



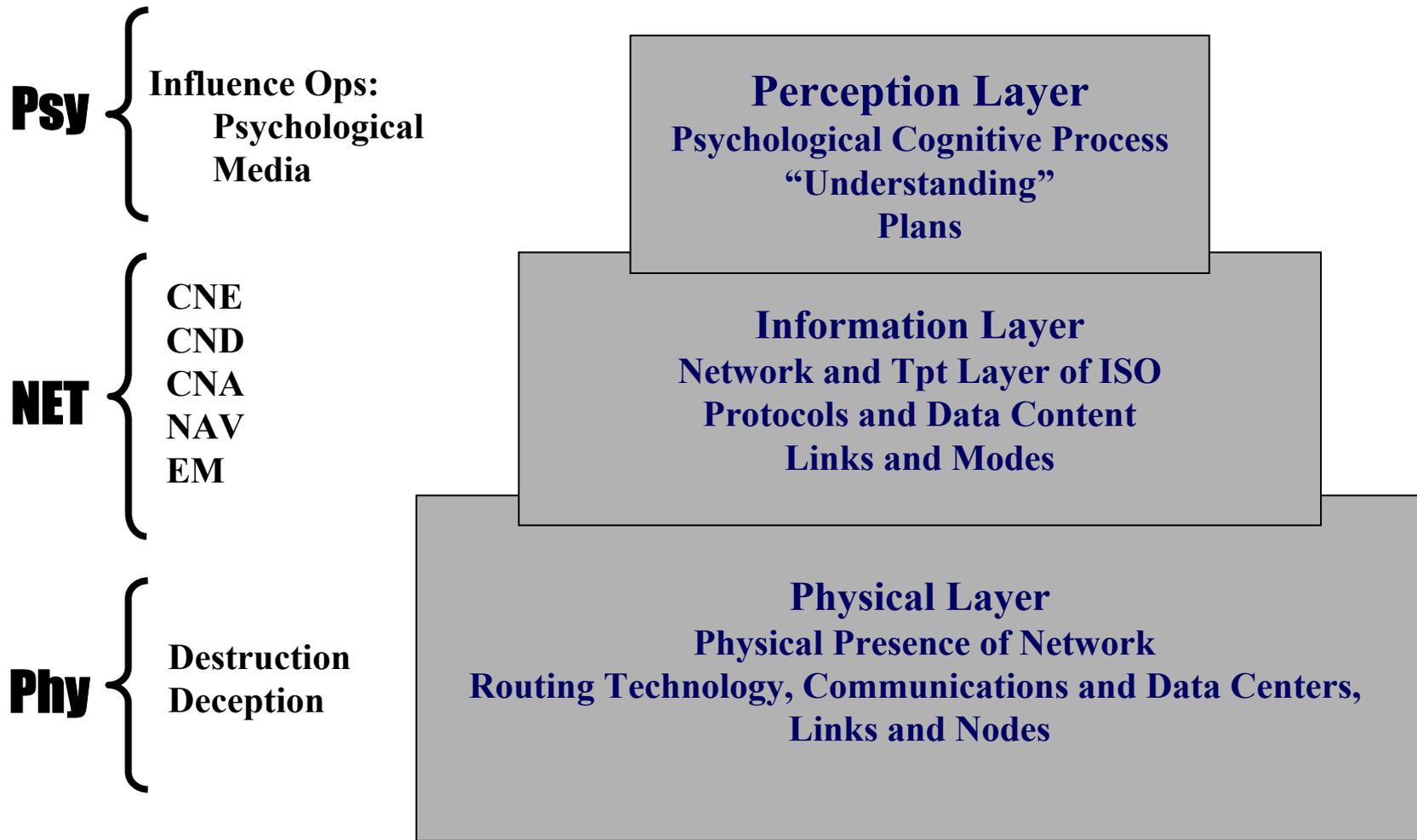
An Operational Framework for Battle in Network Space

*“Thus, what is of supreme importance in war is to attack the
enemy’s strategy” [\[1\]](#)*

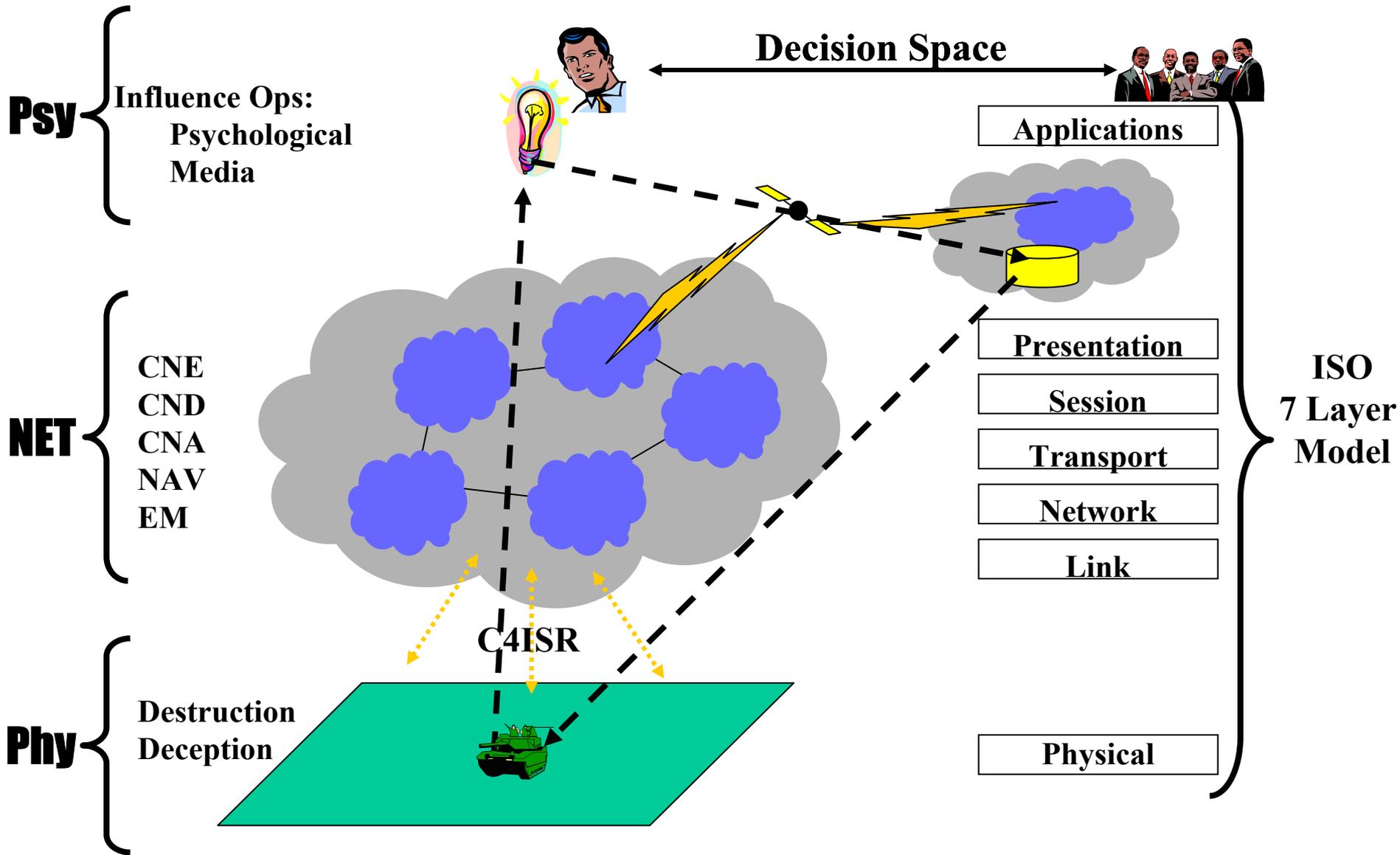
LCol Rob Knight
Deputy Commander
Canadian Forces Information Operations Group HQ

