



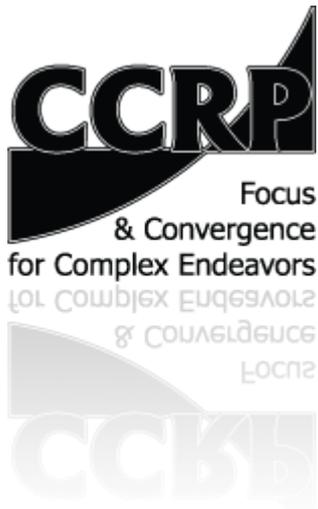
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Department of Defense
Office of the Assistant Secretary of Defense
Networks and Information Integration
DoD Chief Information Officer





The Agility Imperative: Agile C2 for Complex Endeavors

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Questions to be Addressed

- Why is it imperative that we develop a capability to be agile?
- What are the implications for Command and Control?
- Is there a future for traditional approaches to Command and Control?

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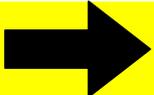
Roots of Unpredictability

The root causes of a lack of Predictability

- A lack of understanding
- Irreducible uncertainty
- A lack of information

Roots of Unpredictability

- A lack of Predictability can be a result of:
 - A lack of understanding
 - Irreducible uncertainty (stochastic properties)
 - A lack of information
- Complexity
 - Limits understanding
 - Increases uncertainty
 - Increases the need for information

Increased Complexity  ***Increased Unpredictability***

Sources of Mission Complexity

21st Century Missions are ***Complex Endeavors***

Complexity of the Task and Environment

+

Complexity of 'Self'

=

Complex Endeavor

Task and Environment

Humanitarian Assistance

Peace Keeping

Counter Terrorism

- The success of 21st Century Missions requires a multi-dimensional effects space
 - *political, social, economic, military*
- The complexity of the mission is a result of the interactions between and among the effects, particularly across dimensions, and the uncertainties associated with a cascading effects chain.

