



Transforming Defense



Office of Force Transformation

Information Age

“A Future Worth Creating”

Globalization II

Globalization III

Vision: Broad and Sustained Competitive Advantage

- *The Strategy*
- *The Metrics*
- *The Technology*
- *The Cost*

Arthur K. Cebrowski
Director, Force Transformation
4 August 2004

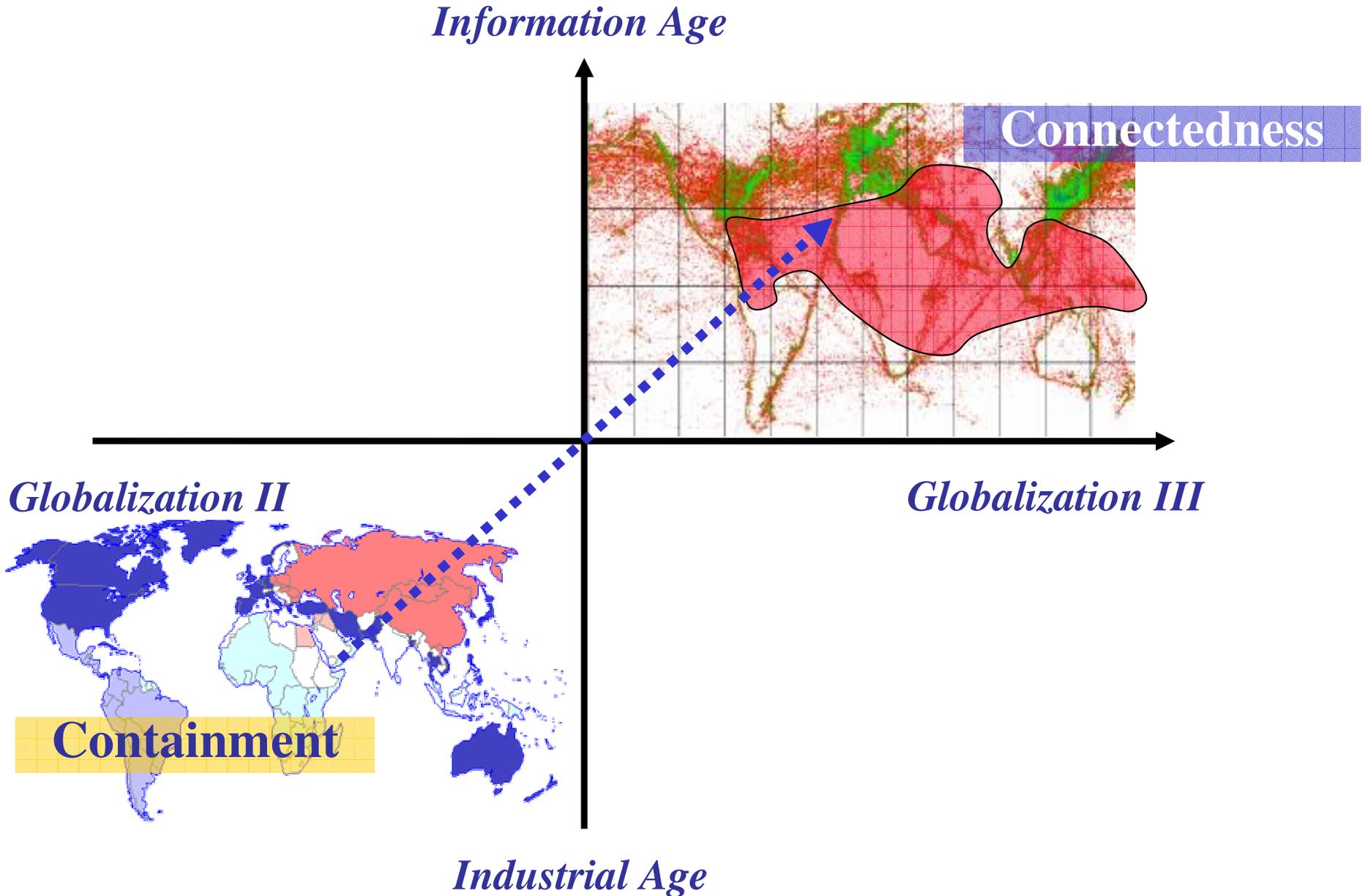
Industrial Age



Transformation

...Meeting the Challenges of the New Competitive Landscape

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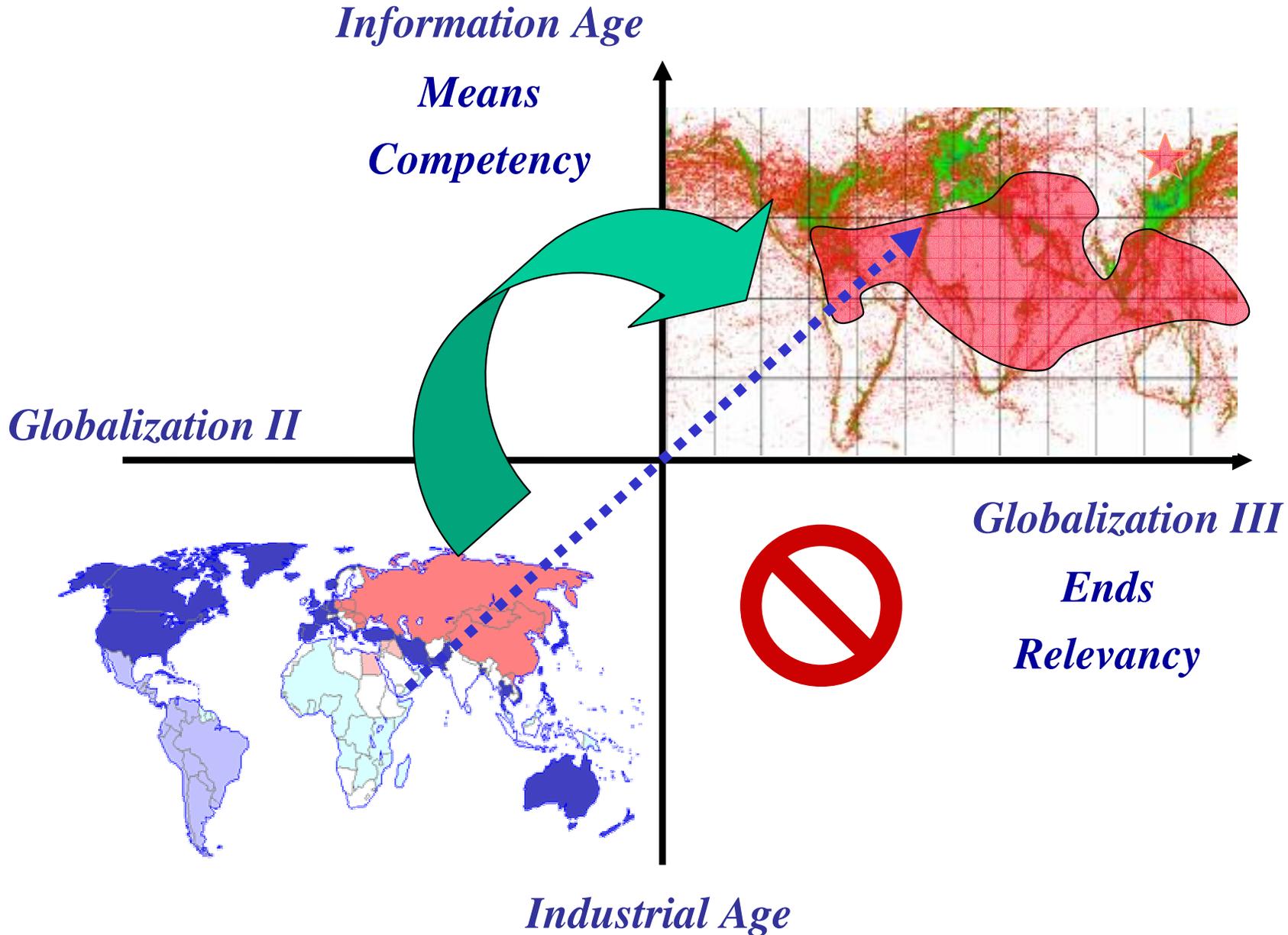


