Effects-Based Operations…

The Way Ahead

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Boeing

Outline

1. **Three why's and a what**
2. **Operations in the Cognitive Domain and Beyond**
3. **Complexity**
4. **Implications for Network Centric Operations**
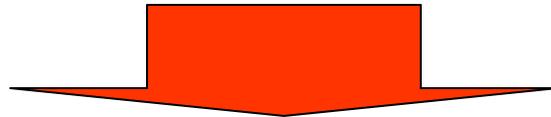5. **Conclusion: Onward to Second Generation Network Centric Operations**

1. Three Why's and a What

Why #1: The Challenge of Asymmetric Niche Competitors

Symmetric, _State-to-State_ Conflict

Opponents have similar means and will

Great Means

vs.

Great Means

Great Will

Great Will

Attrition-based Warfare:
Wearing Down the Physical Capacity for War

Asymmetric Niche Competition

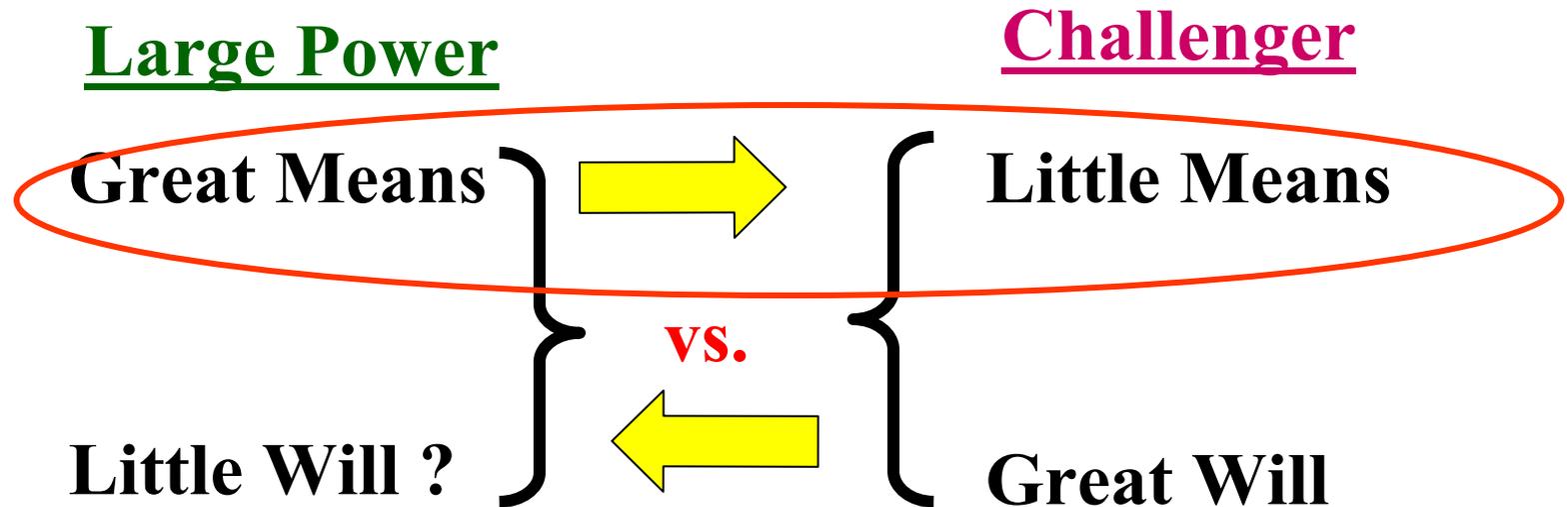*Opponents have unequal means and will*

Large Power   **Challenger**

Great Means   Little Means

vs.

Little Will ?   Great Will

Asymmetric Niche Competition

Opponents have unequal means and will

Large Power   **Challenger**

Great Means ⟩ ⟶ ⟨ Little Means

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Little Will ? ⟵ **Great Will**
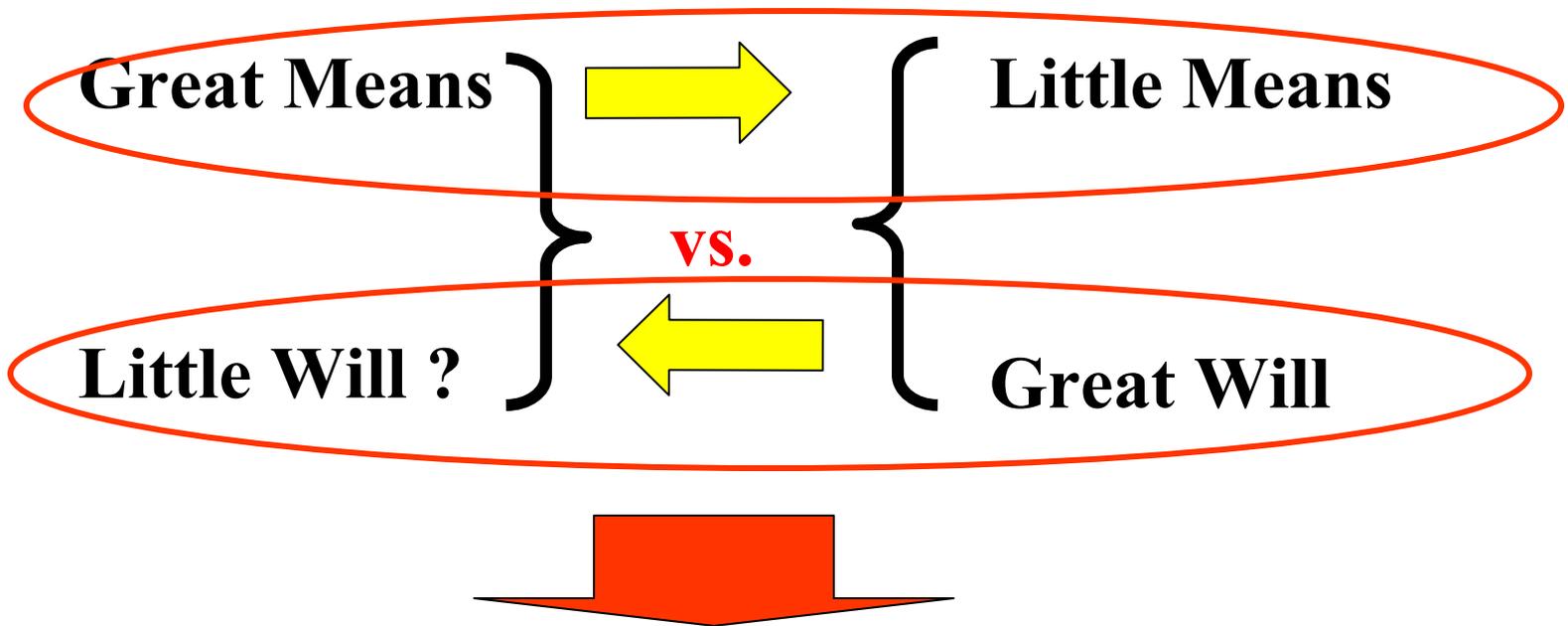
Two Different Asymmetries
Two Different Approaches

Why #2 : Spectrum of Military Operations

Major Combat

Peace   **Crisis**   **War**   **Peace**
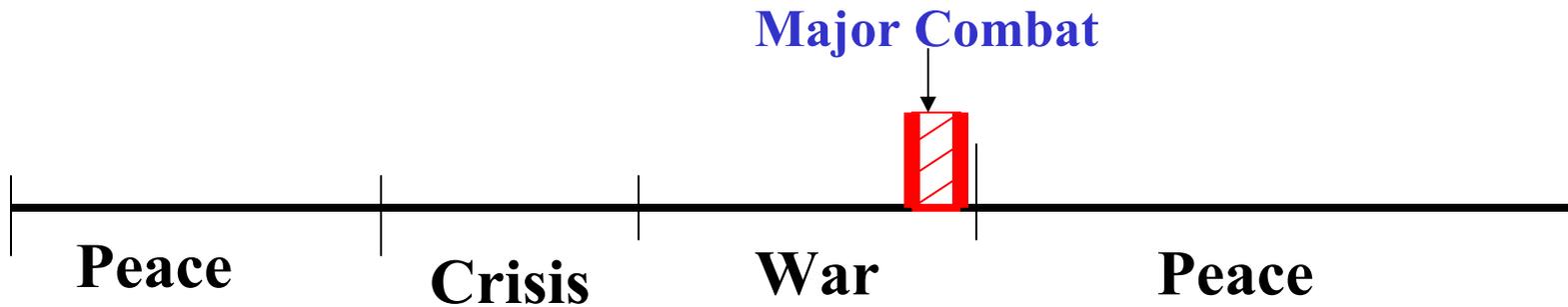
Why #2: Spectrum of Military Operations
New Security Environment