Disaster Relief

Stability Operations

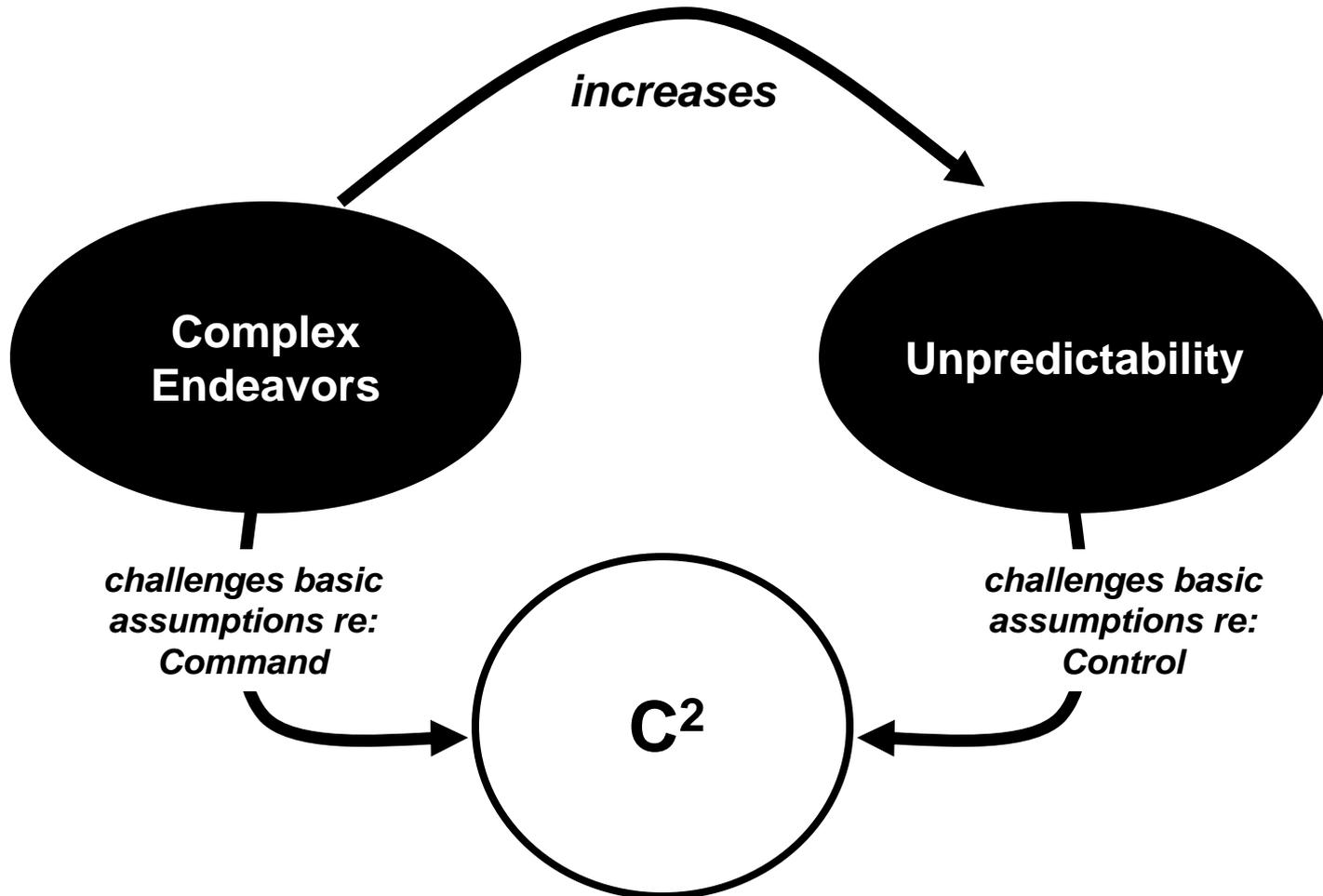
Complexity of Self

- Self = A large number of heterogeneous, independent entities that differ significantly with respect to:
 - Culture, values and norms;
 - Laws, policies, rules, and regulations;
 - Practices and processes;
 - Levels of trust;
 - Language;
 - Information and communications capabilities;
 - Approach to organization and management.
- The complexity of ‘Self’ comes from the nature of the interactions between and among the participating entities and the dynamics of the situation that affect entity willingness, constraints, perceptions, and capabilities.

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Implications for Command and Control



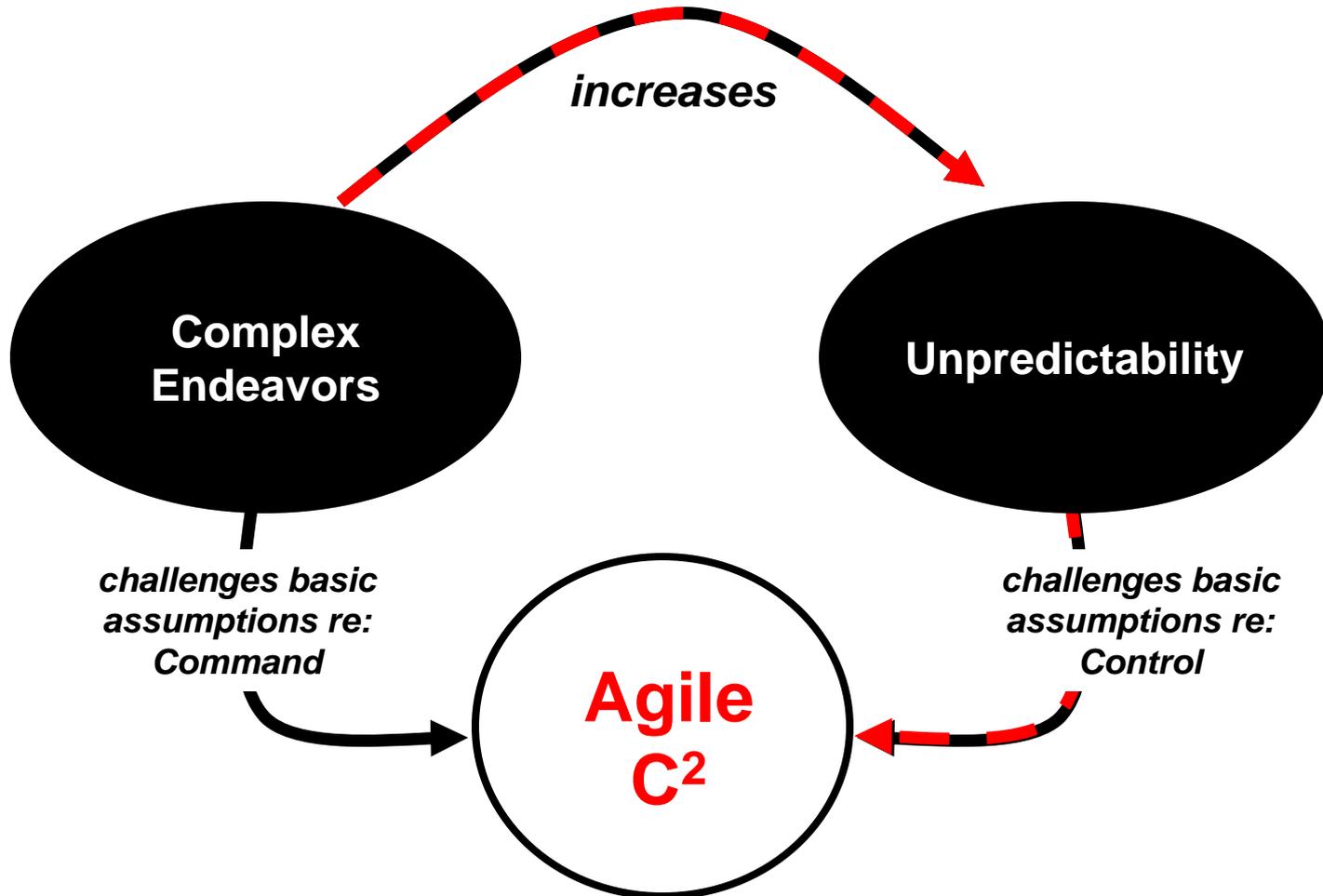
Challenges to Basic C2 Assumptions

Unpredictability

- Increased complexity will make the unexpected occur with greater frequency
- The effective lives of plans will be shorter – they may expire within the planning cycle
- Critical information and expertise necessary to understand the situation will not be readily available
- Traditional approaches to decision making under uncertainty will be less applicable