Transformation

...Meeting the Challenges of the New Competitive Landscape



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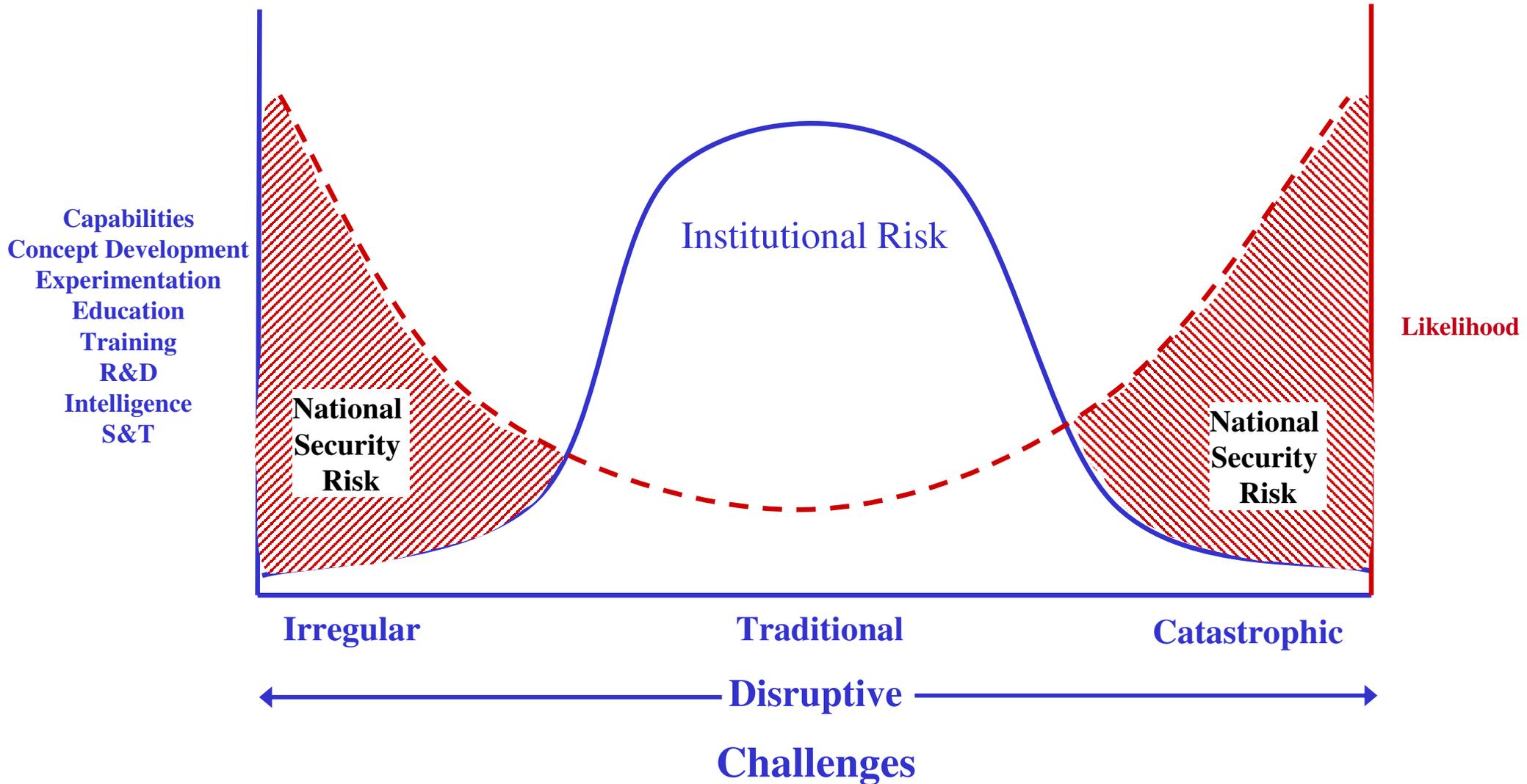


Competency vs. Relevancy

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Competency

Relevancy





Security Environment

... Four Challenges



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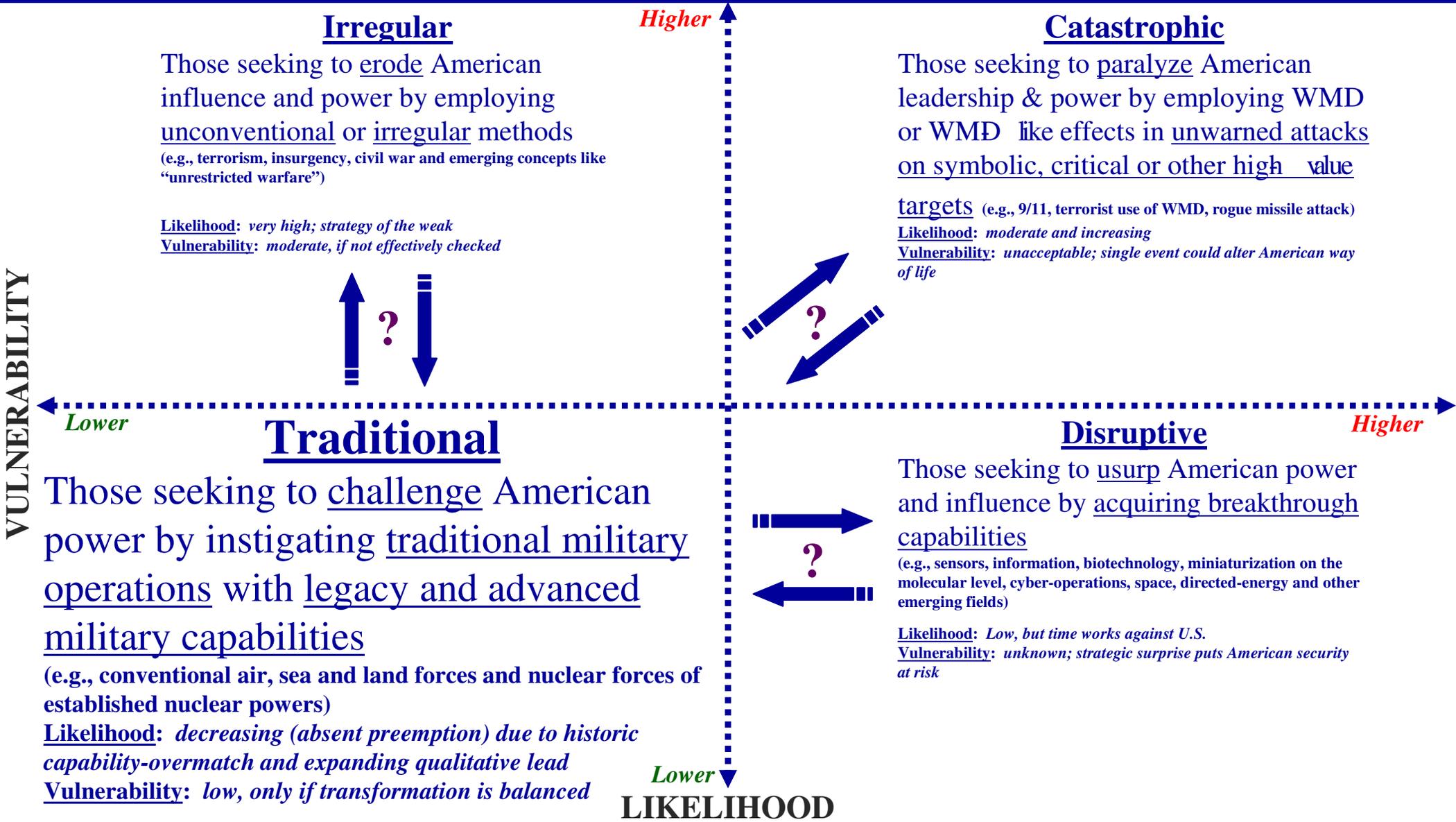


Security Environment

... Four Challenges



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What Are the Issues?

