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# Achieving Agile C2 by Adopting Higher Levels of C2 Maturity

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# Conceptual Foundation

- **C2 Approach Space**

Understanding Command and Control (Alberts and Hayes, 2006)



- **C2 Maturity Levels**

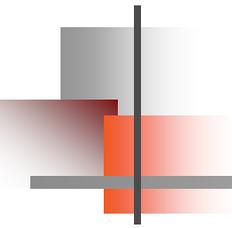
NATO NEC C2 Maturity Model (SAS-065, 2010)



- **Agile C2**

The Agility Advantage (Alberts, 2011)

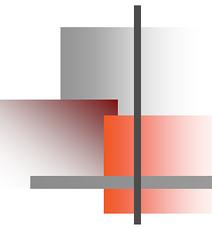




## C2 Agility

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**C2 Agility** is the ability to successfully effect, cope with and/or exploit changes in circumstances facing the command and control / management for **complex endeavors** in an uncertain operational environment (Alberts, 2011). C2 Agility is a critical component of **operational agility**.



# Operational Agility

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**Operational Agility** is an indispensable capability of an organization (entity or collective) for prevailing in an uncertain and dynamic operational environment. It involves a synergistic combination of six attributes of an organization (Alberts and Hayes, 2003):

Responsiveness

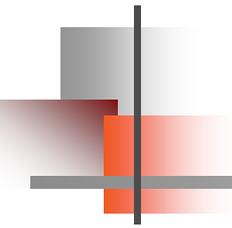
Resilience

Versatility

Innovativeness

Flexibility

Adaptability



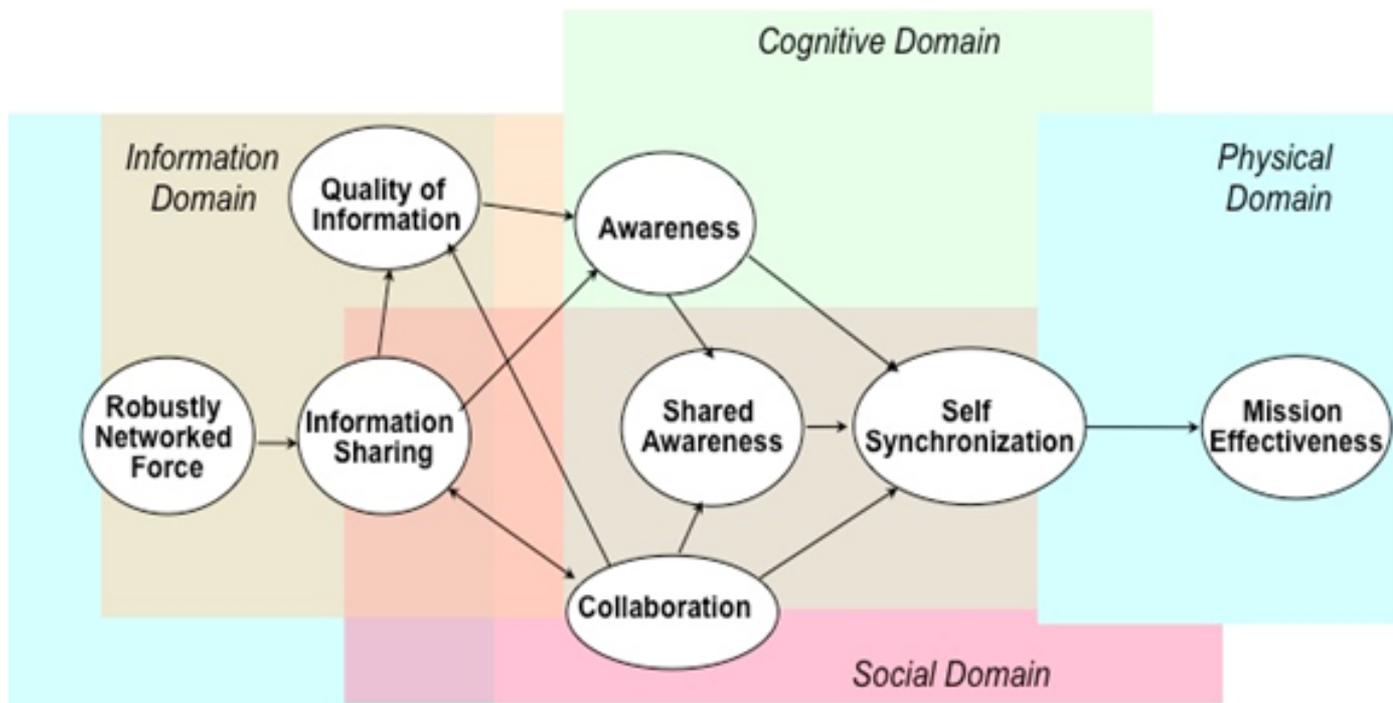
# Complex Endeavors

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**Complex Endeavors** involve complex missions that require complex enterprises that are characterized by a set of diverse (military and non-military) entities that are connected, or networked, and thus principally capable of collectively generating coherent effects and improving mission effectiveness through leveraging connectedness.

# Basic Mechanism: Network-Centric Operations Value Chain

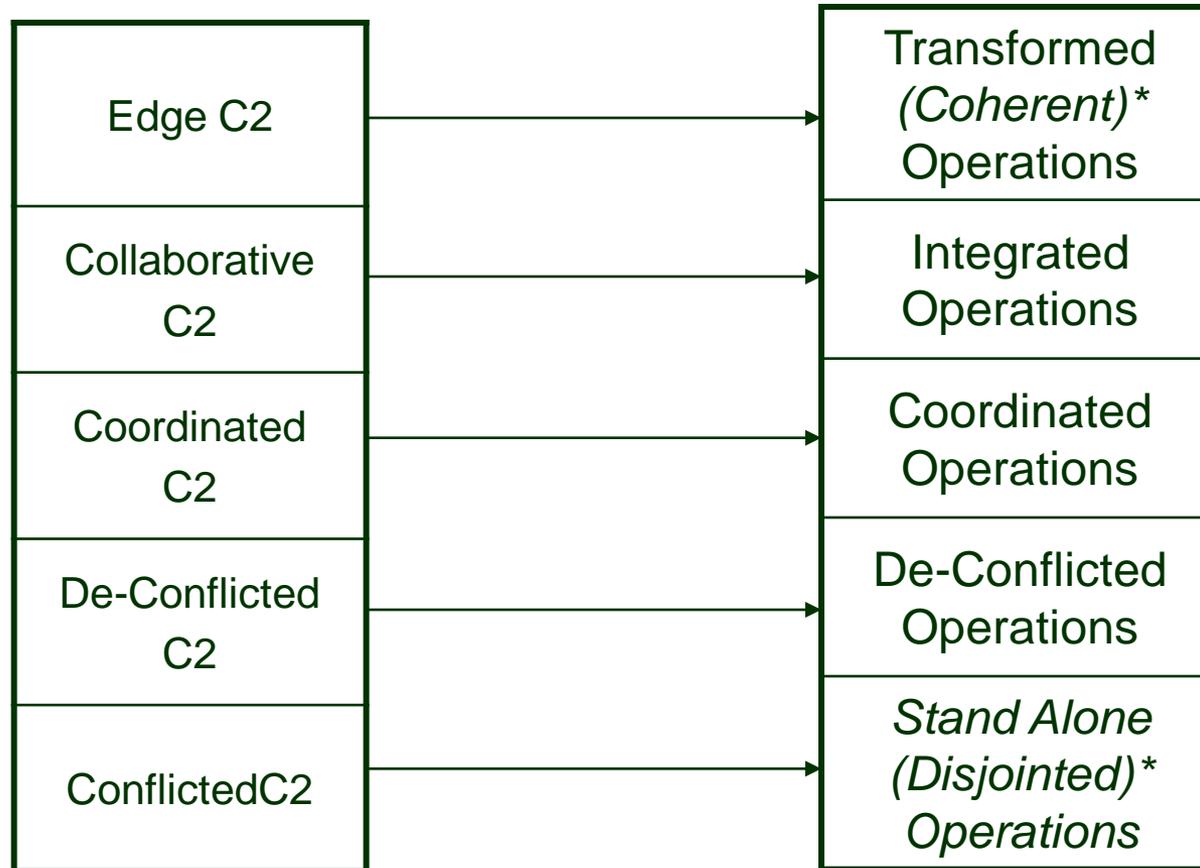
## Domains of Interest in Network Centric Operations