Major Combat

Peace

Crisis Response

Post-Conflict

Peace

Hostilities
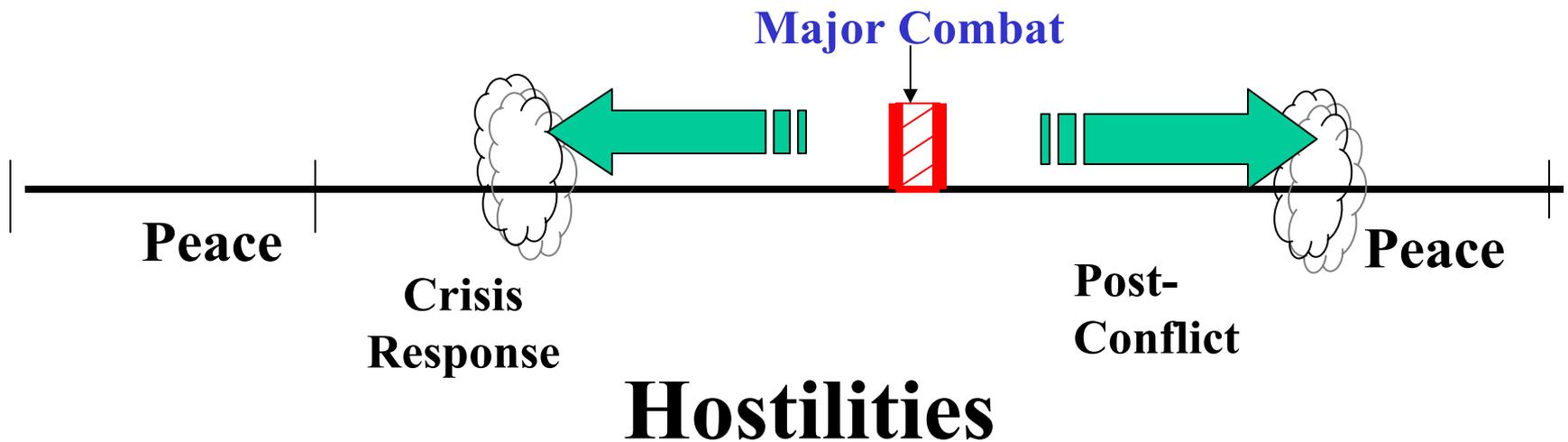
- *Increasing human dimension*
- *Increasing complexity*
- *Increasing "whole of nation" effort*

Why #3: "Real" World Operations

- **Industrial Age: Physical Attrition**
  - **Right targets, weapons, numbers, time, but…**
  - **Enemy adapts:**
    - **Non-uniformed combatants**
    - **Mixed with civilians**
  - **Engagements**

- **Information Age: Psychological Attrition**
  - **Right actions, right timing, right effects**
  - **Complex situation**
    - **No civil-military separation, human shields**
    - **Multiple audiences**
    - **Foe seeking media "effect"**
  - **Interaction on-going**
    - **No beginning or end**
    - **Peace, crisis, war, post war, peace continuum**

The What

Effects-Based Operations:
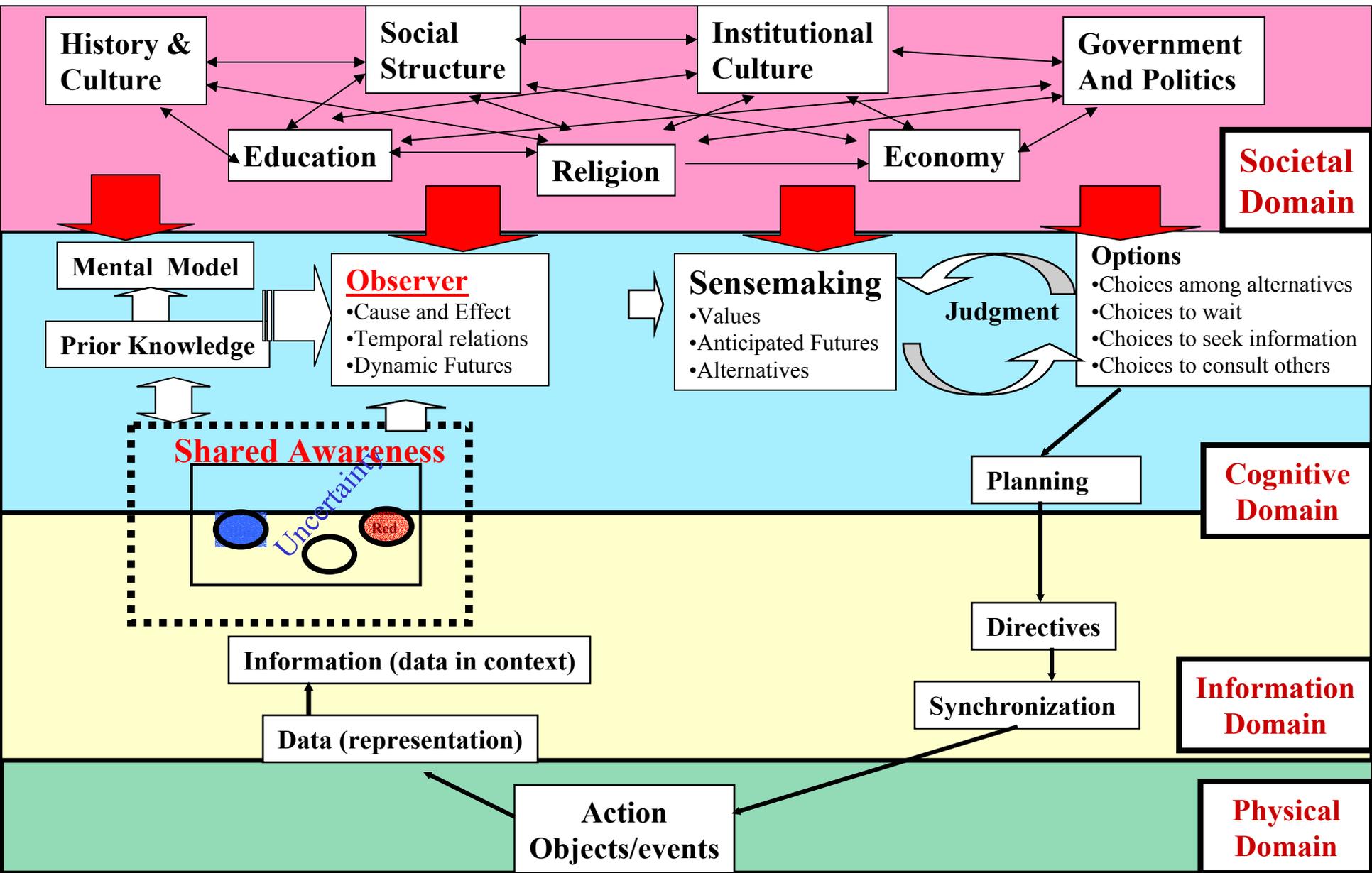
Coordinated sets of actions

directed at shaping the

<u>behavior</u>

of friends, foes, and neutrals

in peace, crisis, and war

2. Operations in the Cognitive Domain

Decision processes {

Mental Model / **Prior Knowledge**

→ **Deep understanding of situation**
- Cause and Effect
- Temporal relations
- Dynamic Futures

→ **Sensemaking**
- Values
- Anticipated Futures
- Alternatives

Judgment

Decisions
- Choices among alternatives including contingent choices
- Choices to wait
- Choices to seek information
- Choices to consult others

Cognitive Domain

Shared Awareness

Blue   Red

Uncertainty

White

Planning
- Missions
- Assets
- Boundaries
- Schedules
- Contingencies

Information (data in context)

Directives
- Requests for support
- Queries
- Reports
- Efforts to consult

Information Domain

Data (representation)

Synchronization

Action Objects/events

Physical Domain

…and Beyond - *The Societal Domain*

History & Culture

Social Structure

Institutional Culture

Government And Politics

Education

Religion

Economy

Societal Domain

Mental Model

Prior Knowledge

Observer
- Cause and Effect
- Temporal relations
- Dynamic Futures

Sensemaking
- Values
- Anticipated Futures
- Alternatives

Judgment

Options
- Choices among alternatives
- Choices to wait
- Choices to seek information
- Choices to consult others

Shared Awareness

Uncertainty

Red

Planning

Cognitive Domain

Information (data in context)

Directives

Data (representation)

