Cyberspace Operations

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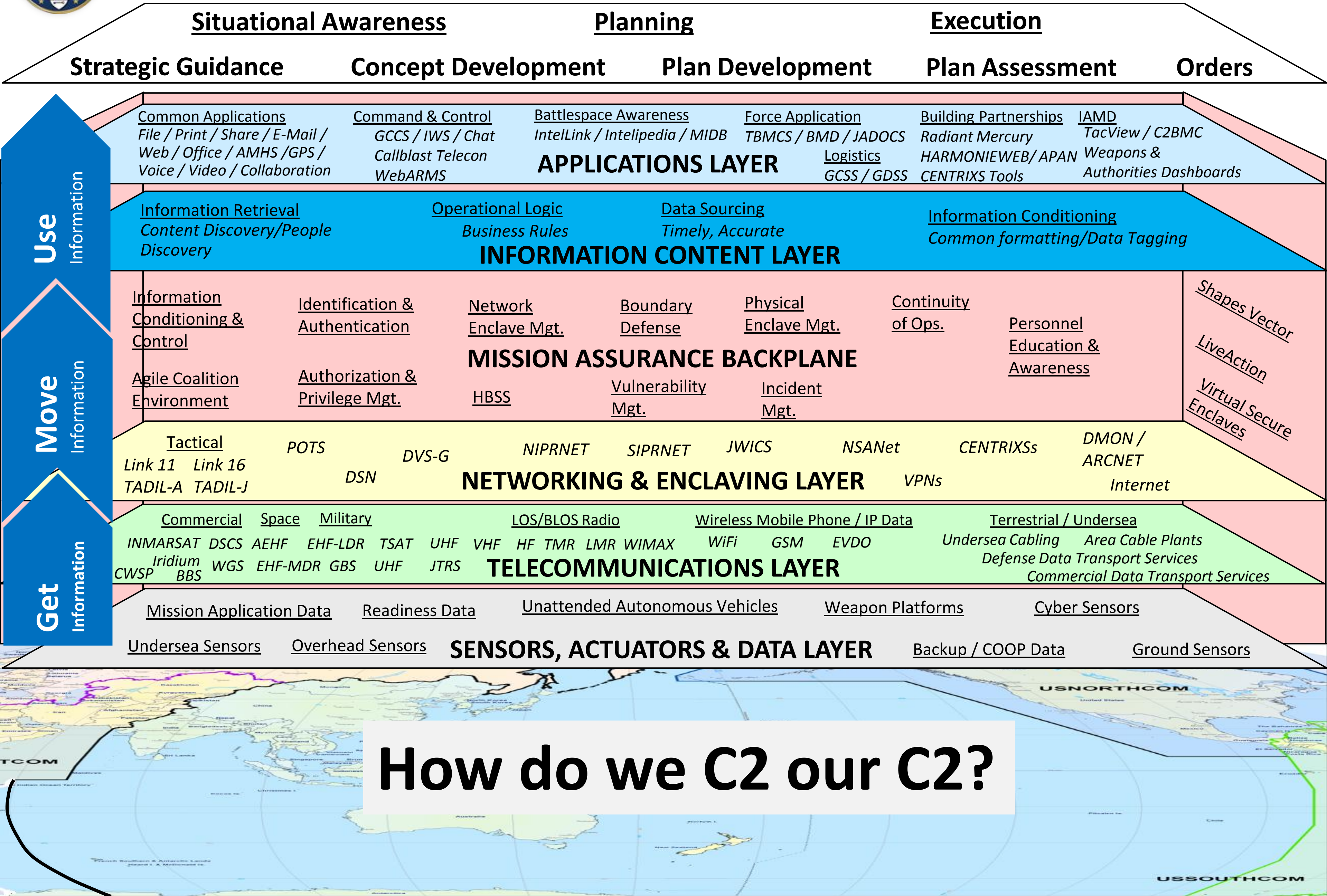
Operational C2 Architecture



Situational Awareness Planning Execution

Strategic Guidance Concept Development Plan Development Plan Assessment Orders

Use Information

Move Information

Get Information

APPLICATIONS LAYER

Common Applications
File / Print / Share / E-Mail / Web / Office / AMHS /GPS / Voice / Video / Collaboration