***The most appropriate response to increased complexity and the associated increases in uncertainty and risk is
Agility***

Implications for Command and Control



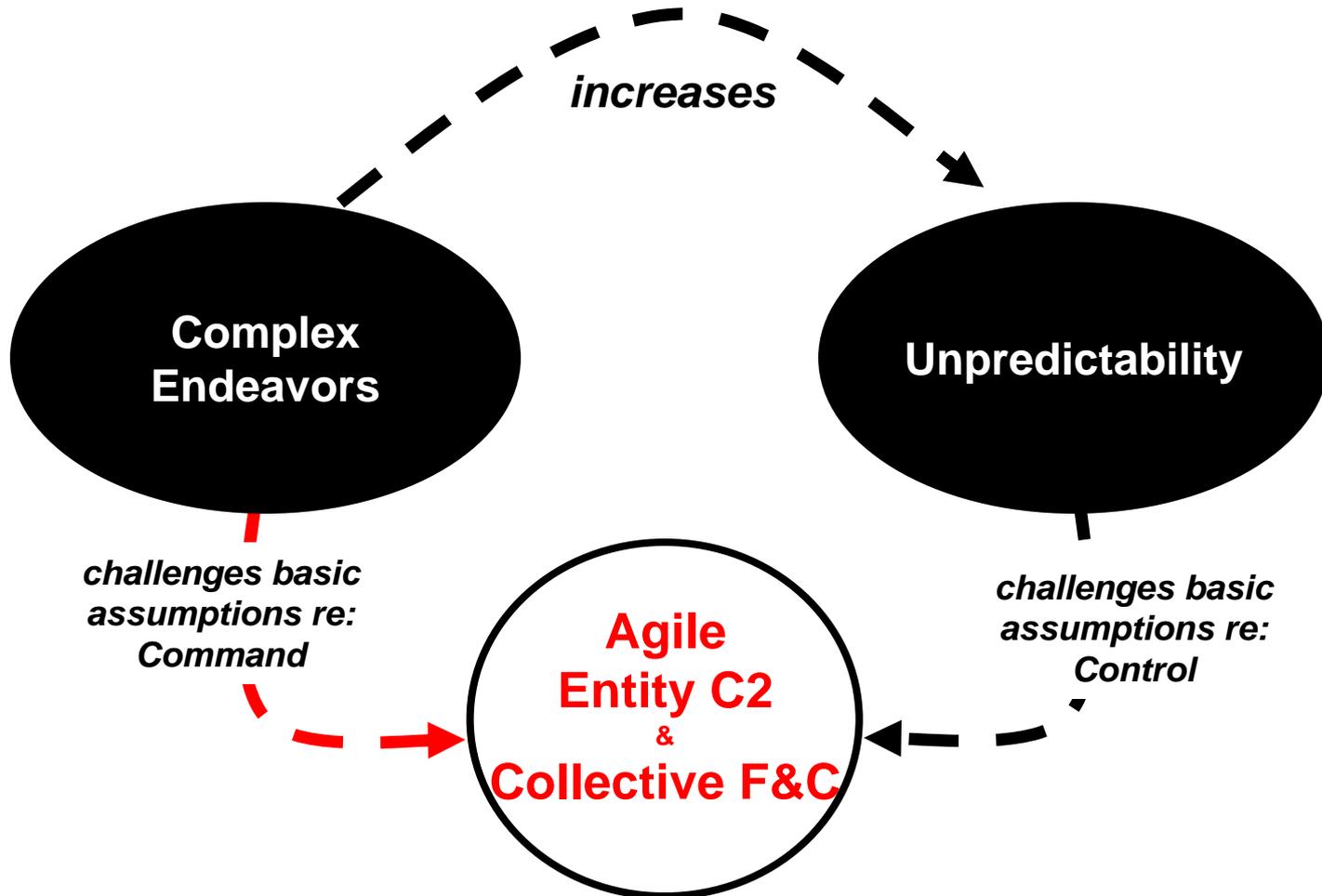
Challenges to Basic C2 Assumptions

Complex Endeavors

- There will not be a unified chain of command.
- Entities will each have their own intent.
- The situation will be, in part, unfamiliar to all entities.
- There will be multiple planning processes.
- Critical information and expertise necessary to understand the situation will be non-organic.
- Actions, to be effective, will require developing synergies between and among entity actions.

