



Transforming National Security

Information Age

“A Future Worth Creating”

Globalization II

Globalization III

Vision: Broad and Sustained Competitive Advantage

- ***Strategy***
- ***Capabilities***
- ***Cost/Metrics***

Industrial Age

Terry J. Pudas
Acting Director, Force Transformation



Transforming Defense

...The Concept

Elements of Transformation

- ✓ Continuing process
- ✓ Creating/anticipating the future
- ✓ Co-evolution of concepts, processes, organizations, and technology
- ✓ New competitive areas/competencies; revalued attributes
- ✓ Fundamental shifts in underlying principles
- ✓ New sources of power
- ✓ Changing attitudes, values, beliefs

- *New Strategic Context*
- *Broadened Threat Context*
- *Technological Threats Facilitated by Falling Barriers to Competition*

"The ultimate competitive advantage lies in an organization's ability to learn and rapidly transform that learning into action."

Jack Welsh



Transforming Defense

...Compelling Need

- **New strategic context**

New Theory of War based on information age principles and phenomena

New relationship between operations abroad and homeland security

New concept/sense of security in the American citizen

- **Broadened threat context**

State/Non-State

Symmetric/Asymmetric

Traditional/Unrestricted

- **New technological threats facilitated by the falling barriers to competitive entry**

Immediate accessibility to highly capable low cost IT

Opens key operational domains to competition: space, sea, cyberspace

To the extent we do not transform, we are at risk



Transforming Defense

...Elements of Strategy

- Transform from Industrial Age to the Information Age
Implement Network Centric Operations
- Ensure sustained competitive advantage
Assure Allies
Dissuade competitive entry
Underwrite deterrence
Implement countervailing strategies
- Broaden the capabilities base
Operational, Technical, Industrial
Create new competitive areas
Revalue competitive attributes for the information age
Decrease capabilities cycle time
- Leverage advantages and opportunities
Manage the devolution of “sunset” capabilities and processes

Achieve Speed and Agility vice Optimization



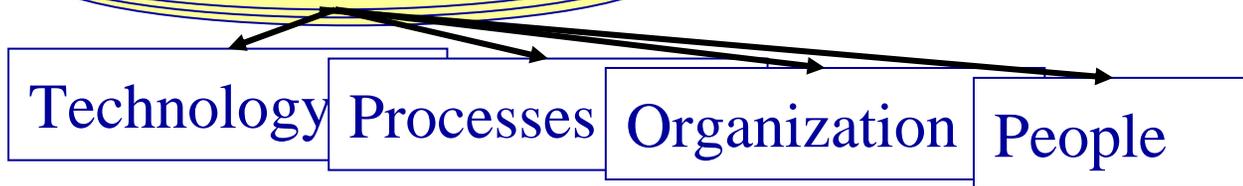
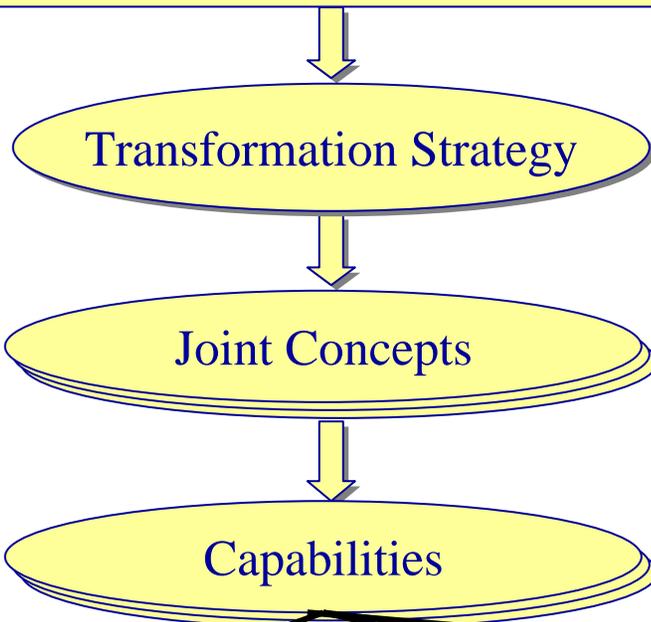
Transforming Defense

...Methodology

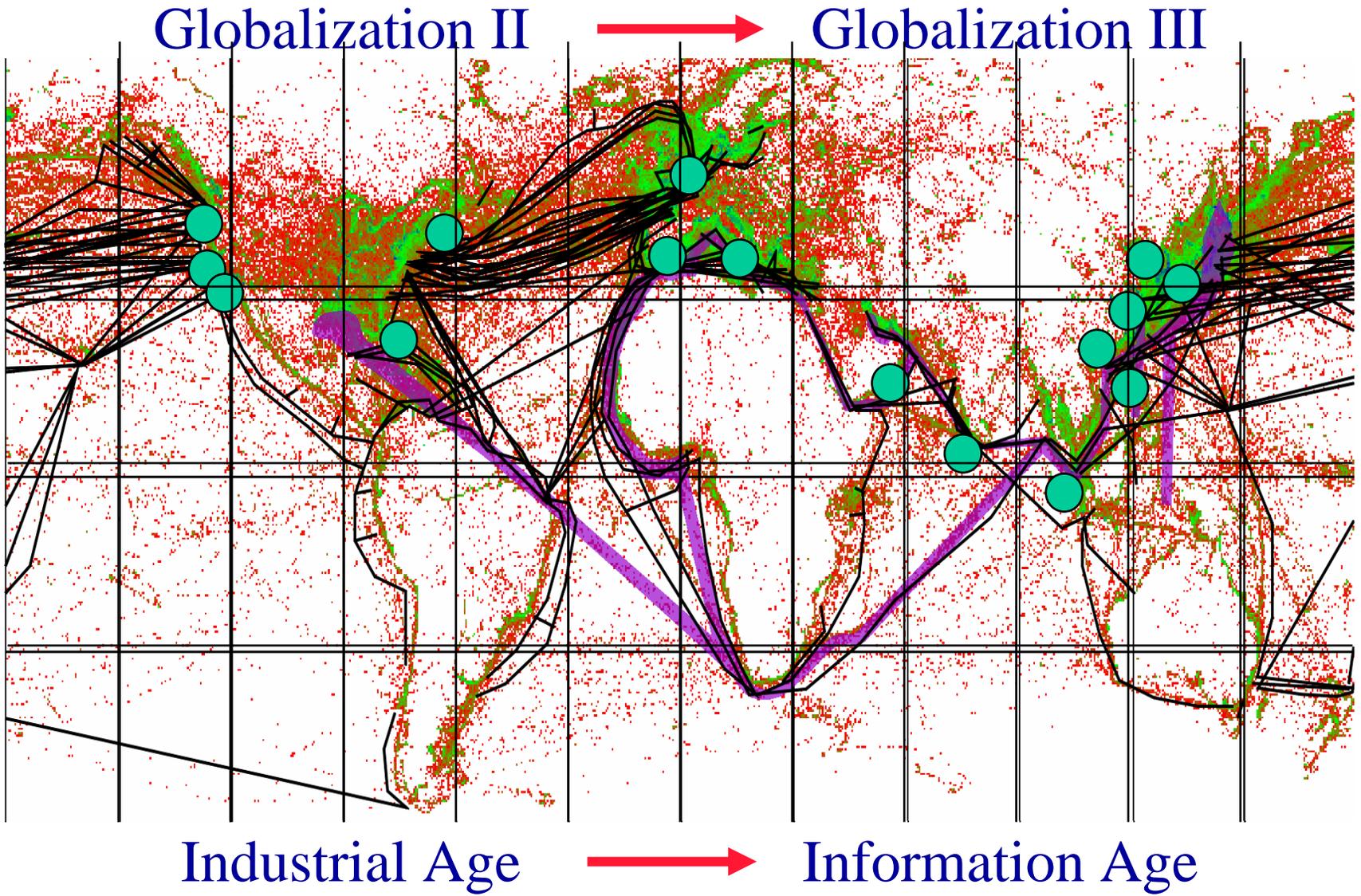


Operational Goals

- Protecting Bases
- Conducting Info Operations
- Project & Sustain U.S. Forces
- Denying Enemy Sanctuary
- Conducting Space Operations
- Leveraging Info Technology



Global Trends





Trends in Security Competition

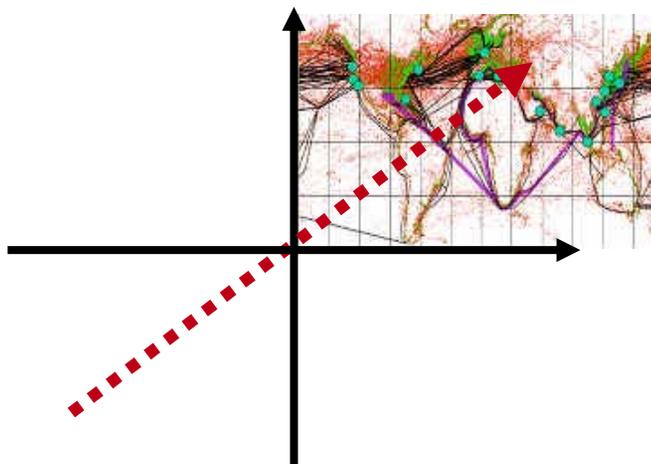
Information Age

- Short Cycle Time
- Mass Customization
- Adaptive Planning
- Interdependence

Globalization II

(1947 – 199X)

- Developed Rules
- Mature Markets
- Narrowing Customer Base
- Security = Defense



Globalization III

(199X – 20XX)

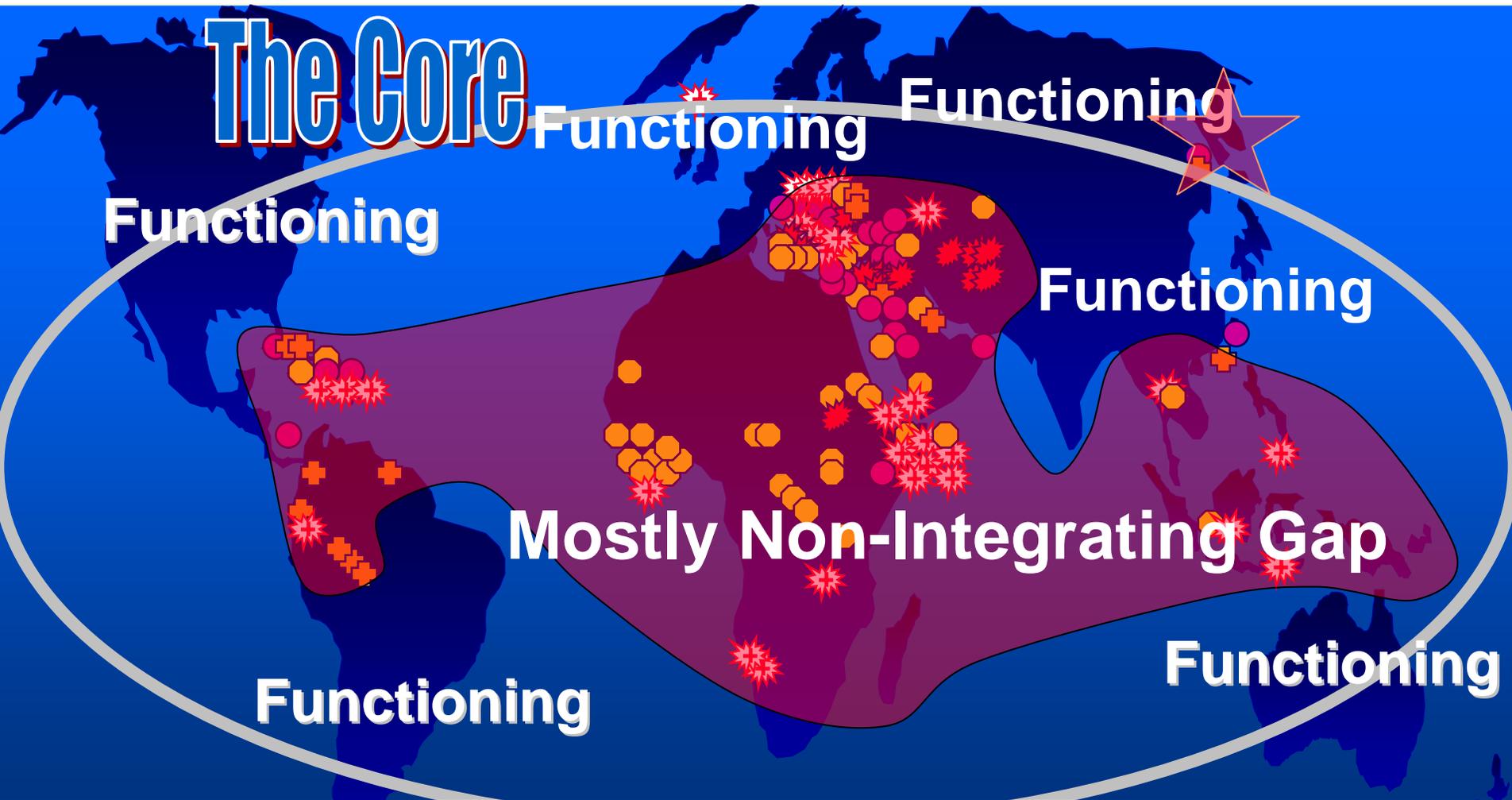
- Emerging Rules
- Market Opportunities
- New Customer Base Emerging
- Security = All Else + Defense

Industrial Age

- Long Cycle Time
- Mass Production
- Deliberate Planning
- Tortured Interoperability