# C2 Approach → NNEC Maturity

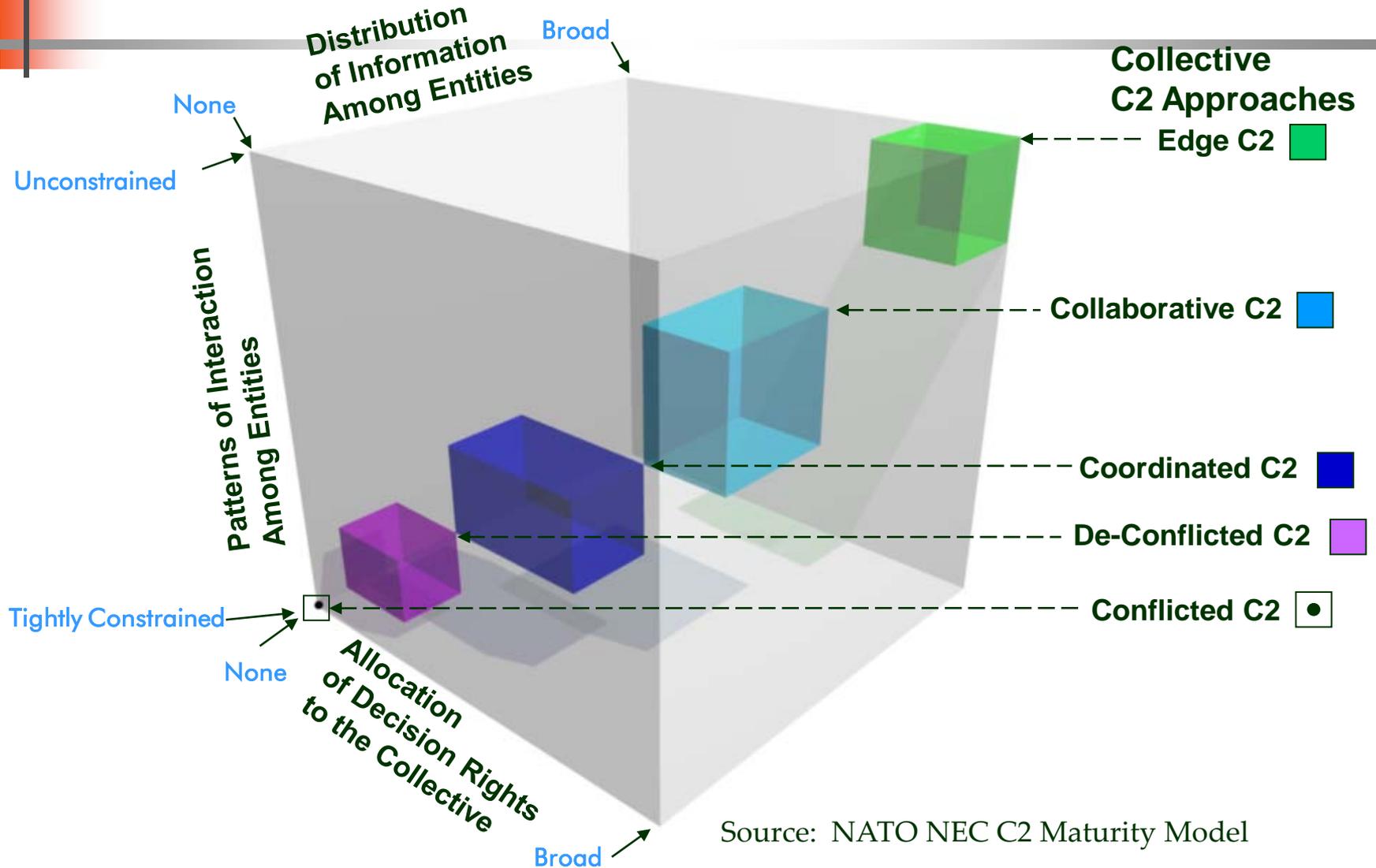
## C2 Approaches

## NNEC Capability Levels



★ The NNEC Feasibility Study used the terms *Coherent* and *Disjointed* rather than *Transformed* and *Stand Alone*

# C2 Approach Space

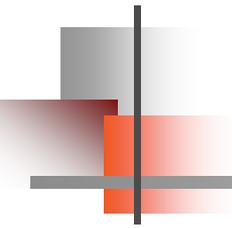


Source: NATO NEC C2 Maturity Model

# C2 Approaches and C2 Approach Dimensions

(context is a collection of civil-military entities)