Complex Endeavors require new approaches to Entity C2 to achieve Collective Focus and Convergence

Implications for Command and Control



Questions to be Addressed

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Future of C2

- What is Agility?
- Rethinking C2

Essence of Agility:

Why do we need Agility

Success must be achieved / maintained in light of

- Dynamic environment
- Complexity and chaotic environment
- Unknown futures
- Unpredictable states
- Rapidly changing situations
- New, diverse circumstances
- Unexpected events
- Unfamiliar situations
- Changing tasks, purposes
- Loss, Damage, Threats

Success = effectiveness, efficiency, survivability

Essences of Agility: What Needs to be Agile

The concept of agility can be applied to

- People
- C2 Approaches
- Organizations
- Processes
- Systems
- Architectures
- Policy
- Doctrine
- Tactics
- Acquisition

Agility

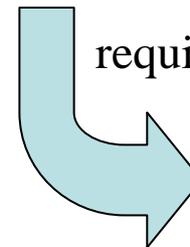
*Agility is the ability to **successfully** cope with **changes** in the environment (system)*



- e.g.,
- degradation / loss of capability
 - change in objectives
 - change in coalition (self)
 -



- maintain acceptable level of
- performance,
 - effectiveness,
 - efficiency



requires

- Timely recognition
- Appropriate response
- Timely response

Essence of Agility: Mechanisms

Being agile includes the employment of one or more of the following inter-related mechanisms

- Adaptability
- Flexibility
- Responsiveness
- Survivability
- Resilience
- Robustness
- Requisite variety
- Innovation
- Learning
- Fault Tolerance
- Re-configurability
- Re-engineering

Essence of Agility: Measuring Agility

- Agility is not completely observable
 - Agility (or a lack of) can be observed only after the fact (manifest)
 - Agility is potential (a capability) until it is manifest
- Thus, measures of Agility must be able to measure both potential and manifest Agility
- Indicants of Agility are also of interest
 - Indicants measure the properties of an entity that are related to more or less agility
 - Indicants may be easier to observe / measure

Essence of Agility: Requisite Agility

- Agility is not an unlimited good
- Improving Agility involves costs
- The amount of Agility required is a function of the situation

Future of C2

- What is Agility?
- Rethinking C2

Future of C2

- What is Agility?
- Rethinking C2

and thinking about Focus and Convergence

Rethinking C2 / Thinking about F&C

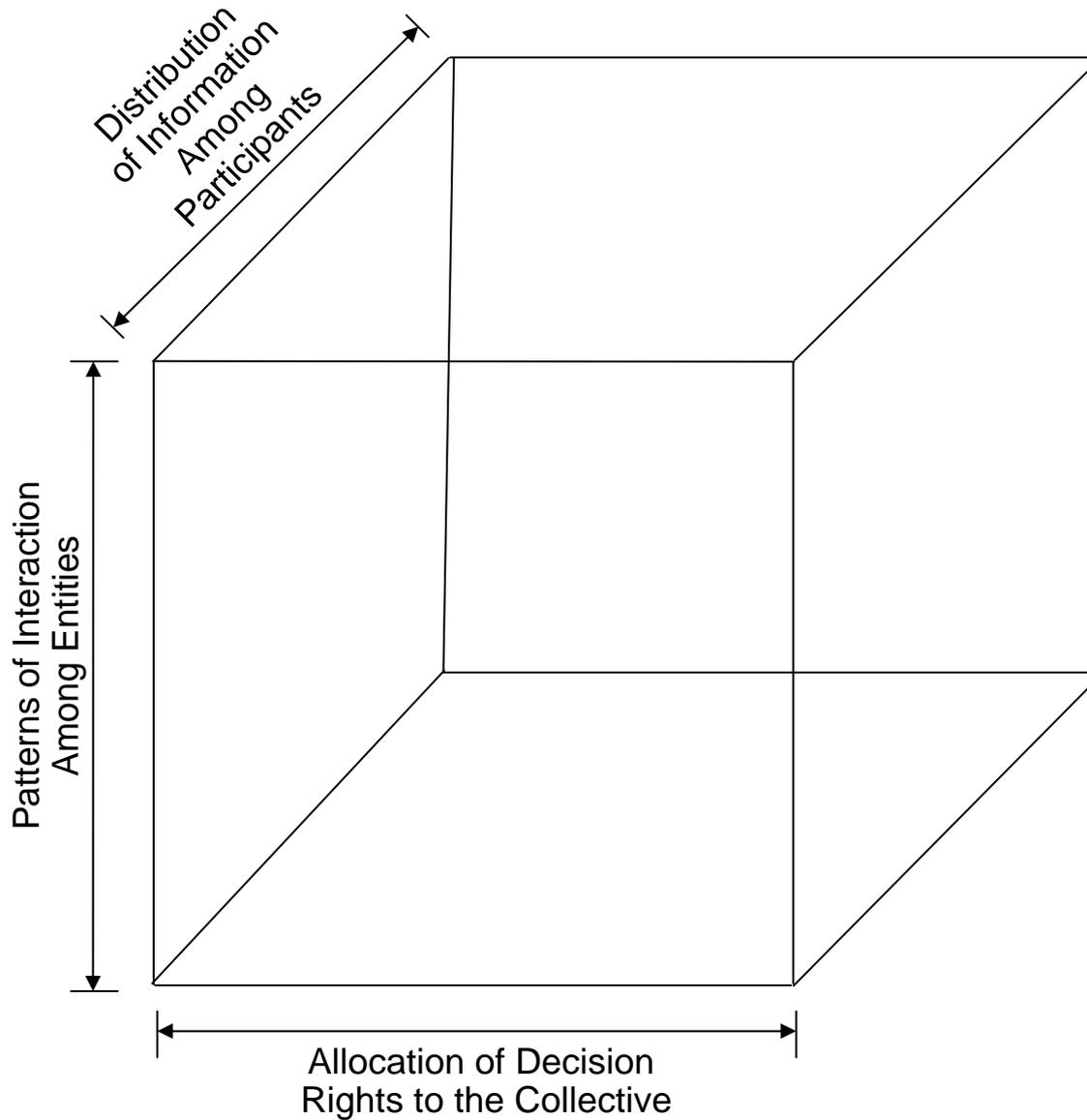
The Mission Space and the Approach Space