Dr. Mark McIntyre
Head, Network Information Operations
Defence R & D Canada - Ottawa

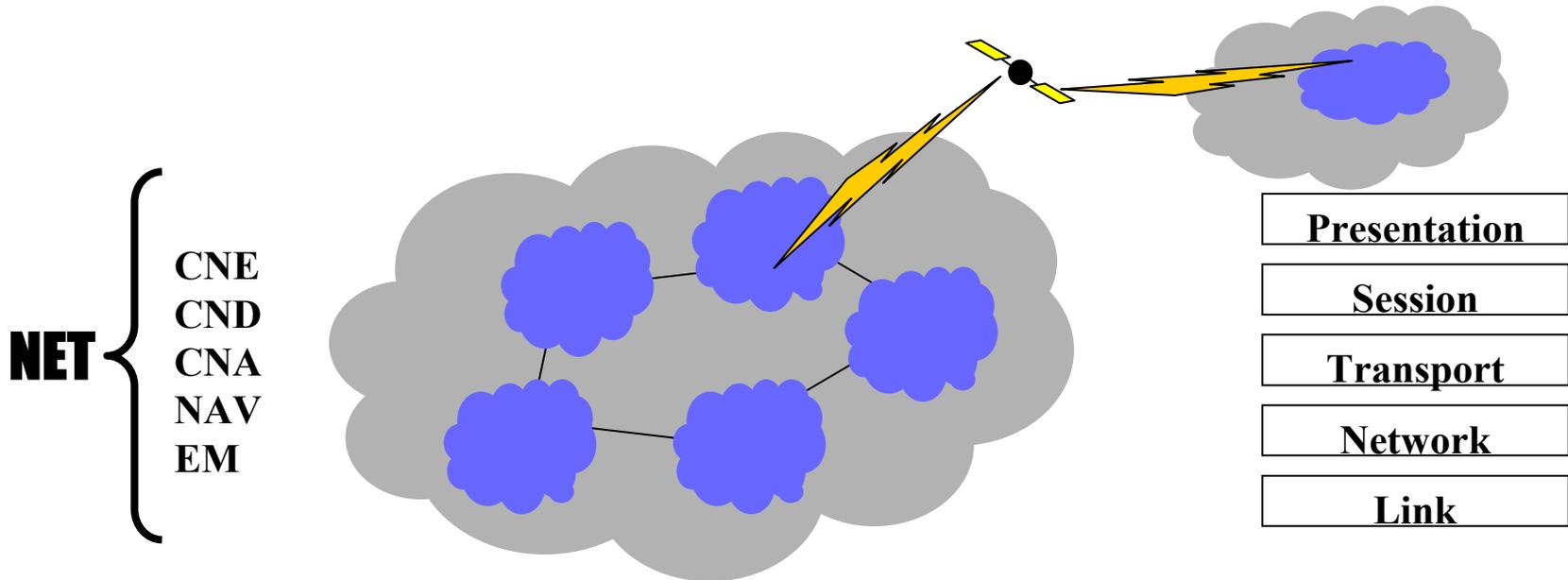
An Operational Model for Information Operations [iii]



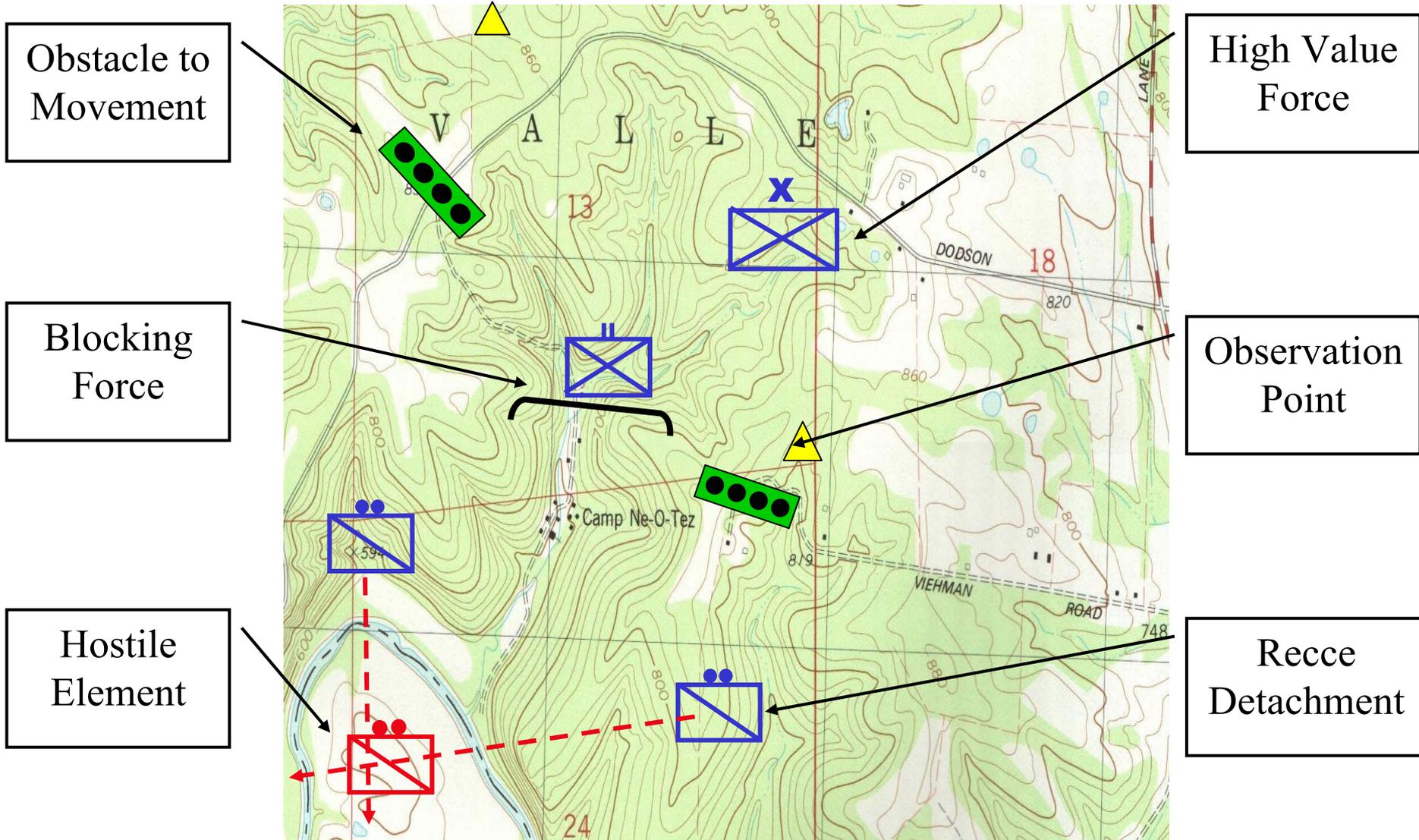
Defining the Information Battle Space:



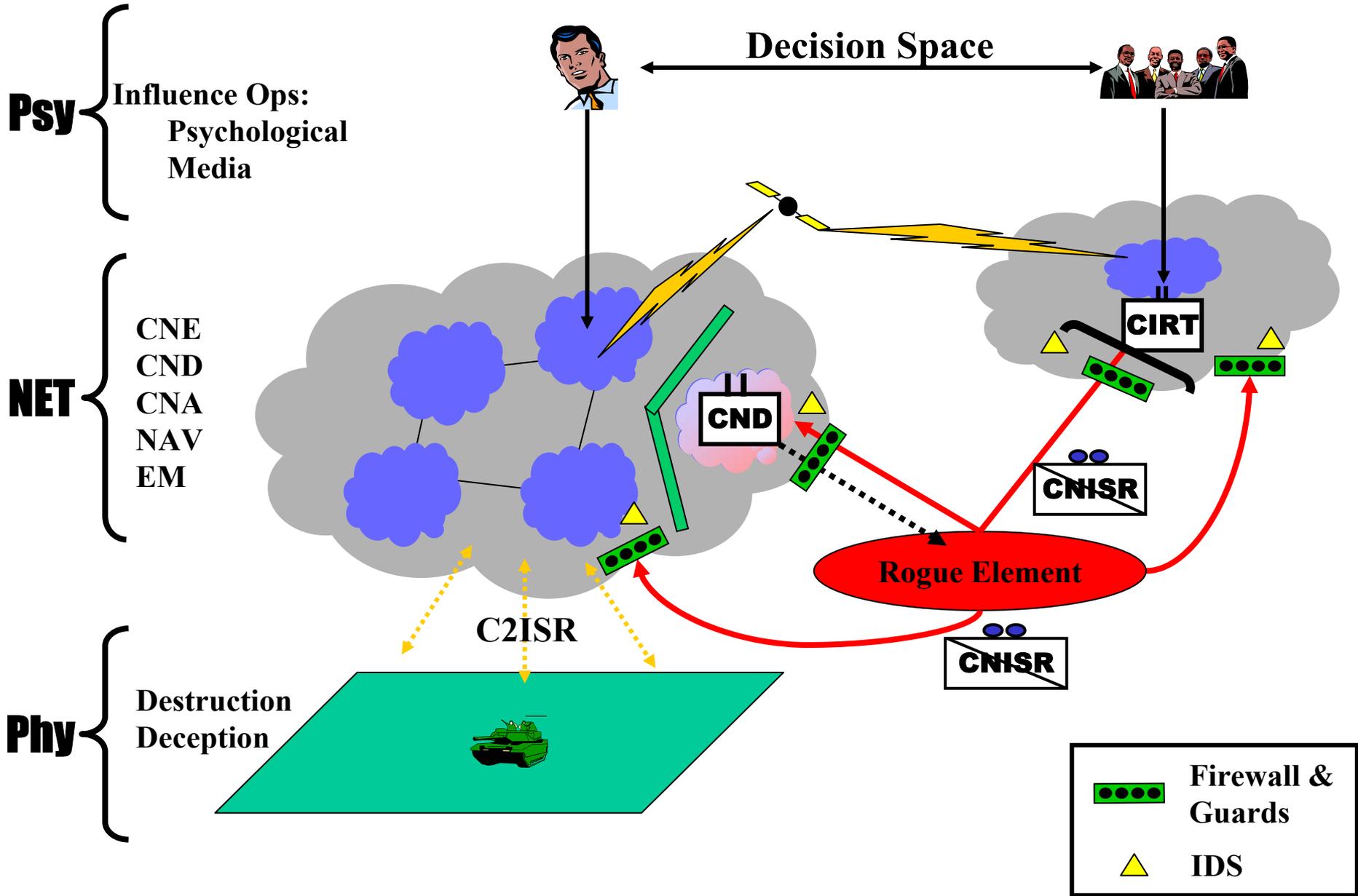
Defining the Network Battle Space:



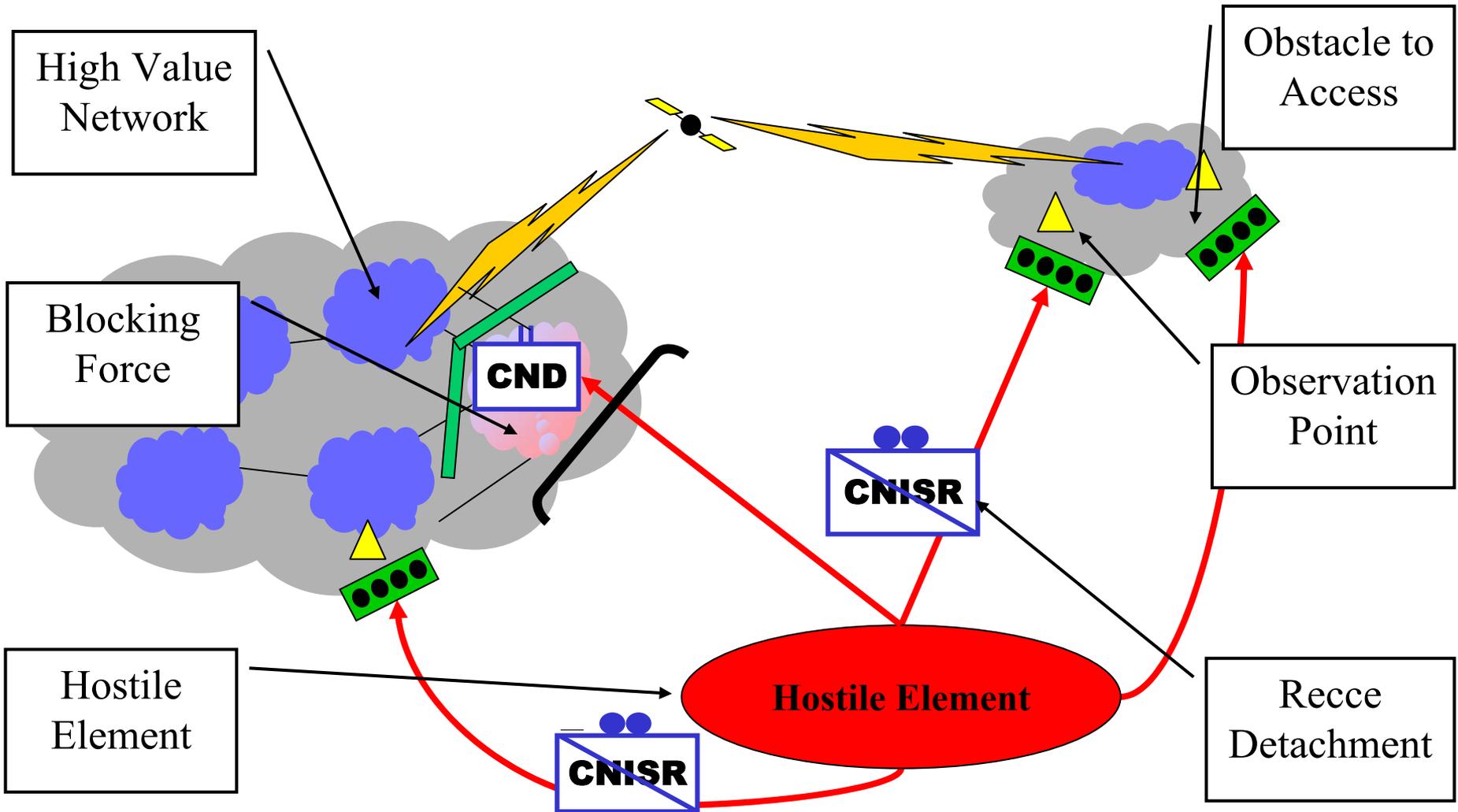
Simple Concepts of Physical Battle Space:



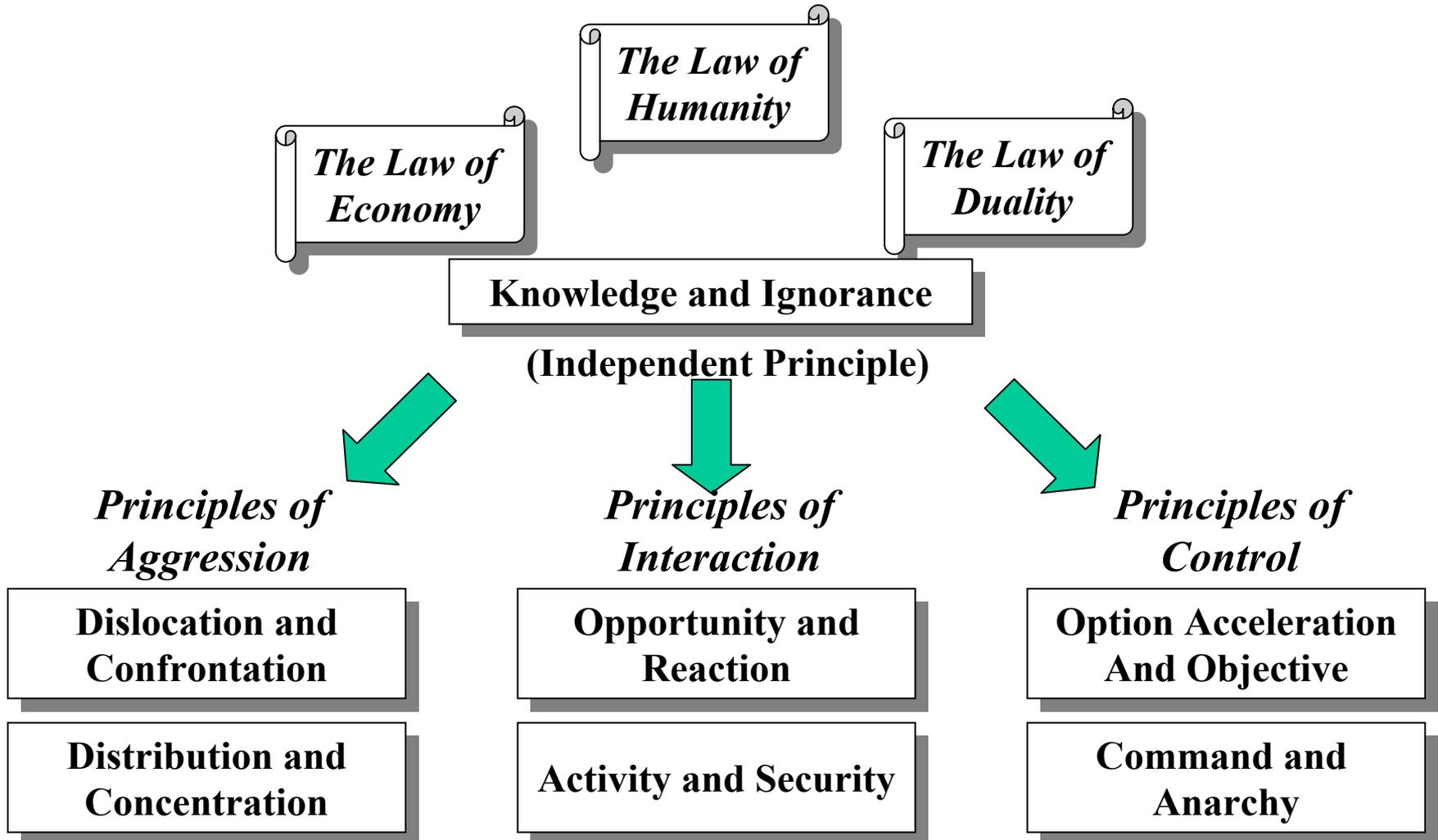
Simple Concepts of Network Battle Space:



Defining the Network Battle Space:



Leonhard's Principles of War for the Information Age [iv]



Leonhard's Principles of War for the Information Age [iv]

The Law of

*The Law of
Humanity*

The Law of

Knowledge and Ignorance

Aggression

**Dislocation and
Confrontation**

**Distribution and
Concentration**

Interaction

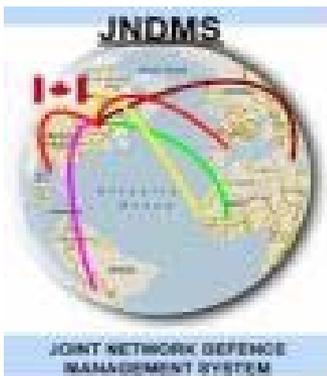
**Opportunity and
Reaction**

Activity and Security

Control

**Option Acceleration
And Objective**

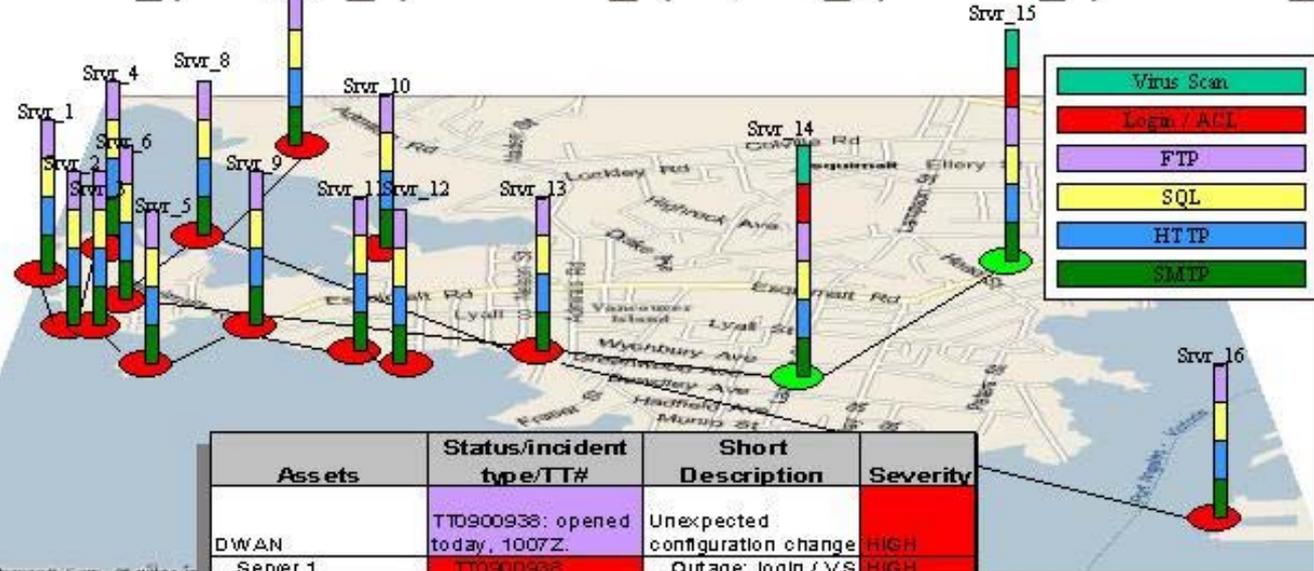
**Command and
Anarchy**



Time viewer 1 Oct 2003 1005Z
 Past ← → Scheduled

Networks [DWAN] + **Operations** [N/A Srvr_7] + **System/apps** [Protocols] + **Locations** [Esquimalt] + **Severity** [N/A] + **Equipment** [Router]