Globalization III



The Core

Functioning

Functioning

Functioning

Functioning

Mostly Non-Integrating Gap

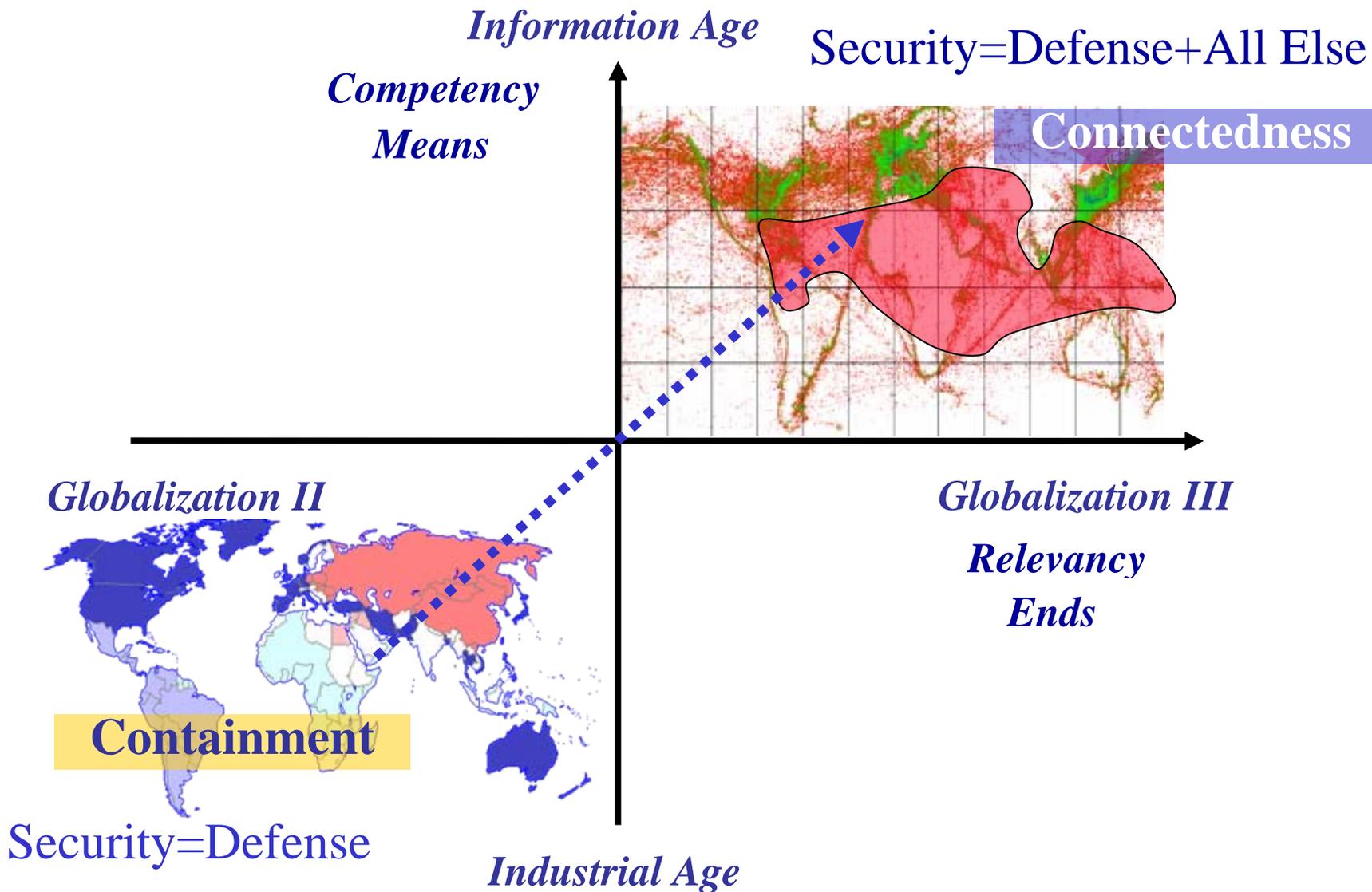
Functioning

Functioning

U.S. Military Responses to Situations, 1990-2002

- Evac's
- Peace/Relief
- Contingency Positioning
- Show of Force
- Combat

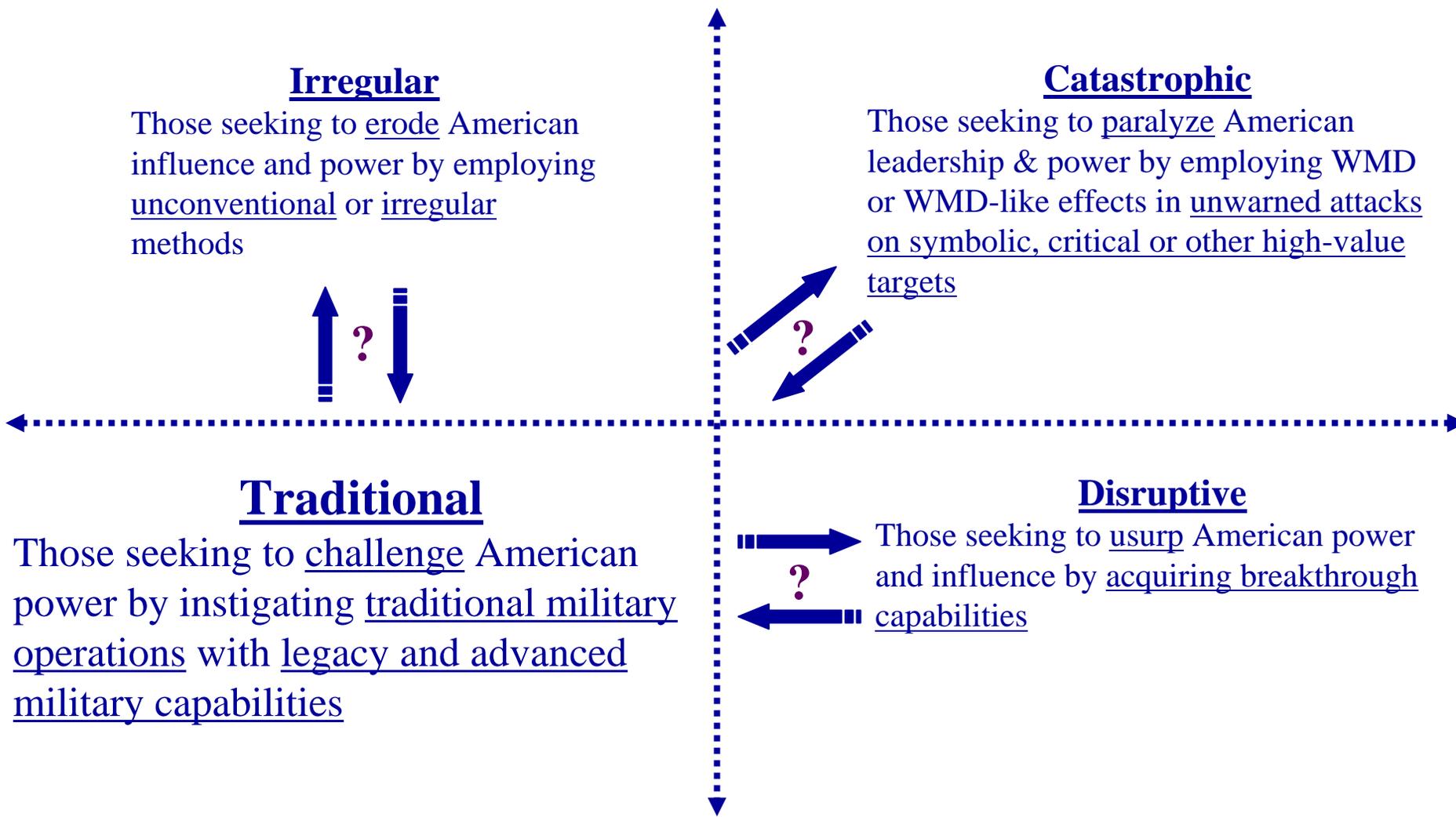
Shifting Strategic Imperatives





Security Environment

... *Four Challenges*



No hard boundaries distinguishing one category from another



Disruptive Security Challenges

...The Approach

Narrow Range of
Disruptive Challenge with
Improved Intelligence

Improve Responses to
Disruptive Challenge with
more Force Flexibility

Dissuade Attempts at
Disruptive Challenge by
Accelerating Transformation



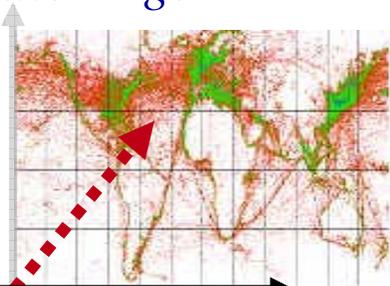
Global Trends...Threats

...Strategic Response

Strategic Capabilities:

- *More preventative - less punitive*
- *Achieve unambiguous warning earlier*
- *More Special Operations like characteristics*
- *An intel / surveillance-based force*
- *Interoperability/interdependence*
- *Coping with Systems Perturbations*

Information Age



Globalization II

Globalization III

Industrial Age

System
State
Individual

	----- [Great Power War?] -----			
	Political Ideology	Hated Dictator	Hated Dictator w/Nukes	Nuclear Nationalists
	Narco-terrorists	Regional Terrorists	International Terrorists	SEI*

*** Super-Empowered Individual**



Transforming Defense

... Characteristics of the Future Joint Force

This is the age of the small, the fast, and the many.

Small: Power and size are uncoupled

Fast: A shorter response with a faster rise time more precisely placed in time and space

Many: The power of the collective at lower cost over a larger area

Rebalance for the information age

“Demassification” through increased information fractions

*Simplification through adaptive relocation of complexity & the human
Networked components vice integrated systems*

Operations based on assured access, information superiority,
control of initial conditions and rates of change