- Virtually all endeavors will be complex
- Situations will be dynamic
- The more complex and dynamic the situation, the greater demands on accomplishing the functions associated with C2

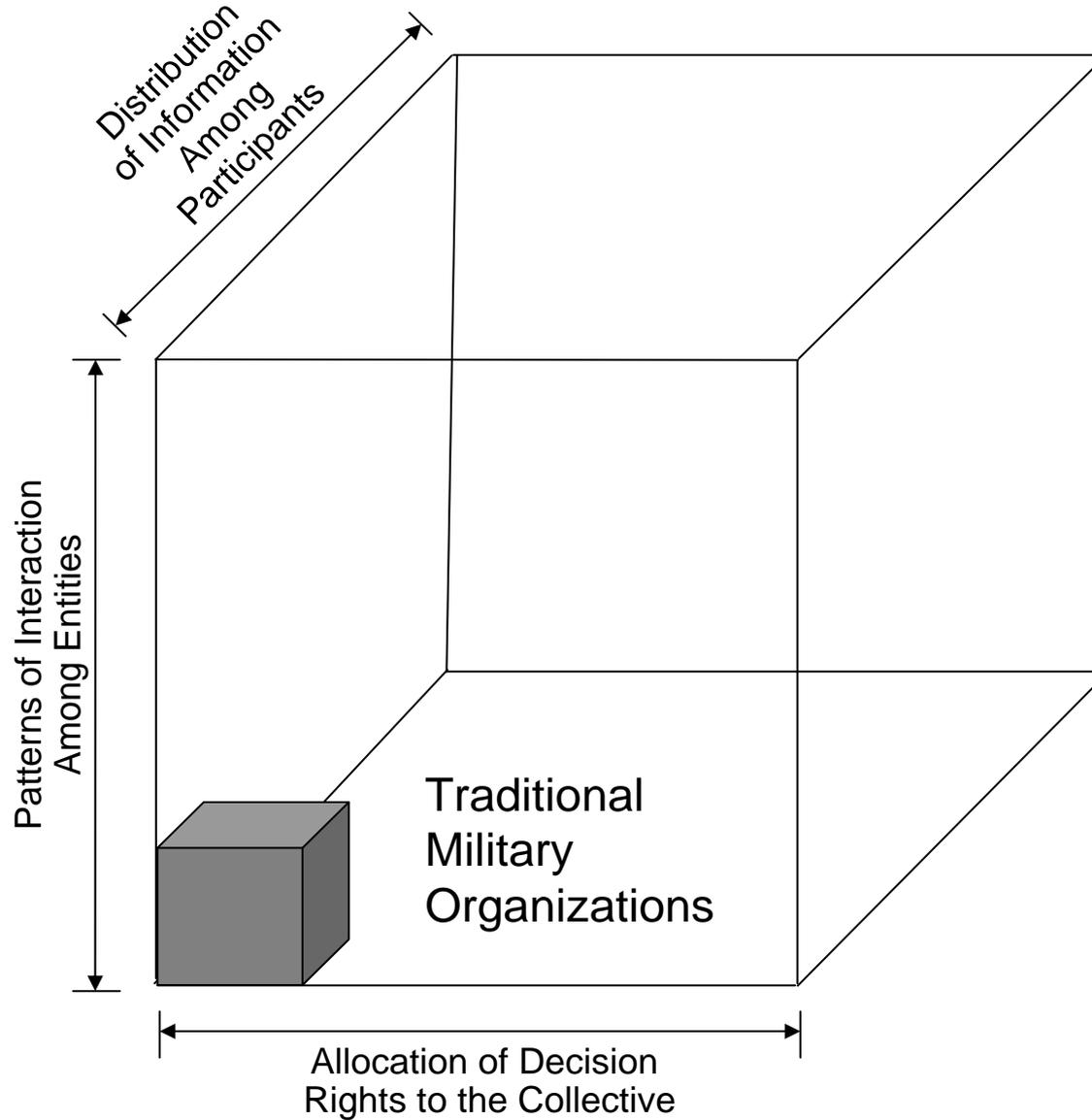
New, Agile Approaches to entity C2 and Collective F&C