- Operations
- Locations
- Standard view
 - Main Ops/Net
 - MARPAC
 - MARLANT
 - NCR
 - Europe
- Equipment
- Security Events
- Defensive Posture
 - DWAN
 - TITAN
 - SPARTAN
 - GPNet
- Severity
 - High
 - Medium
 - Low
 - Other security alerts



Assets	Status/incident type/TT#	Short Description	Severity
DWAN	TT0900938: opened today, 1007Z	Unexpected configuration change	HIGH
Server 1	TT0900938	Outage: login / VS	HIGH
Server 2	TT0900938	Outage: login / VS	HIGH
Server 3	TT0900938	Outage: login / VS	HIGH
Server 4	TT0900938	Outage: login / VS	HIGH
Server 5	TT0900938	Outage: login / VS	HIGH
Server 6	TT0900939	Outage: login / VS	HIGH
Server 7	TT0900940	Outage: login / VS	HIGH
Server 8	TT0900941	Outage: login / VS	HIGH
Server 9	TT0900942	Outage: login / VS	HIGH
Server 10	TT0900943	Outage: login / VS	HIGH
Server 11	TT0900944	Outage: login / VS	HIGH
Server 12	TT0900945	Outage: login / VS	HIGH
Server 13	TT0900946	Outage: login / VS	HIGH
Server 14			
Server 15			
Server 16	TT0900938	Outage: login / VS	HIGH

[My JNDMS profile](#)

Leonhard's Principles of War for the Information Age [iv]

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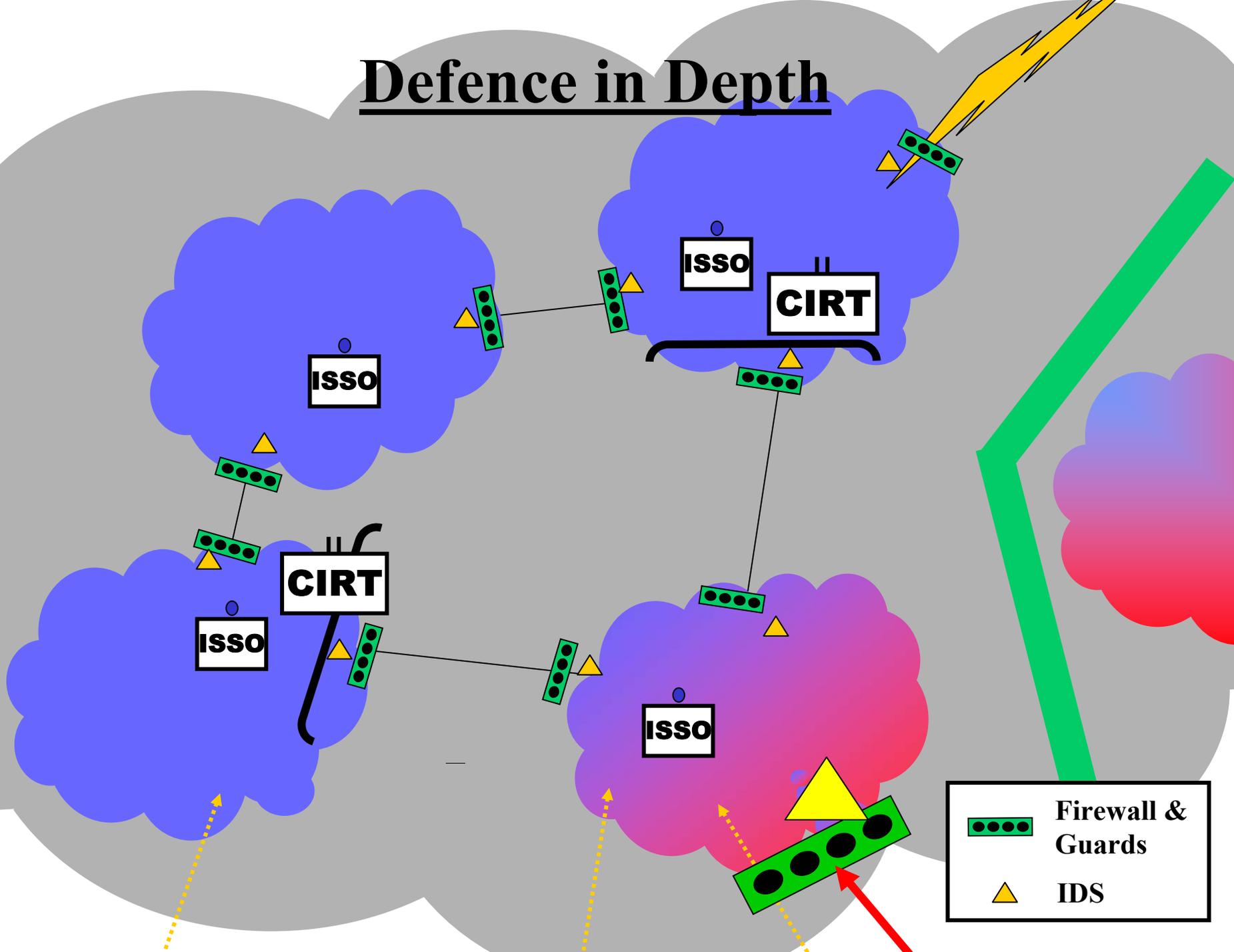
Activity and Security

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**Command and
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Defence in Depth



Leonhard's Principles of War for the Information Age [iv]

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**Opportunity and
Reaction**