A priori access to the domains of conflict

Secure a superior information position and convert it to a competitive advantage

Leverage the path dependency of conflict

Corporate change based on co-evolution and continuous
adaptive acquisition



Top Level Issues

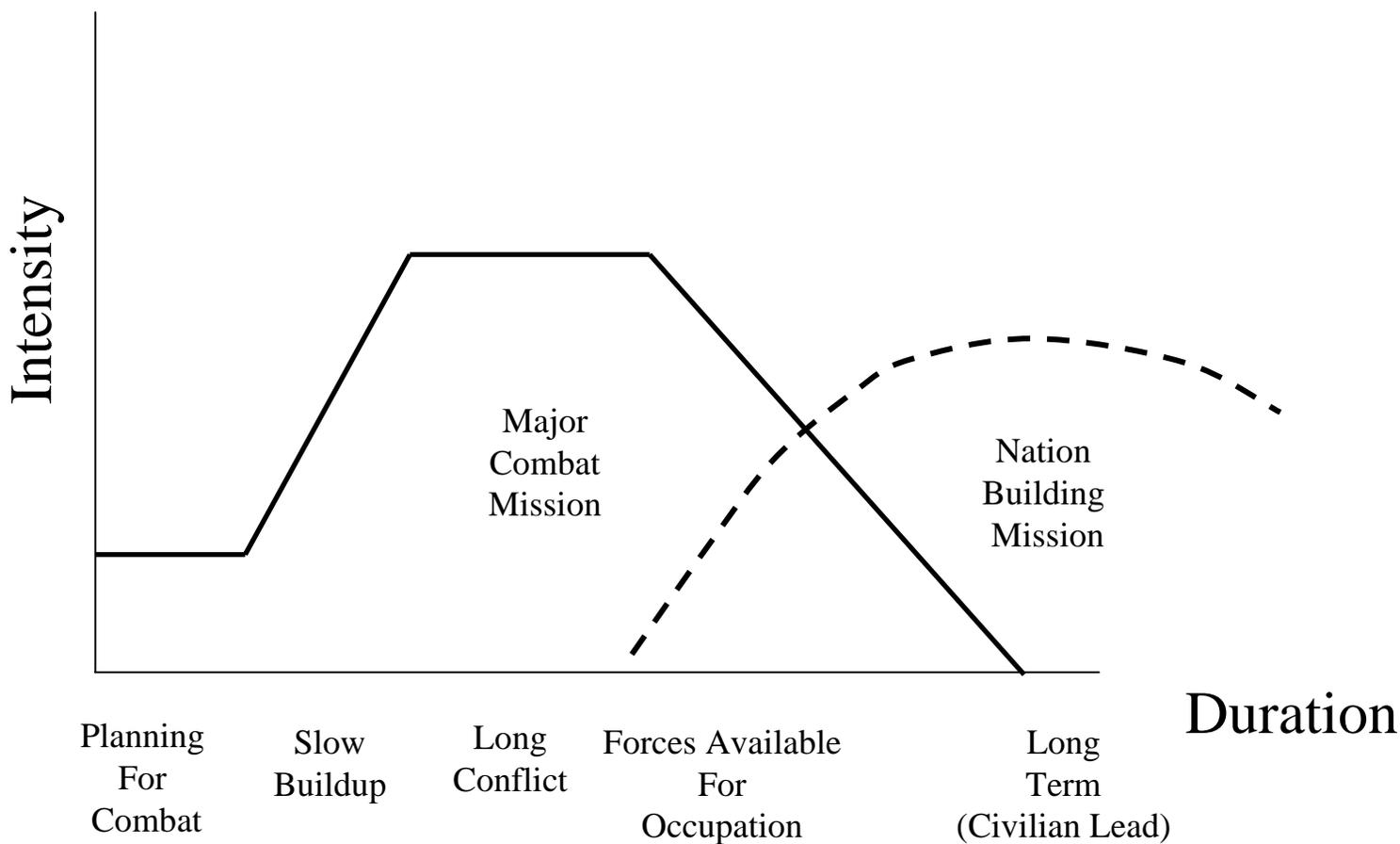
...Culture: Values, Beliefs, Attitudes





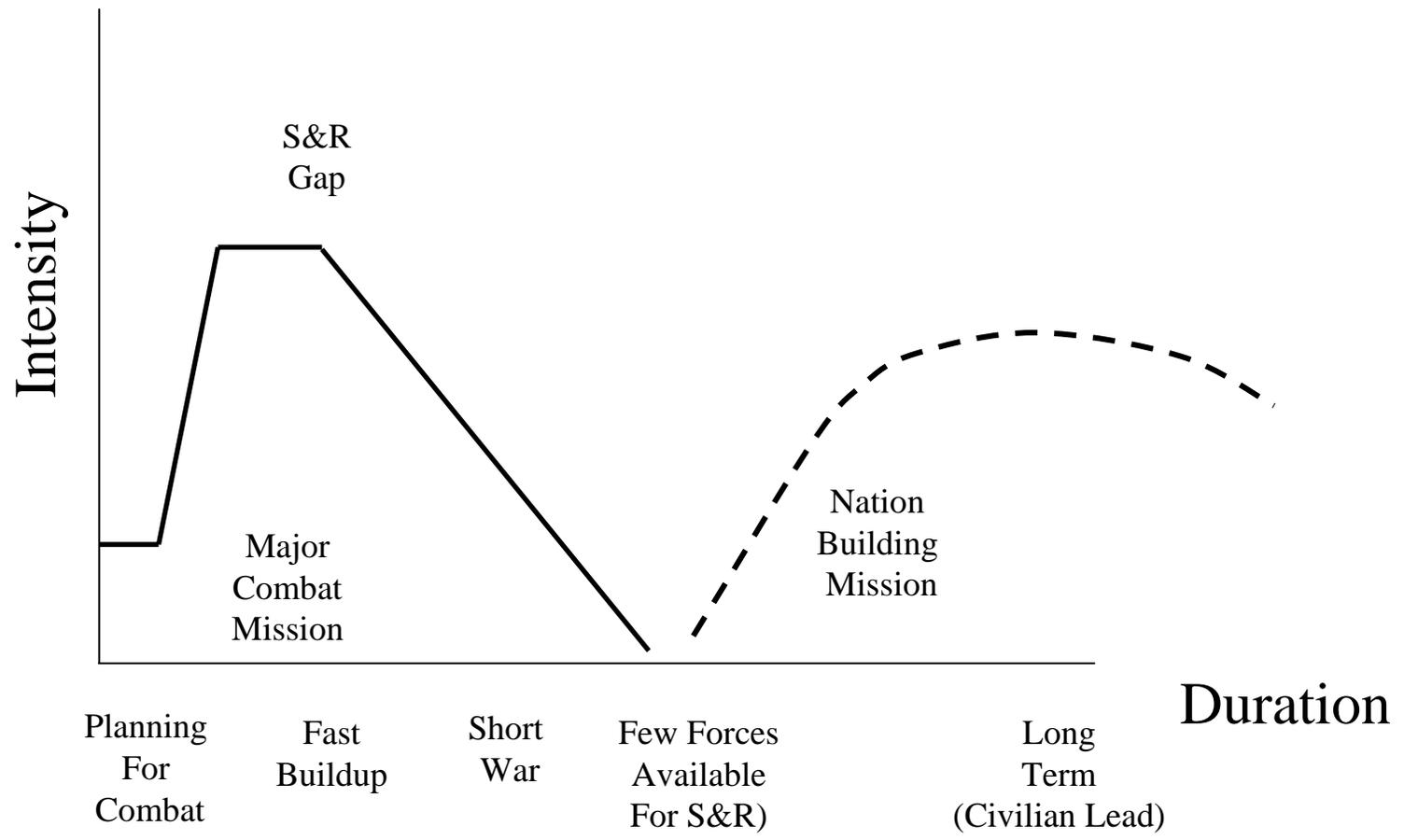
The Stabilization Mission Gap

... Traditional Model



The Stabilization Mission Gap

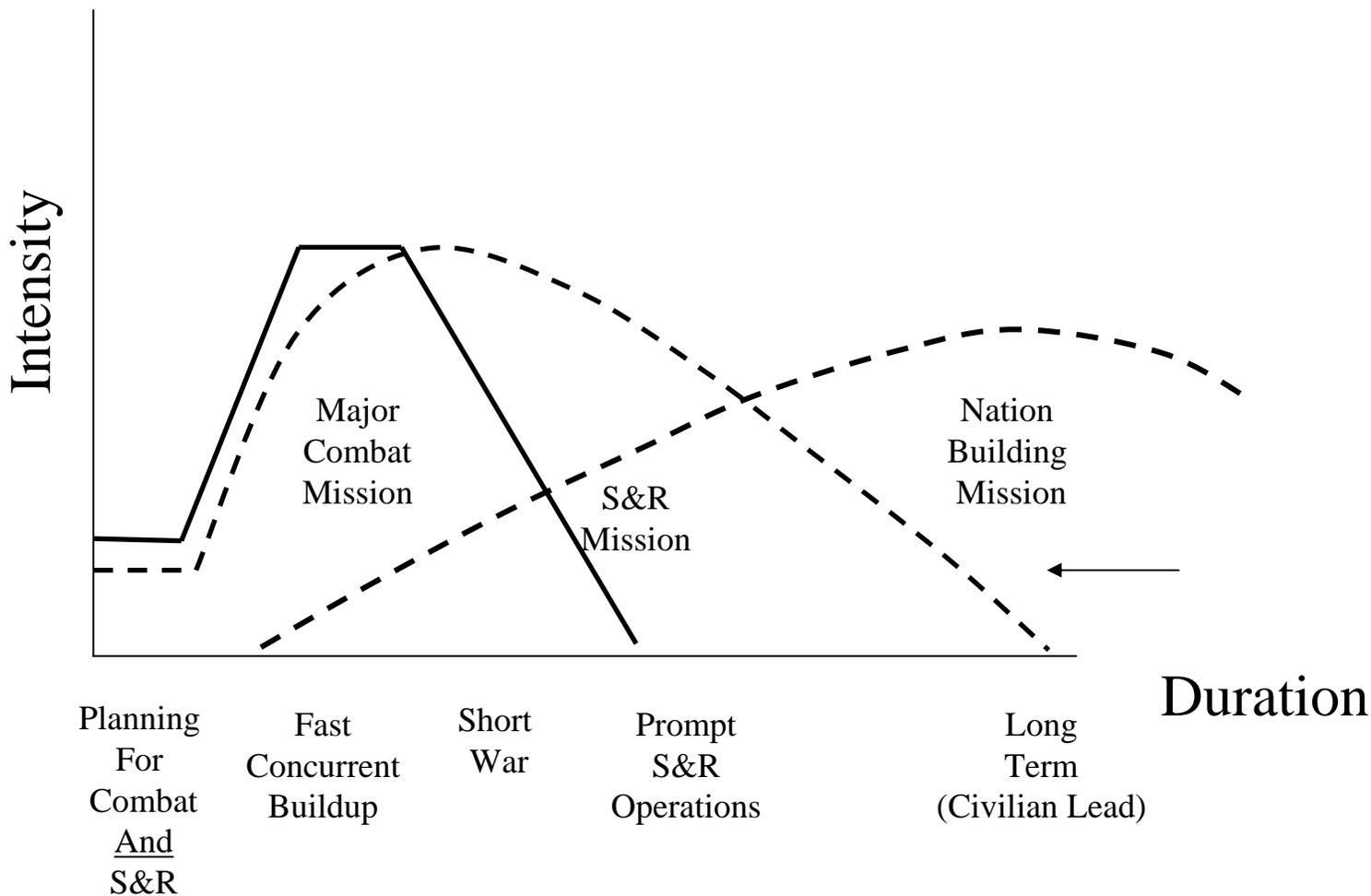
... New Challenges





The Stabilization Mission Gap

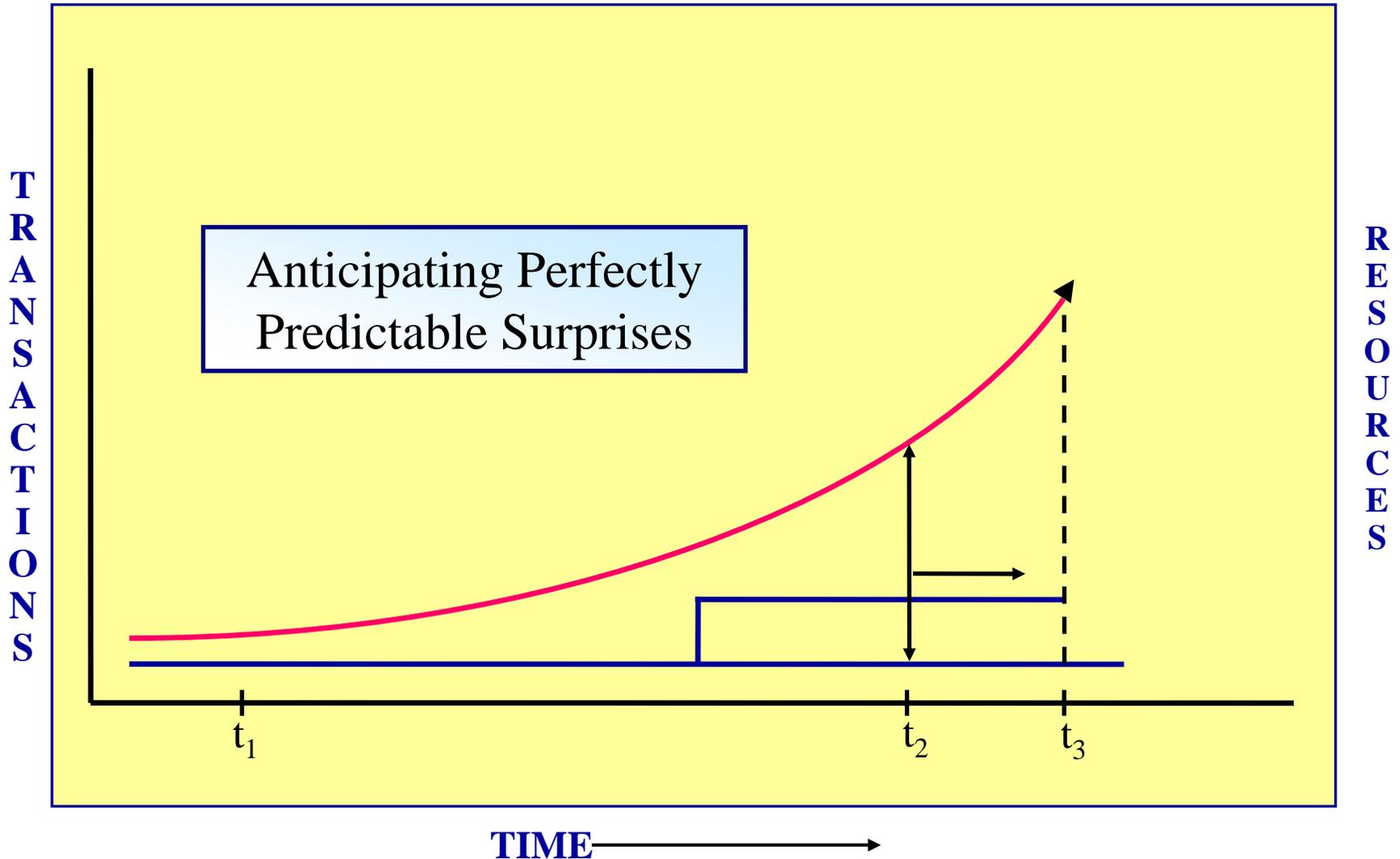
... Transformed S&R Capability





Informing Transformation

...Transactions vs. Resources

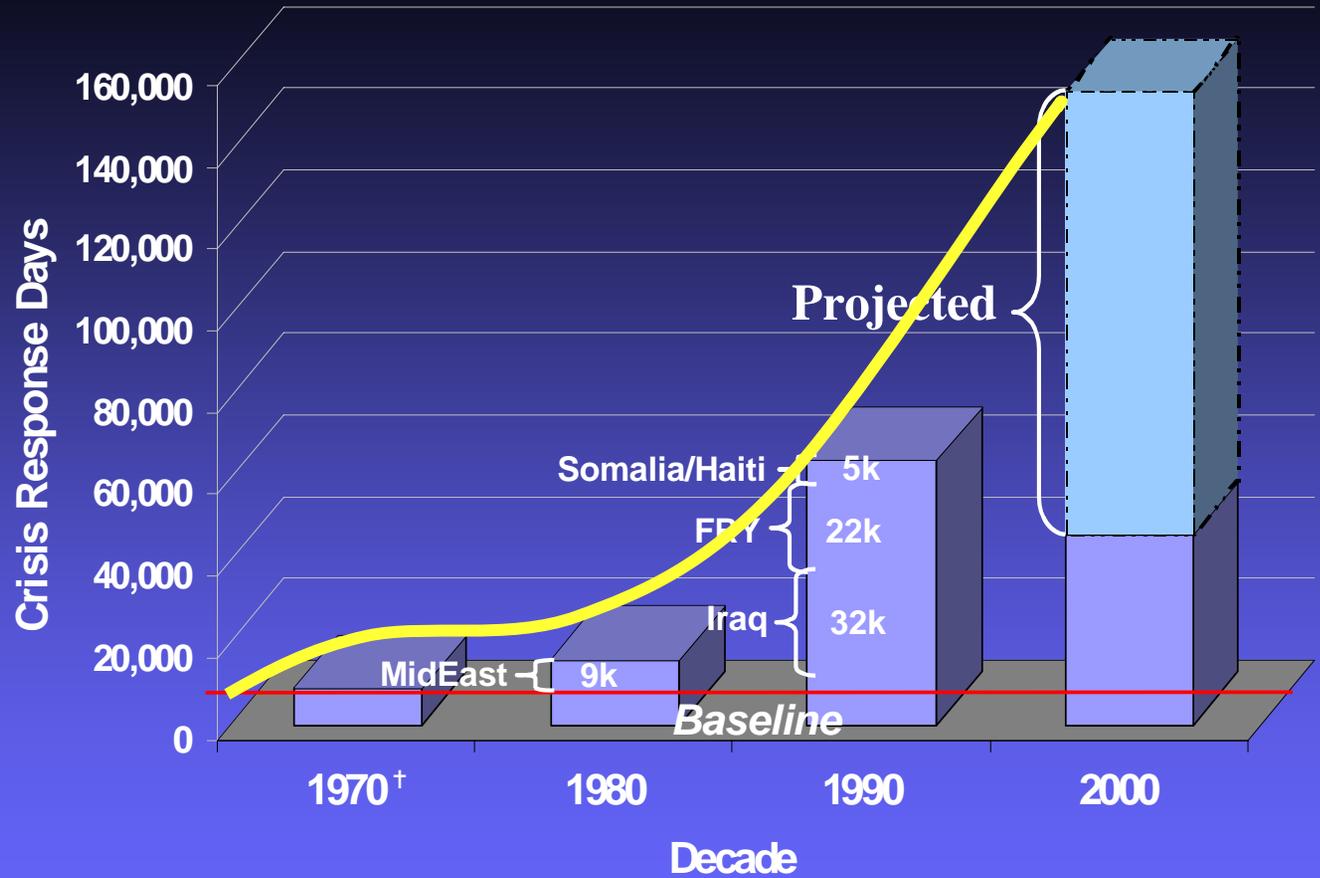




Global Trends and Implications

Policy Choices:

- *Engagement Policy*
- *Substitution of Capital for Labor*
- *Civil Component of National Security*
- *Allied / International Component*



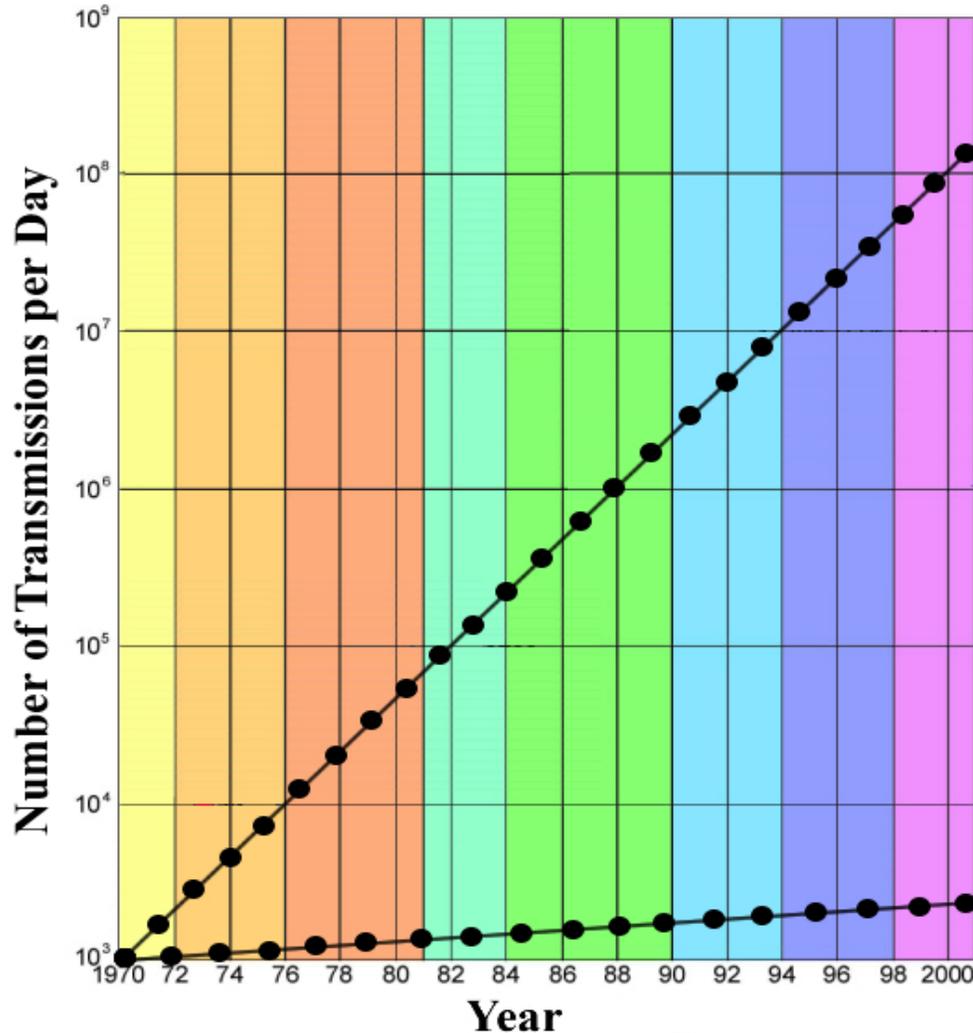
⁺ Excludes Vietnam War

* Total number of response days for all operations by Army, Navy, Air Force and Marines