...Resolving the Contradictions



*Where is the Convergence
Between
“Effects” and Political Victory?*

*How Do We Pre-empt
When We Can't Find Targets
Hiding in Plain Sight?*

- Defensive Orientation
- Social Intelligence vs Military Intelligence

*How Do We Avoid
Strategic Surprise?*

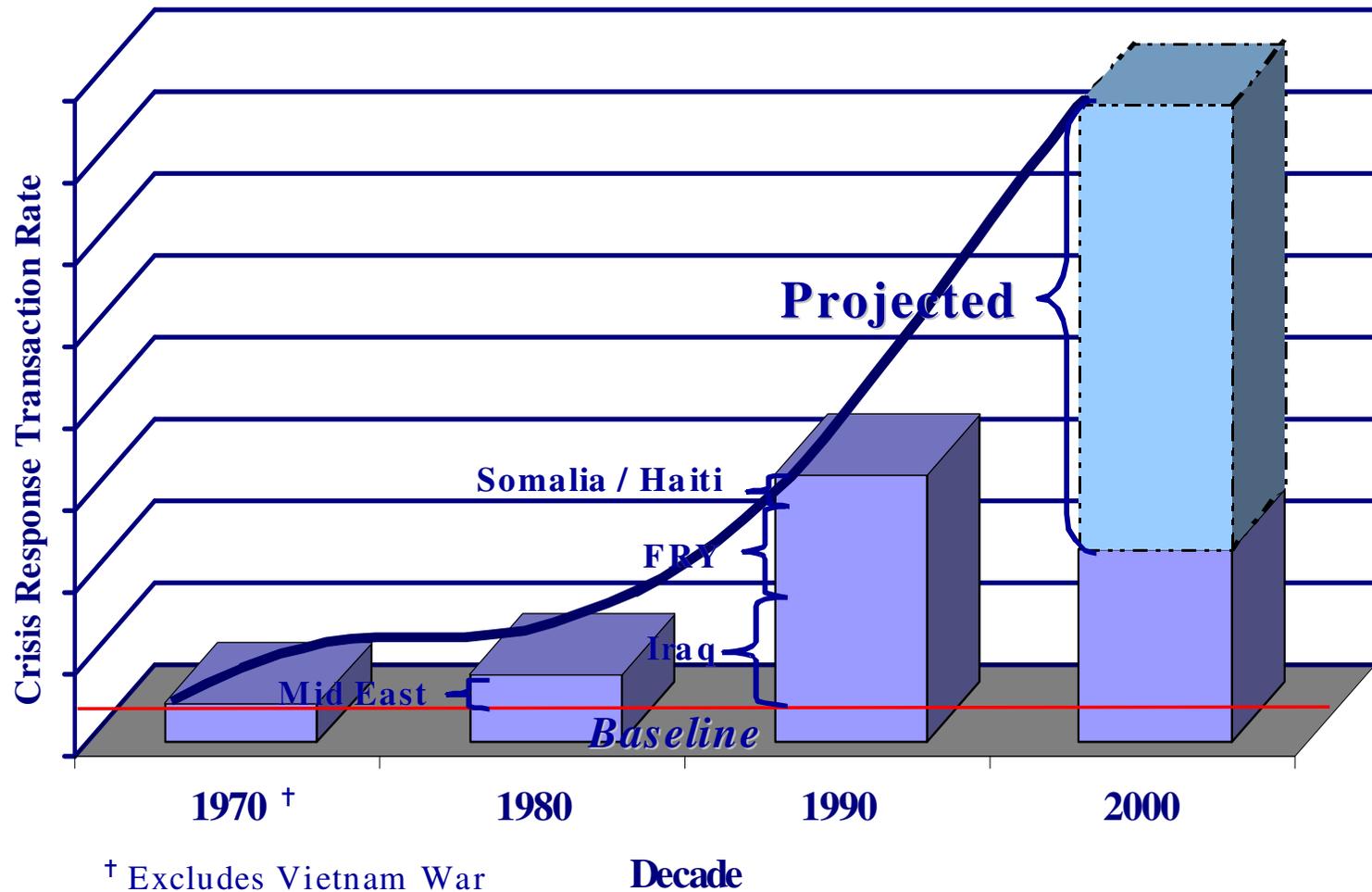


Global Trends and Implications



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





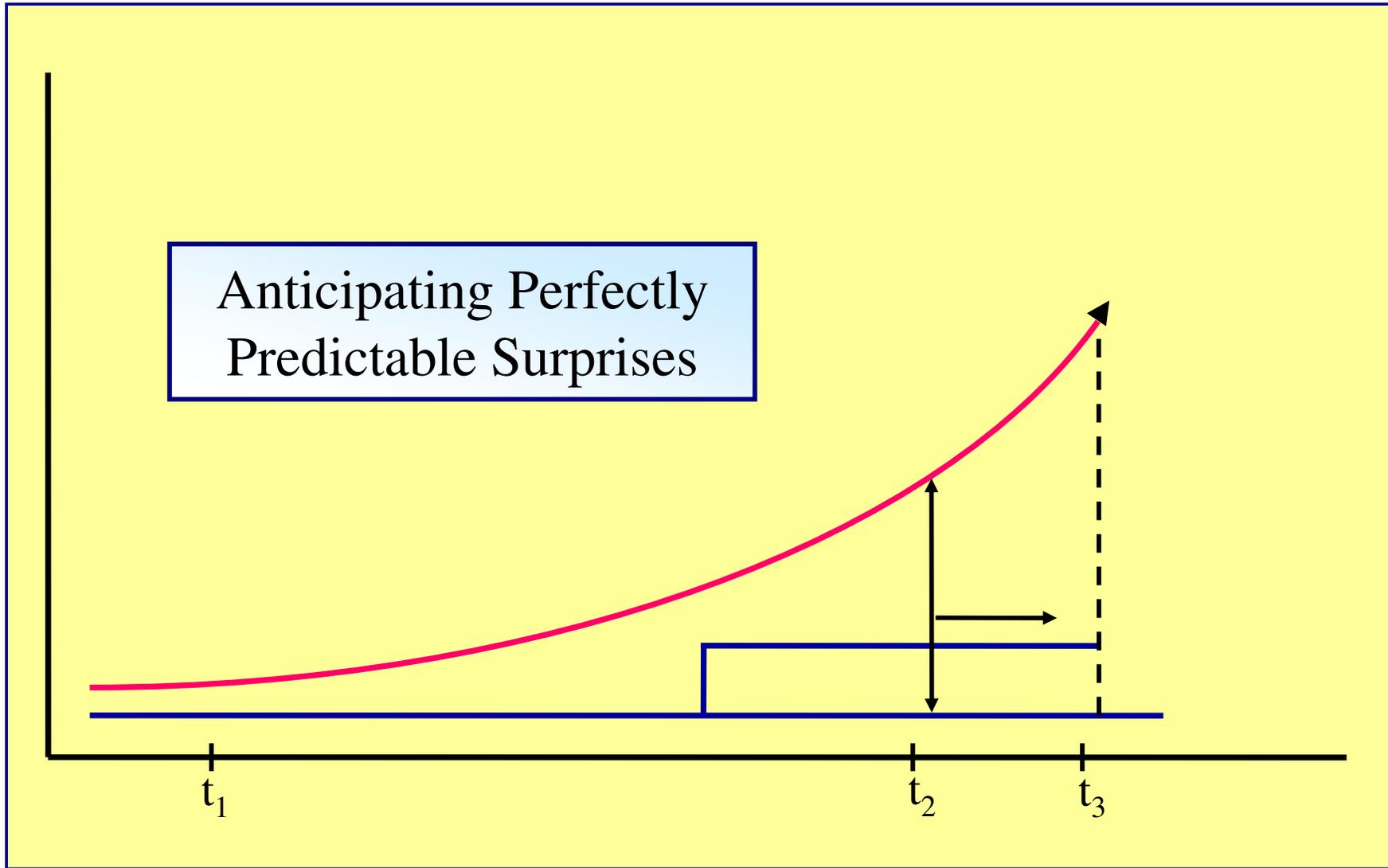
Informing Transformation

...Transactions vs. Resources



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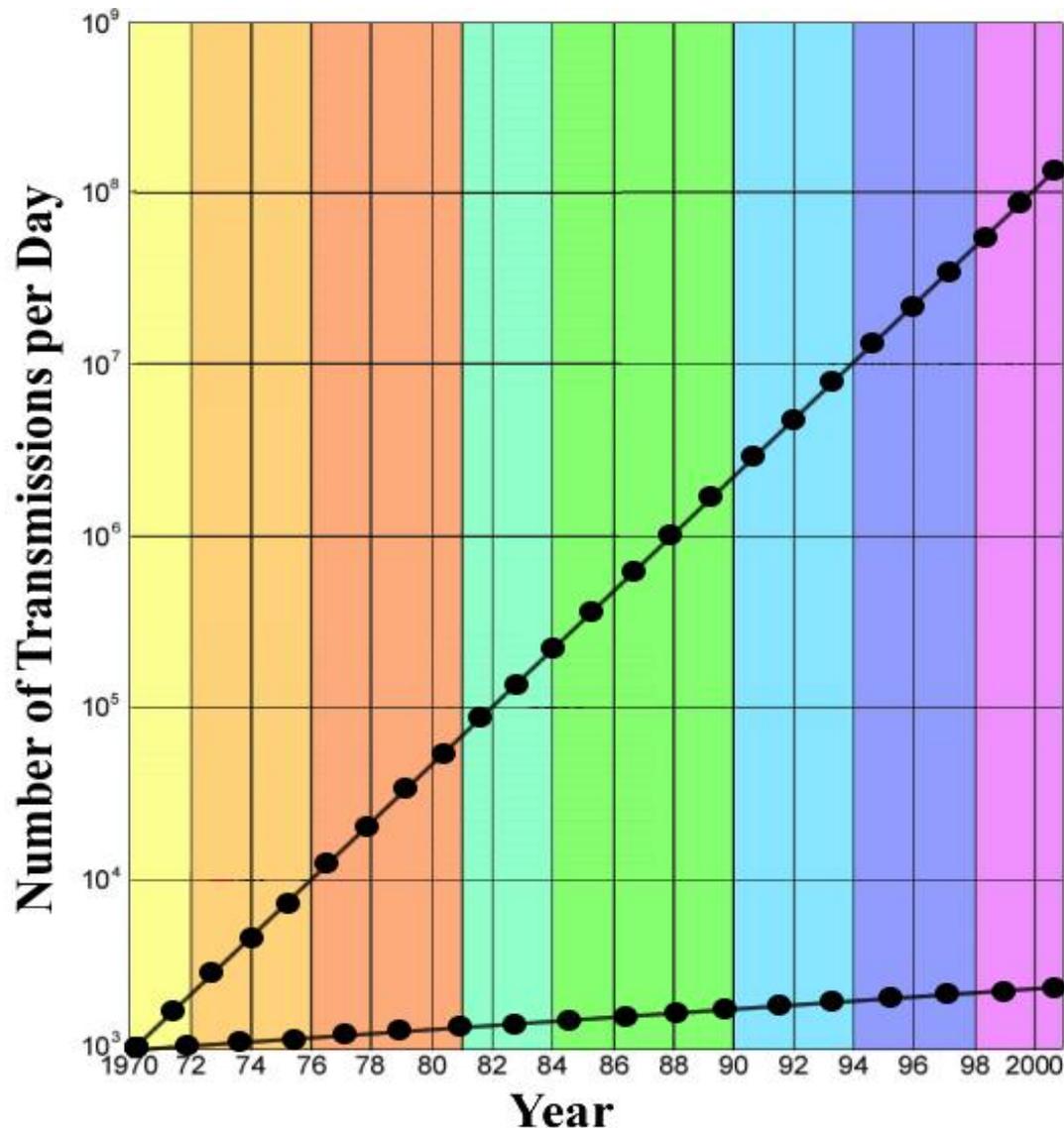


The Collection – Analysis Gap

...Managing the inevitable



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Policy Choices:

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



Transforming the Metrics

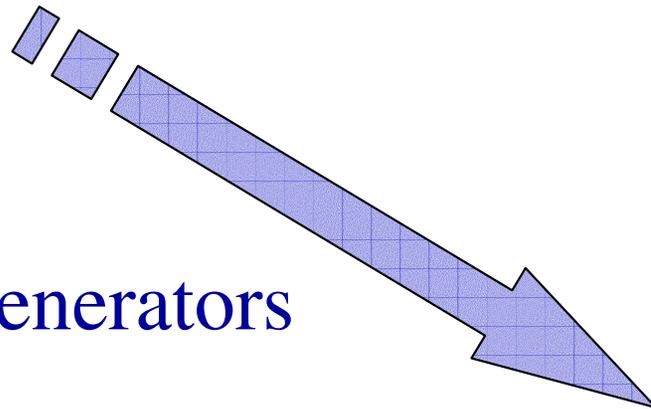
...Shifting value to outcomes



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Initial Metrics

- Networking
- Speed
- Numbers
- Information Generators
- Dispersal



Value of Time
vs.
Cost of Speed

New Basis for Competition

“Dissuasion”= f (present value of future capabilities, future value of present capabilities)

- Create and preserve options
- Employ higher transaction rates
- Achieve higher learning rates
- Create overmatching complexity



Mass-Based Soldier



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Information-Based Soldier



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Information-Based Soldier



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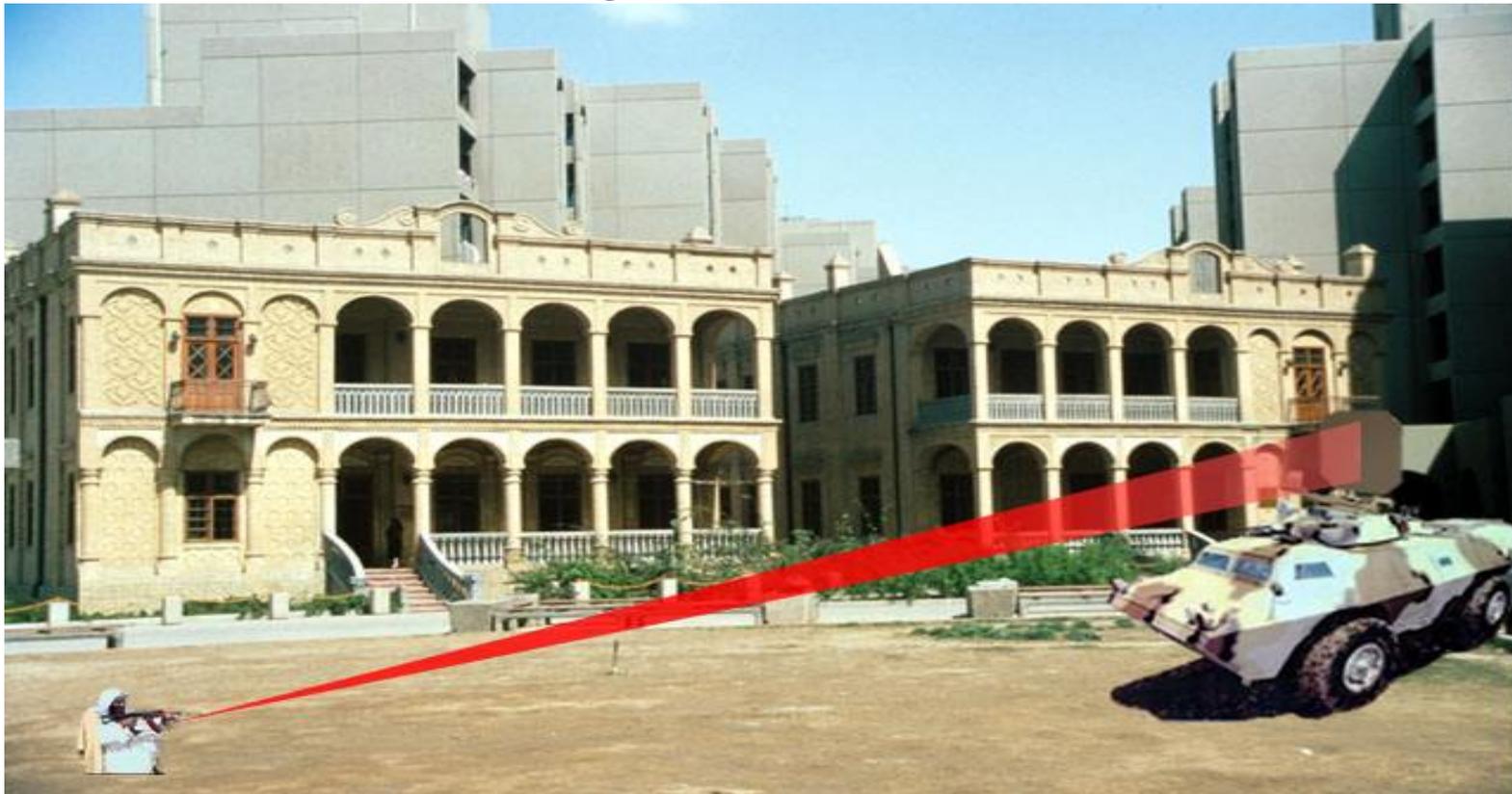


Wildcards vs. Character of War



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Project Sheriff





Sea-Based Tactical Air



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Small Diameter Bomb



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SDB



Sea-Based Tactical Air



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Distributed Sea-based TACAIR

Network-centric

- Collaborative planning and execution
- Netted expeditionary sensors

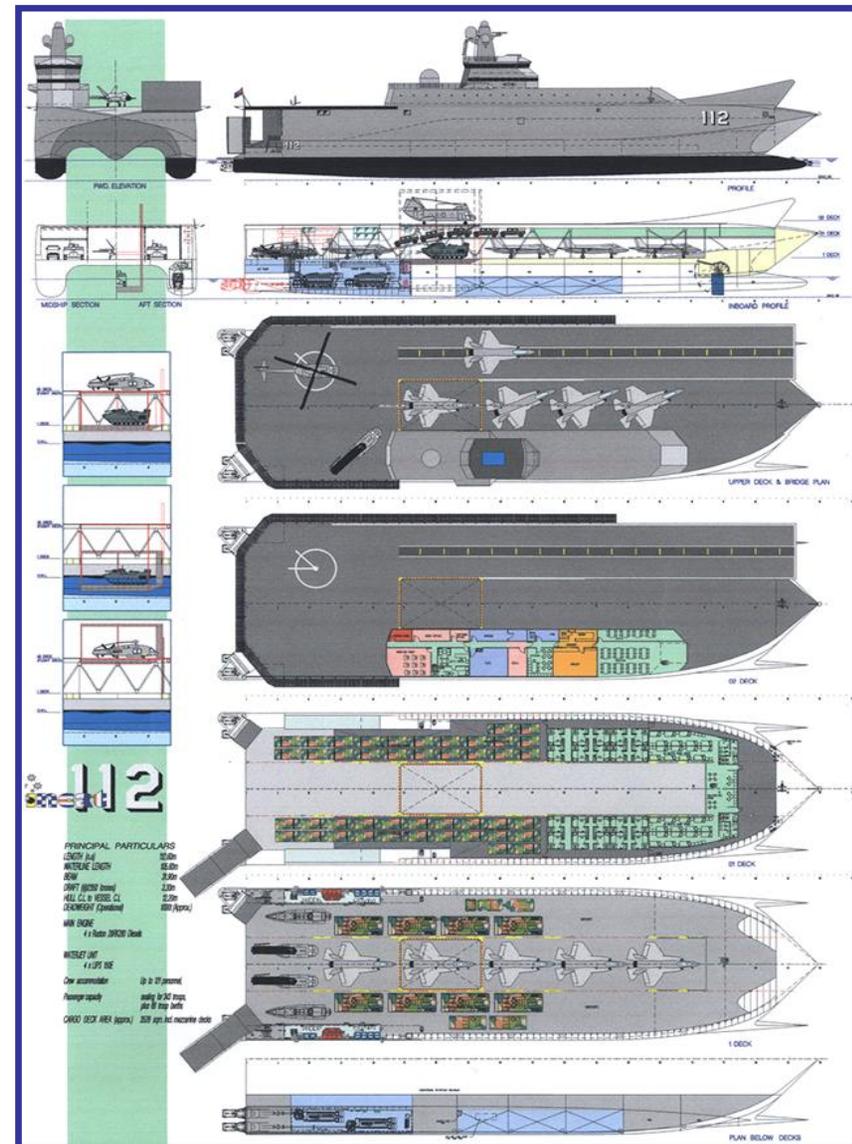
Continuous power vice pulse of power (24 hour ops)

Assured access

- Correct tactical instability
- Complicate enemy ISR
- Improve survivability/susceptibility/vulnerability
- Reduce manpower
- Reduce cost