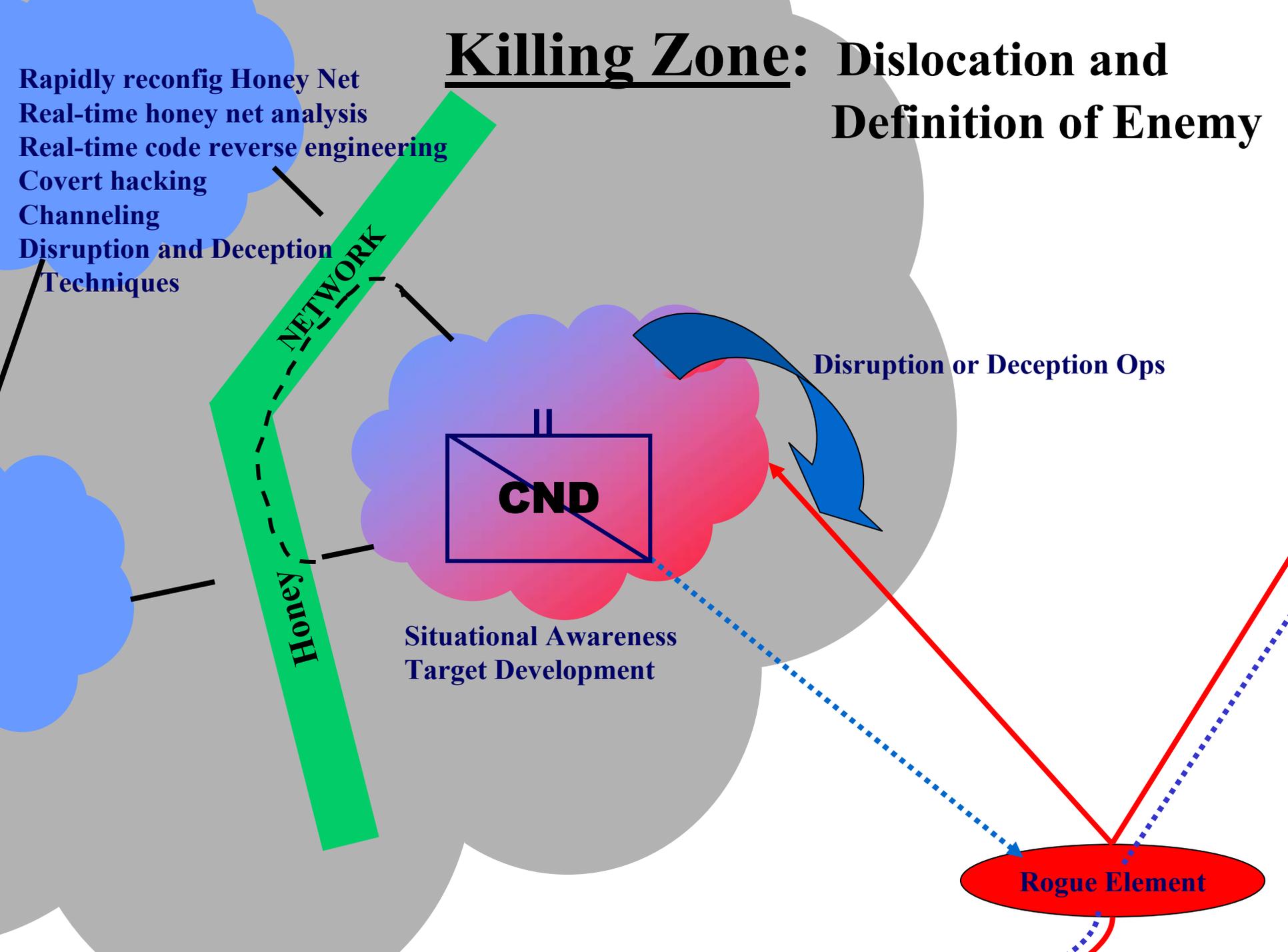
Activity and Security

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Killing Zone: Dislocation and Definition of Enemy



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Anarchy**

Rear Area Security

NVAT

CIRT

Architectural Security
&
Vulnerability

INFOCON
Patches and Protocols
SA & Surveillance
Severing Policy

ISSO

ISSO

NOC

Red Team

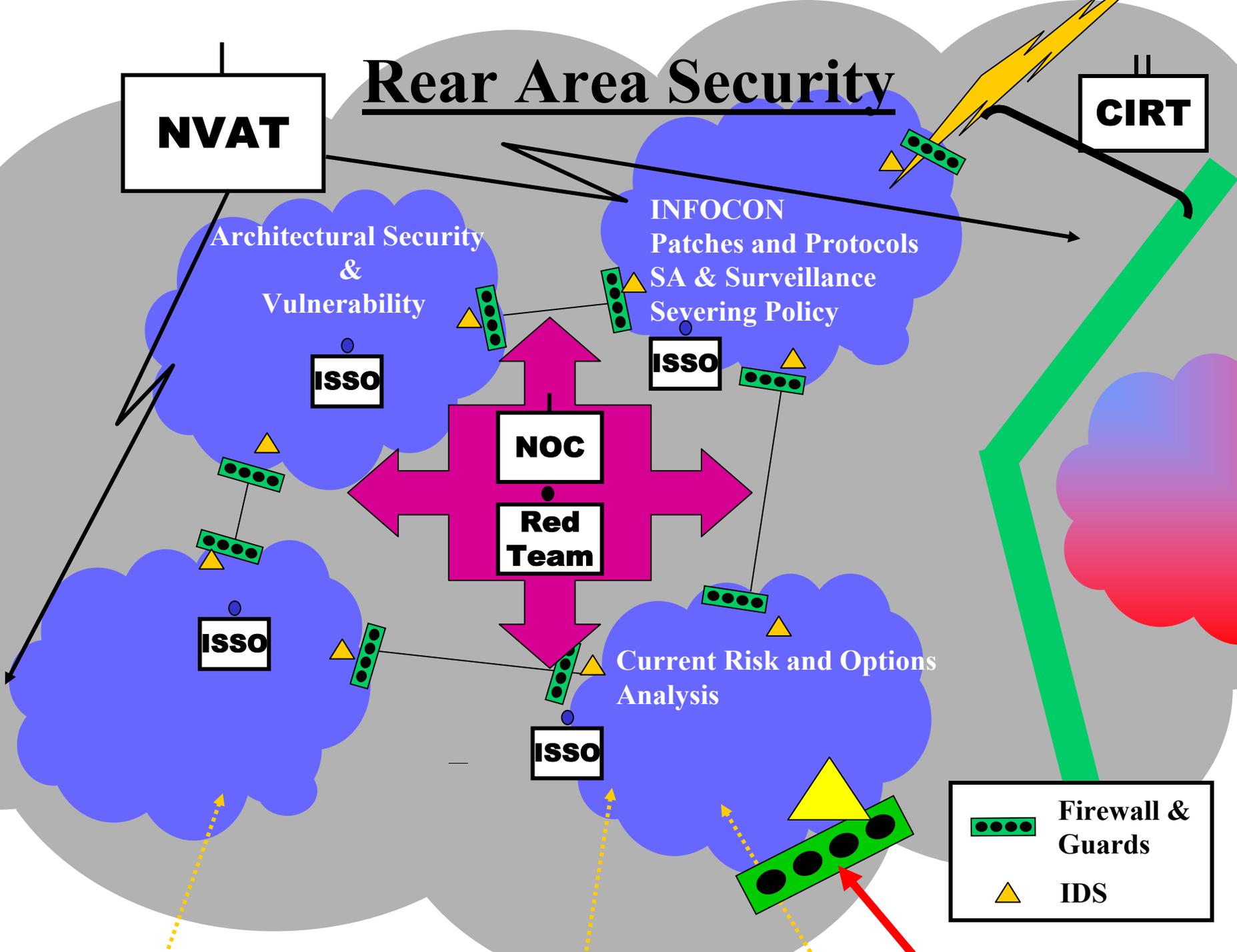
ISSO

ISSO

Current Risk and Options
Analysis

 Firewall & Guards

 IDS



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Interaction

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Control

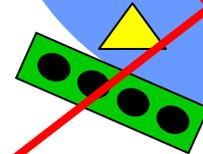
**Option Acceleration
And Objective**

**Command and
Anarchy**



Situational Awareness
Target Development
Disruption or Deception Ops

The Network Attack: Disable or Defeat Enemy



Rogue Element
Intermediary Server / Nation State Site / Terrorist or Criminal Org