The Collection – Analysis Gap

...Managing the Inevitable



Policy Choices:

- *Automate Triage*
- *Automate Analysis*
- *We all become analysts*



Transforming Defense

*“Networked Forces
Outfight
Non-Networked Forces”*

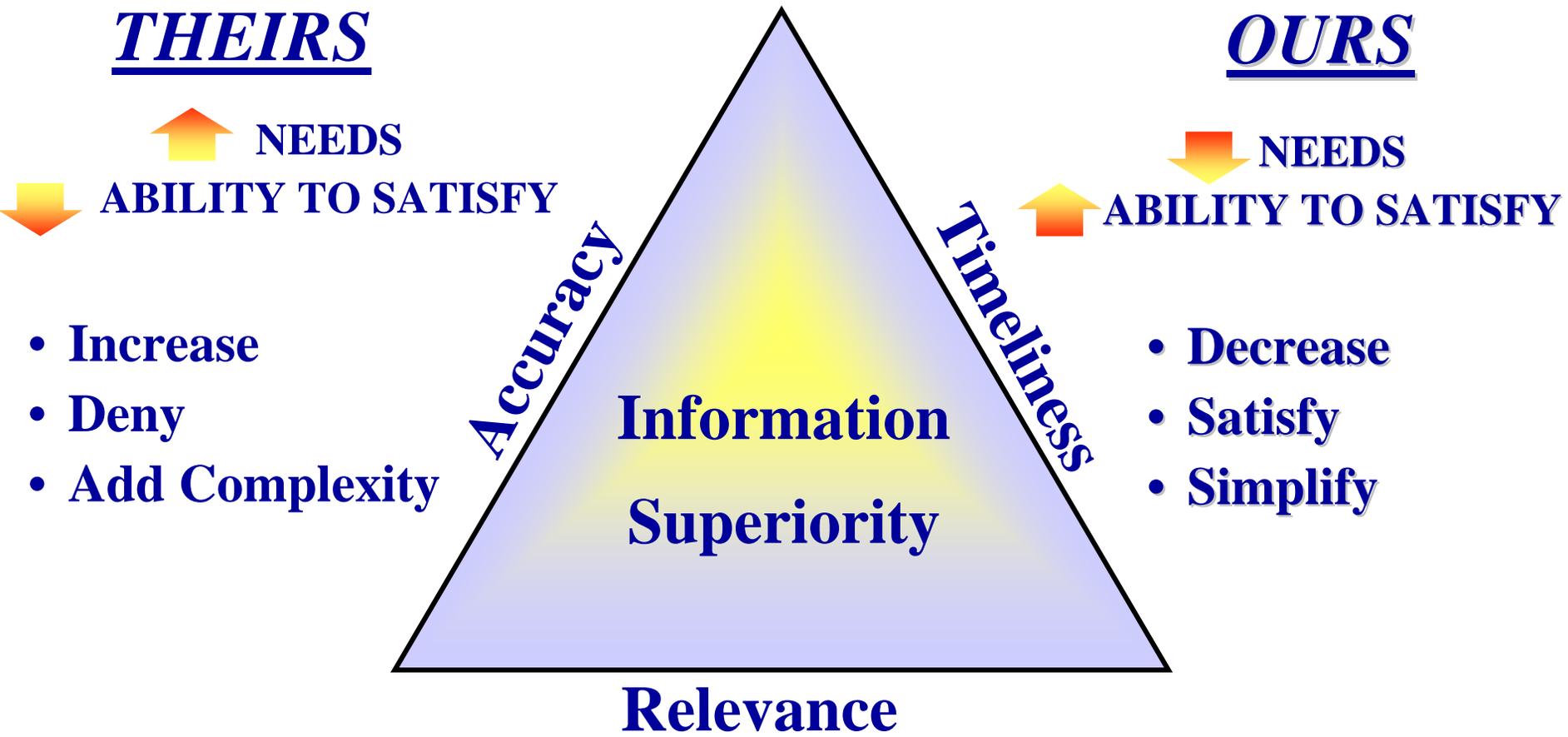
“...it allowed us to make decisions and execute those decisions faster than any opponent.”

*Lt. Gen. David D. McKiernan
Combined Forces Land Component
Commander, OIF*



Competitive Advantage

...New Sources of Power



“We need a force which is designed and capable of fighting first for information superiority.”

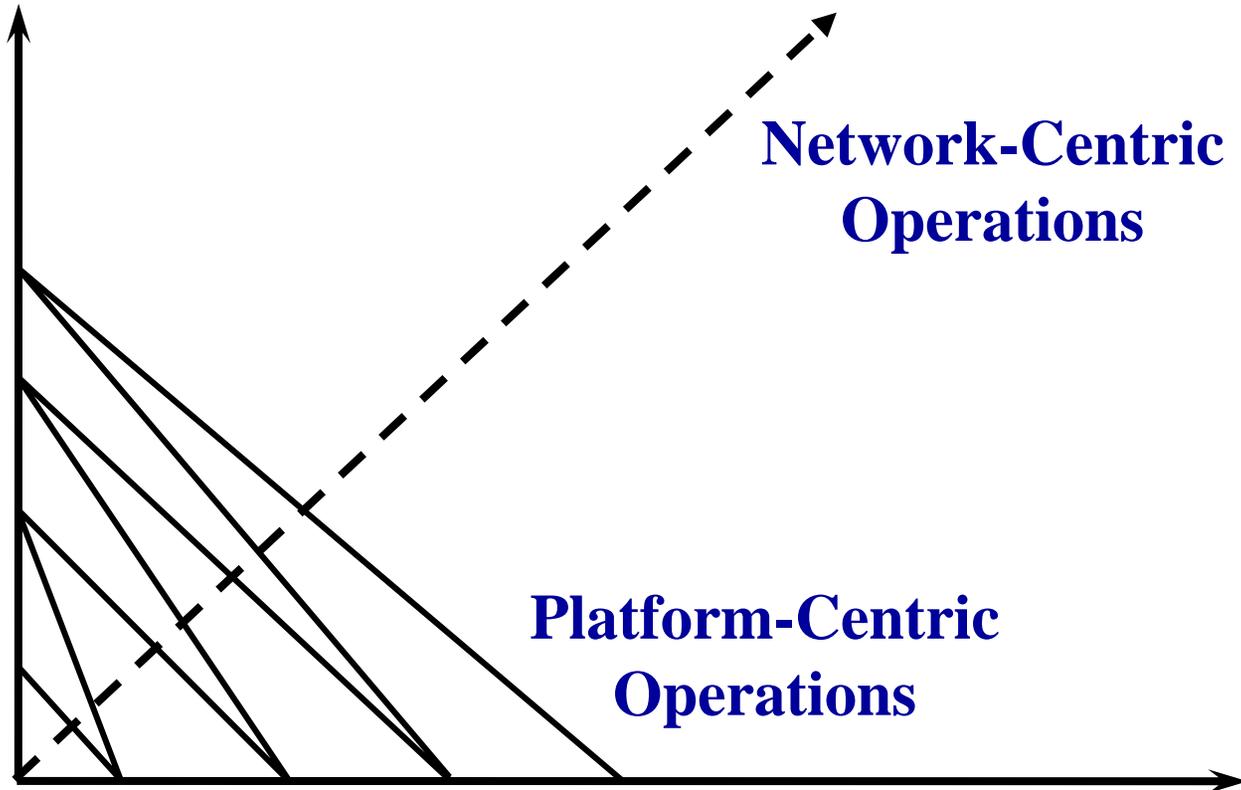


The Networked Competitive Advantage

New Competitive Space

**Information
“Richness”**

- Content
- Accuracy
- Timeliness
- Relevance



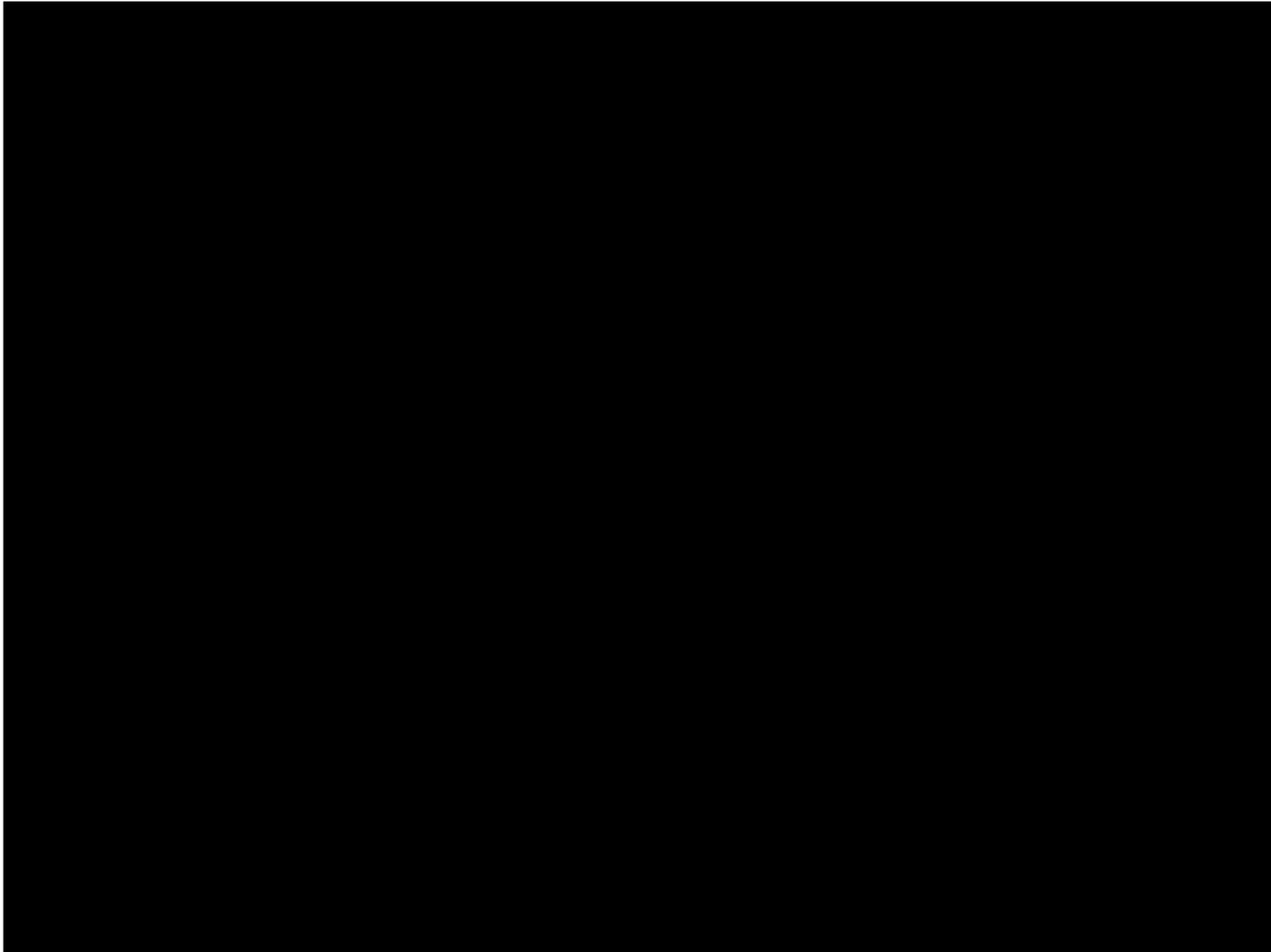
**Network-Centric
Operations**

**Platform-Centric
Operations**

Information “Reach”

Shared Awareness

...The new competitive advantage



Source: New York Times Television – The Perfect War, 2004

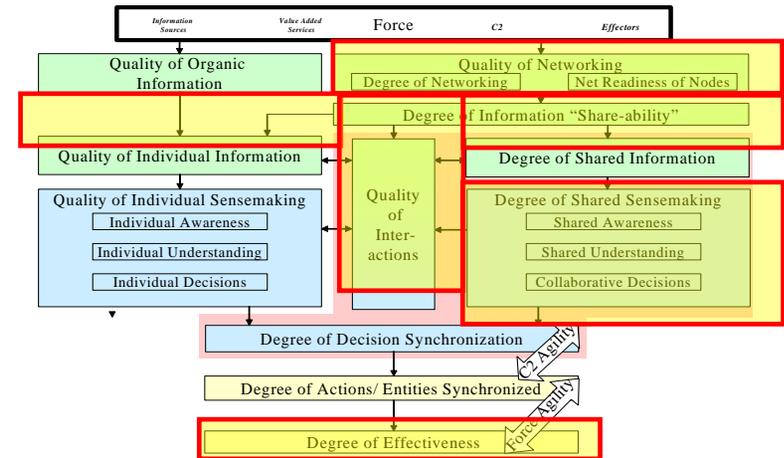


Stryker Brigade Case Study

Scenario

- SBCT attack on Shughart-Gordon
- Certification Exercise (CERTX) at Joint Readiness Training Center, May 2003