Sea-basing implementation

- Split operations/replenishment
- AIMD ashore or ship-based



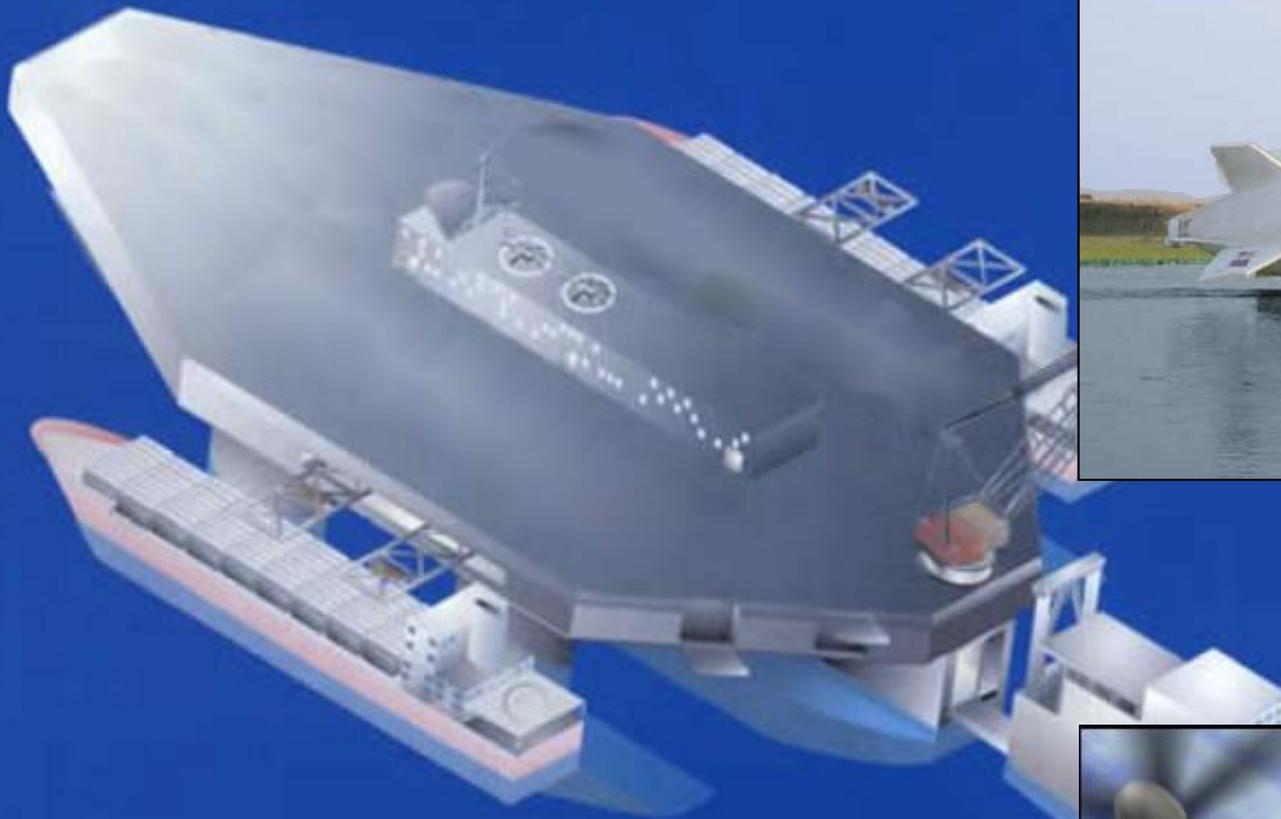


Operational Maneuver

...From the Sea



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High Speed at Sea



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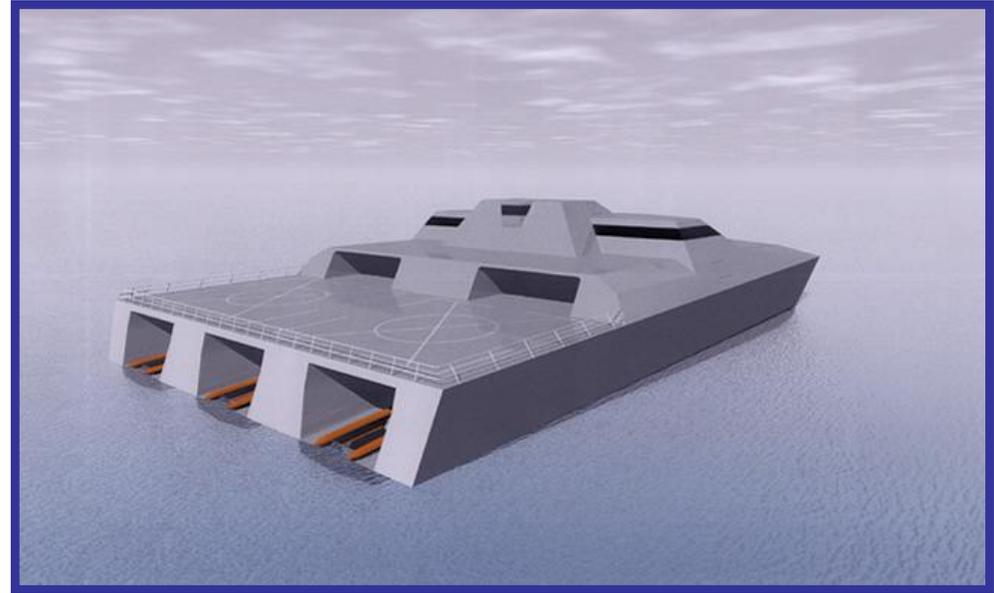
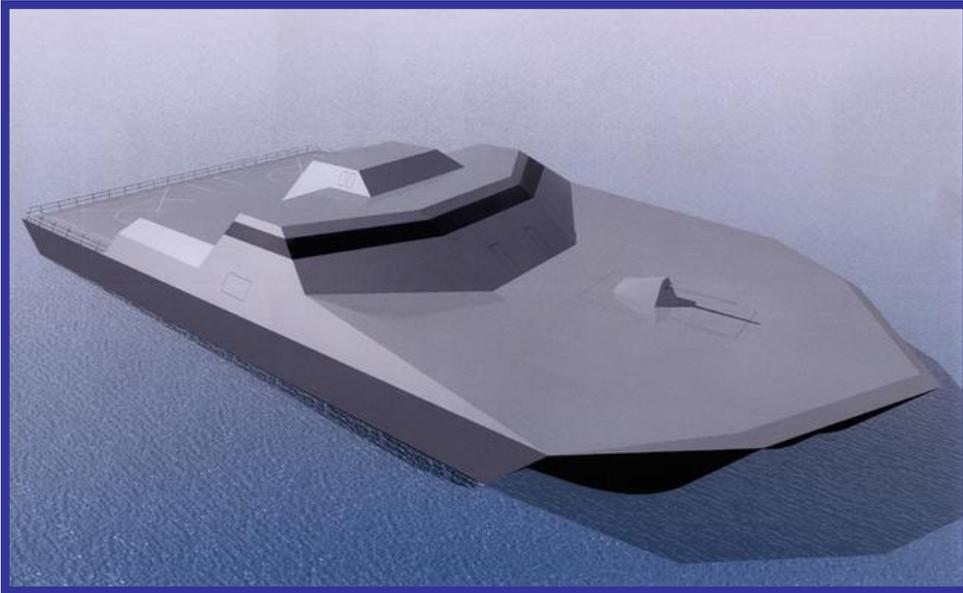


Increased Performance

...For lower cost



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Shallow Draft / High-Speed Sealift



6000-8700 nm, 60-100 knots, 5000 ton payload

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- ***Tactically Survivable:*** *Agile maneuverability...speed / angles*
 - Carbon fiber/ Kevlar strength, inherent multi-dimensional stealth, & networked defense
- ***Operationally Feasible:*** *Modular missions...rapid reconfiguration*
 - Electronic keel and support service standards & protocols, Mission-oriented mobility systems, reconfigurable payloads
- ***Strategically Viable:*** *Adaptable mobility...speed of response*
 - High Payload-fractions, sustained tempo/ reduce foot print ashore

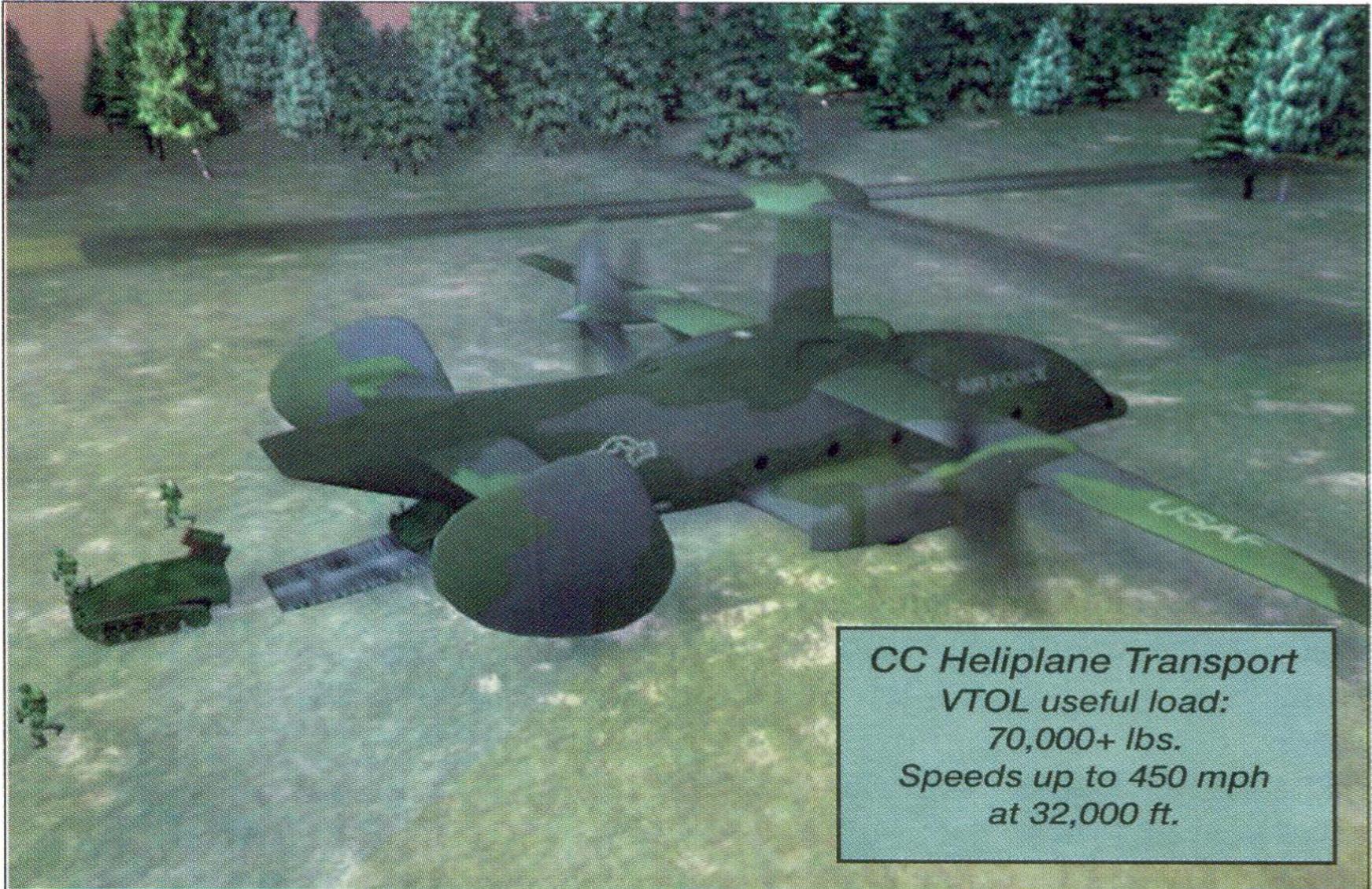


Operational Maneuver

...from Strategic Distances



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CC Heliplane Transport
VTOL useful load:
70,000+ lbs.
Speeds up to 450 mph
at 32,000 ft.