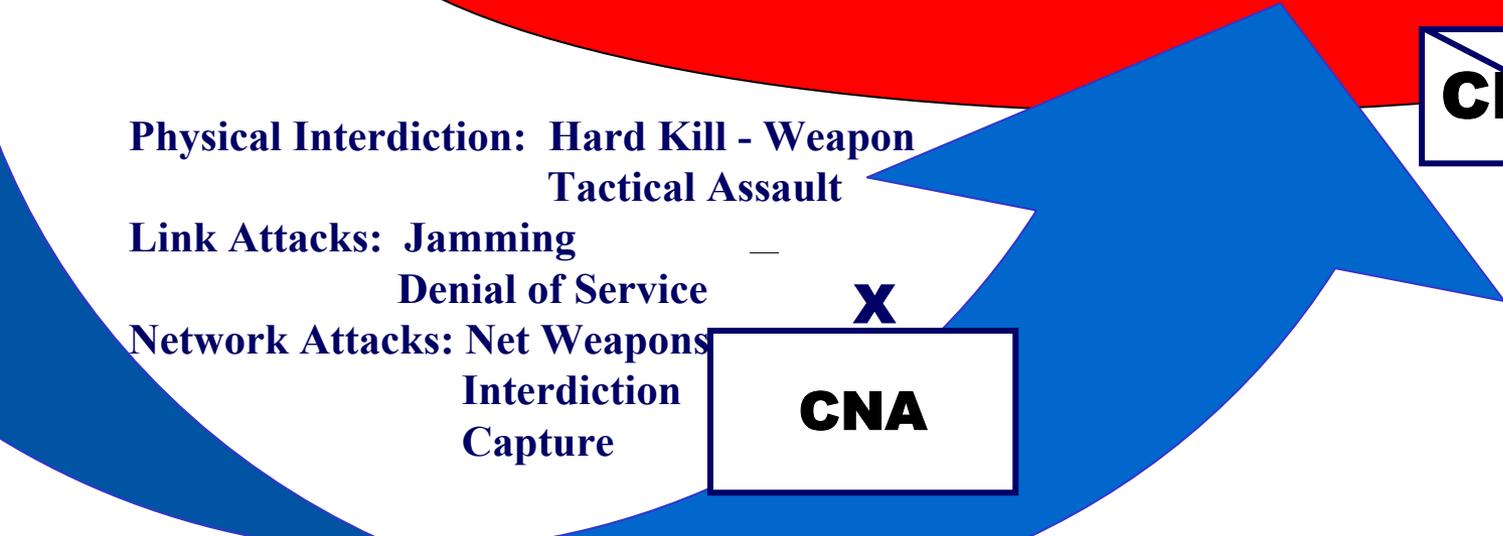


Close Target Recce

Physical Interdiction: Hard Kill - Weapon
Tactical Assault

Link Attacks: Jamming
Denial of Service

Network Attacks: Net Weapons
Interdiction
Capture



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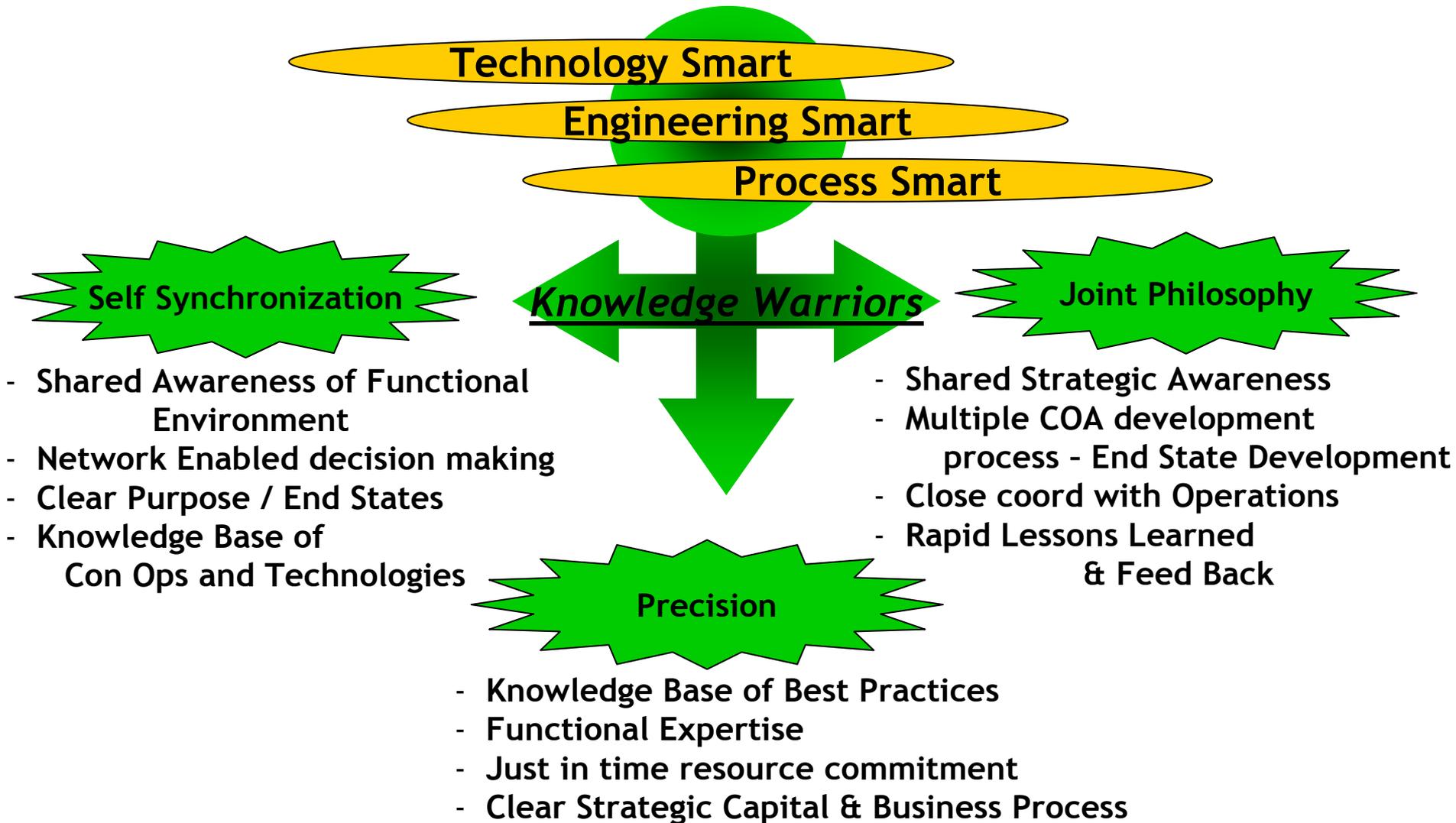
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Knowledge-based Command Structure