Area of Focus



Hypotheses

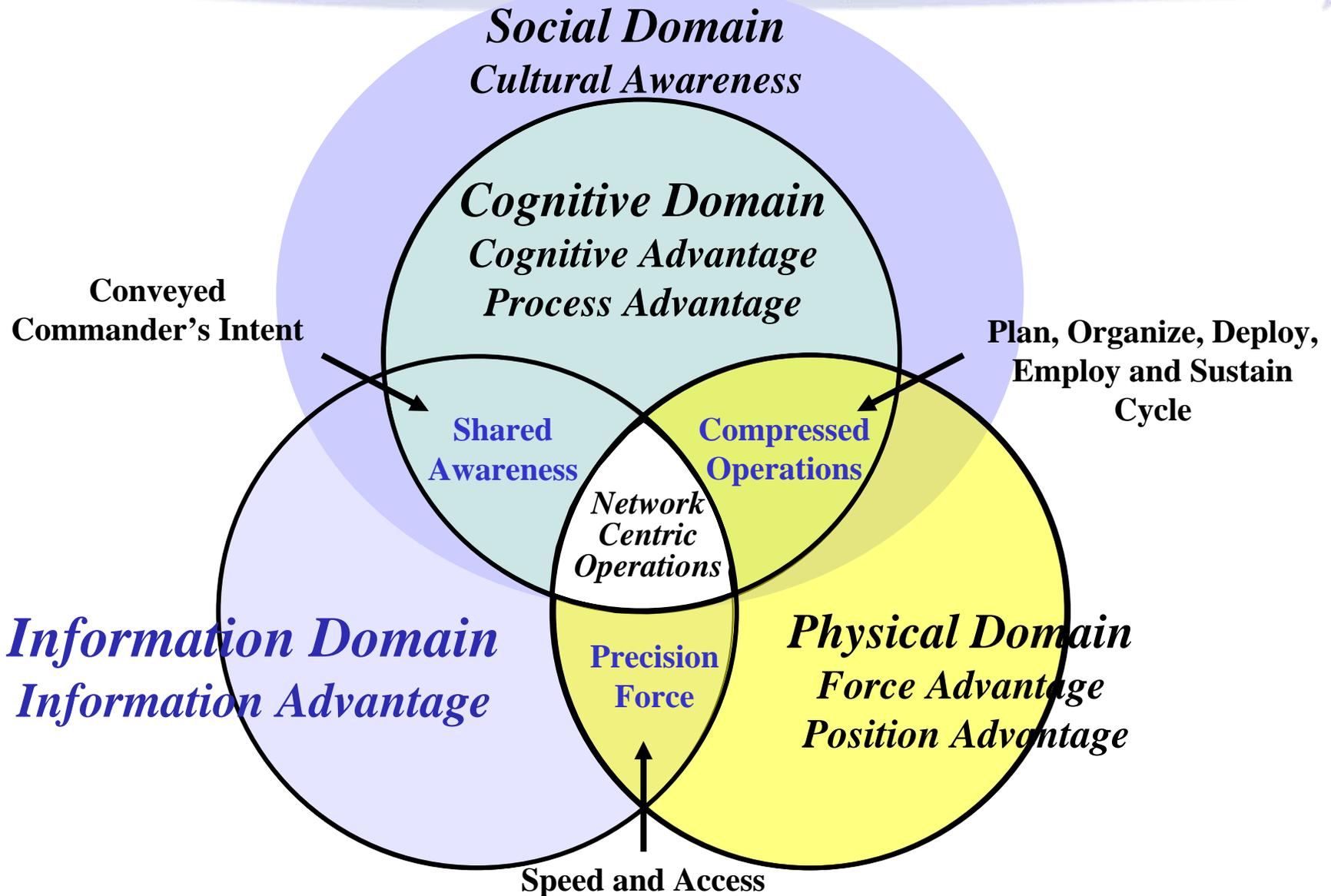
- Stryker Bde NCO capabilities provide significant information and decision superiority and increase force effectiveness and are a source of combat power

Findings

- Friendly :Enemy casualty ratio decreased from 10:1 to 1:1
- Increase in Individual/shared information quality from about 10% to ~80%
- Acceleration of speed of command from 24 to 3 hours in key engagement
- Bottom line result: allowed commander ability to control the speed of command

Competing in the Information-Age

...The Power of Network-Centric Operations





Identify Issues of Regret

... *Candidates for Action Now*

Warfare Elements

- *Fire* – non-lethals, directed energy, redirected energy
- *Maneuver* – seabasing, vertical battlefield, lift for operational maneuver
- *Protection* – urban operations, “biomedical countermeasures” cycle time
- *C2&C* – joint interdependency vs. interoperability
- *ISR* – demand-centered intelligence, tactically responsive space
- *Logistics* – joint demand-centered logistics

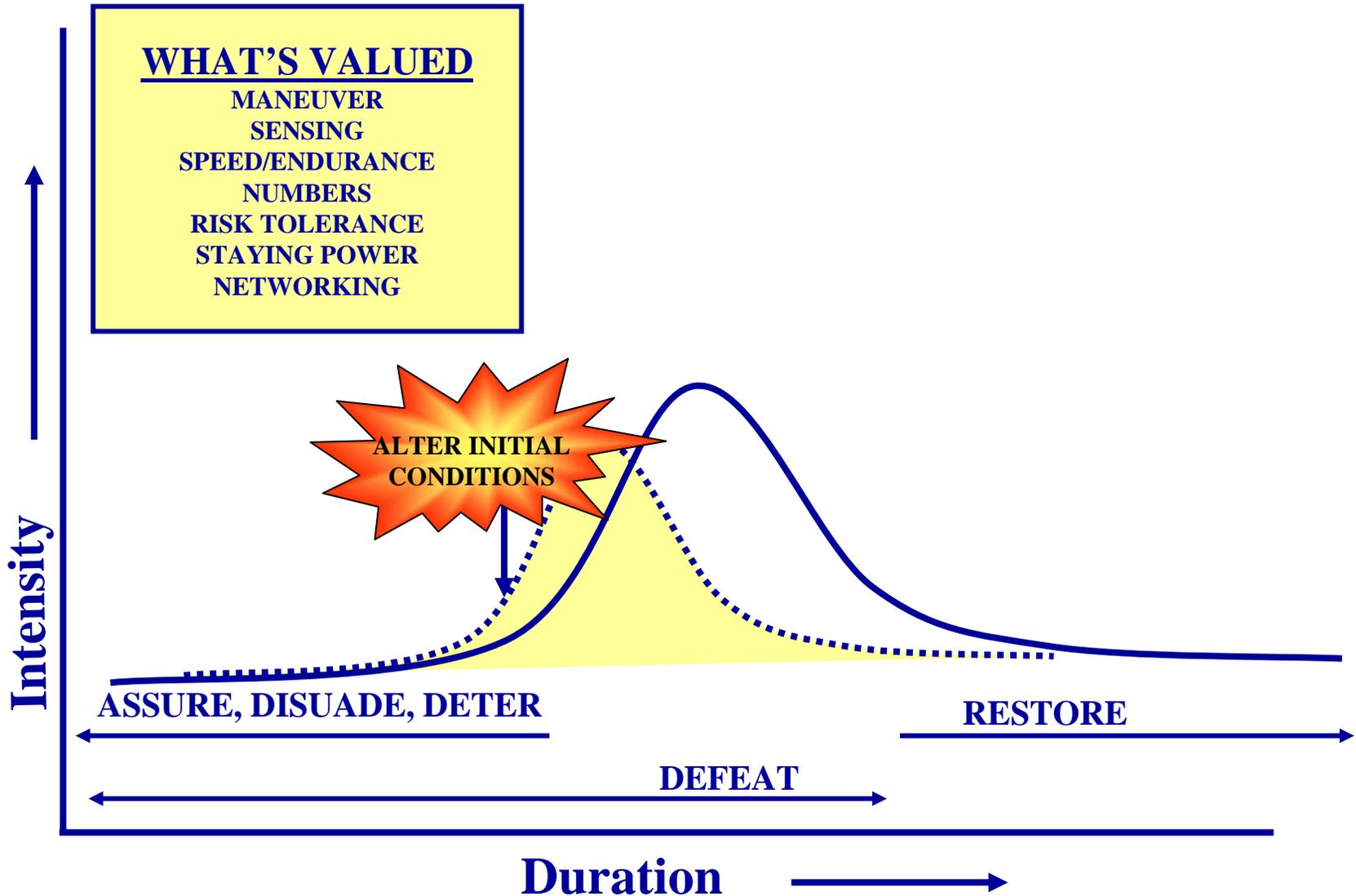
Risk Management (*creating on-ramps*)

- *Joint S&T* – broaden the capabilities base, create generational depth
- *Joint concept development & experimentation* – short cycle time / rapid iteration, concept-based / technology-enabled
- *Joint training* – live / virtual / constructive / distributed
- *People* – culture and organizations



Transforming Defense

...2nd derivative force



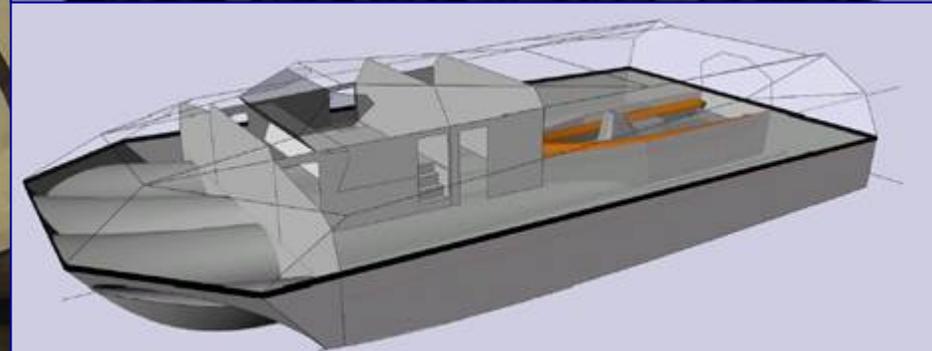
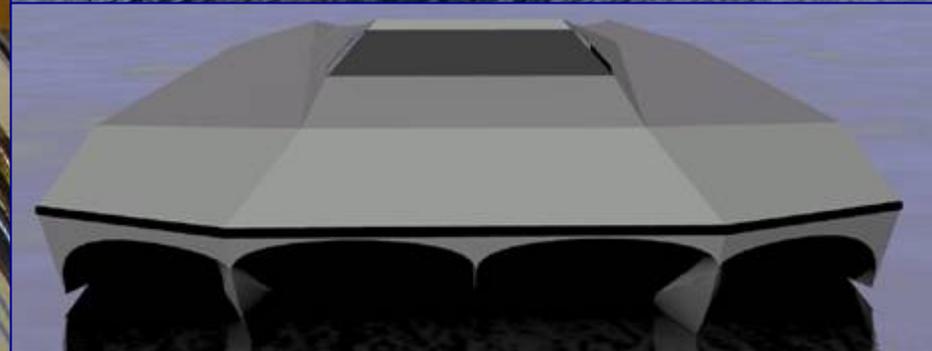
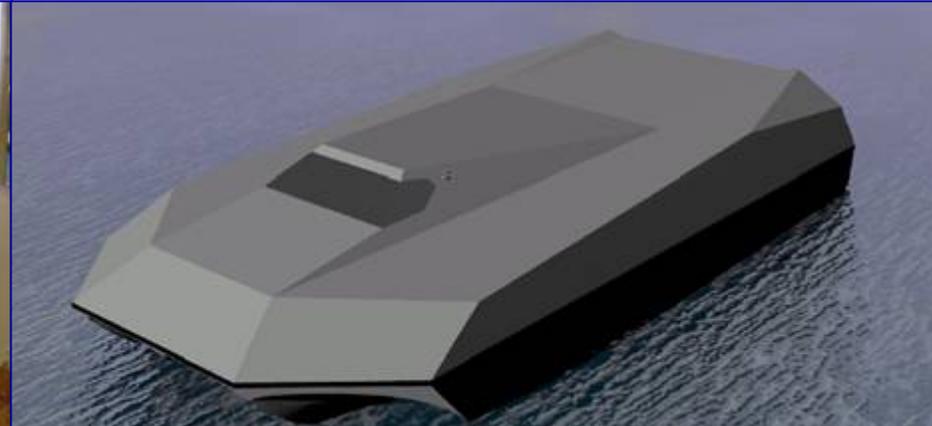


High Speed at Sea

M-80

LOA	80'-0"
Beam	40'-0"
Tunnel Width (4)	5'-0"
Draft (static)	2'-4"
Displacement	67 MT
Payload	15 MT
Fuel Load	10 MT
Classification	ABS
Main Engines	4 x 1650HP C-30 Caterpillars
Surface Piercing Propellers	4
Speed	Max @ full load 50-55 knots
Range @ full load & max speed	500 NM
HP Required (total)	6200hp
Clear Height	15'-0"

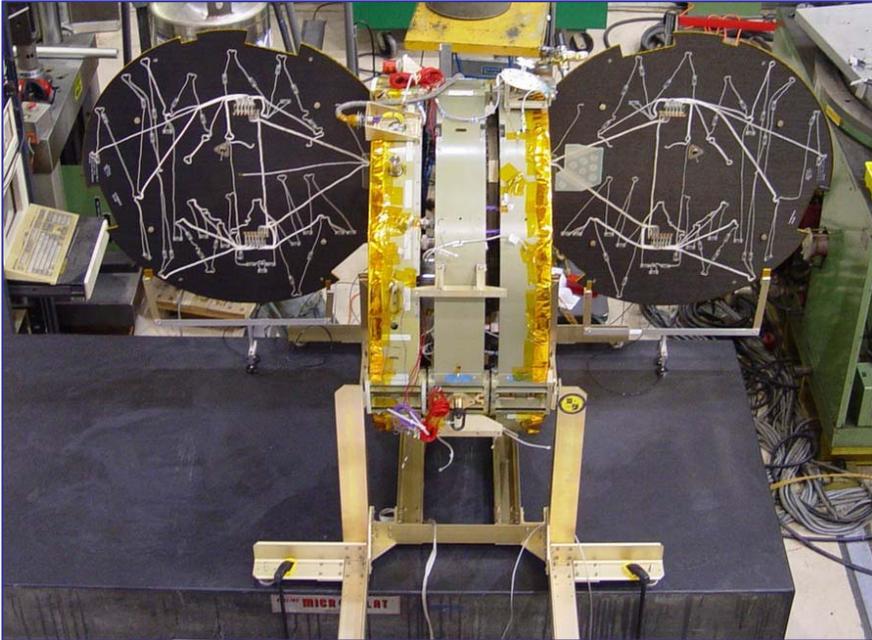
Payloads 43% of Displacement
11-M RIB or equivalent
UAVs
15 personnel





Operationally Responsive Space

...TACSAT 1



A capability on orbit within the planning time constraints of a major contingency

- Responsive
 - < 2 Yr concept to on-orbit capability
- Low Cost
 - Total cost of experiment less than \$15M including launch
- Experiment
 - UAV Components in Space
 - Space/Air Horizontal Integration
 - Designer Payloads
 - TCP/IP Based: SIPR Net Accessed
 - New commercial launch vehicle
- Operationally relevant capability
 - Integrated into Combatant Commanders
 - Exercises/Experiments
 - Time / Capability Trade Off



Project “Sheriff”

...Controlling the Engagement Timelines

The Capabilities

- “Speed-of-light Sensing
- Networked
- Lethal/Non-Lethal Options
- Active/Passive Options
- Kinetic/Non-Kinetic Options
- Survivability



