



Next-Generation C4ISR

Decision-making in the Digital Age

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**NII/CIO
Enabling Net-Centric Operations**





Traditional C4I

A Working Definition

Command: The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission.

Control: Authority...exercised by a commander over part of the activities of subordinate or other organizations...with the intent to assure that an agent or group will respond as directed

Computing & Communications: Enabling technologies for Command and Control...computers and communications process and transport information

Intelligence: Result of collection, processing, integration, analysis, evaluation, and interpretation of available information concerning foreign countries, areas or adversaries

Source: *Joint Pub 1-02*





Traditional C2

Some Common Assumptions

The flow of information follows the chain of command

Information should be restricted to achieve security

Centralized Command – Decentralized Control

Unity of Command is the *sine qua non* of C2

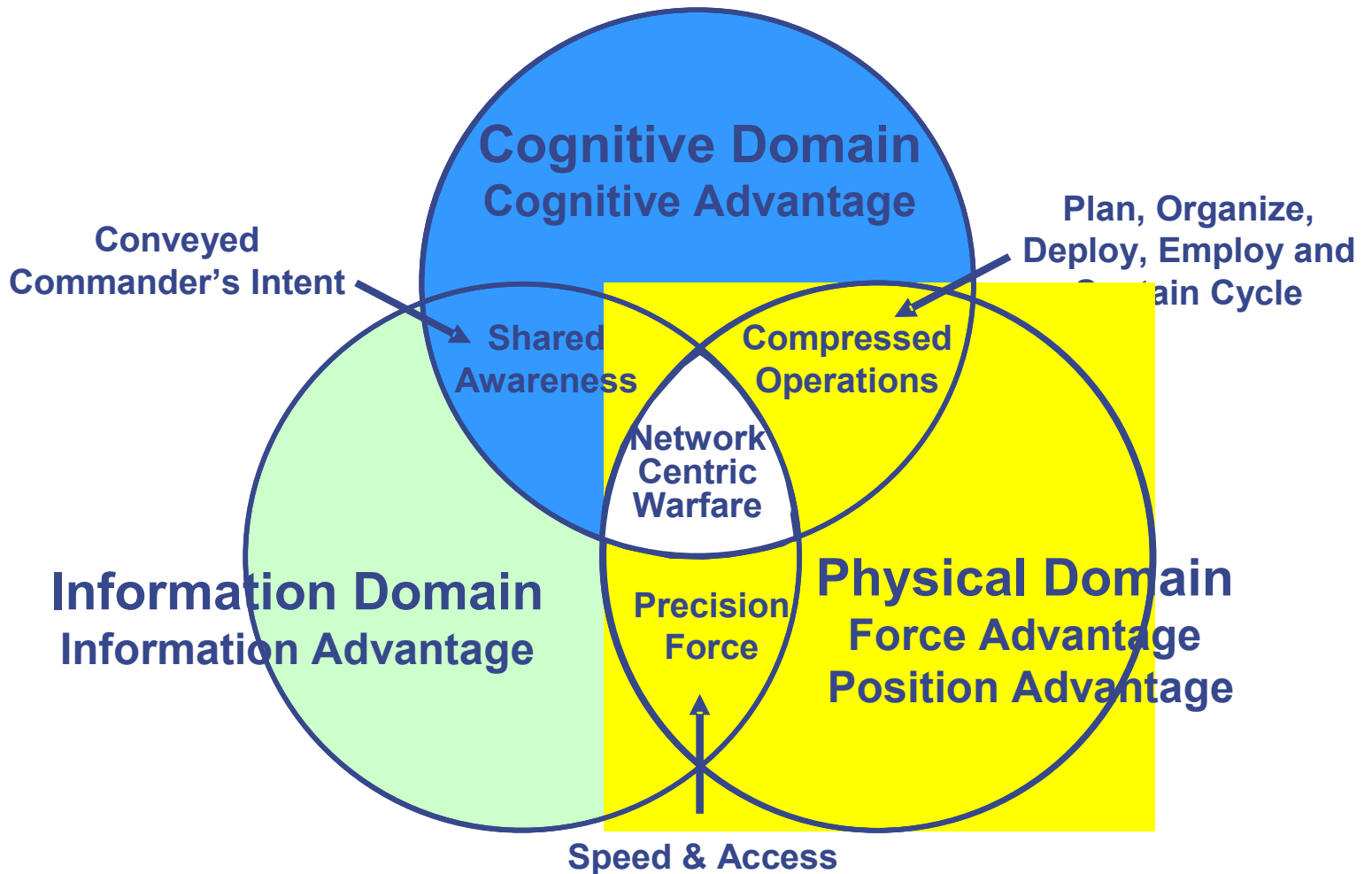
Without Commanders there is no C2





Information-Age Warfare