Command & Control
GCCS / IWS / Chat
Callblast Telecon
WebARMS

Battlespace Awareness
IntelLink / Intelipedia / MIDB

Force Application
TBMCS / BMD / JADOCS

Logistics
GCSS / GDSS

Building Partnerships
Radiant Mercury
HARMONIEWEB/ APAN
CENTRIXS Tools

IAMD
TacView / C2BMC
Weapons & Authorities Dashboards

INFORMATION CONTENT LAYER

Information Retrieval
Content Discovery/People Discovery

Operational Logic
Business Rules

Data Sourcing
Timely, Accurate

Information Conditioning
Common formatting/Data Tagging

MISSION ASSURANCE BACKPLANE

Information Conditioning & Control

Identification & Authentication

Network Enclave Mgt.

Boundary Defense

Physical Enclave Mgt.

Continuity of Ops.

Personnel Education & Awareness

Agile Coalition Environment

Authorization & Privilege Mgt.

HBSS

Vulnerability Mgt.

Incident Mgt.

Shapes Vector

LiveAction

Virtual Secure Enclaves

NETWORKING & ENCLAVING LAYER

Tactical
Link 11 Link 16
TADIL-A TADIL-J

POTS

DSN

DVS-G

NIPRNET

SIPRNET

JWICS

NSANet

VPNs

CENTRIXSs

DMON / ARCNET

Internet

TELECOMMUNICATIONS LAYER

Commercial Space Military
INMARSAT DSCS AEHF EHF-LDR TSAT UHF
CWSP Iridium BBS WGS EHF-MDR GBS UHF JTRS

LOS/BLOS Radio
VHF HF TMR LMR WIMAX

Wireless Mobile Phone / IP Data
WiFi GSM EVDO

Terrestrial / Undersea
Undersea Cabling Area Cable Plants
Defense Data Transport Services
Commercial Data Transport Services

SENSORS, ACTUATORS & DATA LAYER

Mission Application Data

Readiness Data

Unattended Autonomous Vehicles

Weapon Platforms

Cyber Sensors

Undersea Sensors

Overhead Sensors

Backup / COOP Data

Ground Sensors

How do we C2 our C2?

USCYBERCOM Mission and Operations

USCYBERCOM Mission: *USCYBERCOM plans, coordinates, integrates, synchronizes and conducts activities to:* ***direct the operations and defense of specified Department of Defense information networks*** *and; prepare to, and when directed,* ***conduct full spectrum military cyberspace operations*** *in order to enable actions in all domains, ensure US/Allied freedom of action in cyberspace and deny the same to our adversaries.*

Defend the Nation Against Strategic Cyber Attack

Operate and Defend DoD Information Networks (DoDIN)