- There are *many ways* to accomplish the functions associated with Command and Control
- No one approach fits all missions, situations, or endeavors
- The most appropriate approach will be a function of the endeavor
- Entities may need to be able to utilize more than one approach to C2
- The Collective needs to be able to adopt an appropriate approach to F&C
- The approach needs to change with changing circumstances

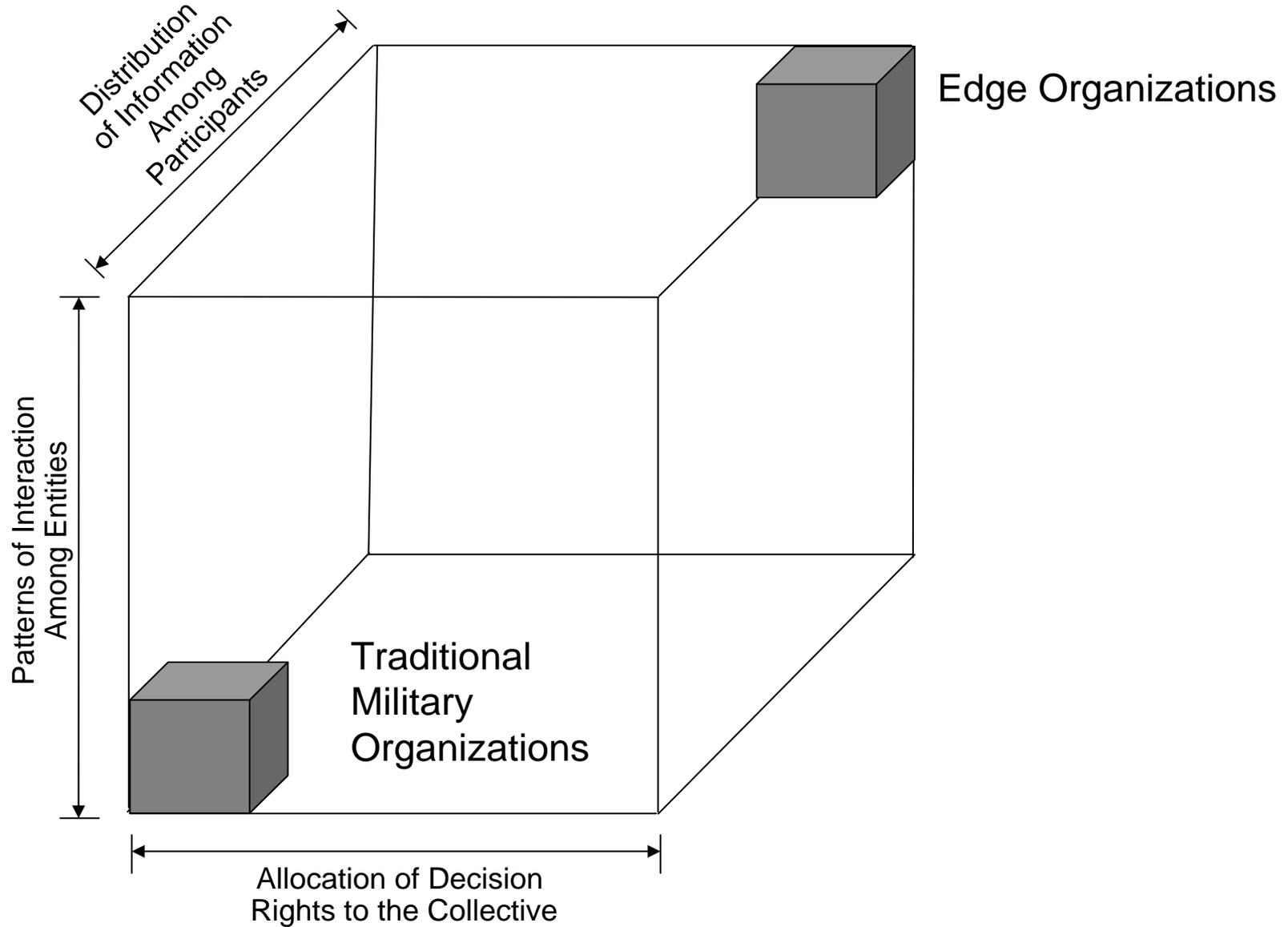
Approach Space



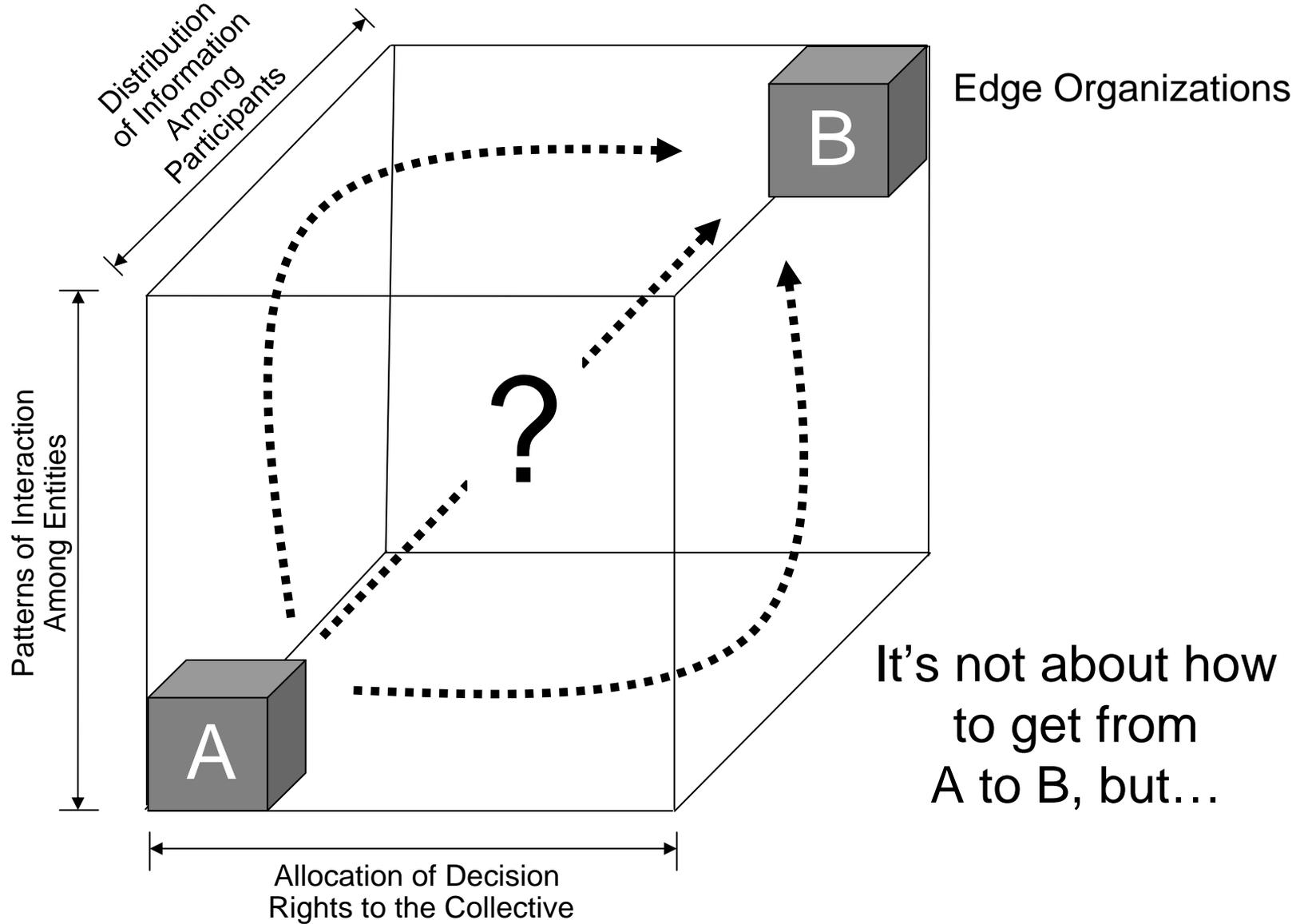
Approach Space



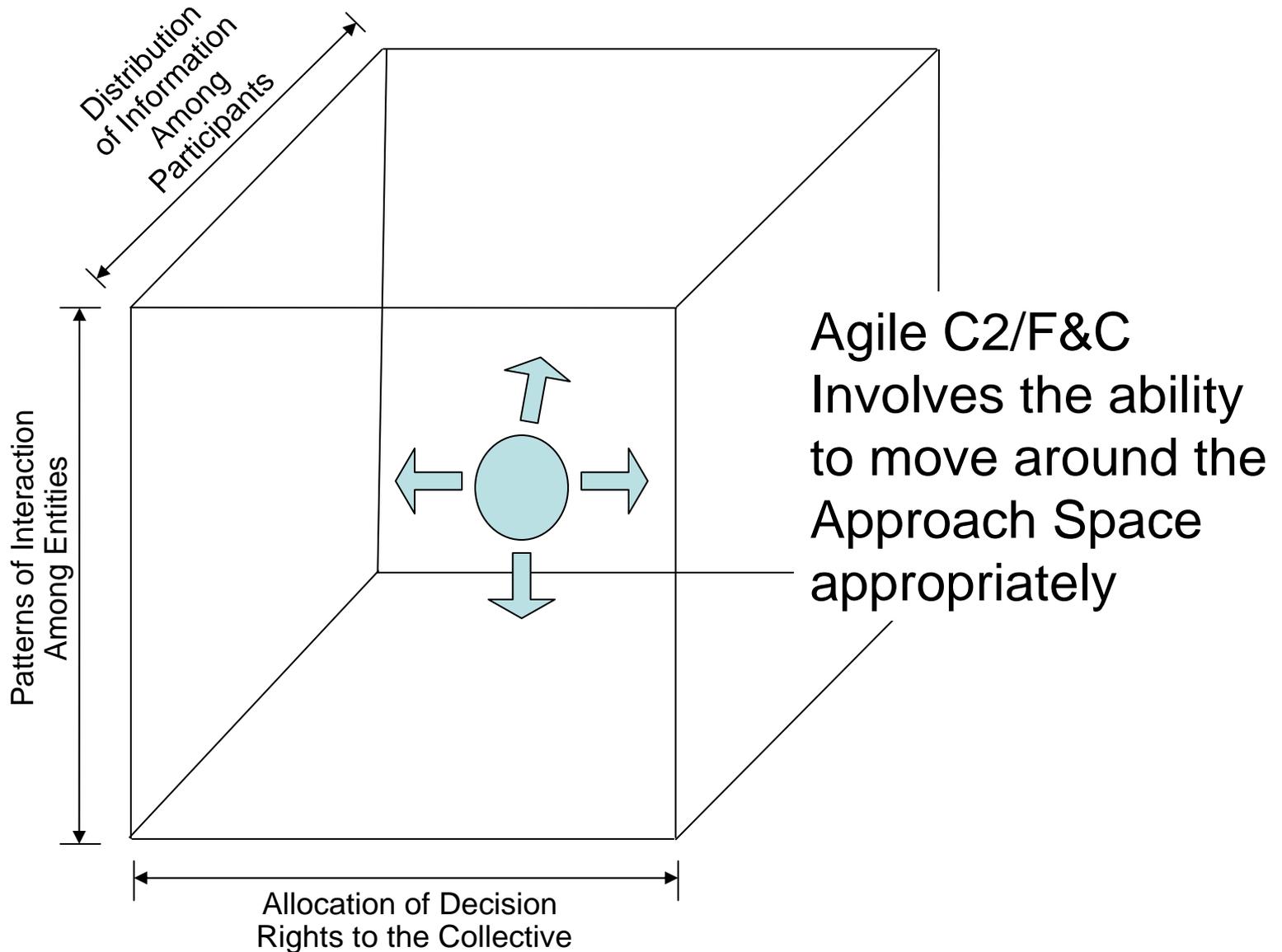
Approach Space



A False Choice

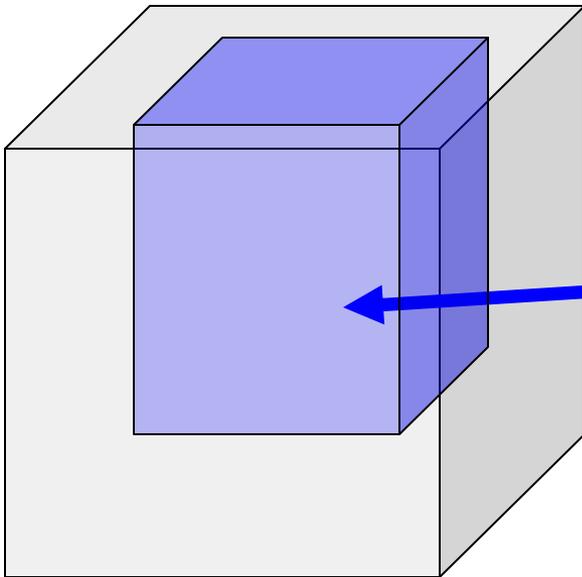


Agility

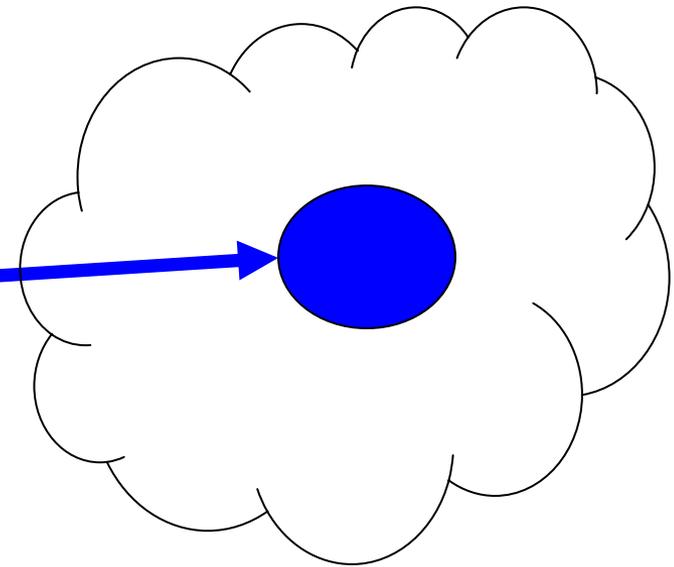


The Real Choices

Approach to
Focus and Convergence



Endeavor Space



What is the appropriate level of Maturity?

Agile C2 / F&C

- C2/F&C Agility is the ability to maintain effectiveness as a function of changing circumstances and stresses
- Agility is an umbrella concept that includes:
 - Responsiveness
 - Flexibility
 - Robustness
 - Innovation
 - Resilience
 - Adaptability
- Being able to recognize and transition to the appropriate approach is an essential capability, but only one of the ways that we can make C2 / F&C more agile
- NEC C2 is inherently more Agile than traditional approaches