Synchronization

Information Domain

Action Objects/events

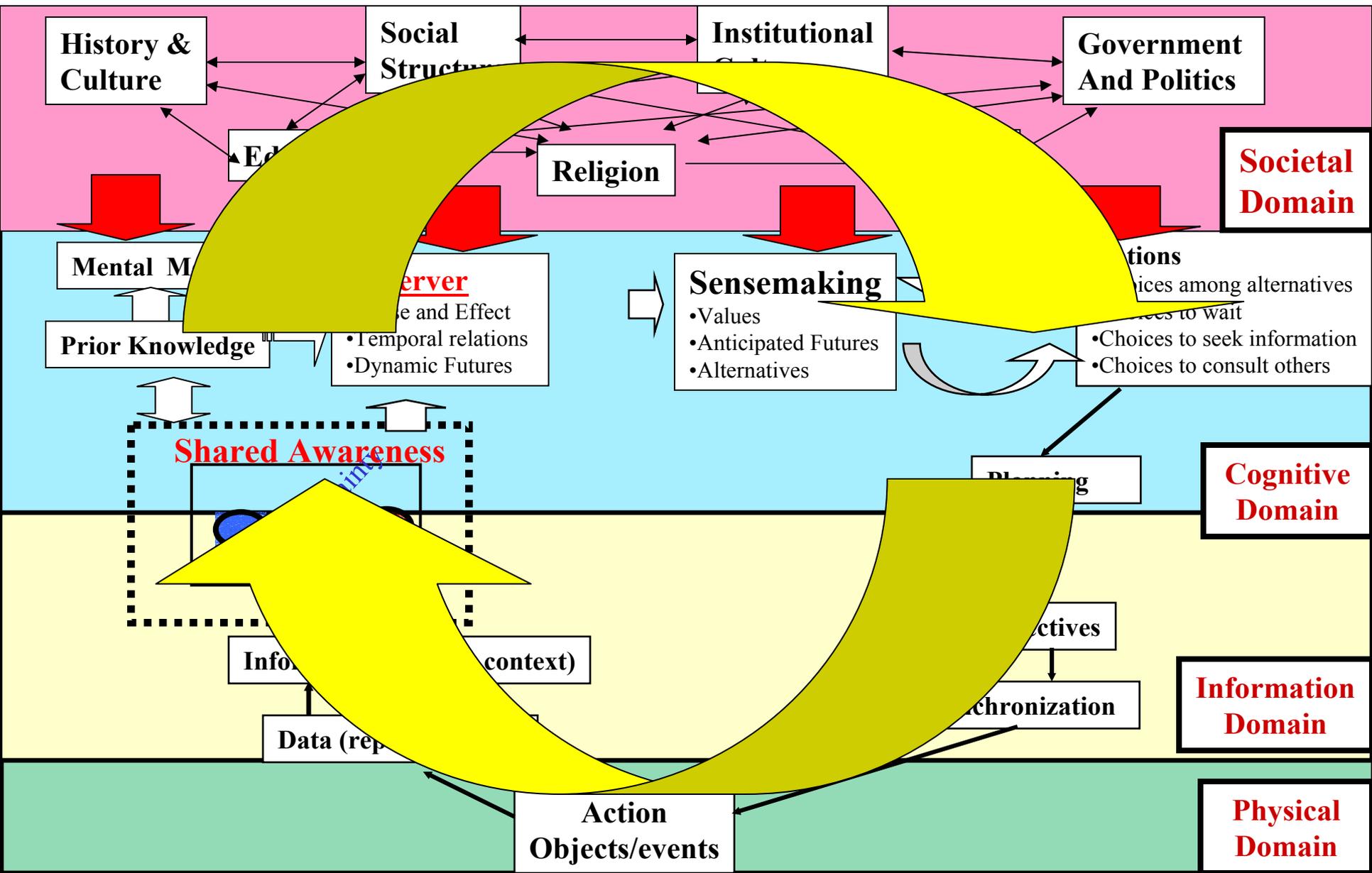**Physical Domain**

Rules of the Game

- *Actions* create effects … on any observer who can see them
- Effects occur simultaneously...
  - ...on four different levels of military operations and
  - ...in political, diplomatic, economic and military arenas
- Effects are cumulative and interrelated
- Effects are physical and psychological

Continuing Action Reaction Cycles

History & Culture

Social Structure

Institutional Culture

Government And Politics

Societal Domain

Education

Religion

Mental Models

Prior Knowledge

Observer
• Cause and Effect
• Temporal relations
• Dynamic Futures

Sensemaking
• Values
• Anticipated Futures
• Alternatives

ions
• Choices among alternatives
• Choices to wait
• Choices to seek information
• Choices to consult others

Cognitive Domain

Shared Awareness

Planning

Information (context)

ctives

chronization

Information Domain

Data (rep...

Action Objects/events

Physical Domain

3. Complexity

- **The Complicated**
  - Known or knowable cause and effect chain
  - Inputs/outputs proportional; whole equals sum of parts
- **The Complex**
  - Multiple interdependent variables
  - Changing cause and effect chain
  - Inputs and outputs not proportional; whole does not equal sum of the parts
- **The Complex Adaptive**
  - Not only complex but evolves independently
- **…and The System of Complex Adaptive Systems**
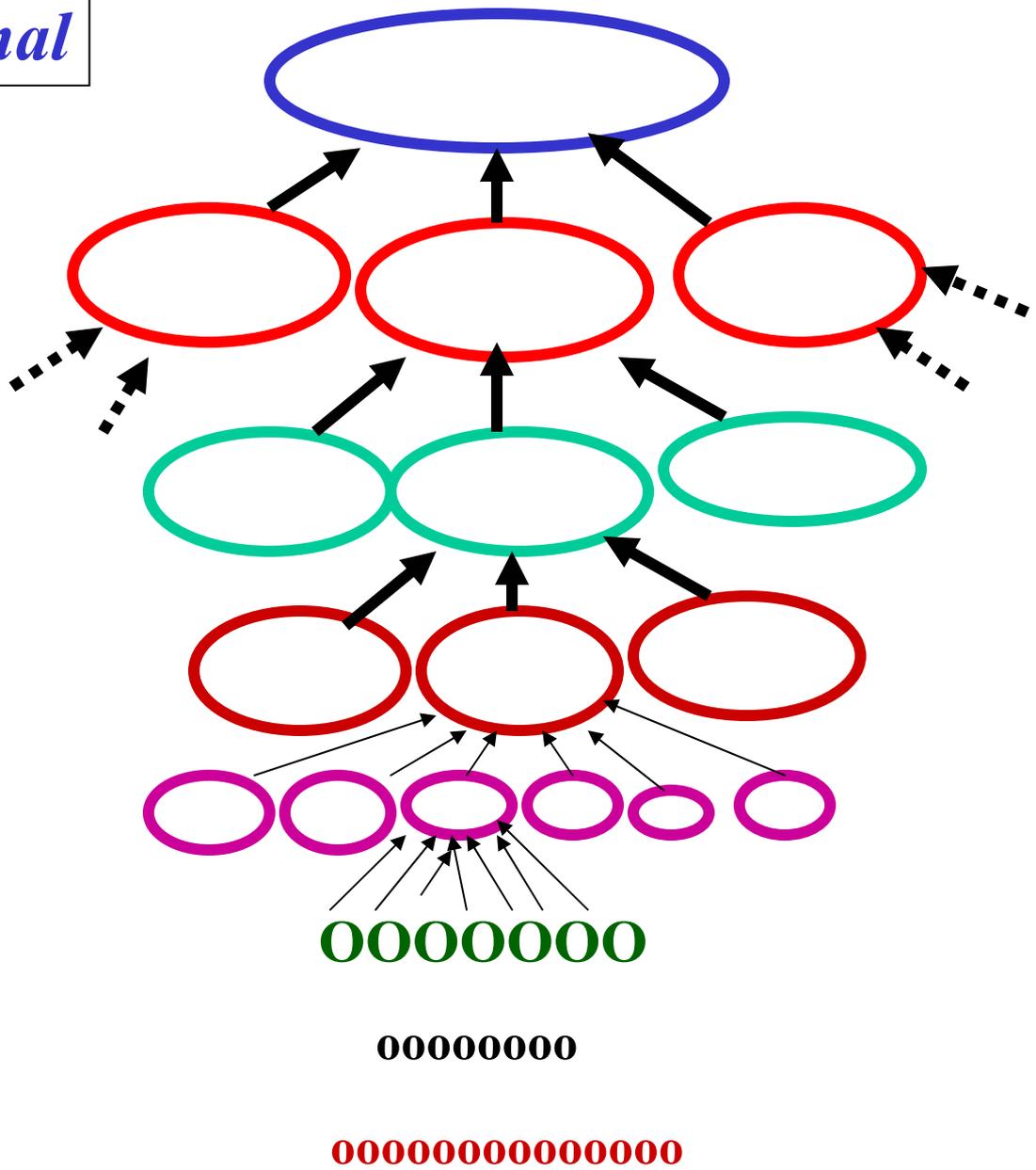
Supranational

Societal

Community

Organization

Group

Organism

OOOOOOO

Organ

oooooooo

Cell

ooooooooooooo

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James Grier Miller, *Living Systems*

