-space
  - Regressed to "processes" and the need to "order" attributes in a logical sequence
  - Difficulty in thinking in the need space – continued to devolve to solution space
- Result: vote of "no-confidence" in the original value identification

Mid-Course Analysis Observations

- Rigorous decomposition is important for bringing out inconsistencies in people's mental models
  - Different definitions of Info Ops
  - Different perspectives on how activities relate
  - All using the same words to mean different things
- Getting to real value identification takes time, insight, and some intuition for the context of the enterprise
- People have difficulty thinking in the abstract – especially with something as squishy as "enterprise"

Potential Heuristics

- Lack of convergence in stakeholder definitions indicates a failure in proper value identification

- Value-space is not as large as you think it is. Ask "Why" questions to winnow symptoms from root causes.

Value Identification – Round #2

- Reduce Ambiguity in objectives and effects
  - "Rinse and Repeat" as needed
  - "Planning should be done top down, Refinement bottom up" – An artillery man's perspective
- Open the trade space for Course of Action development
  - Sum of the Parts ≠ The Whole
  - Ops vs. BPC perspectives
- Enhance collaboration and team work across the staff and with external organizations

Architecture Leverage Points

Not Considered
(Constraint from Ldrshp)

Primary
Leverage
Points

Framework

Enterprise View	Attribute: Values — Reduce Ambiguity in Obj/Eff	Open the Trade Space to IO	Enhance Collaboration across Staff/ External Agencies	Total Impact
Doctrine				0
Organization	3	9	3	15
Training		3	3	6
Materiel				0
Leadership & Education	9	3	9	21
Personnel		3	3	6
Processes	9	3	3	15
Facilities				0
Total	21	21	21	