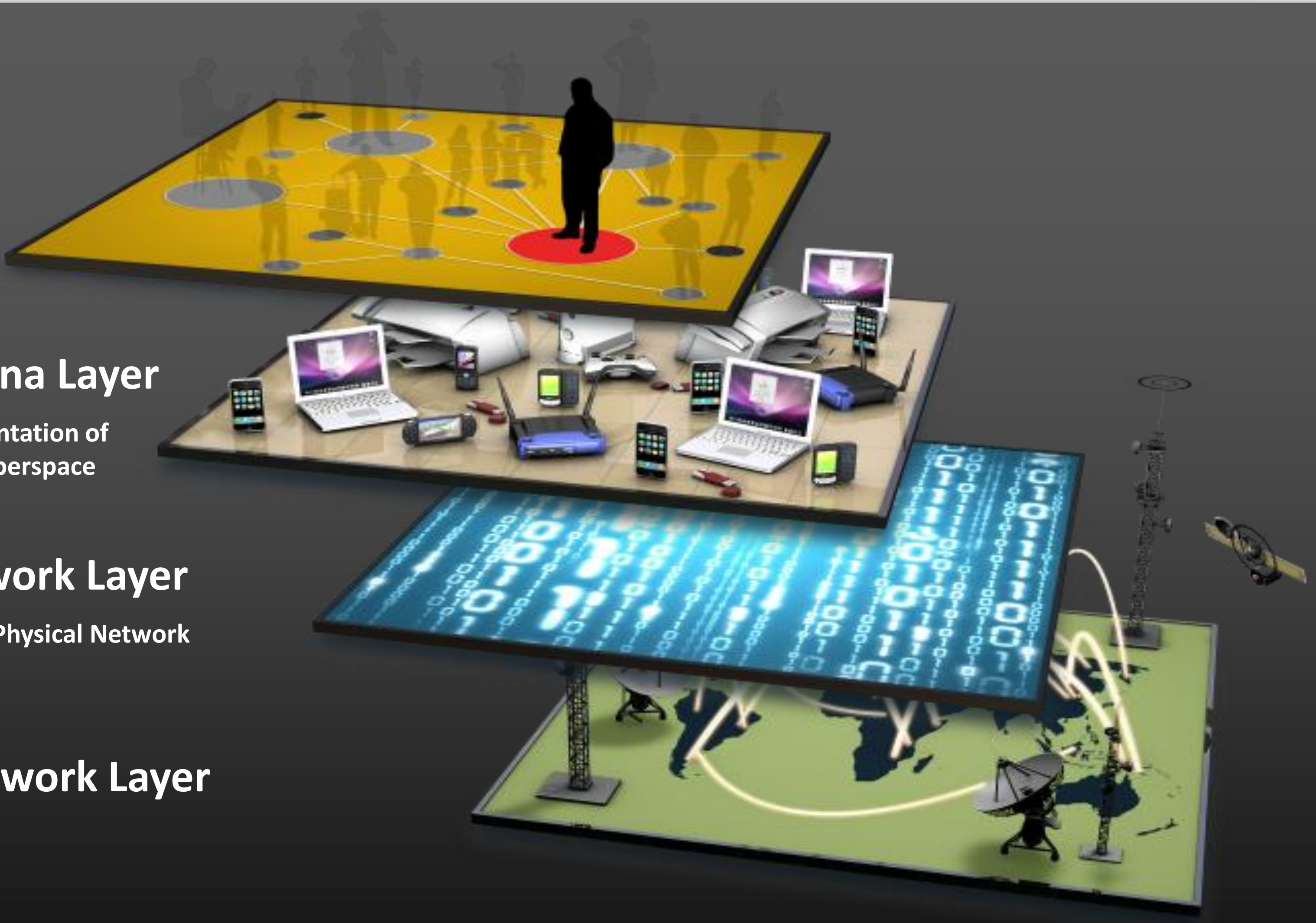
Combatant Command Support

National Mission Teams

DISA/Services Cyber Protection Teams

Combat Mission Teams