International

State

Military

Operational Command

Tactical Unit

Warfighter

Al Qaeda

Regional Franchise

Local Network

Terrorist Cell

Terrorist
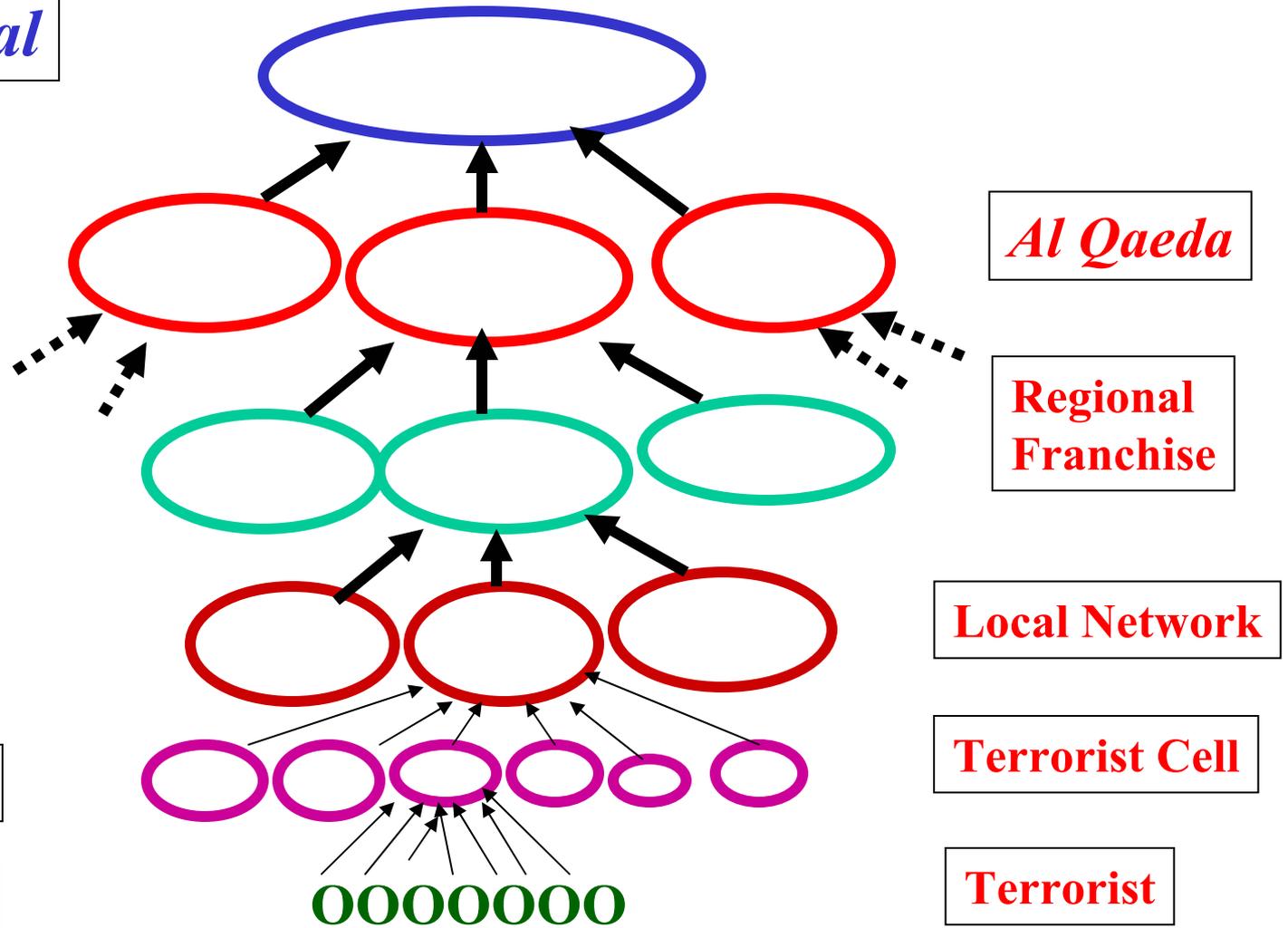
State versus Non-State Actor

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International

Geo-Strategic

Military-Strategic

Operational

Tactical

Individual

OOOOOOO

Military Operations

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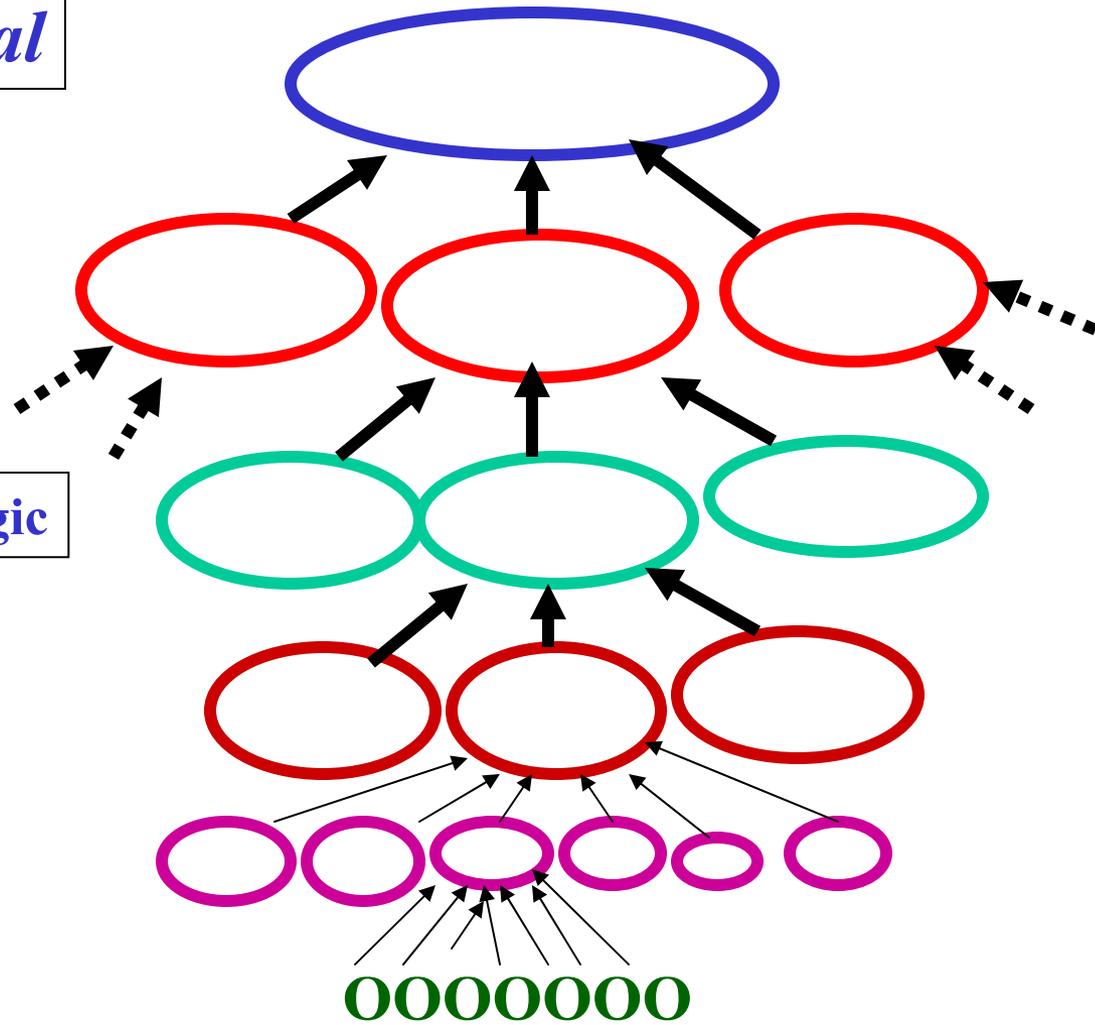
Problem: Orchestrating Actions

- **What will they see?**
  - **Focus**
  - **Force applied**
  - **Scale**
  - **Scope**
  - **Timing**
    - **speed**
    - **duration**
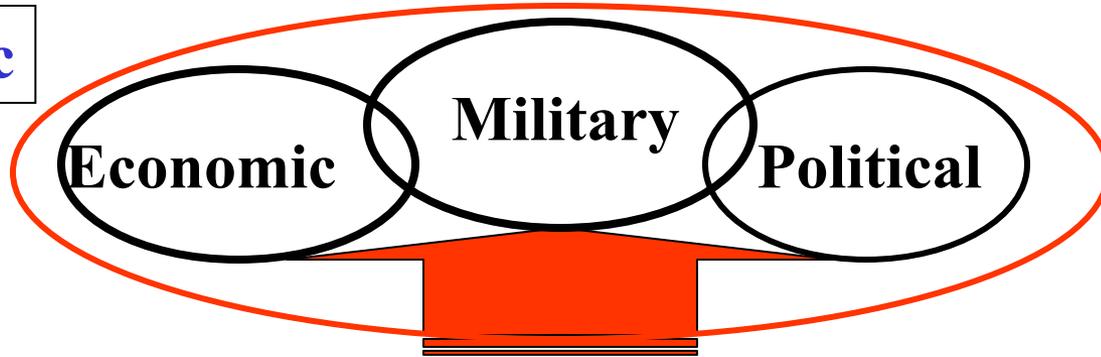   - **synchronicity**
  - **Visibility**