Domains of Conflict





Expanding Military Roles / Demands

Facing the Imperative to Act

- The “CNN Effect” – driving expectations, compressing time
- 24hr News Cycle – shaping perceptions, staying ahead

The Move to Coalition Operations

- Tough problems demand increasingly broad engagement
- In conflicts and crises effective partnerships are critical

Shared Information & Awareness

- Working w/ partners to take action in crisis and conflict
- Capacity to act increasingly depends on GLOBAL support

Coalition Operations Demand Tailored C2





Transforming C4I Capabilities

Meeting 21st Century Challenges

Emerging Missions / Responses

- Missions: Traditional Warfare, Terrorism, Relief Operations
- Response: Building capacity / bringing power to the edge

Supporting Operations, Confronting Threats

- Enemies are increasingly irregular / terrorist
- Diverse, often competing coalitions are engaged

New Roles: Security, Stability & Reconstruction

- Addressing issues **BEFORE** violence erupts
- Non-military organizations are key players

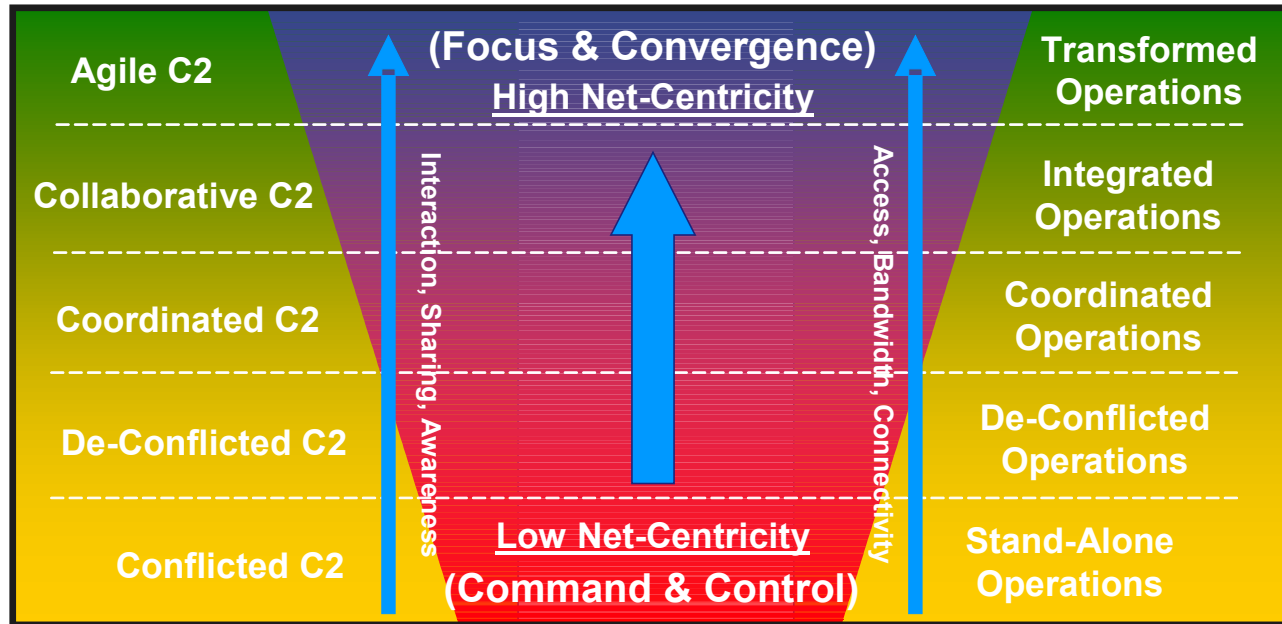
A New Way of Thinking: Focus & Convergence