The Three Layers of Cyberspace



People

Cyber-Persona Layer

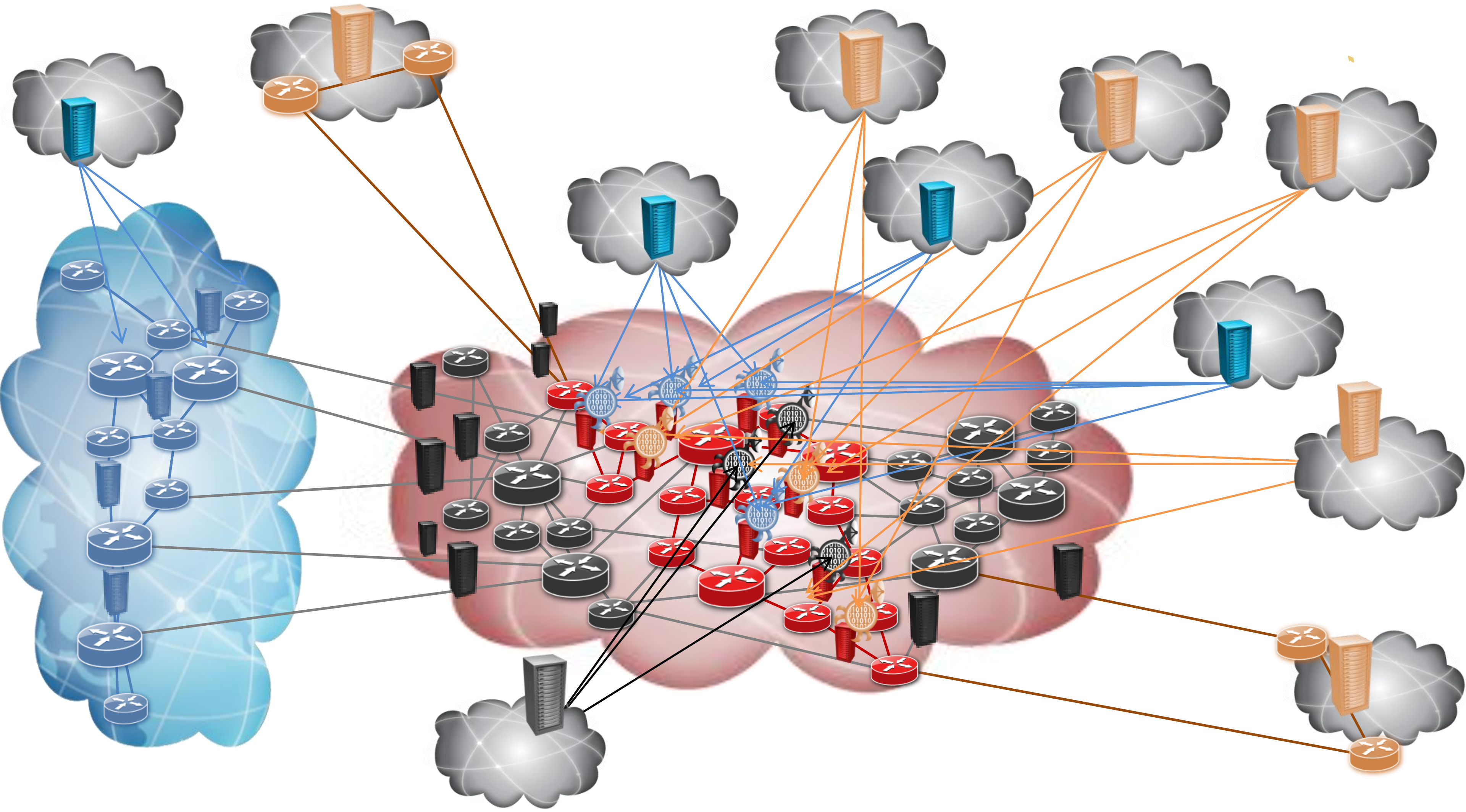
- Digital representation of an entity in cyberspace