What is done

+

How it is done

***Tools
For
Shaping***

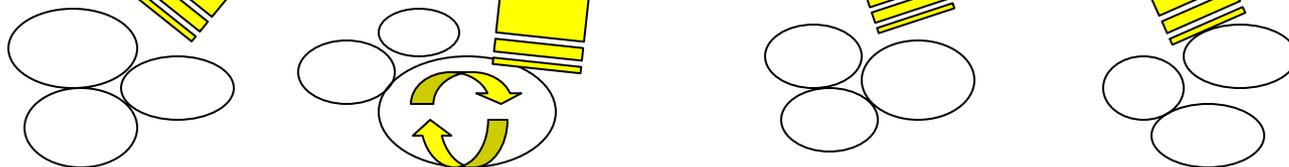# Problem: Deconflicting Actions

Geo-strategic

Economic Military Political

Military Strategic

Theater

Operational

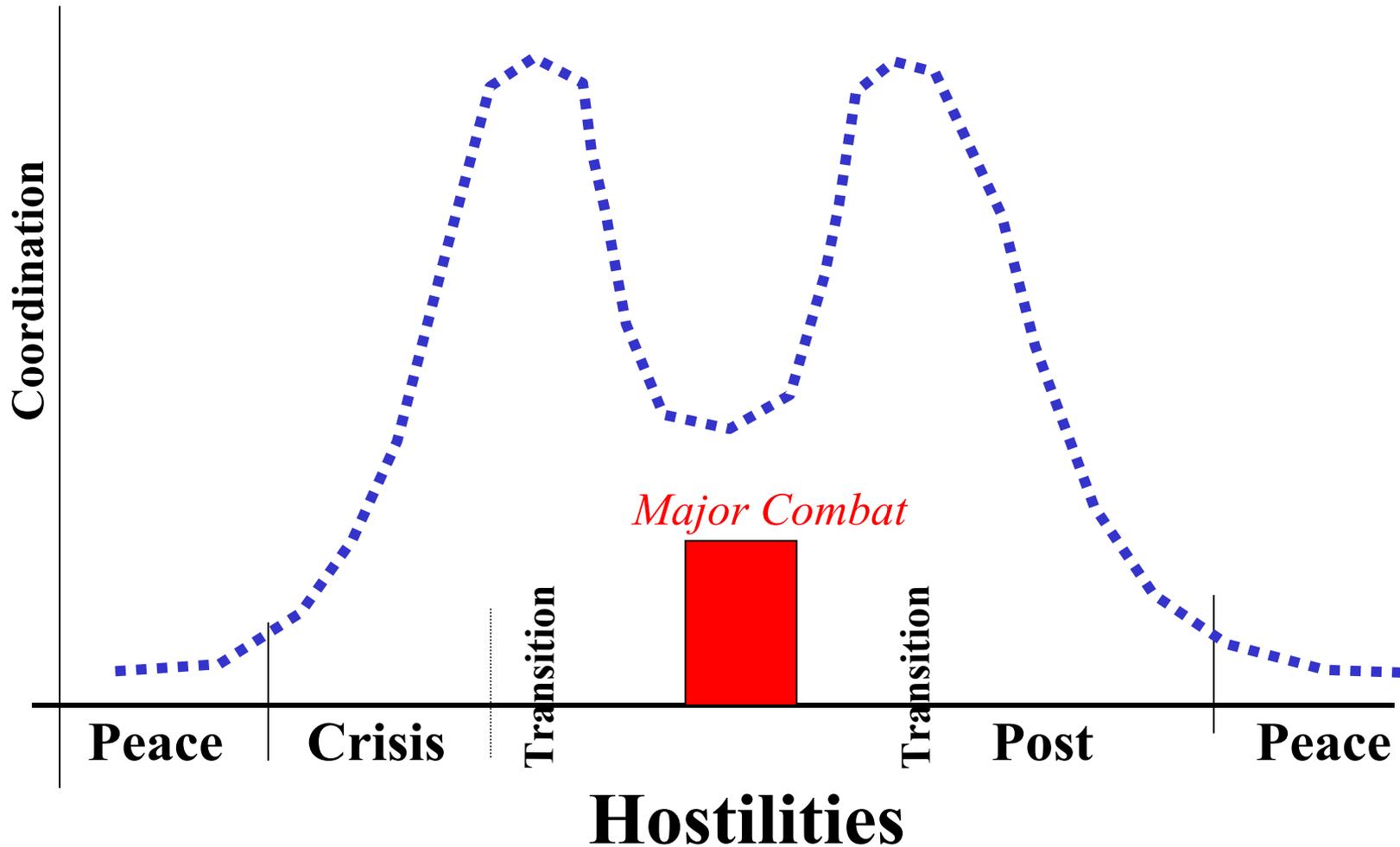Sea Air Ground Space

Tactical

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Synchronization vs Self-synchronization
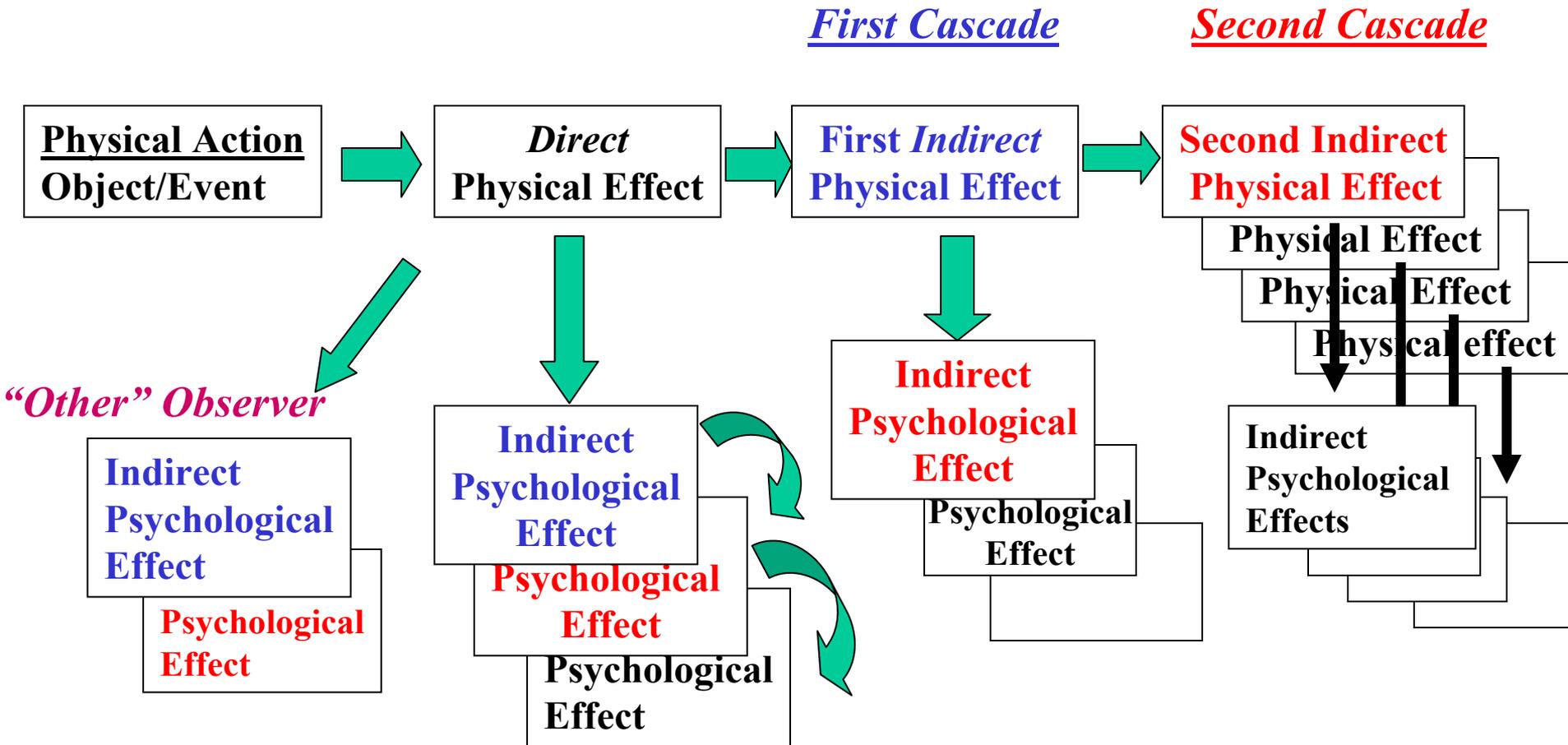

The Fedora Curve

Problem: Defining Effects

Kinds of Effects

•**Destruction**
•**Physical Attrition**
•**Chaos/ Entropy**
•**Foreclosure**
　　•**Passive**
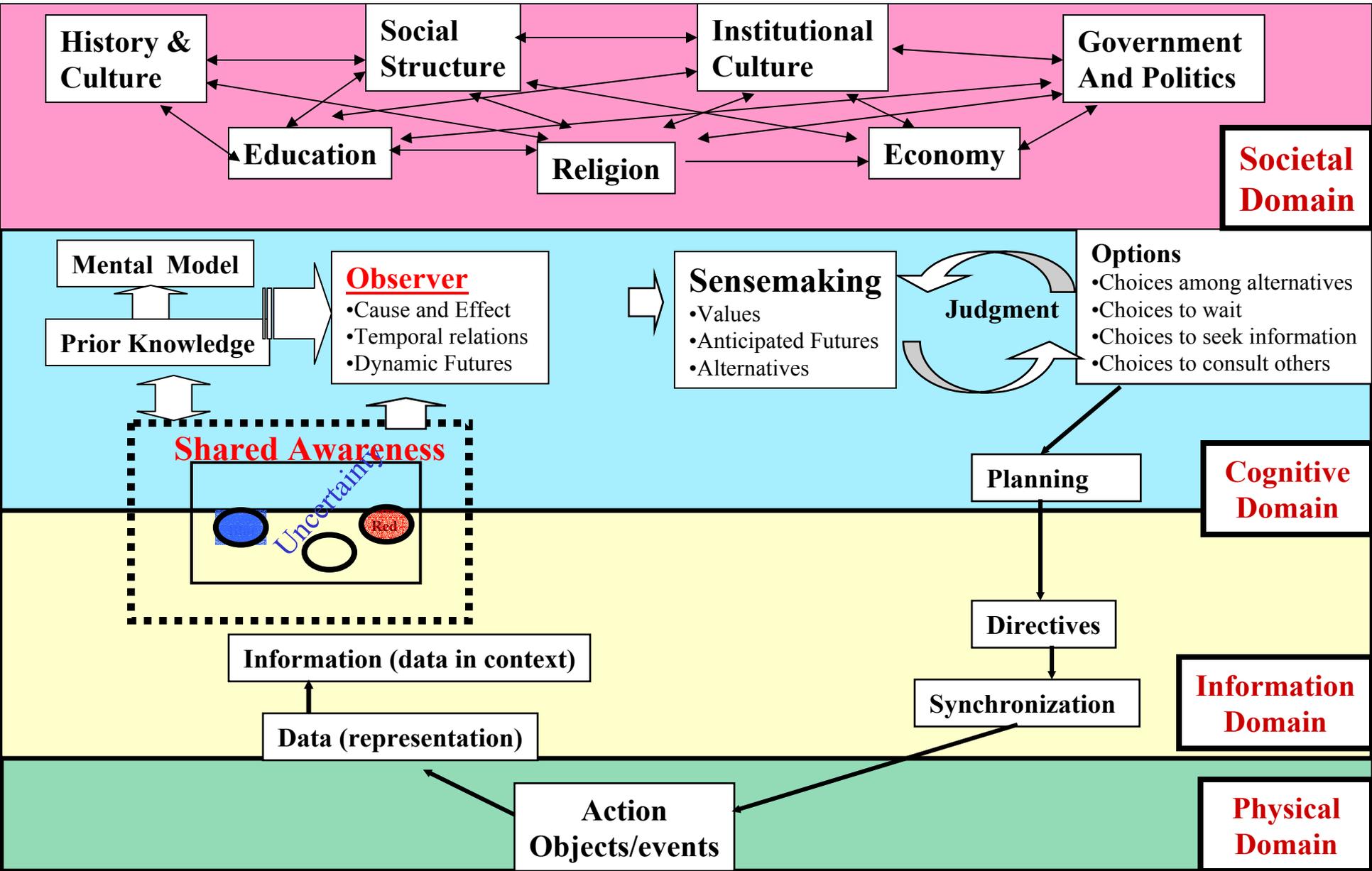　　•**Active**
•**Shock**
•**Psychological**
　　　Attrition