A New Approach to C4I

Focus & Convergence vs. Command & Control



Collaborative Planning & Execution

Can't foresee everything – seek agility and increased awareness

Transformed Mission Operations

Disseminate information, emphasize interoperability w/ partners

Leveraging Net-Centric Capabilities

Pushing intent and awareness to the edge





The Next Generation of C4I

A Way Ahead for Coalition Operations

Today's leaders & soldiers are computer literate and use digital technologies to their advantage for situational awareness and superior decisions making

Implement Net-Centric Technologies

- Information must be discoverable, accessible & understandable
- Security must be **BUILT-IN** not bolted-on...not an afterthought
- Standards based solutions (emphasize IP / Web capabilities)
- Data-transport over fiber optics / satellites / tactical RF

Lay the Cornerstones for Success

- Reinforce trust in coalition partners & relationships
- Improve collaboration among partners
- Increase bandwidth to the edge
- Create agile organizations





Tenets of Net-Centric Warfare

A Hypothesis Regarding Sources of Power

Extending the Benefits of Net-Centric Operations

- A robustly networked force improves information sharing
- Information sharing & collaboration enhance the quality of information and enable shared situational awareness (SA)
- Shared SA enables collaboration & self synchronization, enhances sustainability, and increases speed of command
- These in turn dramatically increase mission effectiveness