Logical Network Layer

- Abstract from Physical Network

Physical Network Layer

Cyber Terrain



Cyberspace Operations

Per Joint Publication 3-12 (05 FEB 2013)

DoDIN Global Operations

*Network focused

Defensive Cyberspace Operations (DCO)

DCO – Internal Defensive Measures (DCO-IDM)

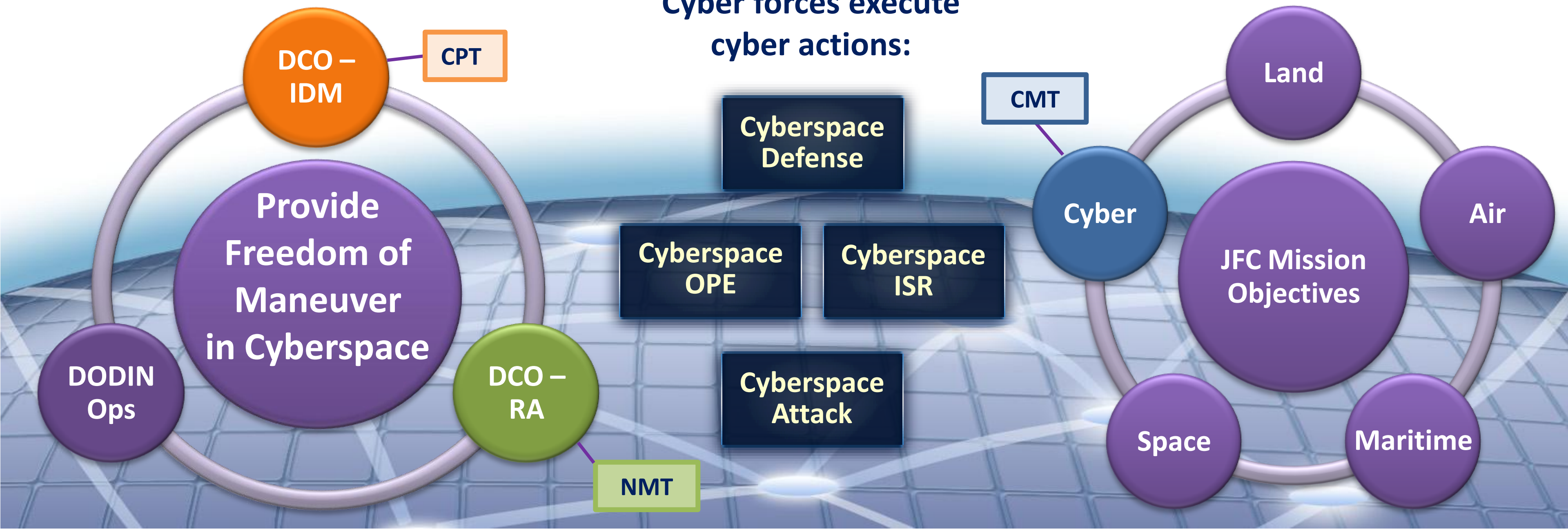
* Mission focused

DCO – Response Actions (DCO-RA)

* Mission focused

Offensive Cyberspace Operations (OCO)

* Project power in and through cyberspace.



Cyber forces execute cyber actions:

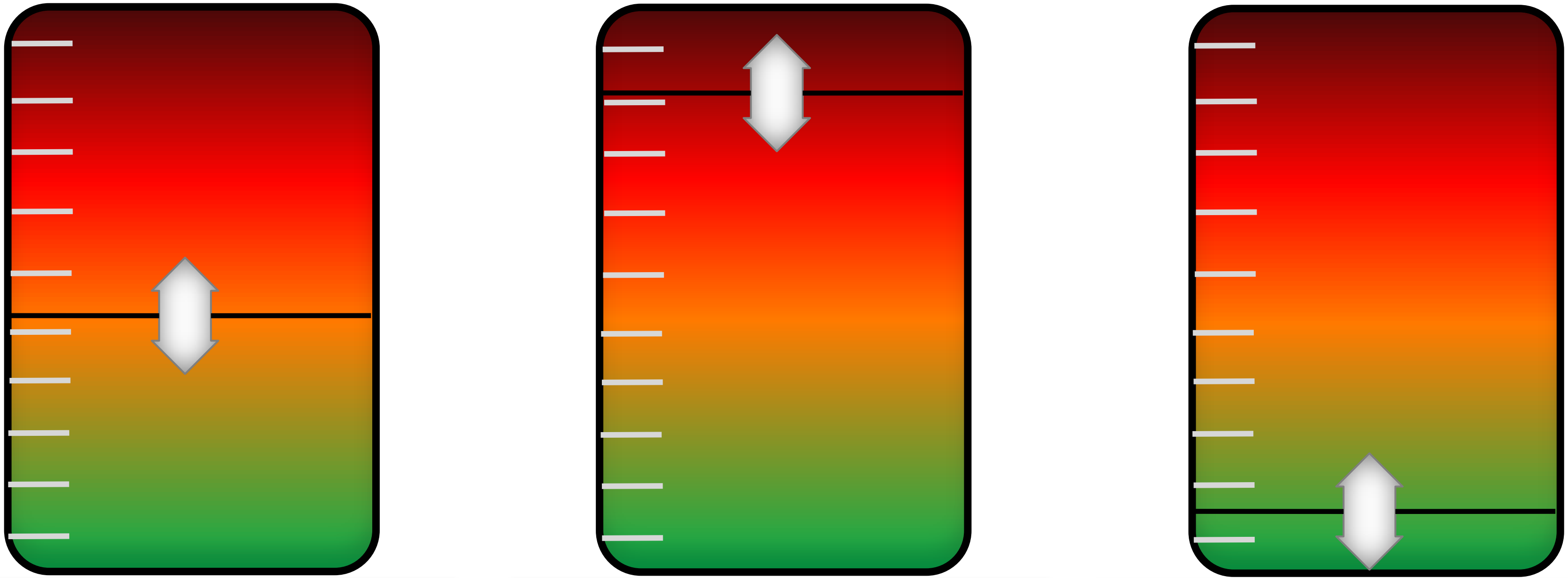
Cyberspace Defense

Cyberspace OPE

Cyberspace ISR

Cyberspace Attack

Preserve Friendly Freedom of Maneuver in Cyberspace



DoD Information Networks Global Operations (DoDIN Global Ops)

LIMITS

- Network performance

Defensive Cyberspace Operations – Internal Defensive Measures (DCO-IDM)

LIMITS

- Identify Key Cyber Terrain
- Link vulnerabilities to threat
- Capability and capacity
- Authorities