Overall Effect

Behavior

Problem: Effects Cascades

First Cascade   *Second Cascade*

| **Physical Action** **Object/Event** | ➡ | ***Direct*** **Physical Effect** | ➡ | **First *Indirect*** **Physical Effect** | ➡ | **Second Indirect** **Physical Effect** |

Physical Effect

Physical Effect

Physical effect

"Other" Observer

Indirect Psychological Effect

Psychological Effect

Indirect Psychological Effect

Psychological Effect

Psychological Effect

Indirect Psychological Effect

Psychological Effect

Indirect Psychological Effects

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Problem: Feedback -- *What can we know?*

Societal Domain

- History & Culture
- Social Structure
- Institutional Culture
- Government And Politics
- Education
- Religion
- Economy

Cognitive Domain

- Mental Model
- Prior Knowledge
- **Observer**
  - •Cause and Effect
  - •Temporal relations
  - •Dynamic Futures
- **Sensemaking**
  - •Values
  - •Anticipated Futures
  - •Alternatives
- Judgment
- **Options**
  - •Choices among alternatives
  - •Choices to wait
  - •Choices to seek information
  - •Choices to consult others
- **Shared Awareness**
- Uncertainty
- Planning

Information Domain

- Information (data in context)
- Data (representation)
- Directives
- Synchronization

Physical Domain

- Action Objects/events
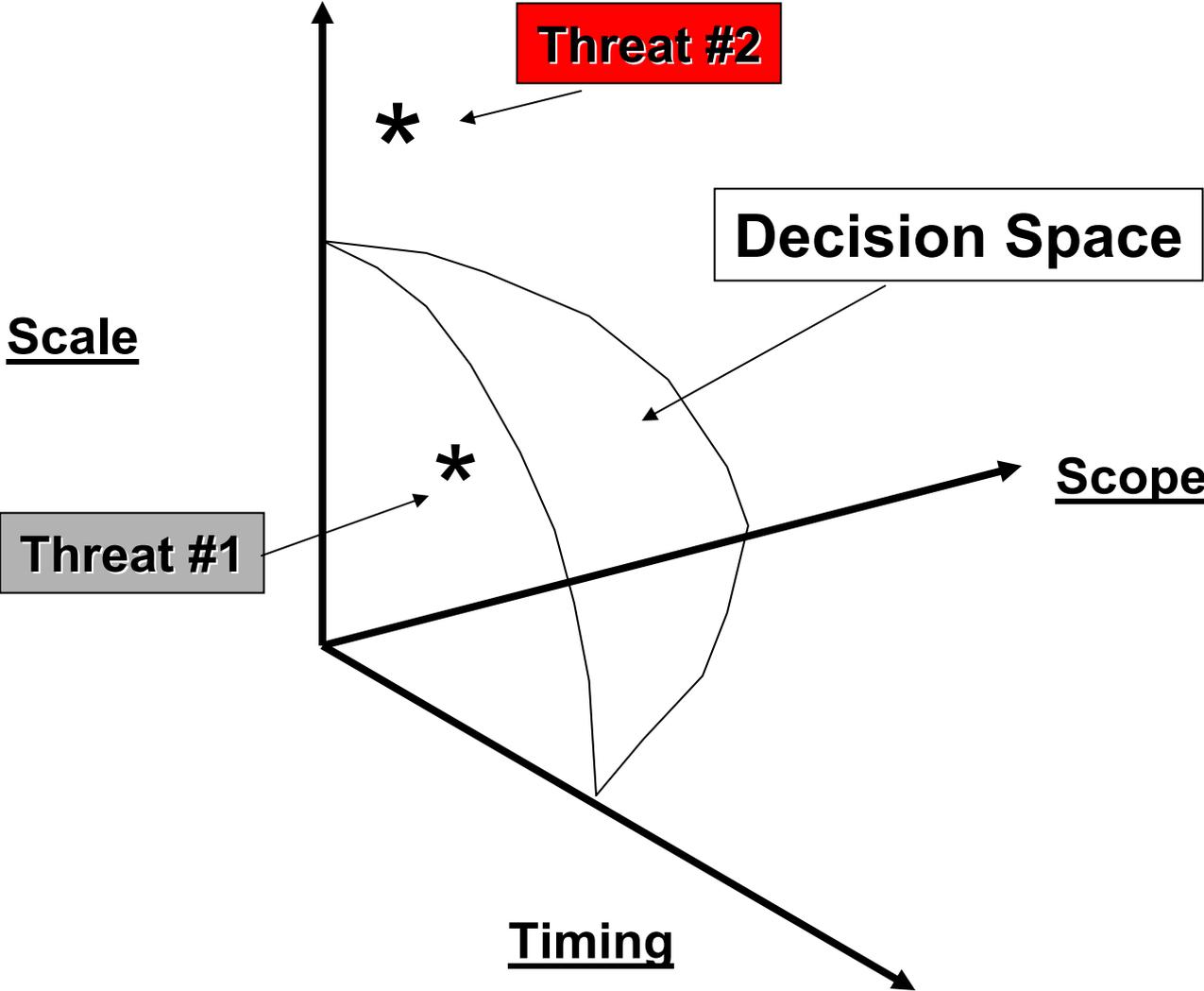
4. Implications for Network Centric Operations

- ***Options not answers***

- ***Knowledge Mobilization not Data Base Management***

- ***Agility and Adaptation not Stock Plans***

- ***Man <u>in</u> the Loop not Man <u>out</u> of the Loop***

•Constructing a Decision Space

Scale
•How much?

Scope
•How?
•Where?
•With what?