Ultra-Large Airlifters

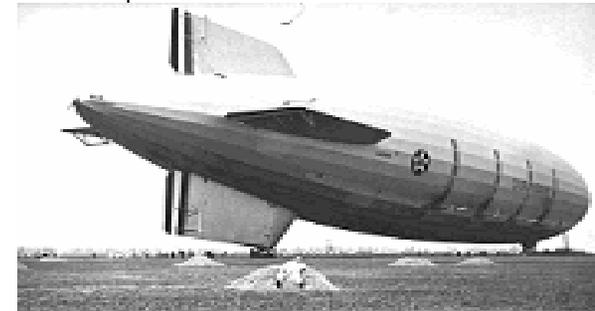


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- **Desired capability...** To meet military needs (now and future) and also multiple commercial needs
- **Ultra-Large Airlifter (ULA)**
 - New term for proposed systems (airship or hybrid air vehicle)
 - Cargo: Payload and Volume far greater than conventional aircraft (100s of tons)
 - Range capability measured in thousands of miles
 - Speed significantly greater than surface ships
 - Will NOT require significant infrastructure for operations
- **Additional Airlift: Origin to Destination**
 - Volume is probably most valuable asset
 - Must bypass ports and airfields
 - Round the Clock Operation
- **Multiple platforms:**
 - Landing zone requirements/flexibility/rapid load & unload critical
 - Prioritize development: greatest military flexibility combined with commercial viability



VTOL- Crane



VTOL



STOL



Approaches to Logistics



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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

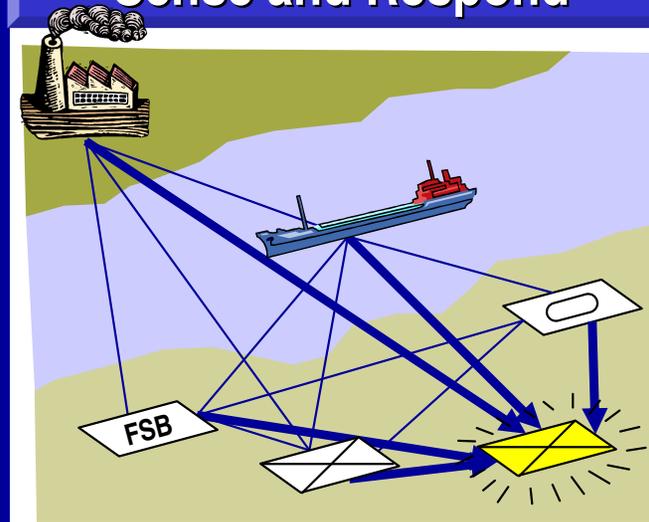
Just-in-Time



- **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



Relay Mirror System



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- **Attributes of an HEL-Relay Mirror System**

- Extended range of engagement for air, land and sea-based systems
- Improved engagement timeline
- Increased field of regard
- Improved battlefield standoff for manned systems

- **Low cost force multiplier**

- High Altitude Airship-based Relay Mirror Systems offer early operational capability for high value missions



Identify Issues of Regret

... *Candidates for Action Now*



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Warfare elements

- ***Fire*** – non-lethals; directed energy; redirected energy
- ***Maneuver*** – lift for operational maneuver; vertical battlefield; seabasing
- ***Protection*** – urban operations; biomedical countermeasures
- ***C2&C*** – joint interdependency
- ***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
- ***Joint training*** – advanced distributed training
- ***Joint S&T*** – strengthen joint / combined warfighting; transform joint force; optimize intel; combat WMD proliferation; fulfill homeland defense duties
- ***People*** (*global trends and implications of exporting security*) – policy choices



Strategic Approach to Cost



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The Need:

Since this is the age of the small, fast, and many, we need organizations, processes, and a strategic approach to cost capable of delivering the requisite capabilities.

An Approach:

1. Strategies for divestiture and devolution of capabilities
2. Suppressing the monetary cost of war
3. Cost imposing strategies
4. Mitigation of cost imposing strategies
5. Reversing the current trend of paying more for decreasing returns

New metrics create opportunities for new cost dynamics!



Strategic Approach to Cost



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Budget Strategy

•Fixed Metrics →

•Reduce total expenditures →

•Decreasing ROI →

•Greatest margin/
transaction →

•Reduce transactions
to reduce cost →

Cost Strategy

•Flexible Metrics

•Reduce individual entity cost

•Increasing ROI

•Greatest number of transactions
with positive margin

•Maximize transactions
proportional to entity cost

*Holding costs high creates opportunities for countervailing strategies
...and may be counter to dissuasion*



Strategic Approach to Cost



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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!