The Cognitive Domain

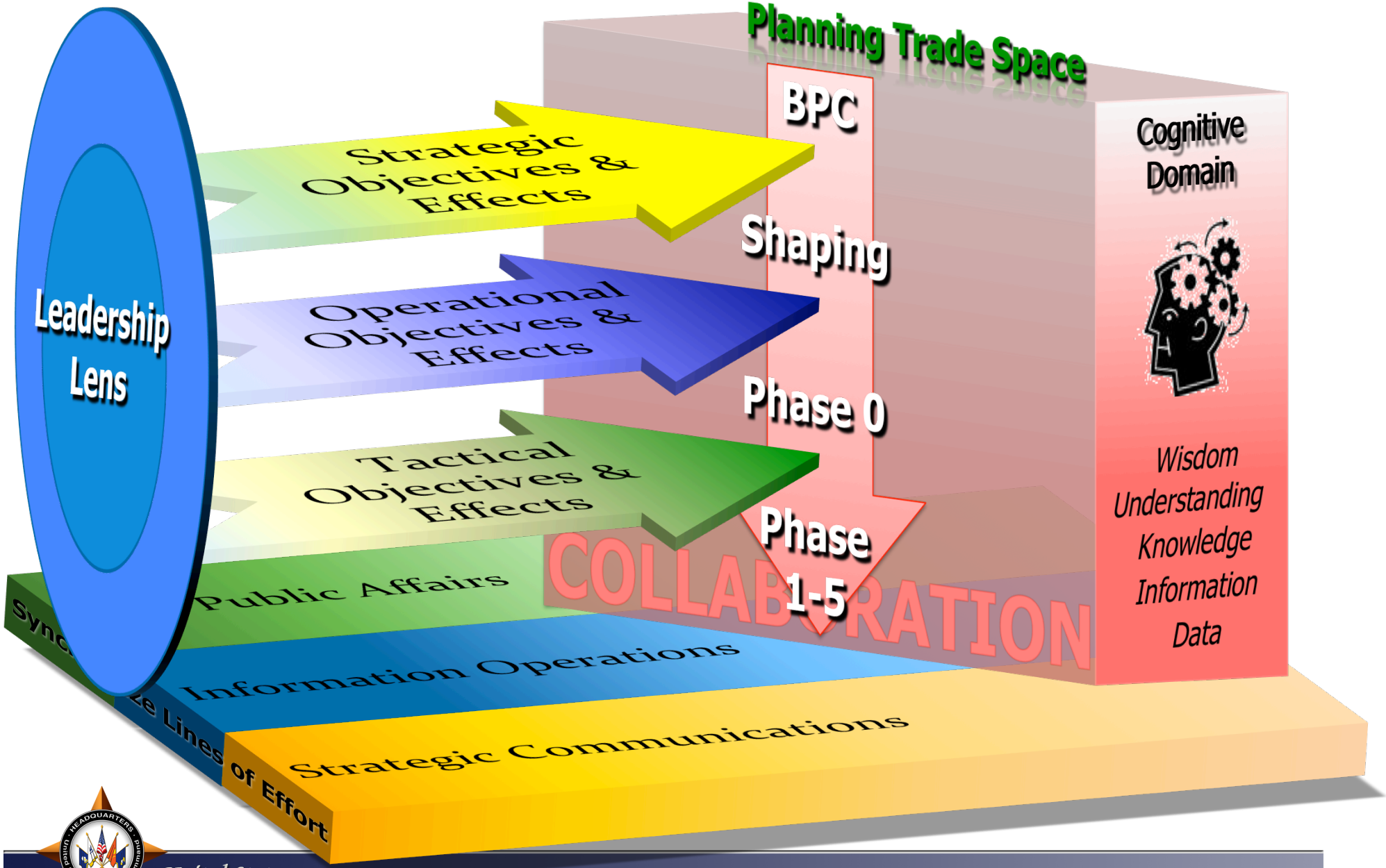
WISDOM = Understanding + Experience

UNDERSTANDING = Knowledge + Insight

KNOWLEDGE = Information + Synthesis across Multiple Contexts

INFORMATION = Data + Context

DATA = Facts and Figures


Planning Trade Space
BPC
Shaping
Phase 0
Phase 1-5
Leadership Lens
Strategic Objectives & Effects
Operational Objectives & Effects
Tactical Objectives & Effects
Public Affairs
Information Operations
Strategic Communications
Lines of Effort
COLLABORATION
Cognitive Domain
Wisdom
Understanding
Knowledge
Information
Data