Timing
•How agile?
•How fast?
•For how long?
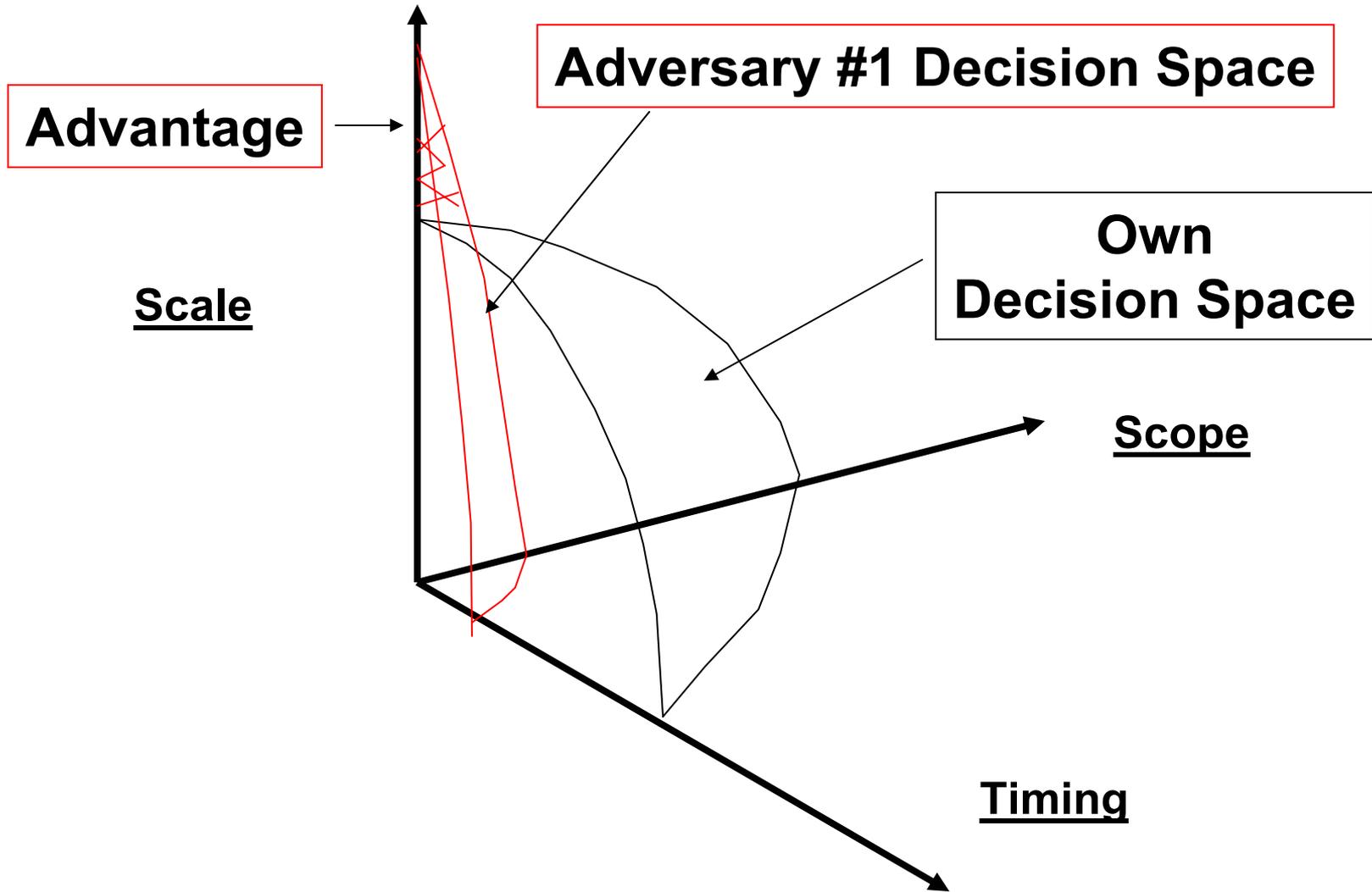•How synchronized?
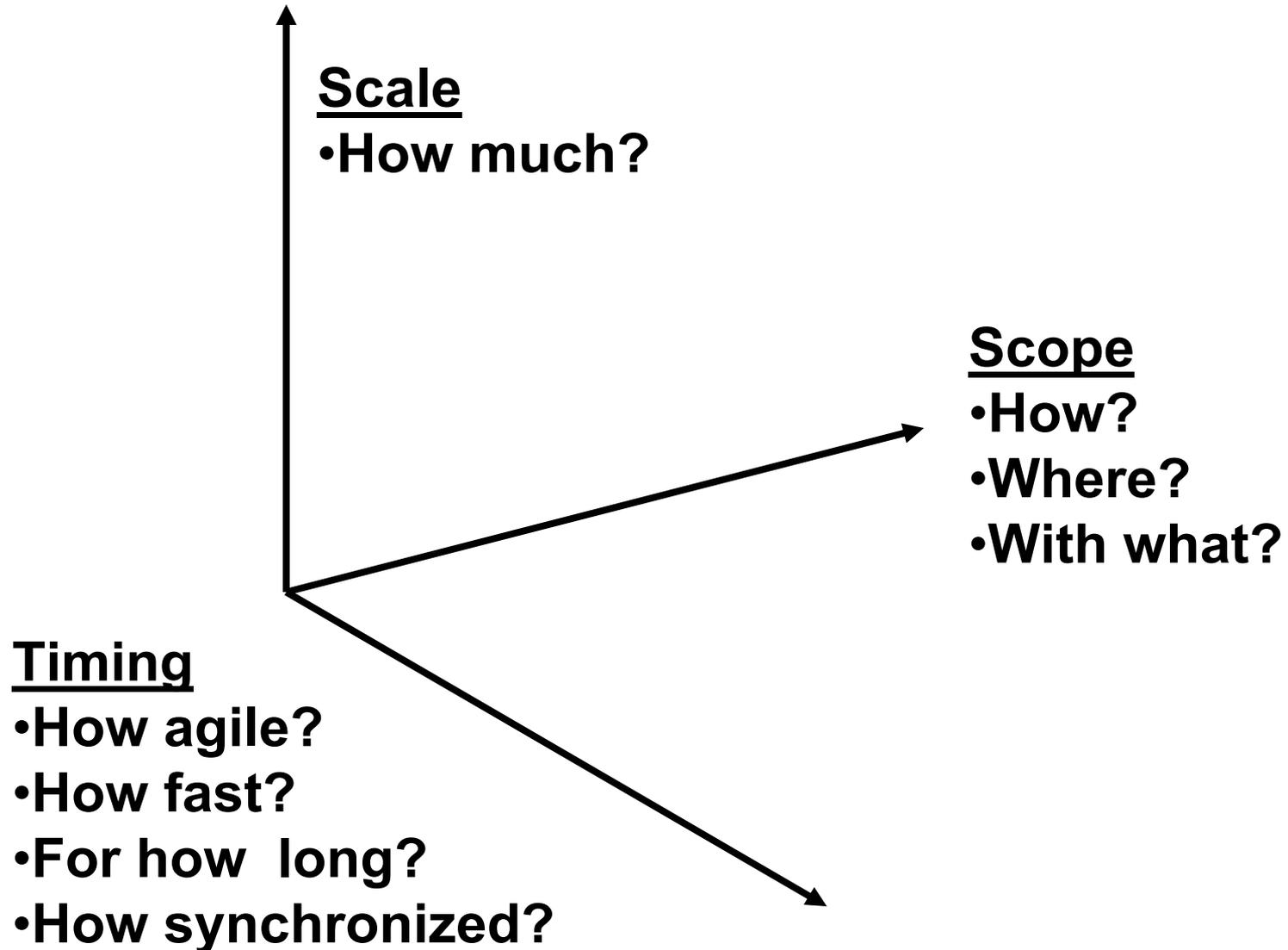
Capabilities/ Networking Define Decision Space

Creating Options
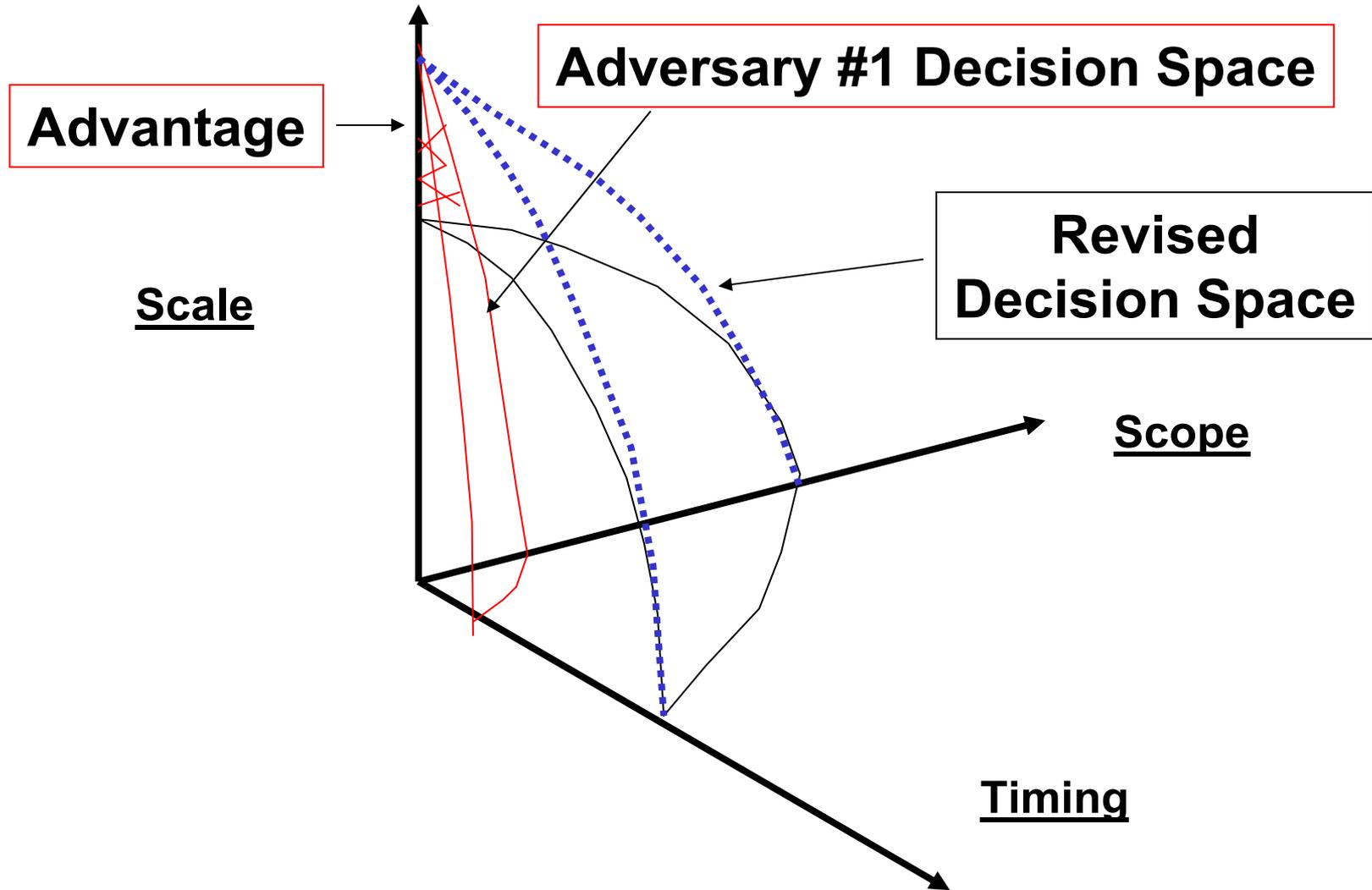
$$C^{(N-1)} \cdot (N_S \cdot N_C) = \text{Options}$$