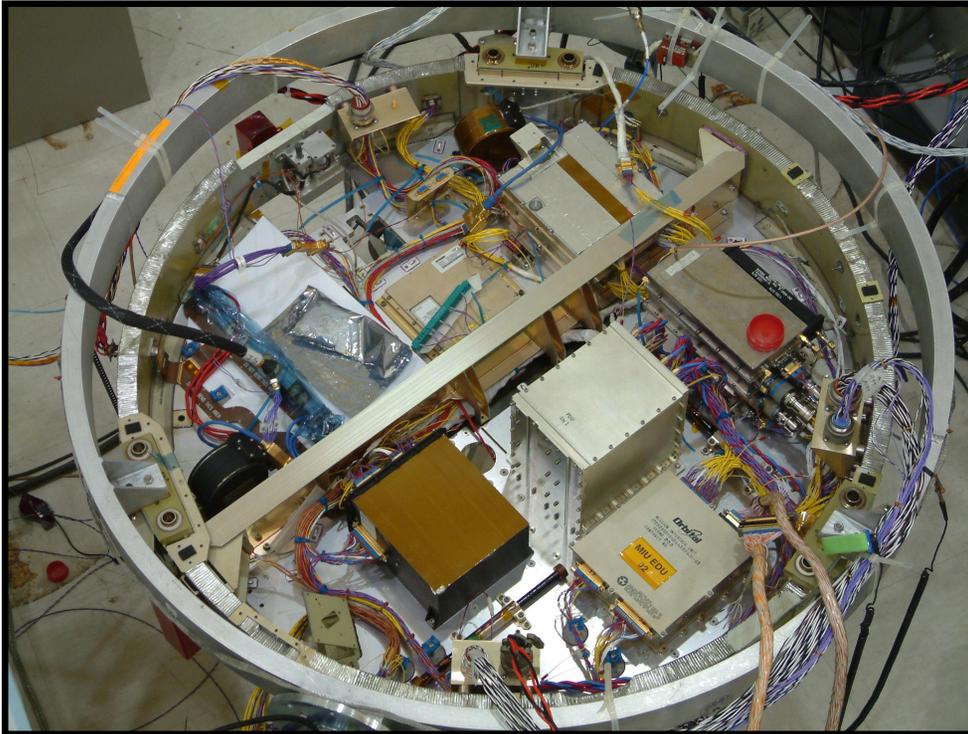


Operationally Responsive Space

...TACSAT 1



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

- Responsive
 - < 1 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



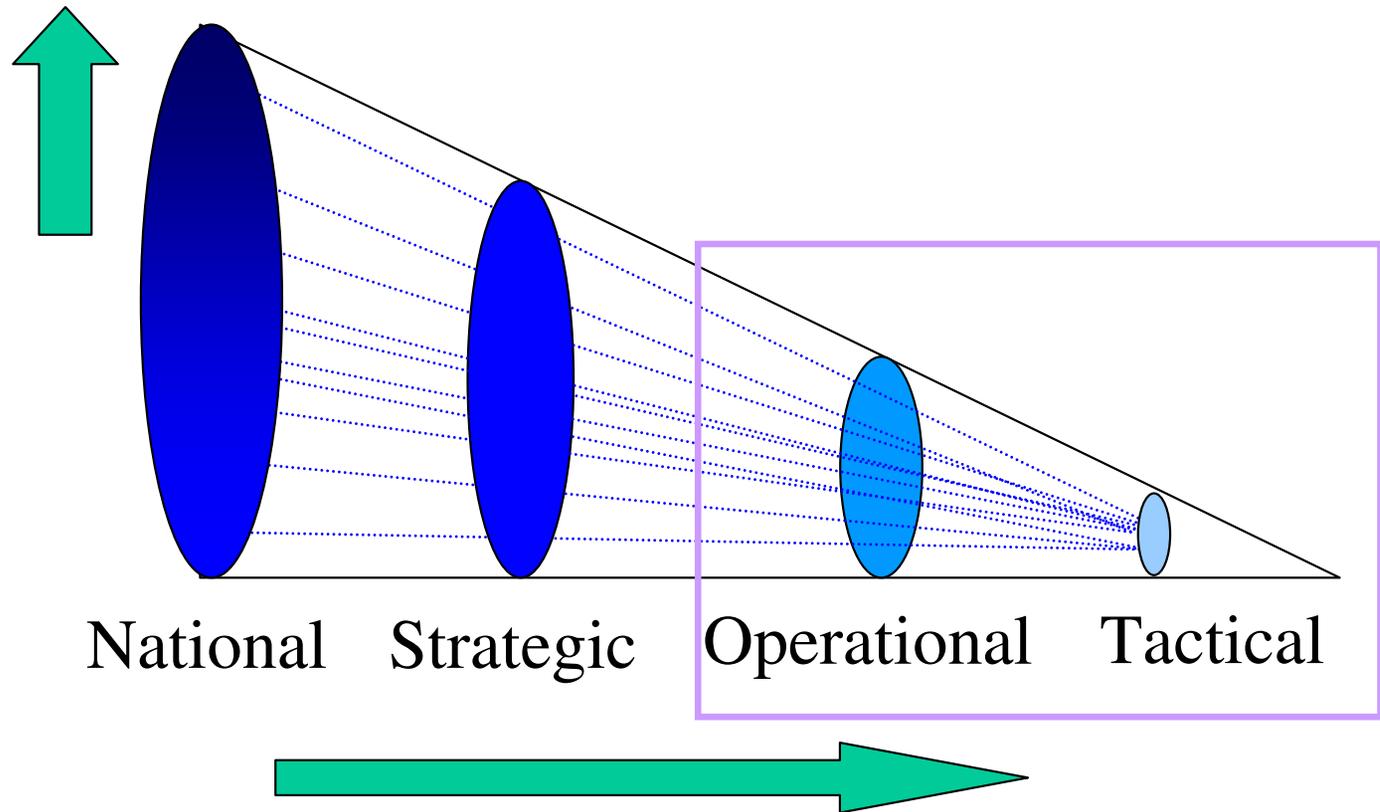
Global Utilities Operational Needs



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National

- Cost
- Mission Criticality
- Risk
- Capability
- Complexity
- Requirements
- Centralized Control
- Classification
- Competing Users
- Launch Challenges





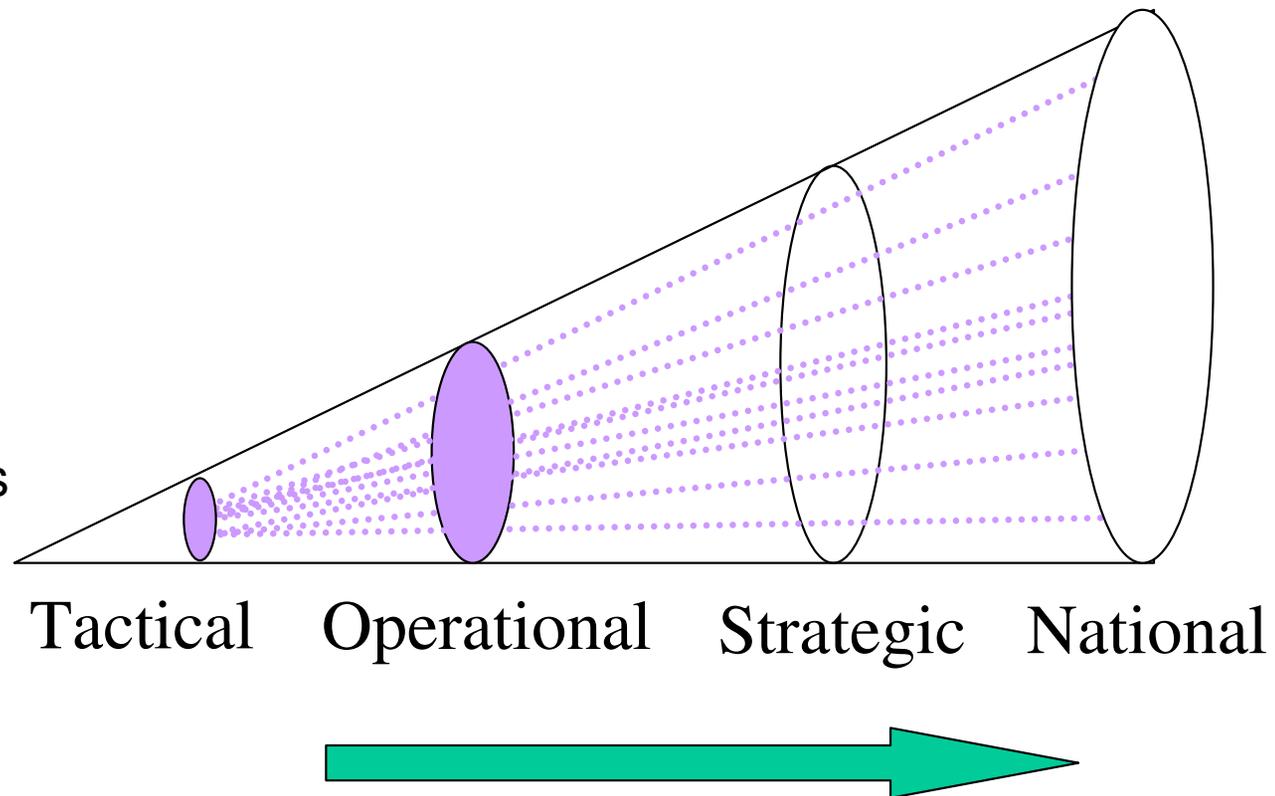
Military Space “Demand Driven”



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Operational

- Demand Driven
- Military Capability
- Autonomous
- Networked
- Decentralized Control
- Reduced Classification
- Broadened User Base
- Decreased Cycle Times
- Risk Tolerant





STA Recommendations



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- Rebalance focus from “Traditional” to “Irregular,” “Catastrophic” and “Disruptive” challenges (USD(P))
- Adopt cost as a strategy (USD(P))
 - Both cost of war and program costs
 - Create cost-suppressing strategies
 - Transform non-discretionary areas
 - Address cost imposing strategies against our adversaries
- Transform management of key functions
 - Realign information activities management under CIO (ASD(NII))
 - Achieve demand-centered joint intelligence (USD(I))
 - Organize joint logistics around the battlefield, not around the supplier (USD(AT&L))
 - Make generational S&T integral to the defense strategy (USD(AT&L) / CJCS)



Transforming Defense



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Information Age

“A Future Worth Creating”

Globalization II

Globalization III

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

Arthur K. Cebrowski
Director, Force Transformation
10 July 2003

Vision: Broad and Sustained Competitive Advantage

Industrial Age



Trends in Security Competition



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Back-up Slides



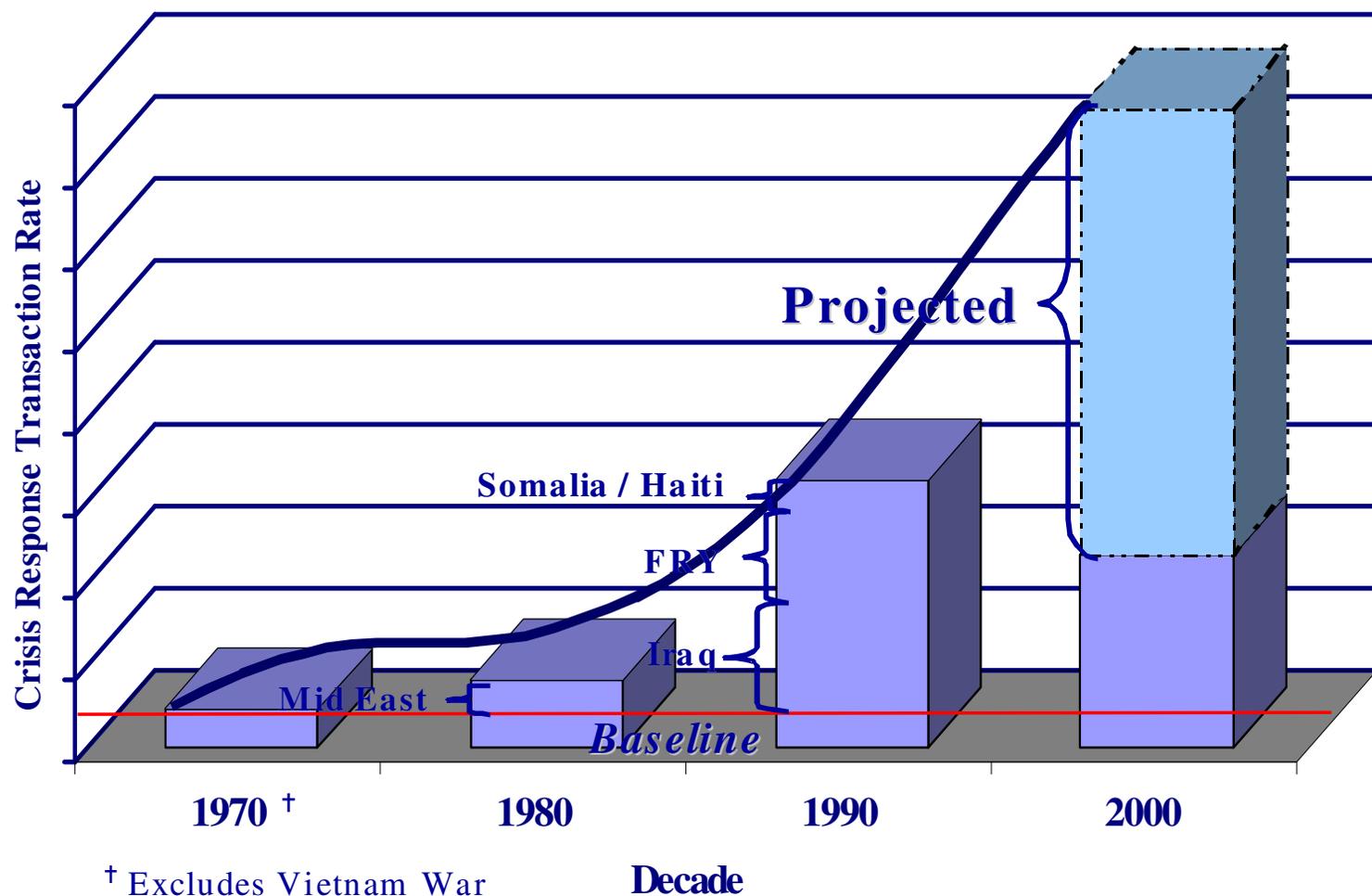
Global Trends and Implications of Exporting Security ... Risk Management Personnel Case