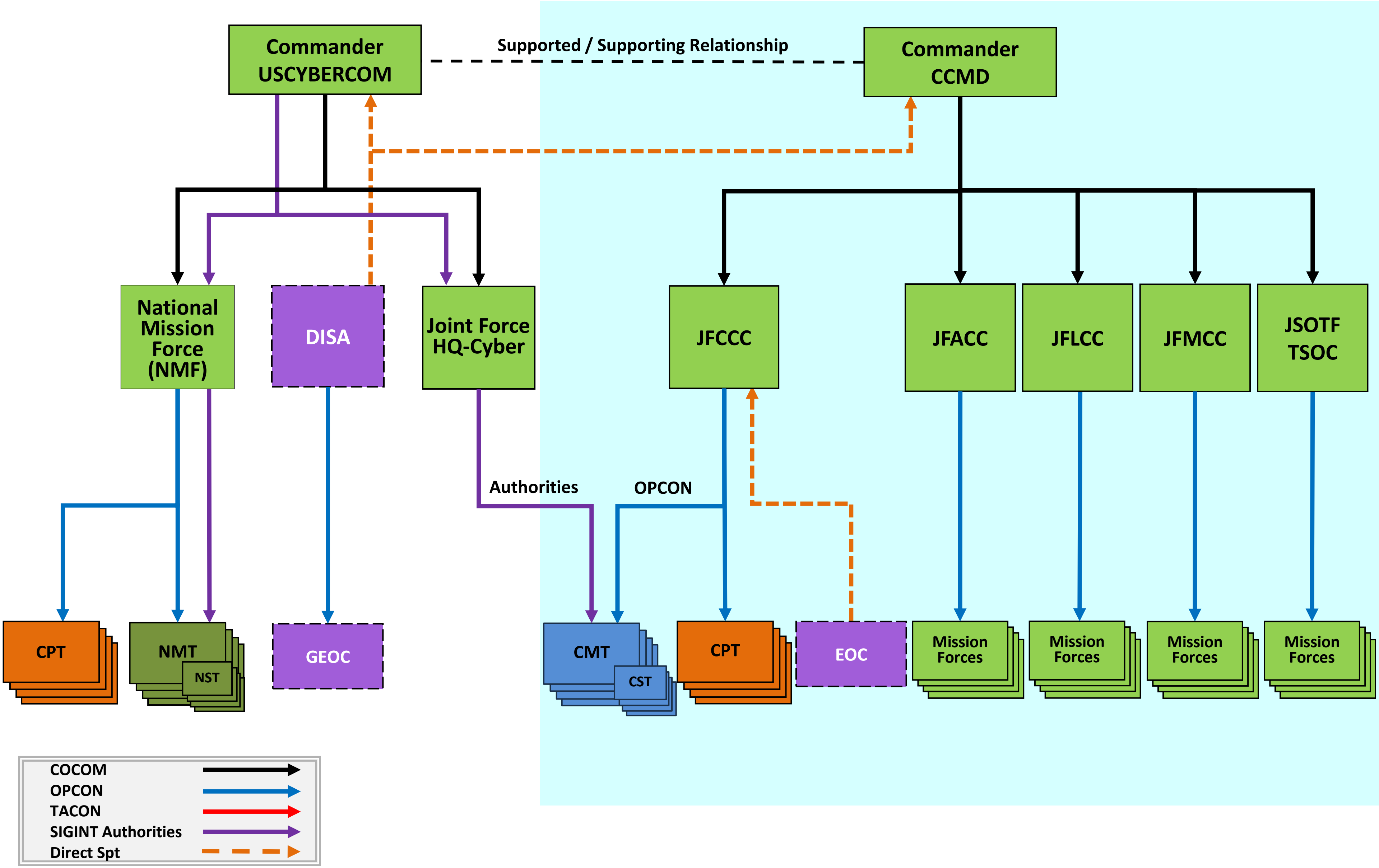
Defensive Cyberspace Operations – Response Actions (DCO-RA)