- *Capabilities Tool Kit*
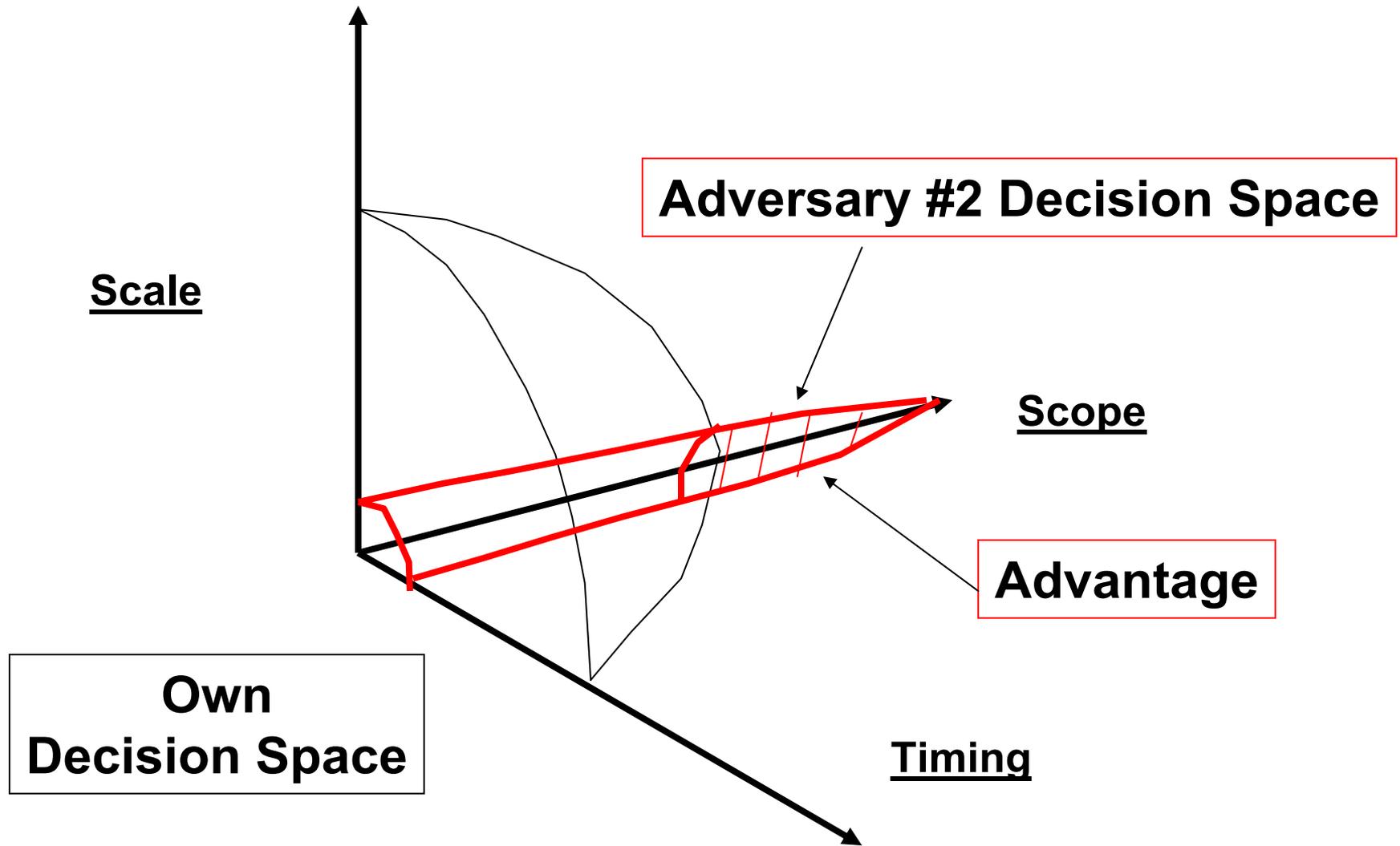- *Social Networking AND Communications Networking*

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Options-Based Decision Space

Options-Based Decision Space

Adversary #1 Decision Space

Advantage

Revised Decision Space

Scale

Scope

Timing

Options-Based Decision Space

Scale

Adversary #2 Decision Space

Scope

Advantage

Own
Decision Space

Timing

• Knowledge Mobilization

- **Complex Adaptive Systems**
  - **Cannot entirely predict threat/ problem**

- **Three Different Kinds of Information /Knowledge**
  - **Sensor-derived information**
  - **Human-derived reporting**
    - **Ambiguous, subjective, uncertain**
    - **Not readily machineable/ Natural language**
  - **Expertise**
    - **Based on mastery of complex subject**
    - **Cannot communicate mastery**
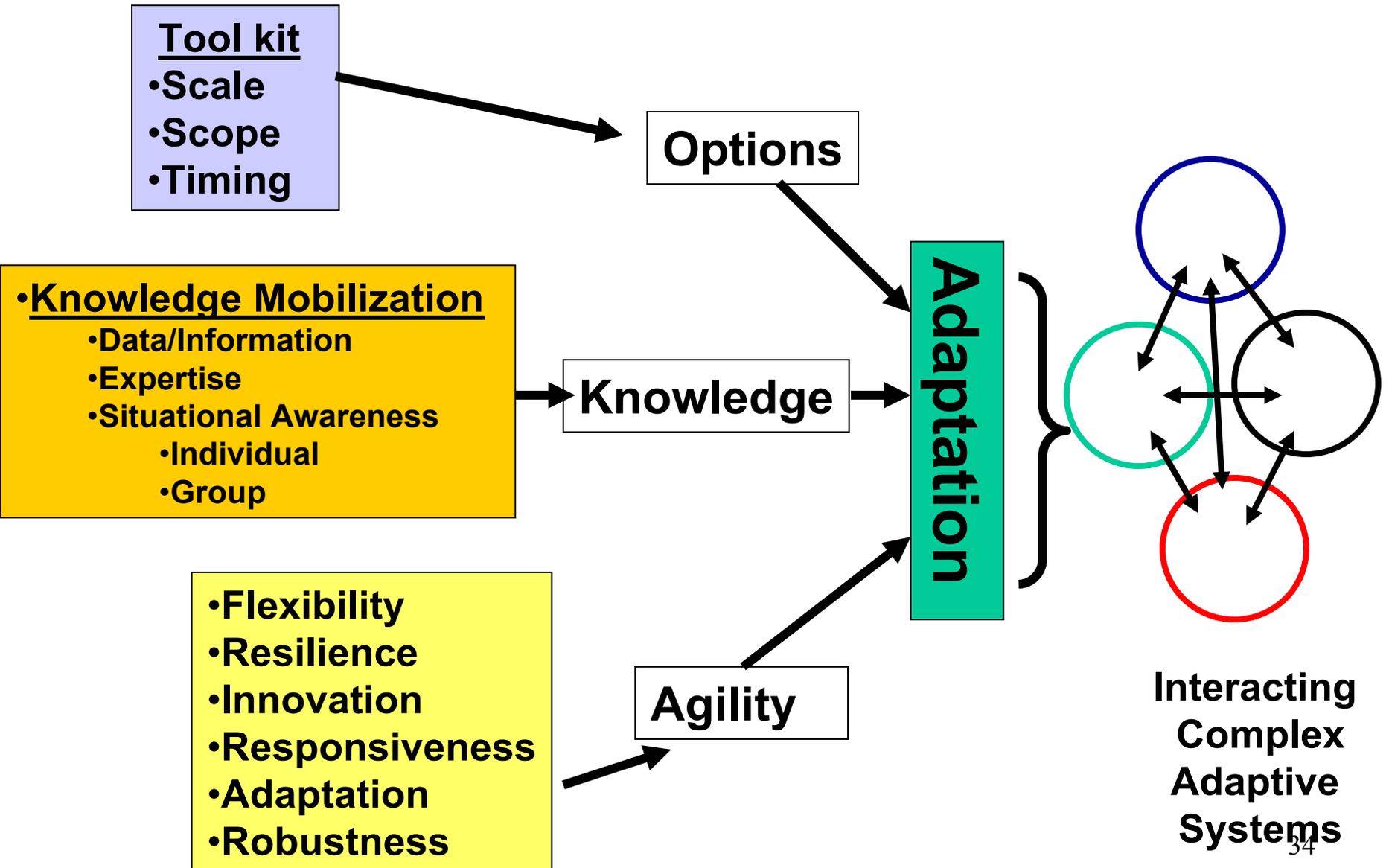
• <u>Knowledge Mobilization</u>

– **Fusion**
  - **Data, Information, Knowledge**
  - **Expertise from across the nation/ coalition**
  - **Flexible, ad hoc, changing communities of expertise**

– **Multiple Interfaces**
  - **Machine-Machine**
  - **Man-Machine**
  - **Man-Man**

• Agility: *Putting it Together*

Tool kit
- Scale
- Scope
- Timing

Options

•Knowledge Mobilization
- Data/Information
- Expertise
- Situational Awareness
  - Individual
  - Group

Knowledge

Adaptation

- Flexibility
- Resilience
- Innovation
- Responsiveness
- Adaptation
- Robustness

Agility

Interacting Complex Adaptive Systems

Conclusions:

- **Complex Security Environment/ Effects-Based Operations impose new requirements**

- **Need to move from *Networks***
  - **Faster targeting**
  - **More efficient attrition …and**
  - **"man *out of* the loop"**

- **To *Networking***
  - **Complex, multi-level, multi-arena responses**
  - **Social *AND* Communications Networking**
  - **Supporting the man *in* the loop**

Second Generation Network Centric Operations

Back-up: Effects-Based Operations

Two Main US Tracks:

- **Track One:** **Effects-based "Targeting"**
  - **Air Force School**
    - **Precision strike to create non-linear psychological effects**
    - **Major combat focus**

- **Track Two:** **Effects-Based _Operations_**
  - **Maneuverist School –Special Forces/ Marine Corps**
  - **Naval School – Crisis Operations**
  - _**Actions**_ **to create psychological effects on observers**
    - **Stimulus and response approach**
    - **Focus: Peace, crisis, war …and post-conflict stabilization**
    - **Applied national power**