Vision: Broad and Sustained Competitive Advantage

• Strategic Imperative
• Capabilities
• New Logic and Metrics
• Opportunities

Terry J. Pudas
Acting Director, Force Transformation
15 March, 2006
**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
- Culture - attitudes, values, beliefs

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

Jack Welsh

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

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

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

Globalization III
(199X – 20XX)
- Emerging Rules
- Market Opportunities
- New Customer Base Emerging
- Security = All Else + Defense
Globalization III

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

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

Mostly Non-Integrating Gap
Shifting Strategic Imperatives

Industrial Age

Information Age

Containment

Globalization II

Security=Defense

Globalization III

Security=Defense+All Else

Competency

Relevancy

Connectedness
Security Environment

... Four Challenges

**Irregular**
Those seeking to **erode** American influence and power by employing unconventional or **irregular** methods

**Traditional**
Those seeking to **challenge** American power by instigating **traditional military operations** with **legacy and advanced military capabilities**

**Catastrophic**
Those seeking to **paralyze** American leadership & power by employing **WMD or WMD-like effects** in **unwarned attacks on symbolic, critical or other high-value targets**

**Disruptive**
Those seeking to **usurp** American power and influence by acquiring **breakthrough capabilities**

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No hard boundaries distinguishing one category from another
Global Trends...Threats

...Strategic Response

Strategic Capabilities:

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

<table>
<thead>
<tr>
<th>System</th>
<th>State</th>
<th>Individual</th>
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<tbody>
<tr>
<td>Political Ideology</td>
<td>Hated Dictator</td>
<td>Hated Dictator w/Nukes</td>
</tr>
<tr>
<td>Nuclear Nationalists</td>
<td>Narco-terrorists</td>
<td>Regional Terrorists</td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>

* Super-Empowered Individual
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 fraction
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
Policy Outcome = f\{Power, Moral Principle\}

Top Level Issues

...Culture: Attitudes, Values, Beliefs

Citizen Soldier

Volunteer (Recruited) Force → Professional

Warrior + Enforcer + “Systems Administrator”

Projecting Power

Event Focused

Punitive

Access to Battlespace

Exporting Security

Continuous

Preventative

Access to Political Victory
The Stabilization Mission Gap

...Traditional Model

Intensity vs Duration

- Planning for Combat
- Slow Buildup
- Long Conflict
- Forces Available for Occupation
- Long Term (Civilian Lead)

Major Combat Mission

Nation Building Mission
The Stabilization Mission Gap

...New Challenges

Intensity

S&R Gap

Major Combat Mission

Planning For Combat

Fast Buildup

Short War

Few Forces Available For S&R

Duration

Nation Building Mission

Long Term (Civilian Lead)
The Stabilization Mission Gap

...Transformed S&R Capability

Intensity

Major Combat Mission

S&R Mission

Nation Building Mission

Planning For Combat And S&R

Fast Concurrent Buildup

Short War

Prompt S&R Operations

Long Term (Civilian Lead)

Duration
Informing Transformation

...Transactions vs. Resources

Anticipating Perfectly Predictable Surprises
Global Trends and Implications

Policy Choices:

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

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

† Excludes Vietnam War
The Collection – Analysis Gap

…Managing the Inevitable

Policy Choices:

• Automate Triage
• Automate Analysis
• We all become analysts
Network Centric Warfare?

Admiral, with all due respect—could we have less network-centric and more rounds on target?!
“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
Coalition Forces Land Component Commander, OIF
23 April 03
Network Centric Operations

We will conduct network-centric operations with compatible information and communications systems, usable data, and flexible operational constructs.

A knowledge empowered force, capable of effective information sharing across all agencies and partners, will be able to make better decisions quicker, increasing joint force effectiveness.
Military Response to Information Age

Network Centric Warfare

Translates an Information Advantage into a decisive Warfighting Advantage

Information Advantage - enabled by the robust networking of well informed geographically dispersed forces

Characterized by:

- Information sharing
- Shared situational awareness
- Knowledge of commander’s intent

Warfighting Advantage - exploits behavioral change and new doctrine to enable:

- Self-synchronization
- Speed of command
- Increased combat power

Information Sharing is a New Source of Power
We need a force which is designed and capable of fighting first for information superiority.
Learning Rate