C2 Approach	Allocation of Decision Rights <i>to the Collective</i>	Patterns of Interaction Among Participating Entities	Distribution of Information (Entity Information Positions)
<b>Edge C2</b>	Not Explicit, Self-Allocated (Emergent, Tailored, and Dynamic)	Unlimited As Required	All Available and Relevant Information Accessible
<b>Collaborative C2</b>	Collaborative Process and Shared Plan	Significant Broad	Additional Information Across Collaborative Areas/Functions
<b>Coordinated C2</b>	Coordination Process and Linked Plans	Limited and Focused	Additional Information About Coordinated Areas/Functions
<b>De-Conflicted C2</b>	Establish Constraints	Very Limited Sharply Focused	Additional Information About Constraints and Seams
<b>Conflicted C2</b>	None	None	Organic Information



## Principal Hypotheses underlying C2 Maturity Model

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- Increased connectedness enables more network-enabled C2 approaches;
- The most network-enabled C2 approach is not necessarily the appropriate (efficient) approach in the situation at hand;
- As complex endeavors and dynamic mission environments are typically characterized by frequent situational changes, entities / collectives need to be capable of transiting between C2 approaches;
- C2 Maturity characterizes an entity's capability to
  - recognize the situation-dependent appropriateness of different C2 approaches and
  - to transition between different C2 approaches;
- An entity's degree of C2 Maturity (C2 capability level ) is constrained by the type of C2 approaches it may be able to implement (toolbox analogy);

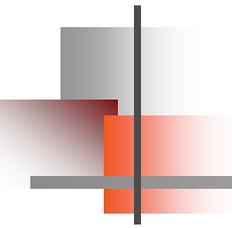
## C2 Maturity levels and C2 Agility



C2 Capability Levels	Contents of C2 Toolkit	C2 Approach Decision Requirement	Transition Requirements
Level 5	Edge C2 Collaborative C2 Coordinated C2 De-Conflicted C2	Emergent	
Level 4	Collaborative C2 Coordinated C2 De-Conflicted C2	Recognize 3 situations and match to appropriate C2 approach	
Level 3	Coordinated C2 De-Conflicted C2	Recognize 2 situations and match to appropriate C2 approach	
Level 2	De-Conflicted C2	N/A	None
Level 1	Conflicted C2	N/A	None

## Conclusions: C2 Maturity → C2 Agility

- There are many ways to accomplish the functions associated with Command and Control
- No one approach to accomplishing the functions associated with command and control fits all missions or situations whether for a single entity or a collection of independent entities (a collective)
- The most appropriate approach will be a function of the endeavor and the prevailing circumstances
- Therefore, Entities (and Collectives) will need to be able to employ more than one approach
- C2 Agility is the ability to appropriately move around in the C2 Approach Space in response to changing missions and circumstances
- Agile C2 systems and processes are required for C2 Agility and to make specific approaches to C2 more agile



# Validation Studies

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- **Methodology:** Inductive process for theory building: iterating model development and case study analyses;
- **Types of case studies (17)**
  - Combat and Exercises (Stryker Brigades, UK Wise Wargames)
  - Peace Operations (NATO ops in Bosnia and Kosovo)
  - Simple Disaster Responses (to earthquakes and floods)
  - Complex Disaster Responses (**Tsunami 2004**, Katrina 2005)
- **Comparative Template - Factors**
  - Variables defining collective C2 approaches
  - Characteristic patterns of interaction
  - Measures of C2 effectiveness
  - Measures of endeavor Effectiveness