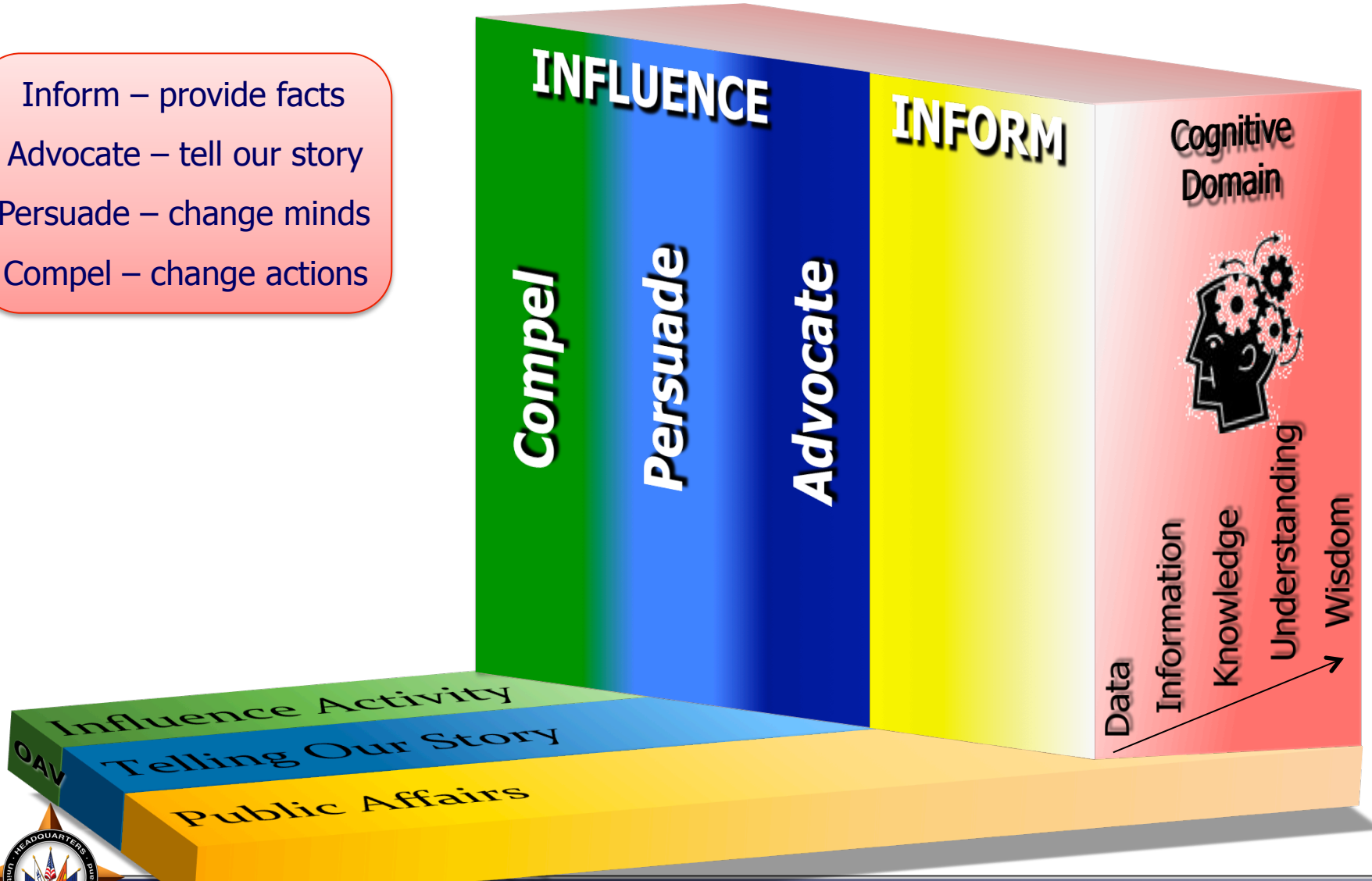
Cognitive Lines of Effort

Inform – provide facts

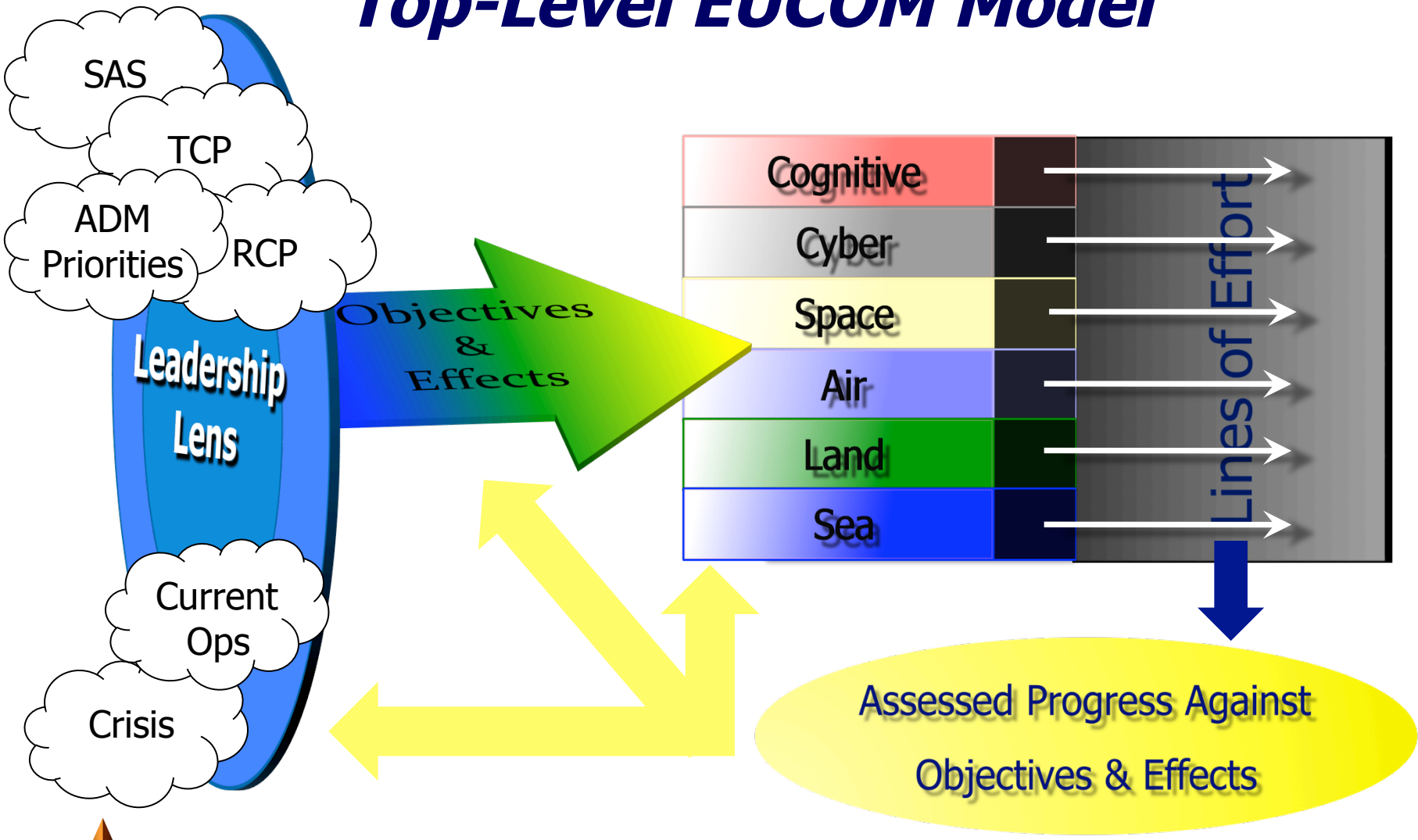
Advocate – tell our story

Persuade – change minds

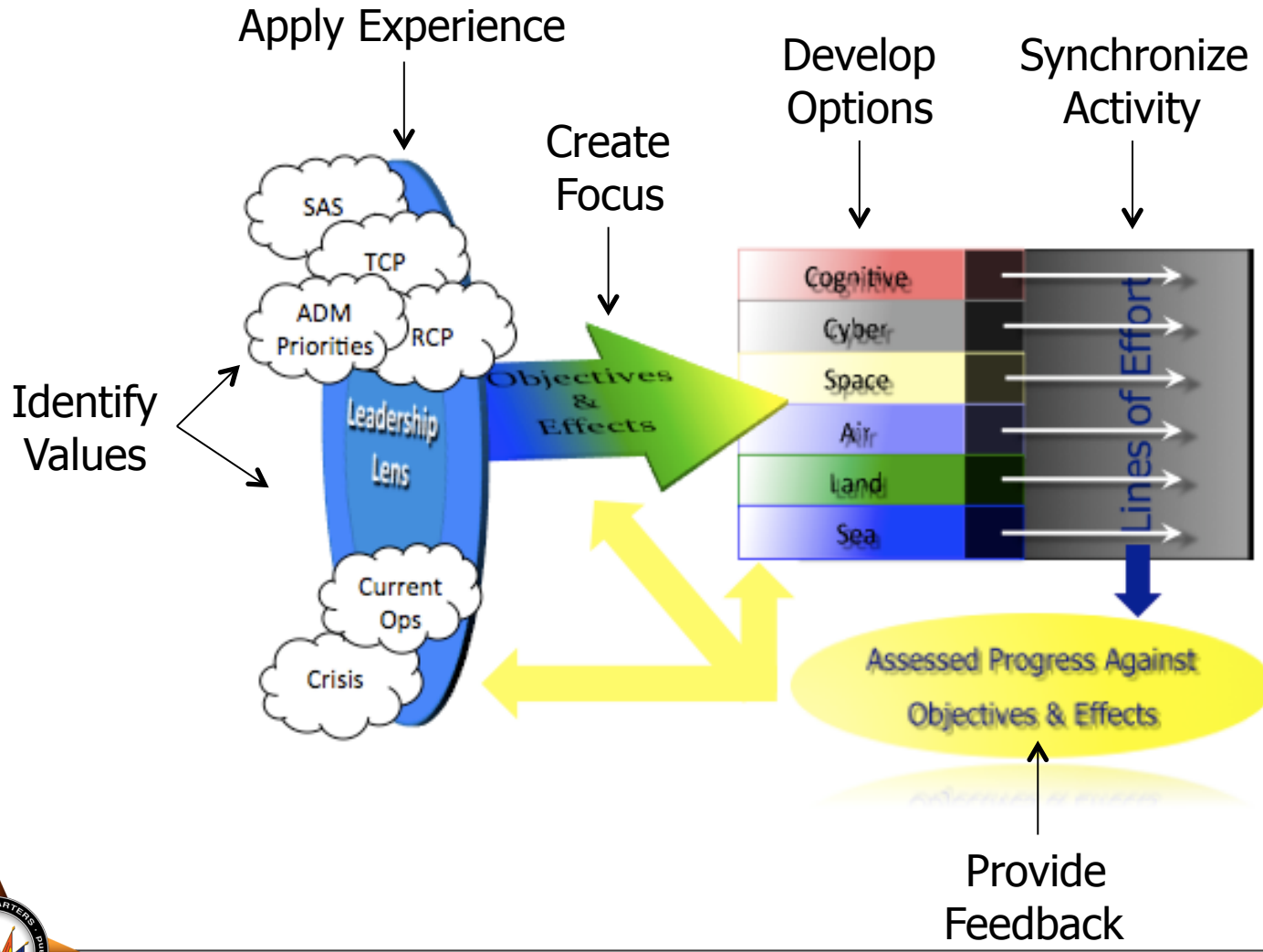
Compel – change actions



Top-Level EUCOM Model



Key Activities & Products



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Convergence between Theory & Practice

- Value-focused thinking works
  - Keep the discussion in "need" vice "solution" space
  - Generating the dialogue produces the insight – ask "why" at least three more times
- Drive the discussion to a common model
  - Unarticulated assumptions will kill you – get them out in the open
  - Words are too ambiguous – use pictures at a minimum
- Context, Context, Context!
  - You cannot have too much domain experience
  - Get perspectives from everyone in the enterprise

Divergence between Theory and Practice

- Most people don't think in the abstract very well
  - EA hurts most people's head – get concrete fast