Information "Richness"
- Content
- Accuracy
- Timeliness
- Relevance

Competitive Advantage

Information "Reach"
Network-Centric Warfare

PLANNING
Distributed
Collaborative
Fast/Adaptive

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. . .
Ability to Adapt

...Learning rate

Empowered Self-Synchronization

Planned Synchronization

Lost combat power

Execution

Time
Competing in the Information-Age

...The Power of Network-Centric Operations

Plan, Organize, Deploy, Employ and Sustain Cycle

Conveyed Commander’s Intent

Social Domain
Cultural Awareness

Cognitive Domain
Cognitive Advantage
Process Advantage

Information Domain
Information Advantage

Information Advantage
Shared Awareness

Cognitive Domain
Cognitive Advantage
Process Advantage

Physical Domain
Force Advantage
Position Advantage

Network Centric Operations

Compressed Operations

Speed and Access

Competing in the Information-Age

…The Power of Network-Centric Operations
Effects-Based Operations

Findings From Combat

<table>
<thead>
<tr>
<th>Domain</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Land</td>
<td>Maneuver ( \approx 60% )</td>
</tr>
<tr>
<td></td>
<td>Attrition ( \approx 10% )</td>
</tr>
<tr>
<td>Air</td>
<td>Lack of Knowledge/SA ( \approx 80% )</td>
</tr>
<tr>
<td></td>
<td>Surprise ( \approx 80% )</td>
</tr>
<tr>
<td>Sea</td>
<td>Lack of Scouting ( \approx 80% )</td>
</tr>
<tr>
<td></td>
<td>Surveillance ( \approx 80% )</td>
</tr>
</tbody>
</table>

Network-Centric Warfare
- High Rates of Change
- Closely Coupled Events
- Lock in/Out
- Speed of Command
- Self Synchronization

What’s Valued
- Maneuver
- Sensing
- Speed / Endurance
- Numbers
- Risk Tolerance
- Networking
Shared Awareness

...The new competitive advantage

Stryker Brigade

**Scenario**

- SBCT attack on Shughart-Gordon
- Certification Exercise (CERTEX) at Joint Readiness Training Center, May 2004

**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 CMD ability to control the speed of command
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 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 concept development & experimentation** – short cycle time / rapid iteration, concept-based / technology-enabled
- **Joint training** – live / virtual / constructive / distributed
- **People** – culture and organizations
Project “Stiletto”

Distributed Adaptive Operations

- Mass effects without massing forces
- Influence actions broadly
- Exploit the network
- Create high transaction rates
- Self-organize decision-making
- Generate organic intelligence
- Adapt rapidly
- Execute either distributed or concentrated operations
- Create overmatching complexity

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
<td>LOA</td>
<td>80’-0”</td>
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<tr>
<td>Beam</td>
<td>40’-0”</td>
</tr>
<tr>
<td>Tunnel Width (4)</td>
<td>5’-0”</td>
</tr>
<tr>
<td>Draft (static)</td>
<td>2’-4”</td>
</tr>
<tr>
<td>Displacement</td>
<td>67 MT</td>
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<tr>
<td>Payload</td>
<td>15 MT</td>
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<tr>
<td>Fuel Load</td>
<td>10 MT</td>
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<tr>
<td>Classification</td>
<td>ABS</td>
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<tr>
<td>Main Engines</td>
<td>4 x 1650HP C-30 Caterpillars</td>
</tr>
<tr>
<td>Surface Piercing Propellers</td>
<td>4</td>
</tr>
<tr>
<td>Speed</td>
<td>Max @ full load 50-55 knots</td>
</tr>
<tr>
<td>Range @ full load &amp; max speed</td>
<td>500 NM</td>
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<tr>
<td>HP Required (total)</td>
<td>6200hp</td>
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<tr>
<td>Clear Height</td>
<td>15’-0”</td>
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<tr>
<td>Payloads</td>
<td>43% of Displacement</td>
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</table>
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
Operationally Responsive Space

• 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

A capability on orbit within the planning time constraints of a major contingency
Re-Directed Energy

...Concept Description

Warfighting Advantage:
- Decrease Engagement Timeline
- Reduce Collateral Damage
- Revalue LOS Only Lasers
- Increase Shots per Laser
- Optimize Beampath Flexibility & Engagement Options

Laser – Relay Mirror – Air Vehicle Technology Pairing
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**: 0.5-1 year

- **Globally available technology**
- **Our technological advantage comes from speed of systemization**
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
Focus in designing alternative architectures:

- Low unit cost
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- Sensing
- Innovative designs
- Mass Customization

*Preserve Strategic Advantage: innovation & the breadth, depth and diversity of the industrial base*
New Logic and Metrics

• Achieve higher **learning rates**
  Co-evolve concepts, capabilities and processes
  Continuous adaptive acquisition and experimentation

• **Employ higher transaction rates**
  Faster cycle times
  Speed of information and operational mobility

• **Create and preserve options**
  Technology on-ramps
  Broaden capabilities base
  Mass customization

• **Create overmatching complexity**
  Scalable
  The small the fast and the many