LIMITS

- Policy
- Rules of Engagement
- Authority

- Intelligence
- Access
- Capability

An Option for Cyber C2



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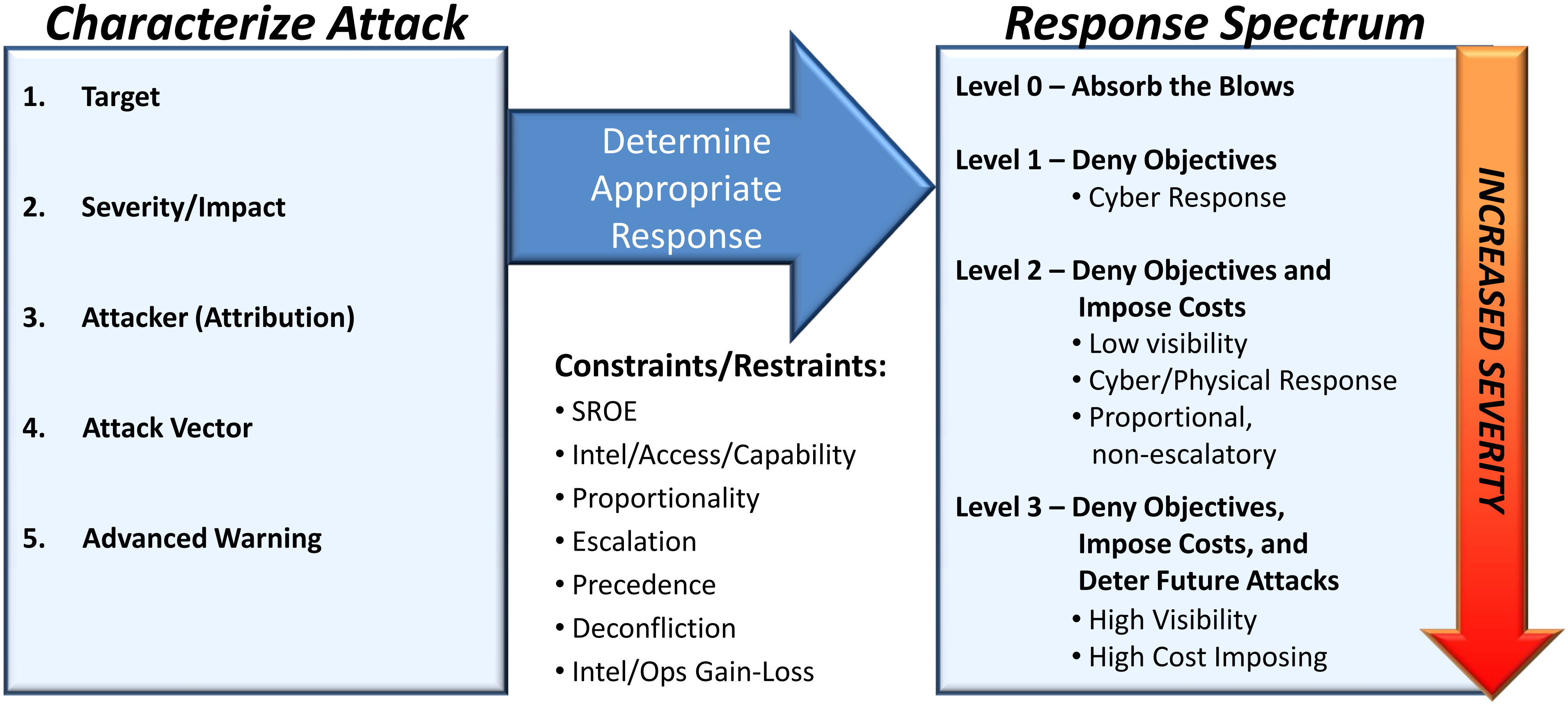
Analytic Framework for Responding to Cyber Attack Against the U.S.



Characterize Attack

1. Target
2. Severity/Impact
3. Attacker (Attribution)
4. Attack Vector
5. Advanced Warning

Determine Appropriate Response

Constraints/Restraints:

- SROE
- Intel/Access/Capability
- Proportionality
- Escalation
- Precedence
- Deconfliction
- Intel/Ops Gain-Loss

Response Spectrum

Level 0 – Absorb the Blows

Level 1 – Deny Objectives

- Cyber Response

Level 2 – Deny Objectives and Impose Costs

- Low visibility
- Cyber/Physical Response
- Proportional, non-escalatory

Level 3 – Deny Objectives, Impose Costs, and Deter Future Attacks

- High Visibility
- High Cost Imposing

INCREASED SEVERITY

- ***Time (+target/severity) drives requirement for pre-approved, pre-planned actions.***
- ***Response execution by agency with capability and capacity, then align authorities.***