The Technology

- Compact Active-Denial Technology
- Phraselator High-Power Direction Hailer
- Vector-Beam High-Power
White/IR Spot Light
- Counter Improvised
Explosive Device (IED)
- Active Protection
- Counter Sniper
- Rapid-Fire Kinetic Weapon
- Multi-Spectral Sensor Suite
- Armor Protection
- Integrated Electronic Warfare Suite
- Net-Centric Technology



Approaches to Logistics

Mass-Based



- **More is better**
- **Mountains of stuff measured in days of supply**
- **Uses massive inventory to hedge against uncertainty in demand and supply**
- **Mass begets mass and slows everything down**

Prime Metric: Days of supply

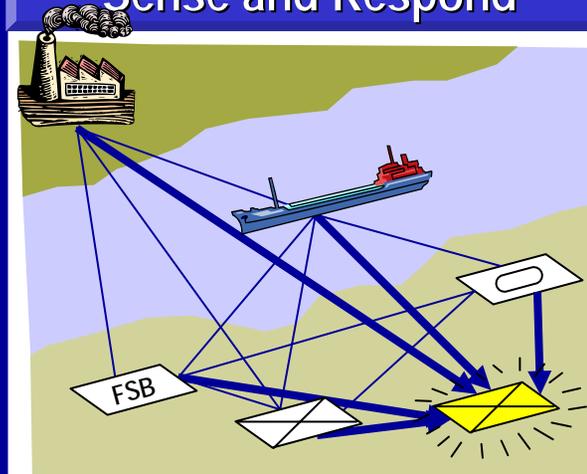
Just-in-Time



- **On-time is better**
- **Inventory is reduced to a minimum and kept moving**
- **Uses precise demand prediction and static optimization to purge uncertainty**
- **Works great ... except when it doesn't**

Prime Metric: Flow Time

Sense and Respond



- **Agile is better**
- **Inventory is dynamically positioned throughout**
- **Uses transportation flexibility and robust IT to handle uncertainty**
- **Initial S&R models look promising**

Prime Metric: Speed & Quality of Effects



Strategic Approach to Cost



Key Elements

- *Decrease operational costs*
- *Achieve better ROI for less*
- *Broaden the capabilities base*
- *Create and preserve future options*
- *Manage divestiture*
- *Transform non-discretionary areas*
- *Impose cost to adversary*
- *Develop counter-cost imposing strategies*

New metrics create opportunities for new cost dynamics

Technology Trends and Cycles

Primary Structural Materials

20-40 years

Propulsion

15-25 years

Weapons

8-15 years

Sensors

3-8 years

Stealth Concepts

3-5 years

Communications

1-3 years

IT Software

1.5-2 years

IT Components

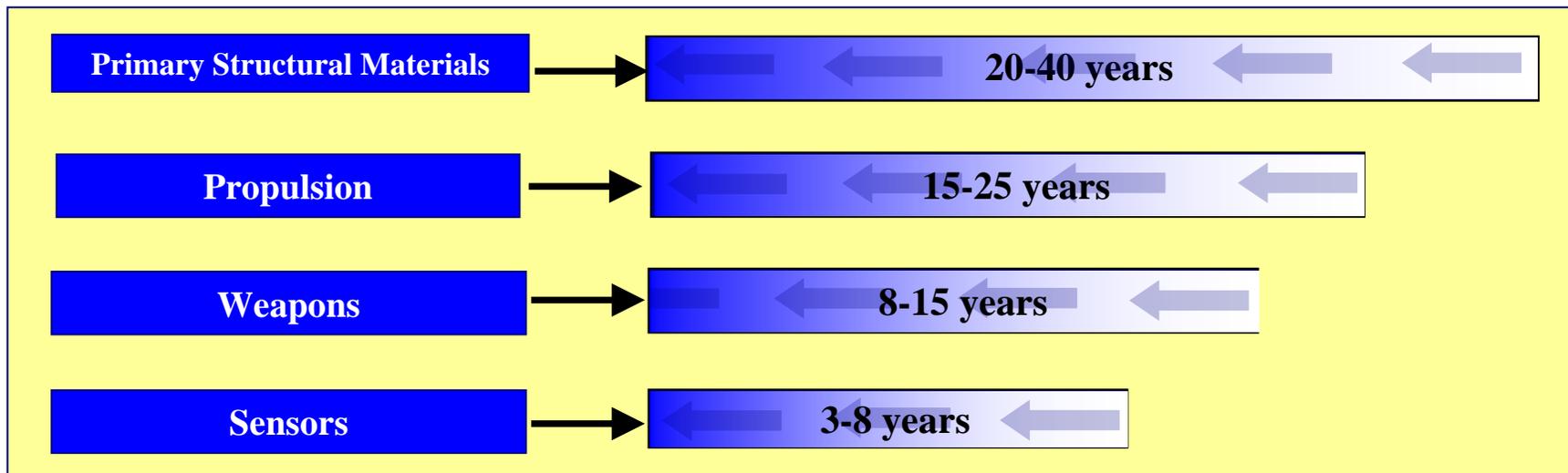
.5-1 year

- Globally available technology
- Our technological advantage comes from speed of systemization



Technology Trends and Cycles

...New Opportunities



Stealth Concepts → 3-5 years

Communications → 1-3 years

IT Software → 1.5-2 years

IT Components → .5-1 year

- Historical Opportunity
- Time and Cost Compression

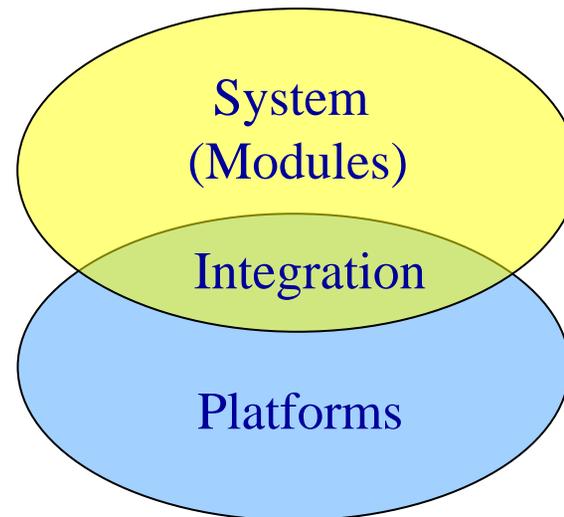


Alternative Architectures

... Characteristics

Focus in designing alternative architectures:

- Low unit cost
- Modularity
- Numbers
- Speed
- Networking
- Sensing
- Innovative designs
- Mass Customization



Preserve Strategic Advantage: innovation & the breadth, depth and diversity of the industrial base

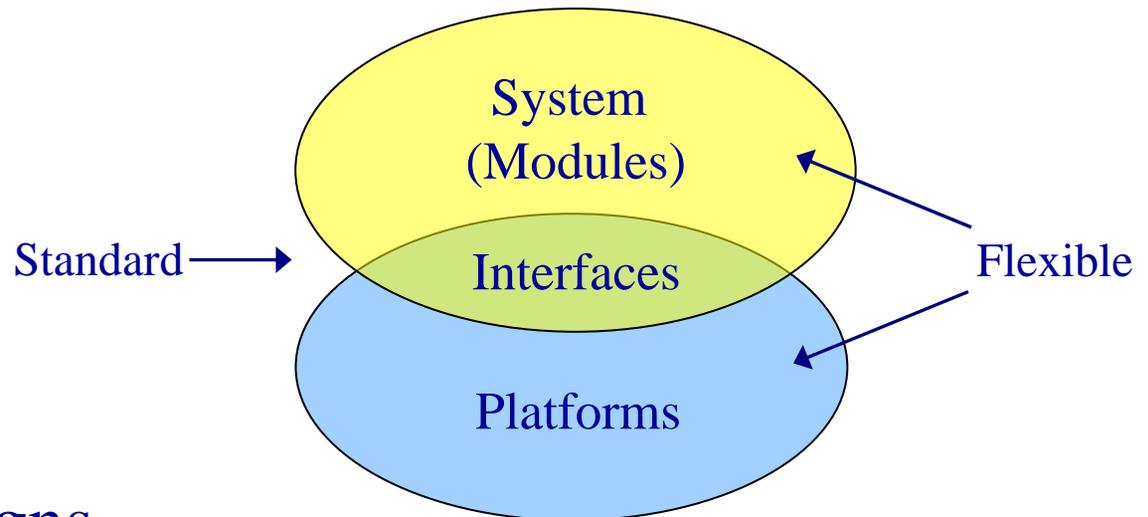


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New Logic and Metrics

...Competency

- **Access**

The ability to use military assets, both information and physical, at the best points of effect in hard-to-reach locations even when denial strategies are employed by the enemy;

- **Speed**

Minimization of response time from deliberate operational (or strategic) maneuver to stunning tactical swiftness;

- **Distribution**

The extent to which firepower, sensors, and other systems are spread over a diverse and geographically dispersed set of assets/platforms;

- **Sensing**

The ability to provide information with accuracy, timeliness and relevance, and especially to locate and track fleeting targets;

- **Mobility**

The ease and promptness by which military assets can be shifted from one physical location to another; and

- **Networking**

The extent to which military assets are connected together through information technology that assures shared awareness and information access.



New Logic and Metrics

...Relevancy

- Create and preserve options

Technology on-ramps

Broaden capabilities base

Mass customization

- Employ higher transaction rates

Faster cycle times

Speed of information and operational mobility

- Achieve higher learning rates

Co-evolve concepts, capabilities and processes

Continuous adaptive acquisition and experimentation

- Create overmatching complexity

Scalable

The small the fast and the many

Compete on time and cost vice budget



Transforming Defense

... *Corporate Strategy*

Part I: Continuous small steps

Sustaining

Evolutionary changes

Stay on the local maximum

Part II: Many medium jumps

Explore and expand the local region

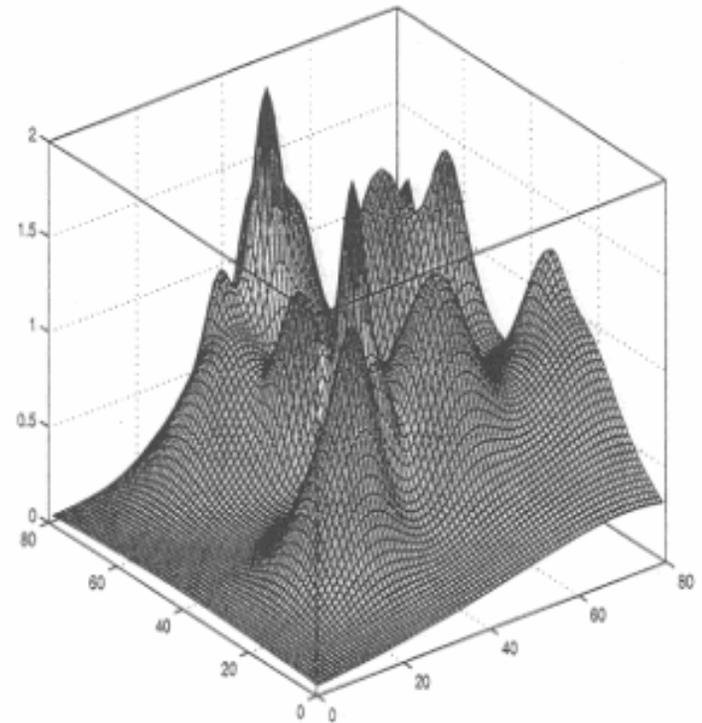
New doctrine / organization / systems

Part III: A few big bets

Could change DoD

Change the world

Create a new game with new rules



“If you are not making any big bets you are a fixed strategic target and at risk.”



Key Barriers to Transformation

... Challenges

- Cultural barriers

Speed of understanding vs speed of doctrine

Values, attitudes and beliefs

- Physical barriers

Speed of mass (lift and mobility)

Speed of information (connectivity & interoperability)