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Anarchy**

NVAT

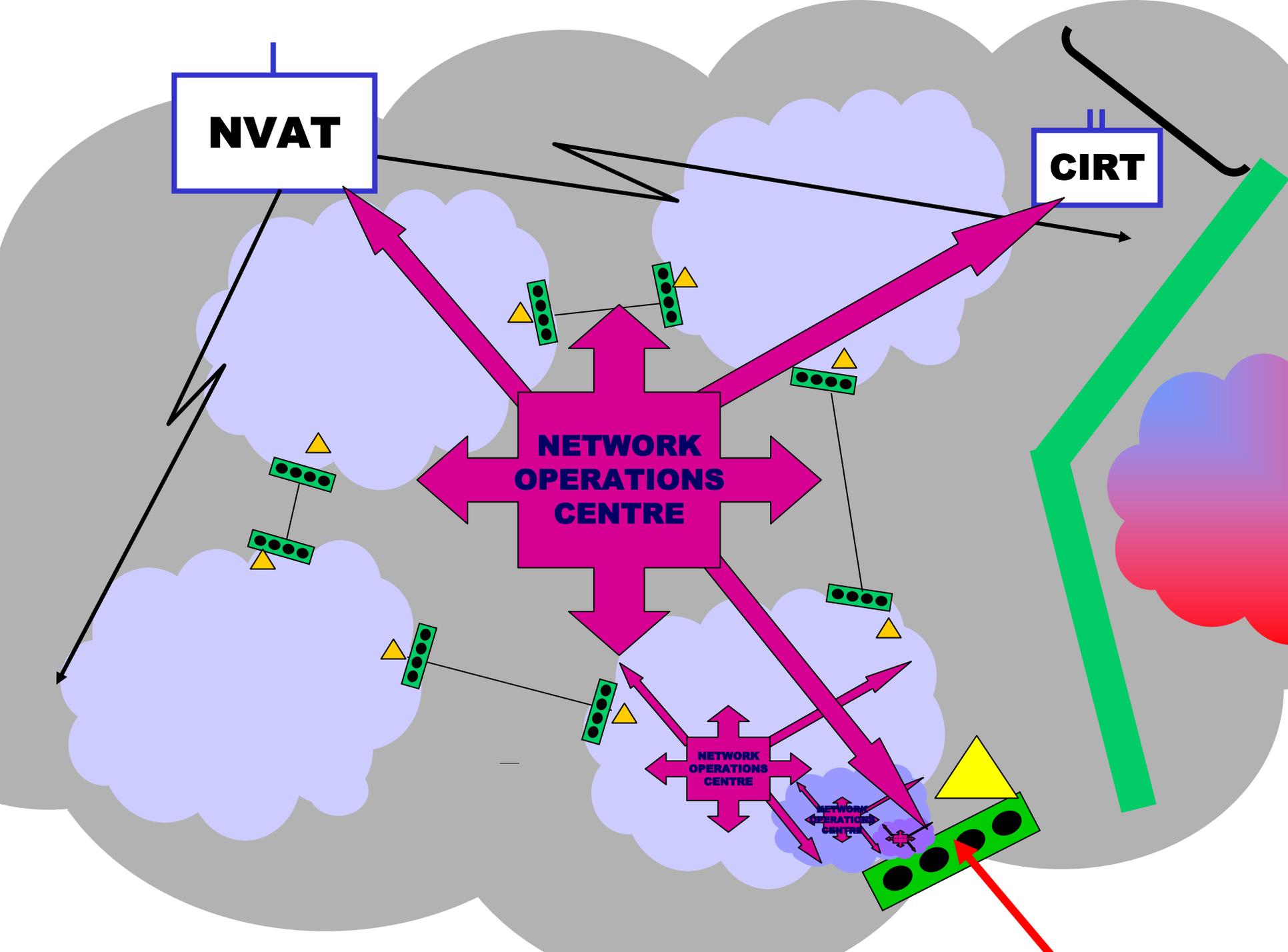
CIRT

**NETWORK
OPERATIONS
CENTRE**

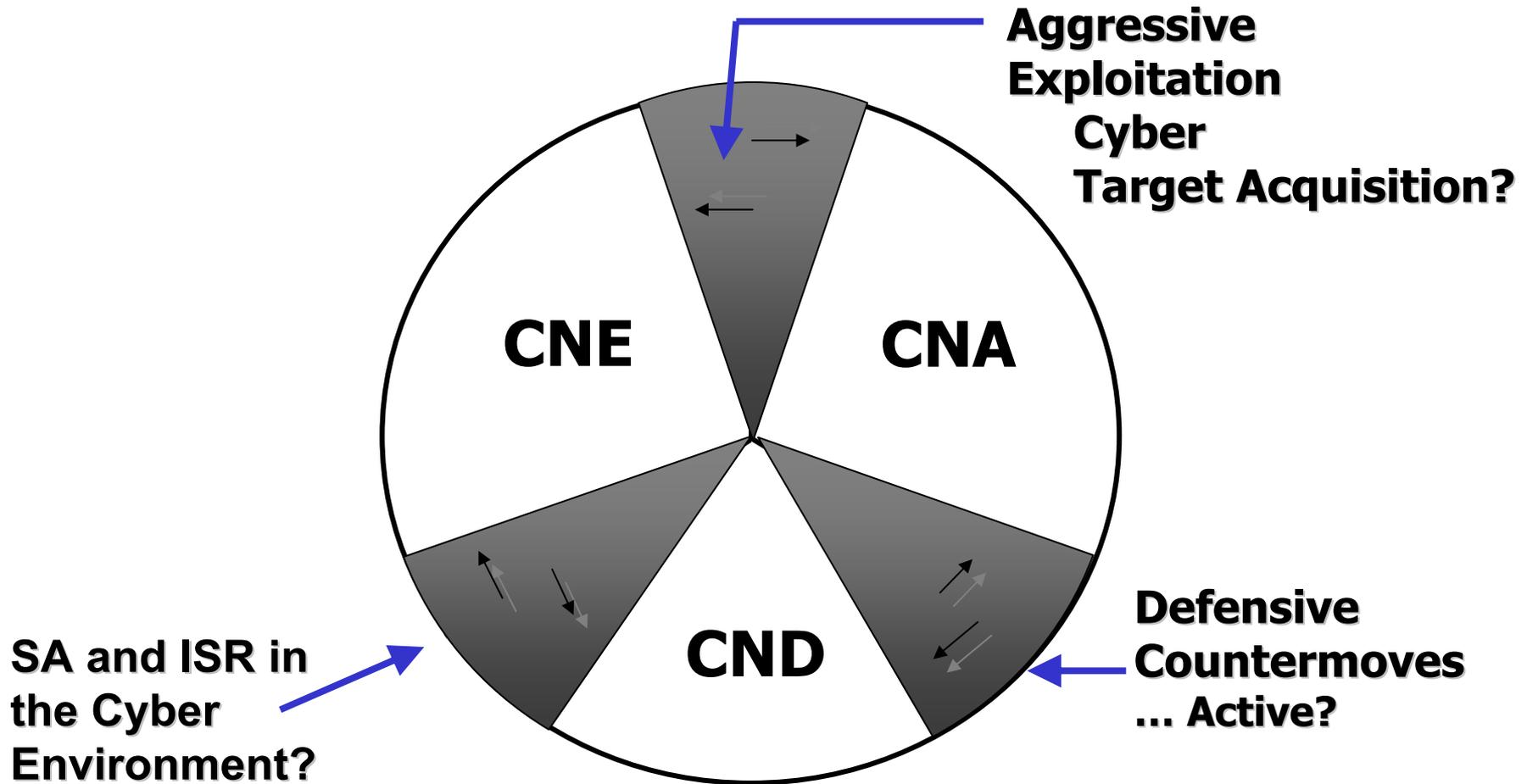
**NETWORK
OPERATIONS
CENTRE**

**NETWORK
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CENTRE**

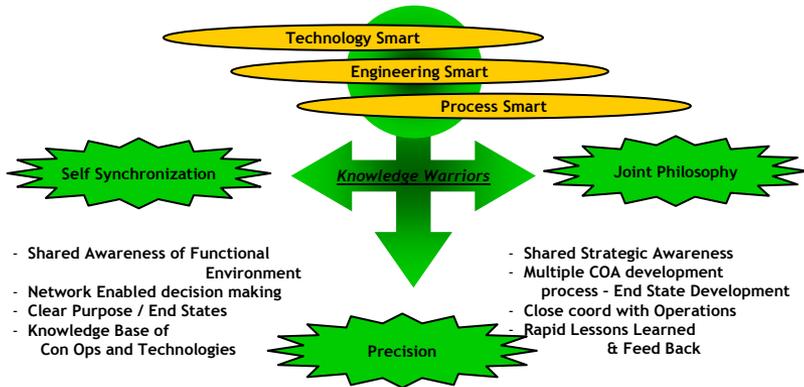
CIRT



Elements of CNO [ii]



Discussion



- Shared Awareness of Functional Environment
- Network Enabled decision making
- Clear Purpose / End States
- Knowledge Base of Con Ops and Technologies

- Shared Strategic Awareness
- Multiple COA development process - End State Development
- Close coord with Operations
- Rapid Lessons Learned & Feed Back

- Knowledge Base of Best Practices
- Functional Expertise
- Just in time resource commitment
- Clear Strategic Capital & Business Process