  - Avoid the "process and organization" trap
- "Politics" has to be added to the model
  - Implementation in a bureaucracy may be the hardest thing you attempt in the entire process
  - Architect for stable intermediate forms based on what is politically achievable
- Getting time to "think" is next to impossible
  - Looks a lot like "doing'" nothing
  - The "urgent" displaces the "important"

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Conclusions

- Rigor counts – don't take shortcuts
- Never accept the first answer you get – keep digging
- A common model is essential – words are necessary but not sufficient – drive out ambiguity 24/7
- Context, Context, Context – must have domain savvy
- Generating stakeholder dialogue may be the most important thing you do through the entire effort
- Implementation is as hard as value identification
- Politics drives the design for stable intermediate forms of an enterprise architecture – account for it early

Helpful Hints

- Use someone else to take notes so you can just listen
- Use analogies to drag important concepts out of the stakeholder's framework and into a broader context
- Value identification takes time – don't attempt to get it all in one pass or a single interview
- There is no substitute for domain experience. Go get it before attempting an EA effort of any size.
- Expect conflict to result through the process and know how to deal with it so it doesn't derail the effort
- Get your boss's perspective early and often or you won't get the implementation right

Backup Slides

Enterprise Purpose Framework

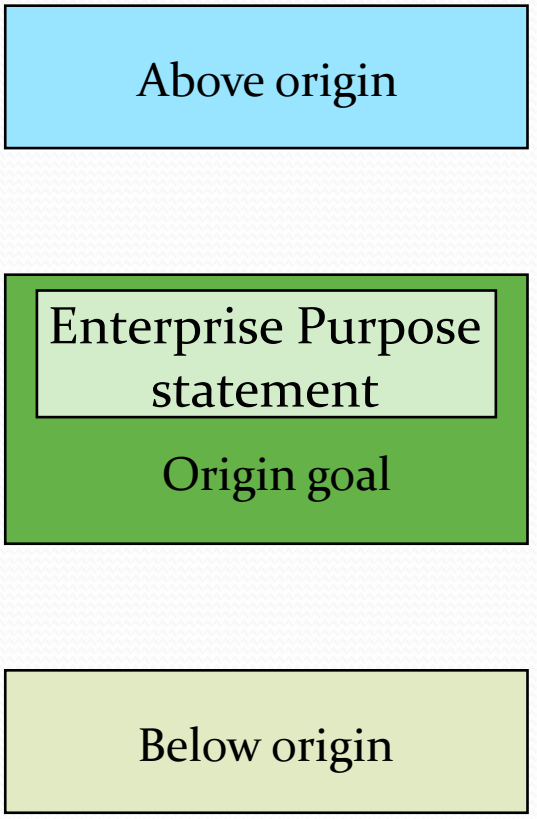
Layers above the "origin"

- The product/system success goal (the "origin") is just one part of the goal structure of the enterprise.
- Understanding (by the architect) how the origin goal combines with other enterprise goals is vital. You may have to reconstruct these to have them make sense.
- Layers above origin goal merge into enterprise strategy and other functional strategies.