- Fiscal barriers

Willingness and ability to devalue and devolve

Strategic approach to cost

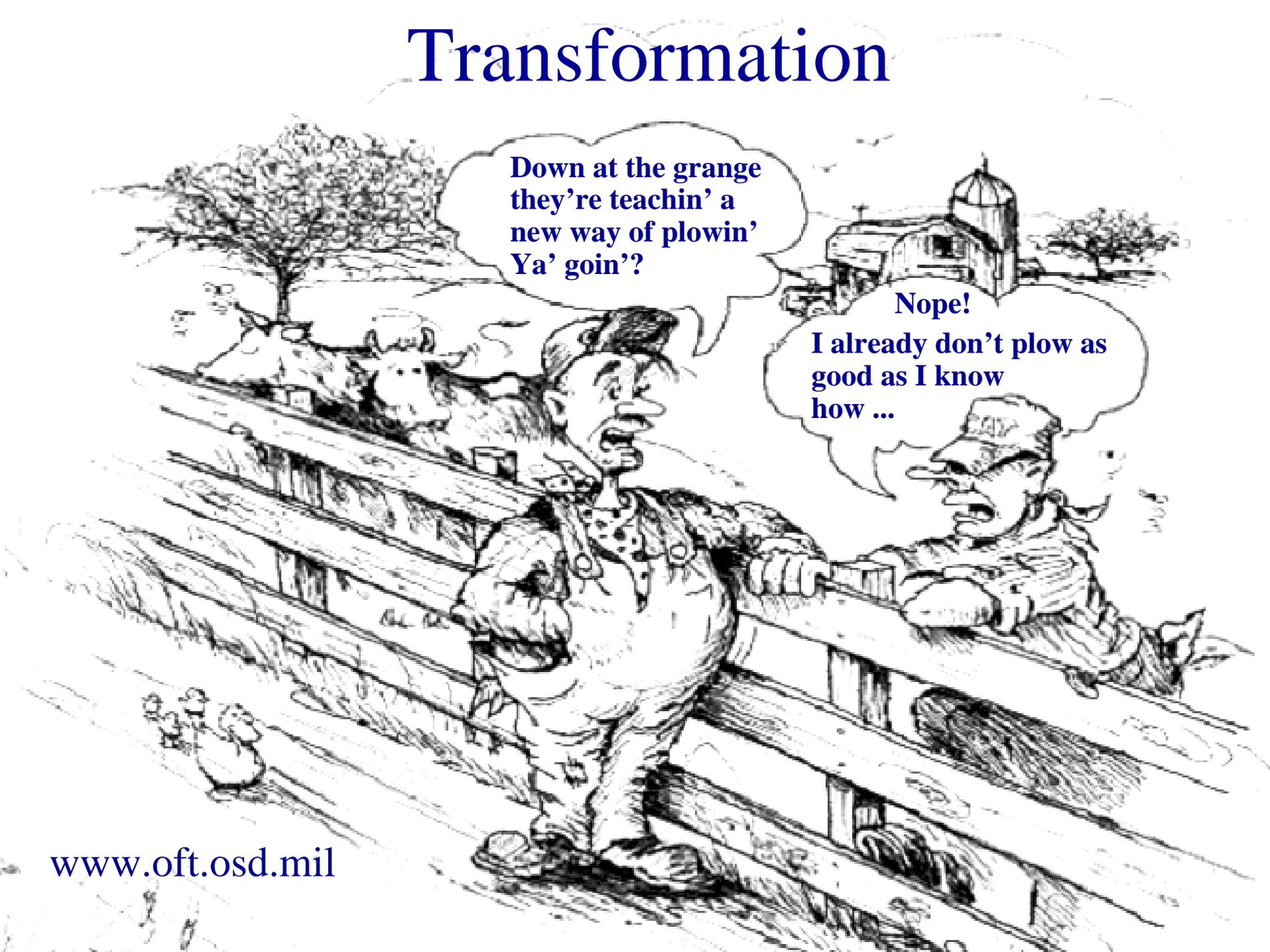
- Process barriers

Transformation of the management of defense



BACK-UP

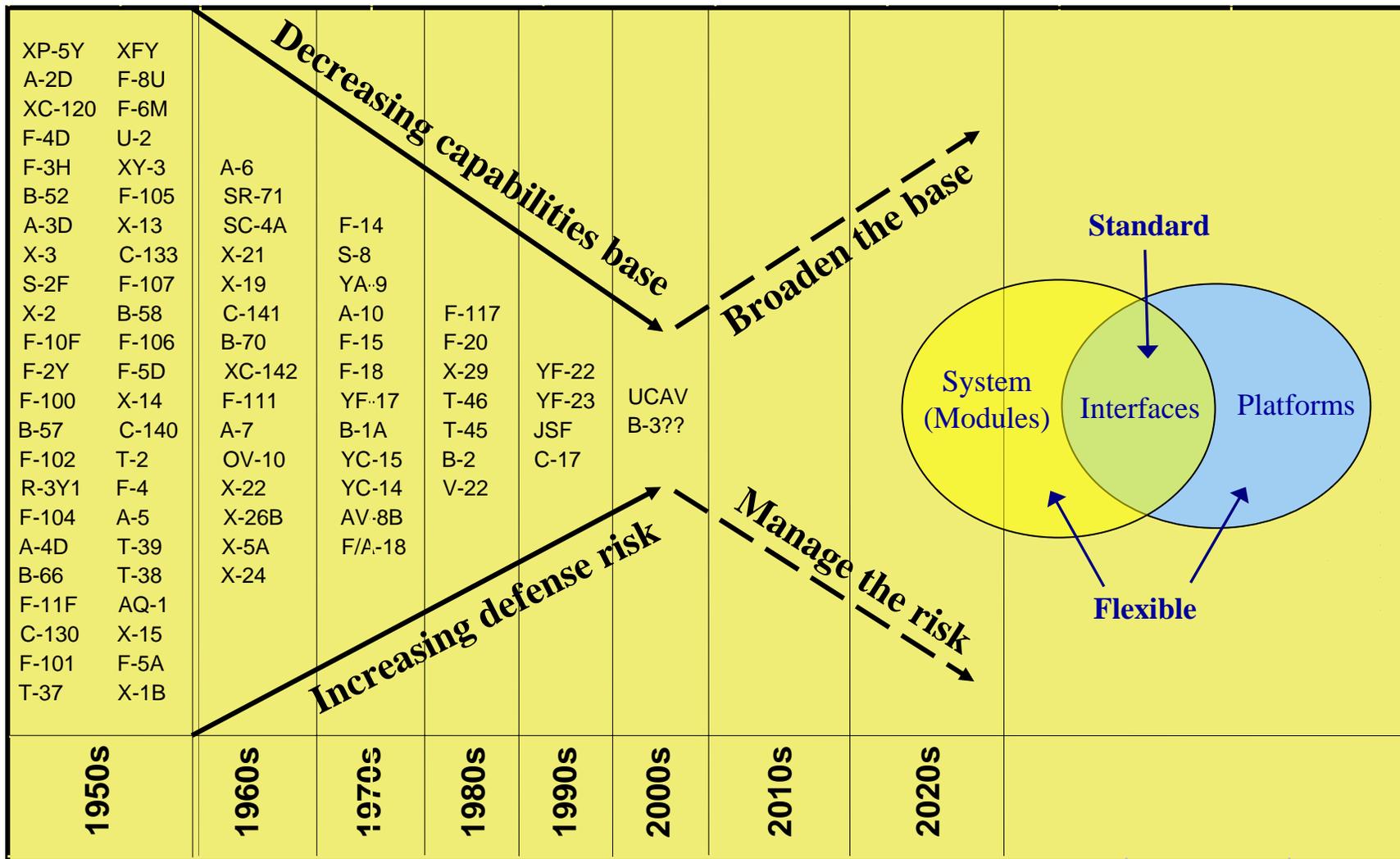
Transformation



Down at the grange
they're teachin' a
new way of plowin'
Ya' goin'?

Nope!
I already don't plow as
good as I know
how ...

Aircraft Program Trends





Navy Program Trends



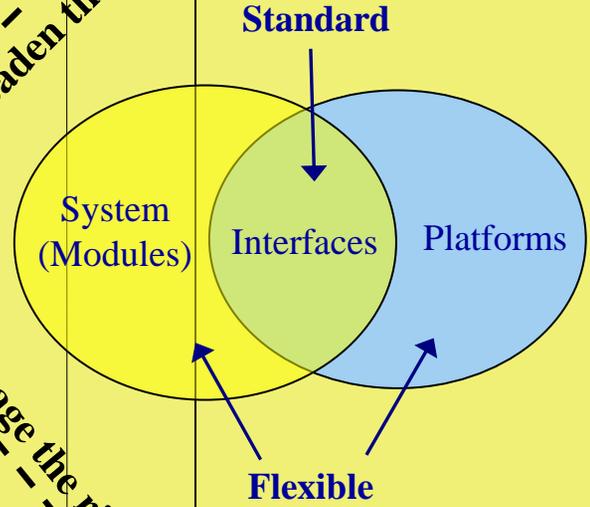
AO 149		DDG 37	CV 63																
SS 572		CVN 65	SSN 671																
SSN 575		FFG 1	LSD 36																
MSO 519	DL 1	CG 26	AE 26	CGN 36															
SS 576	SSK 1	AOE 1	AOR	AOT 168															
LST 1171	DD 927	AFS 1	LPH 2	DD 963															
SSG 574	SS 204	FF 1052	SSN 593	SSN 685	CG 47														
SSG 577	DE 1006	CGN 35	SSN 594	LHA 1	LSD 41														
SSN 578	AO 143	AS 33	SSN 597	SSN 688	SSN 719	AOE 6													
AE 23	AGSS 569	SSBN 640	SSBN 608	PHM 1	MCM 1	MHC 51	LPD 17												
SS 580	CV 59	CG 16	CGN 38	CGN 38	AO 187	PC 1	SSN 774												
SSN 585	SSN 571	CGN 25	FFG 7	SSN 751	SSN 21														
SSRN-586	MSO 508	AS 31	AS 39	AO 177	LHD 1														
CGN 9	MSO 421	FF 1037	AO 177	DDG 993	DDG 51														
SSBN 598	AE 21	AD 37	LPD 1	DDG 993															
SSGN 587	DD 931	PGH-2	SSAG 555	SSBN 726															
DDG 2		CV 67	PGH 1	CVN 68															
LST 1156		AS 36	PG 92																
MSO 422		SSBN 616	LCC 19																
		SSBN 627	LST 1179																
		FF 1040																	
1950s	1960s	1970s	1980s	1990s	2000s	2010s	2020s												

Decreasing capabilities base

Broaden the base

Increasing defense risk

Manage the risk



Based on date first ship in class was launched



Capabilities Balance

... Competent and Relevant

**Domain of
Cooperative
Engagement**

Winning / Maintaining the Peace
All Sources of Power

**Domain of
Political Victory**

Strategic Advantage:

The Commons

High Seas & Air Above
Space
Cyberspace

Global Stability

Winning the War

Local Stability

Intervention:

Decisive Operations

Land
Littorals
Low Altitude

**Domain of
Strategic
Primacy**

Winning the Battle / Combat
Combat Power

**Domain of
Military
Victory**



Western Iraq Case Study

...Key Findings to Date

- Western Iraq was the most “networked” theater of operations, operationally and tactically, in the history of warfare.
- Largest conventional & coalition SOF operation in the history of warfare.
- Largest scale use of tactical data-links in history of warfare.
- Only area of operation in Iraq where Blue Force Tracking information on SOF + conventional ground forces was provided via data link to fixed wing combat aircraft.
- Zero Fratricide: Only area of operations in Iraq where air-to-ground fratricide was eliminated



Warfare: The Big Trends

Age

Weapons

Energy

Nomadic

Bare-Handed

Human

Agrarian

Cold

Mechanical

Industrial

Hot

Thermal

Information

Info-based

Cognitive(?)

Senior Colonel Wang Baucon, PLA



“Informationalized” War

- More *complicated* causes
- More *limited* goals
- *Richer* in content
- *Shorter* duration
- *Decreased* damages
- *Increased integration* of operations
- Increased significance of *intangibles*



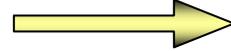
Warfare: The Big Trends

PEOPLE



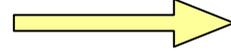
NUMBERS

PLATFORMS



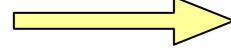
MOBILITY

MUNITIONS

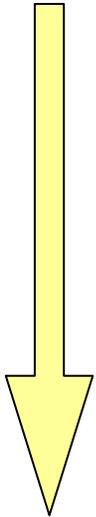


SPEED/RANGE

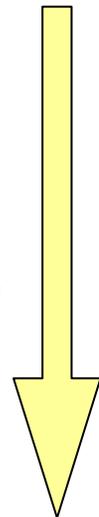
ROBOTICS



PRECISION



**INCREASED
DETACHMENT**



**INCREASING
SPEED AND
INFO CONTENT**

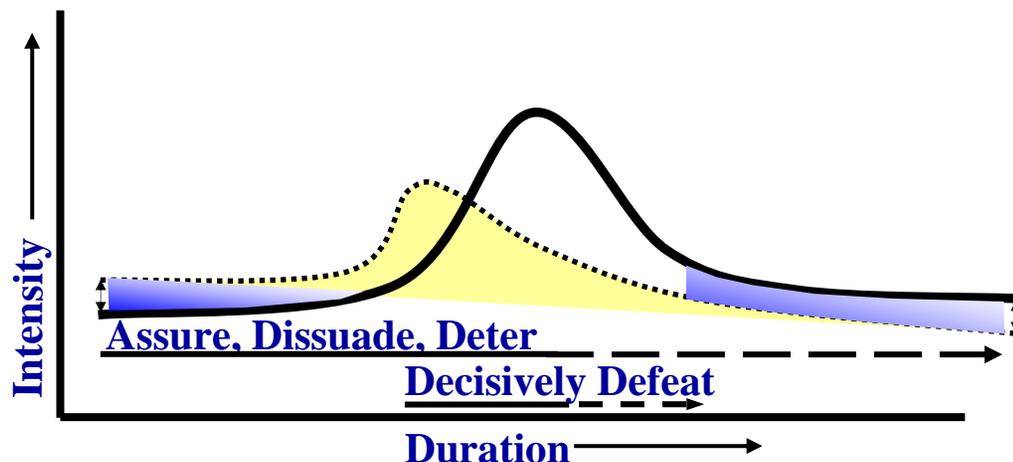


Expanding Competition

$$\text{Policy Outcome} = f \{ \text{Power}, \text{Moral Principle} \}$$

Western power is unmatched

- Therefore, policy will be attacked through its moral principles (legitimacy, international law, etc.)



If the frontiers of National Security can be everywhere and are not territorial borders but fault lines within societies, then...

- The nexus of foreign and domestic security policy is intelligence
- We must be able to look and operate deeply within societies

Assured Access includes the domains of political victory

- Speed of modern warfare creates a continuum, not a succession of phases



Picking the Issues: Identify the Perfectly Predictable Surprises

You're looking at a perfectly predictable surprise when you see:

- Mismatches in metrics
- Systemic contradictions that must be resolved sooner or later
- Strategies yielding negative returns on investment
- A widening gap between transaction rates and resource availability



Connecting the Present to Our Future

Expanding Competition → Power and Principle

Strategic Posture → Shrinking the Dysfunctional,
Disconnected Gap of Globalization

Operational Maneuver → Creating a one-two punch

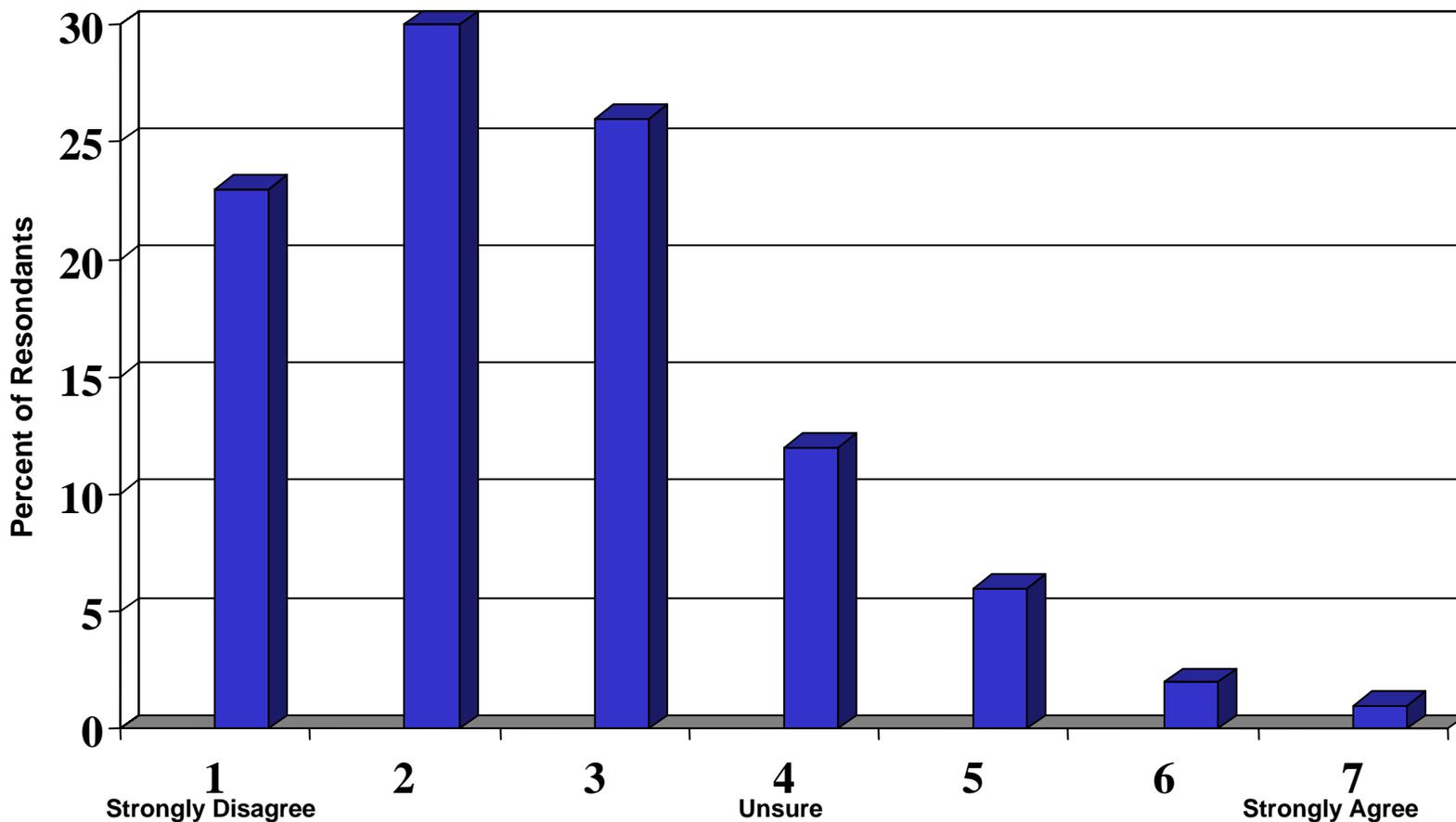
Mapping Future Challenges Risk

Issues:

- *How to make near-term actions robust across alternative futures?*
- *How to create on-ramps for capabilities?*



Within the next 10 years, some adversaries will likely have the ability to use long-range precision strike weapons such as ballistic and cruise missiles to deny our use of fixed military infrastructure, such as ports, airfields, and logistical sites.