# Indian Ocean Tsunami 2004

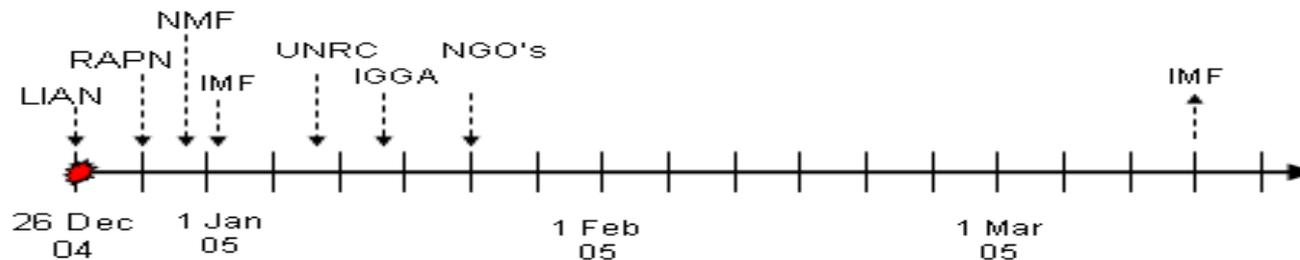


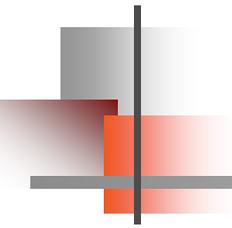
# Response to Tsunami 2004 in Aceh

## Response Clusters in Aceh:

- Local individuals and organizations and Local NGOs (LIAN)
- Regional and provincial Agencies and local NGOs (RAPN)
- National military forces (NMF)
- International military forces (IMF)
- UN and Red Cross/Crescent (UNRC)
- International government and government agencies (IGGA)
- International non-government organizations (NGO)

## ■ Arrival in Aceh



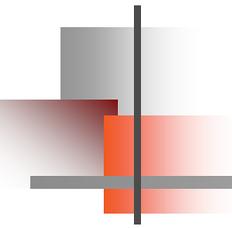


# Indian Ocean Tsunami 2004 (Aceh, Thai Med)

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## Collective C2 Approach

- **1st Phase (Search and Rescue)**
  - Self-organized locals (Aceh) S&R teams: **Collaborative**
  - Indonesian Military: **Coordinated**
  - Thai Medical Organization: **Coordinated - Collaborative - Edge**
- **2<sup>nd</sup> Phase (Relief)**
  - International NGO: **Conflicted – De-Conflicted**
  - Military: **Coordinated – Collaborative**
- **Reconstruction**
  - Nat. Gov., IO, NGO: **De-Conflicted – Coordinated**



## Katrina 2005

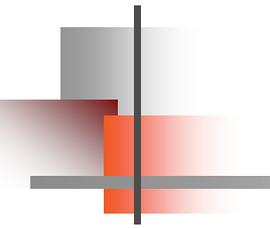
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### Approach and Resources

- US National Response Plan (NRP) implies a *pull* response philosophy: Local authorities -> State resources -> Federal resources;
- State resources (AL, LA, MS): Emergency Ops Centers, National Guards
- Fed. Resources: NWS, DHS (JFO), FEMA (regional HQs), active duty forces

### Collective C2 Approach

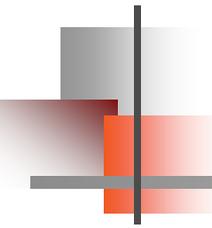
- Prior to landfall: **De-conflicted / Coordinated**
- During landfall: **Conflicted**
- After landfall: **De-conflicted -> Coordinated -> Collaborative**  
(emerging for Law Enforcement)



## Summary of Evidence from Validation Case Studies

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- The more complex and dynamic the mission and situation, the more network-enabled the C2 Approach must be to succeed.
- Entities that had higher levels of C2 Maturity were able to adopt a more appropriate C2 Approach than entities that had lower levels of C2 Maturity.
- The more mature an entity's C2 capability, the more able it was to manifest agile behaviors: C2 Maturity and C2 Agility go hand in hand.
- In order to adopt Edge C2 in response to a rapidly changing context, an organization must be able to quickly form task clusters of small teams "hardened" by professional competence and thus capable to self-synchronize (Thai medical organization's response to Tsunami) .
- The connectivity and performance of supporting systems can constrain the adoption of more network-enabled C2 Approaches and hence lower the effective C2 maturity of entities. As a result, their agility will be compromised.



## Operationalizing C2 Agility

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- Operationalizing Agility involves moving Agile C2 from a theory to military practice.
- The NATO NEC C2 Maturity Model (N2C2M2) provides a conceptual framework to guide efforts aimed at empirically ascertaining the C2 Maturity and C2 Agility manifested by an entity or collective in a particular set of circumstances.
- The N2C2M2 permits to associate a degree of C2 Maturity or C2 Agility to simulated results (experiments, field trials) and observations in ongoing operations and, thus, to undertake a variety of C2-related analyses and assessments.
- These assessments are necessary to ascertain the effectiveness and efficiency of proposed ways to improve C2 Maturity and Agility