Eliminating Traditional C2 Limitations / Shortfalls

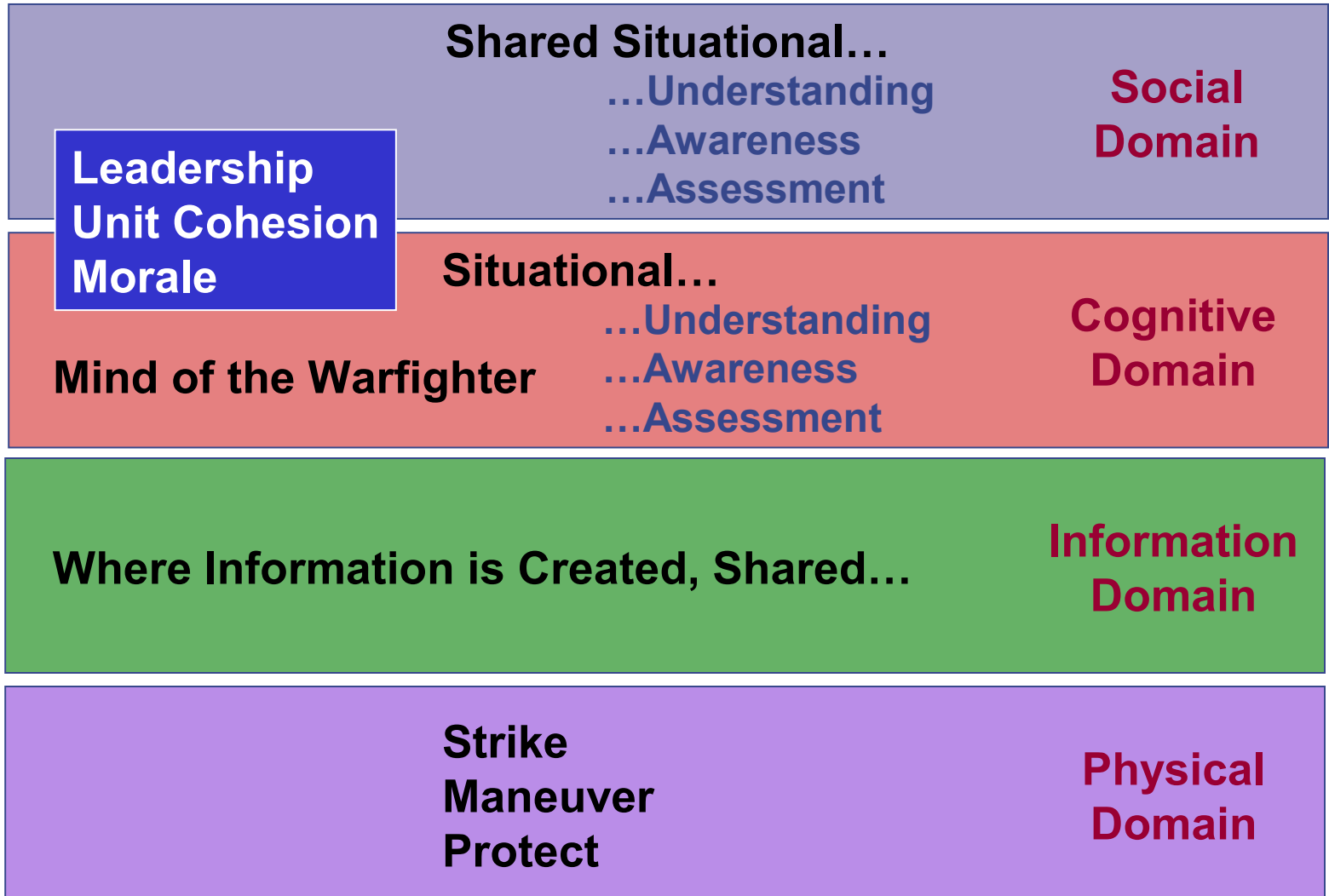
- Focus on pre-selected concepts and circumstances
- Slow, ineffective response to unexpected events
- Gaps & seams in responsibilities and actions
- Reliance on serial decision-making process
- Constrains on information access / flow





Domains of Warfare

Social, Cognitive, Information & Physical



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Thank You



Backup Slides



Perspectives on C4I Evolution

Ensuring Success in the Face of Uncertainty

Influences outside the military community

- The impact of Globalization
- The influence of Cyberspace
- Expanding missions, roles and demands

Responses within the military community

- Transforming C4I capabilities (missions, operations, roles)
- Increasing organizational agility – a new C4I approach
- Re-aligning the culture of C4I





Globalization: C4I Risks & Opportunities

Hardware & Software often sourced internationally

- Issues and concerns:
 - 1.) Foreign Mergers & Acquisitions increasing
 - 2.) R&D / manufacturing investments growing
 - 3.) Corporate alliances w/ foreign partners up
- Reduced transparency in corporate actions
- Greater risk of supply-chain based attacks

IT Services & Ops Centers increasingly outsourced

- Foreign companies often oversee network infrastructure
- Exposure of networks to unknown actors is increasing
- Govt. / private partnerships are critical to security

--- BUMPER STICKER ---





Cyberspace Challenges to C4I

Networks tie our “Global Society” together

- Distant events have a local feel (e.g. Katrina, Indonesian Tsunami)
- Knowledge of tragedy, suffering, disaster, all spread quickly

Our information... valuable *and* vulnerable

- Secrets (Military, Intellectual, Economic) – espionage
- Personal Identities and Identity Theft – criminal acts
- Estonia Cyber attack – information can be denied

Cyber-Security... a high priority

- Resilient infrastructure & information security strategies are key
- Integrity of Command & Control networks/data is critical
- Solutions require international community engagement
- Need a consistent foundation for global cyber-law