System problem statement (SPS) within the "origin" goal

Layers below the origin

- These decompose the origin goal (usually the live or die goals [0.1] and other necessary goals [0.2])
- Usually meaningful decomposition of goals is not possible until high level concept (form and function) are defined

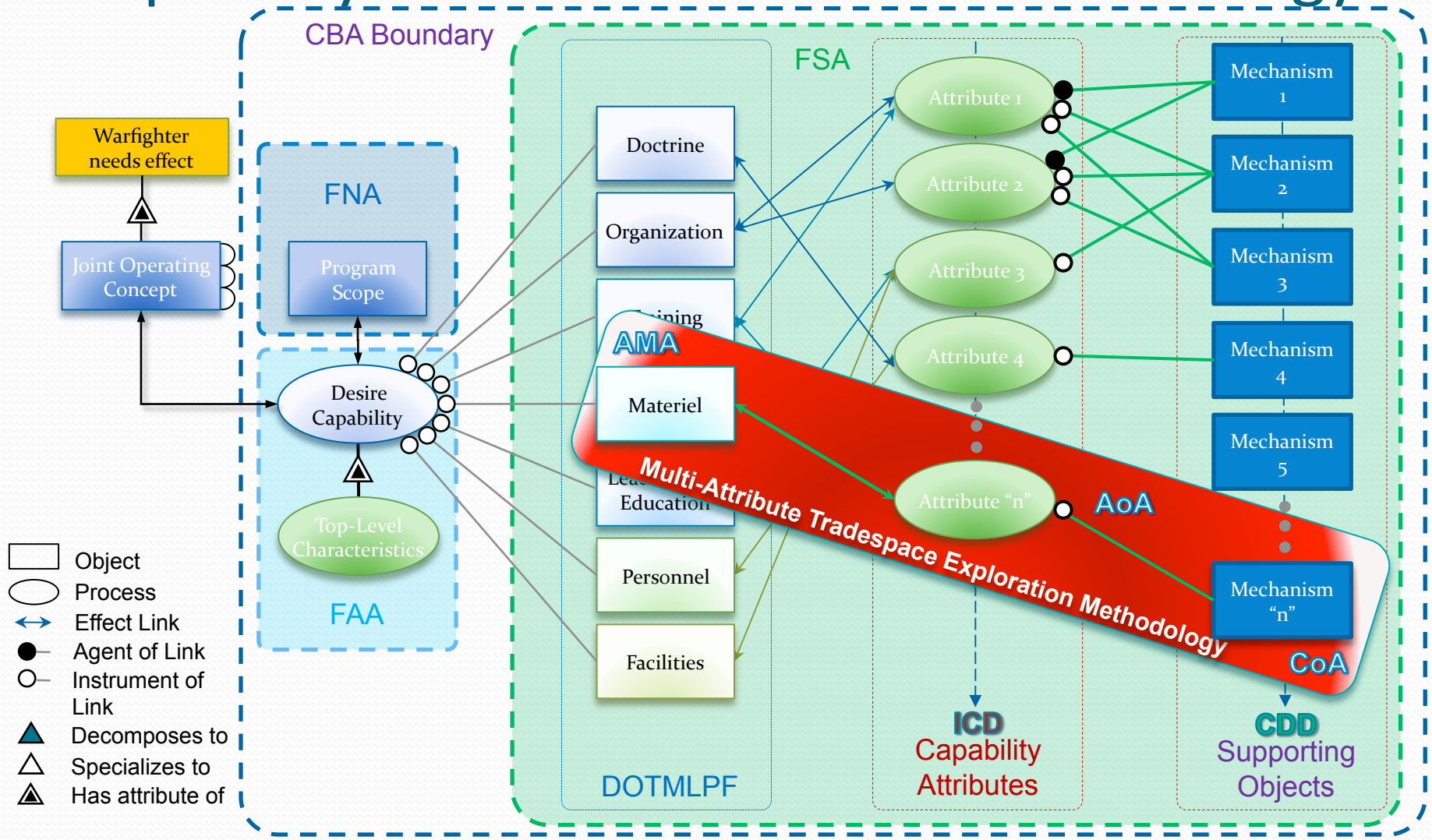


Source: Crawley

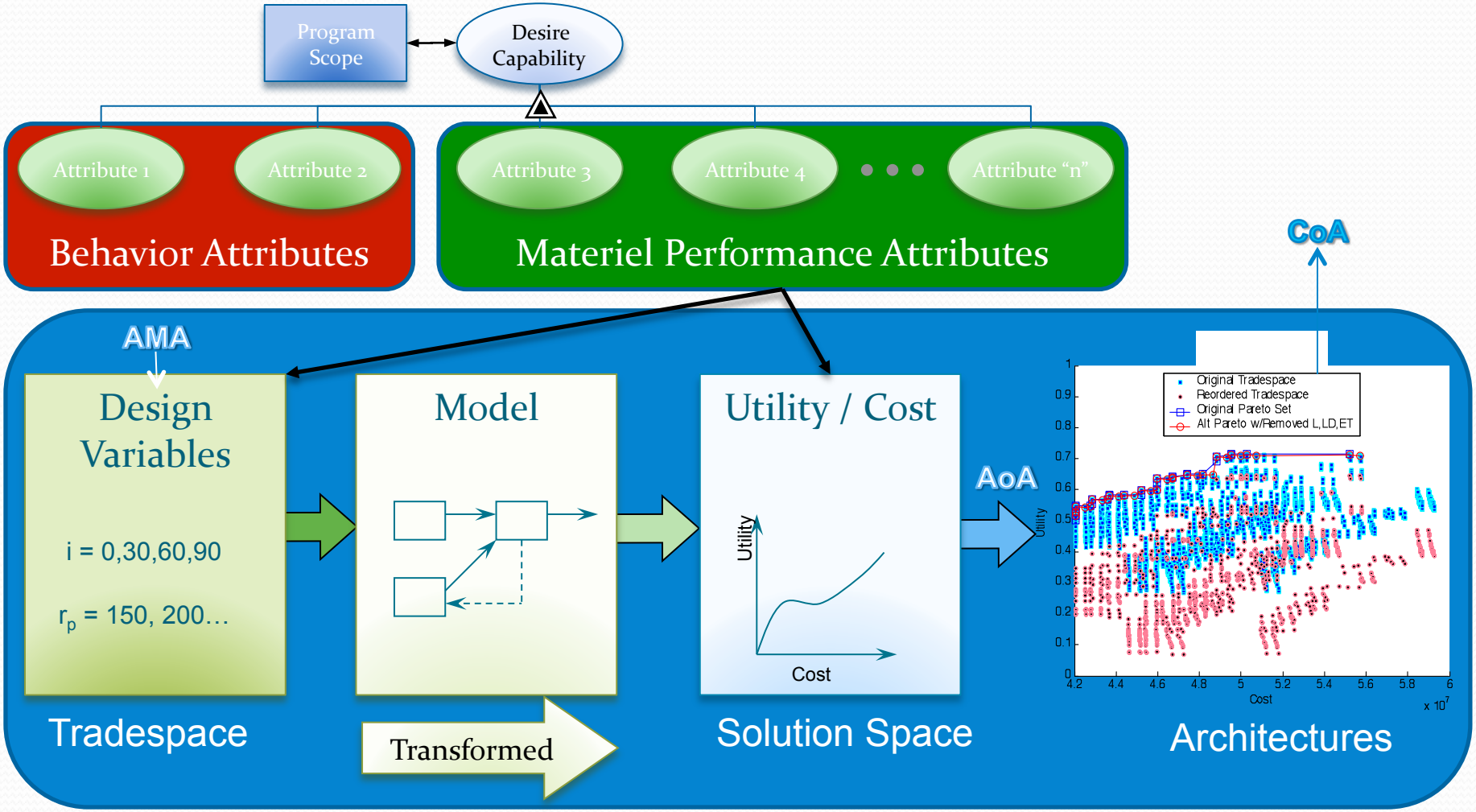
Concept Fragment Generation

- Assess each of the desired attributes through the lens of a particular framework perspective
- Brainstorm potential mechanisms for creating the desired attribute from that particular perspective
- Assess compatibility of individual concept fragments with leadership direction and compatibility with other concept fragments
- Cull out those fragments that are inconsistent with leadership direction
- Develop architectures off compatible concept fragments to populate the full tradespace

Capability-Based Assessment Methodology



MATE Methodology



Capability-Based Assessment Methodology