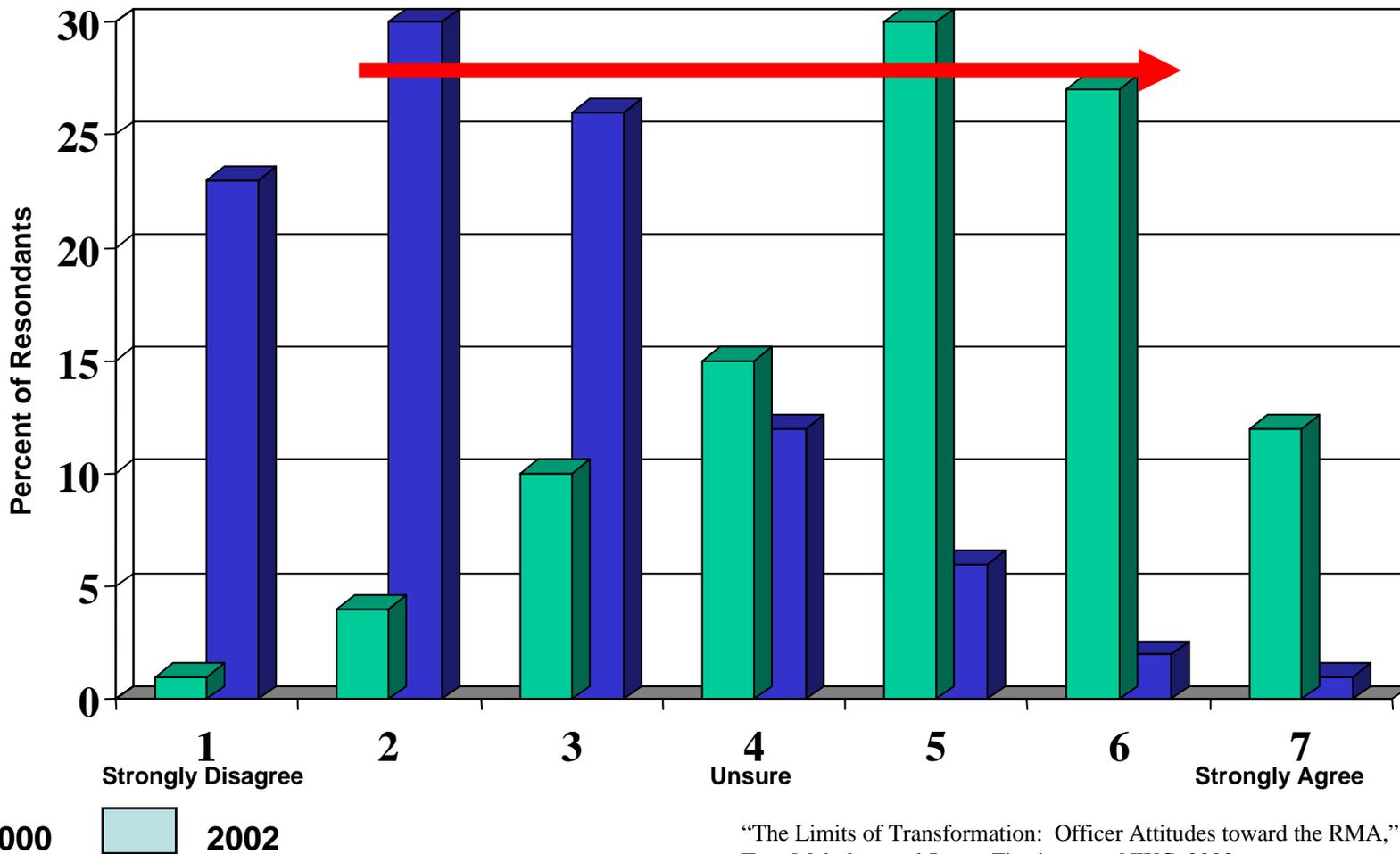


2000

Source: Thomas G. Mahnken and James FitzSimonds, "Officer Attitudes Toward Innovation", Naval War College, 2002



Within the next 10 years, some adversaries will likely have the ability to use long-range precision strike weapons such as ballistic and cruise missiles to deny our use of fixed military infrastructure, such as ports, airfields, and logistical sites.



“The Limits of Transformation: Officer Attitudes toward the RMA,”
Tom Mahnken and James Fitzsimmons NWC, 2003



Transforming Defense



**Global
Interests**

**Homeland
Security**



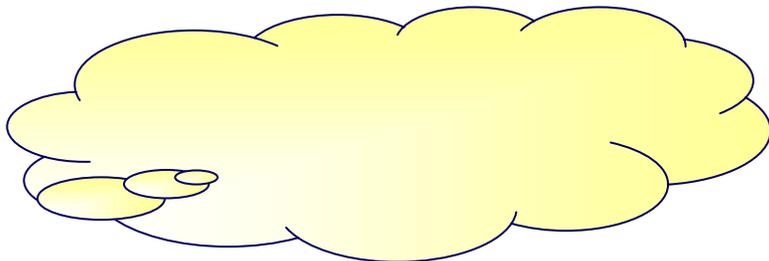
**Surrogate
Wars**



MAD

Containment

1990 ↑



2000 ↓

**Global
Interests**

**Homeland
Security**



**System
Perturbations
and
Consequences**



Transaction Strategy?



Network-Centric Warfare

...The Emerging Theory of War

A Management Perspective...

STAFFING

A new elite
The fight for talent
New employer/employee relationship

PLANNING

Distributed
Collaborative
Fast

ORGANIZING

Follows information
Trimmed for speed

DIRECTING

By ruleset and incentives
Self-synchronization
By ensuring information access

CONTROLLING

By ensuring information access
Trimmed for speed

It's all about information access and speed. . .
. . . not information management



Emerging Realities

- Demand for *Knowledge* Outstrips the Demand for *Data*
- *Network-Centric Warfare* Closely Couples Sensors with Shooters
 - Provides shooters with quality information with improved timeliness
 - Avoids loss of Fleeting Engagement Opportunities
- *Simultaneous execution* of highly responsive autonomous action and synchronized operations
- *Network-Centric Warfare* is enabled by an in-depth Protection Strategy (Mobile Defense in-depth)

Network-Centric Warfare forms the Center Piece of Combat Capability by integrating Information, Platforms, Weapons, and Sensors



Transforming the Future Joint Force

...to the Information age

Integrated systems



Networking components

Precision weapons



Precision Effects

Weapons reach



Sensor reach

Dispersed Offense



Networked Force

High volume strike force



Full service maneuver force

Securing the sanctuary



Assuring Access



Education for Security

because...

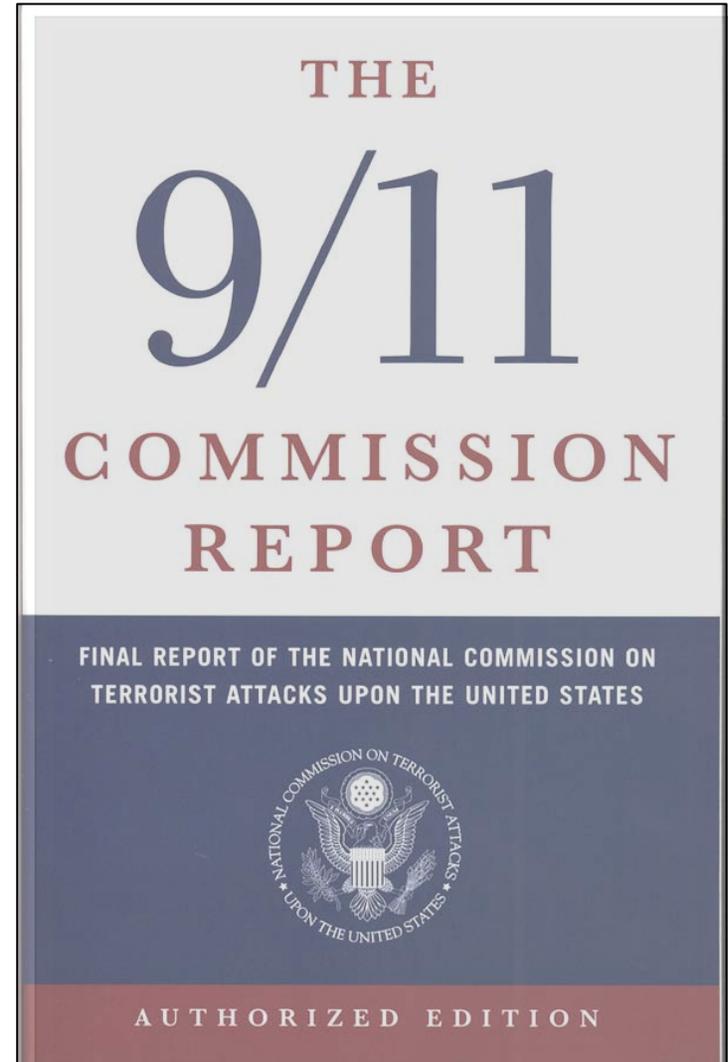
*National Security is more
than war*

and...

War is more than combat

and...

*Combat is more than
shooting*





Transforming National Security

...The Logic

...The Dynamic

...The Opportunity

Information Age

Globalization II

Globalization III

Industrial Age

Vision: Broad and Sustained Competitive Advantage

- *Strategic Imperative*
- *New Logic and Metrics*
- *Technology Opportunities*
- *Alternative Architectures*

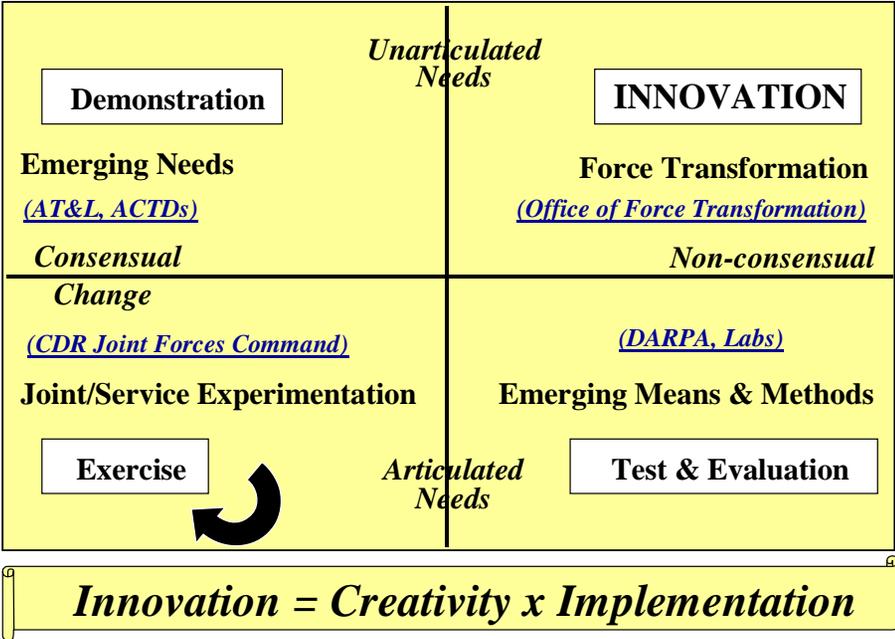
*Terry J. Pudas
Acting Director, Force Transformation*



Transforming Defense

- The Role of Defense in National Security
- The Management of Defense
- The Force

As National Strategy
As Corporate Strategy
As Risk Management Strategy



Vision: Broad and Sustained
Competitive Advantage

Security System Balance?

...Major Movements

Strategic Posture/Balance



Operational Maneuver

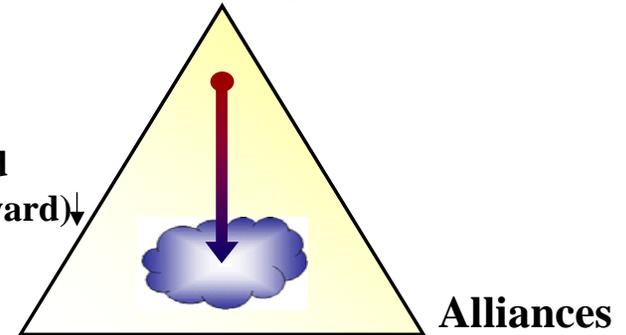


Deter Forward



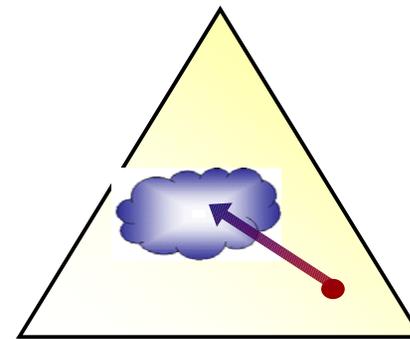
Strategic Deploy From Home (Reactive)

Forces Forward
(Garrison Forward) ↓
(Sea-based) ↑
(Hubs) ↑



Strategic Distances (CONUS and Hubs)

Sea





Broaden the Base?

“If the only person that builds spacecraft for the government is Air Force Space Command, and I go to that warehouse for every product, there is not a lot of competition. There are a lot of well-intending, energetic people, but there is not a lot of competition.”

*Gen. James E. Cartwright
Commander, U.S. Strategic Command*