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Policy choices:

- *Engagement policy*
- *Culture & organizations*
- *Substitution of capital for labor*
- *Increased civilian component*
- *Increased international component*





Re-Directed Energy



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- **Objective:**

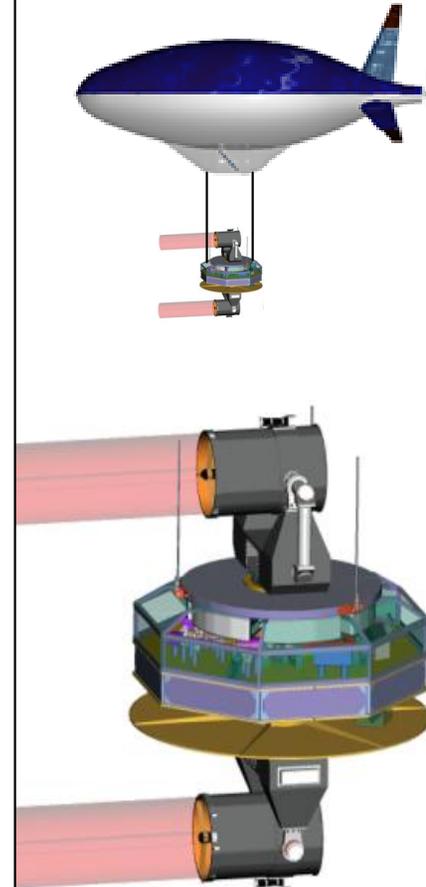
- Re direct laser energy **beyond line of sight (BLOS)** via airborne relay mirror system
- Build an experimental system **compatible with the High Altitude Airship (HAA) ACTD** that creates a technical means to provide indirect laser propagation geometries

- **Unarticulated Need:**

- **Over horizon active defense, communication and sensing**
 - *Re-Direct laser energy to over-the-horizon objectives i.e. cruise missiles, ballistic missiles, aircraft, artillery, and ground targets*
 - *Re-Direct laser energy to operational nodes within the optical communications footprint*
 - *Direct line image relay without optical to electronic conversion*

- **Approach:**

- The **FY05 rapid field experiments** will determine the operational viability and prepare a **functional surrogate to accurately redirect laser energy through the ARMS payload suspended from a crane.**
- In **FY06** the system will be upgraded to include light weight components and higher power levels **for operational effects and conduct concept driven operational experimentation onboard a persistent low altitude airborne platform**
 - *High-risk components and subsystems experiments will be performed*
 - *A functional surrogate will be configured for the prospective HAA ACTD*





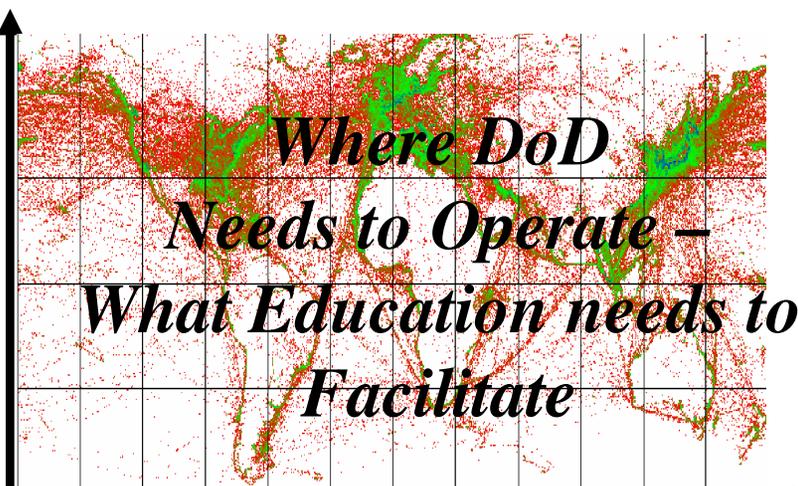
Education and Transformation



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Information Age

*“Primary Axis of
Air Force Institute of Technology
Naval Postgraduate School
Competencies”*



*Where DoD
Needs to Operate –
What Education needs to
Facilitate*

Globalization II

Globalization III

*Current Focus of PME
“Primary Axis of War College
Competencies”*

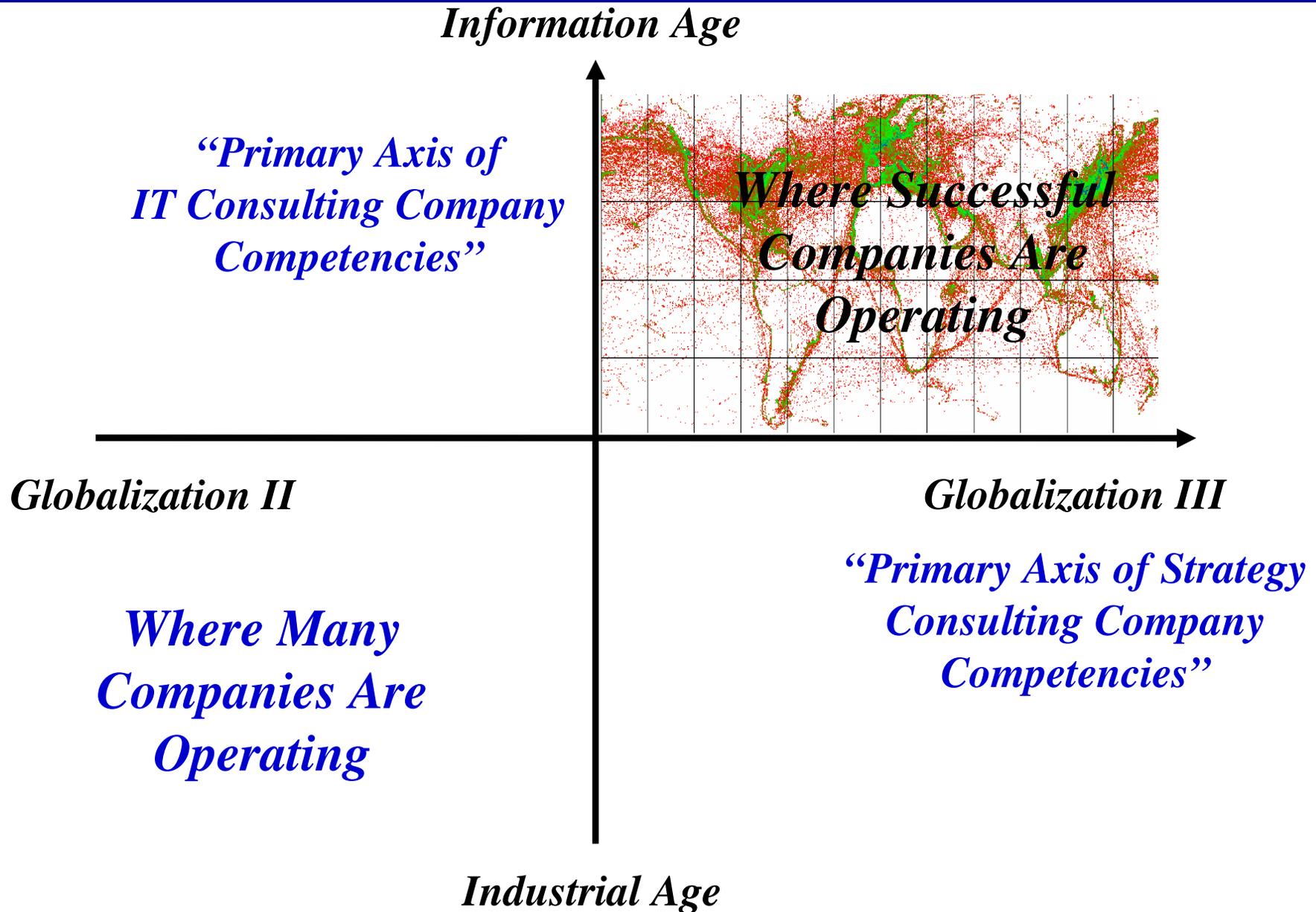
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Industrial Age



Parallel Challenges in the Commercial Sector

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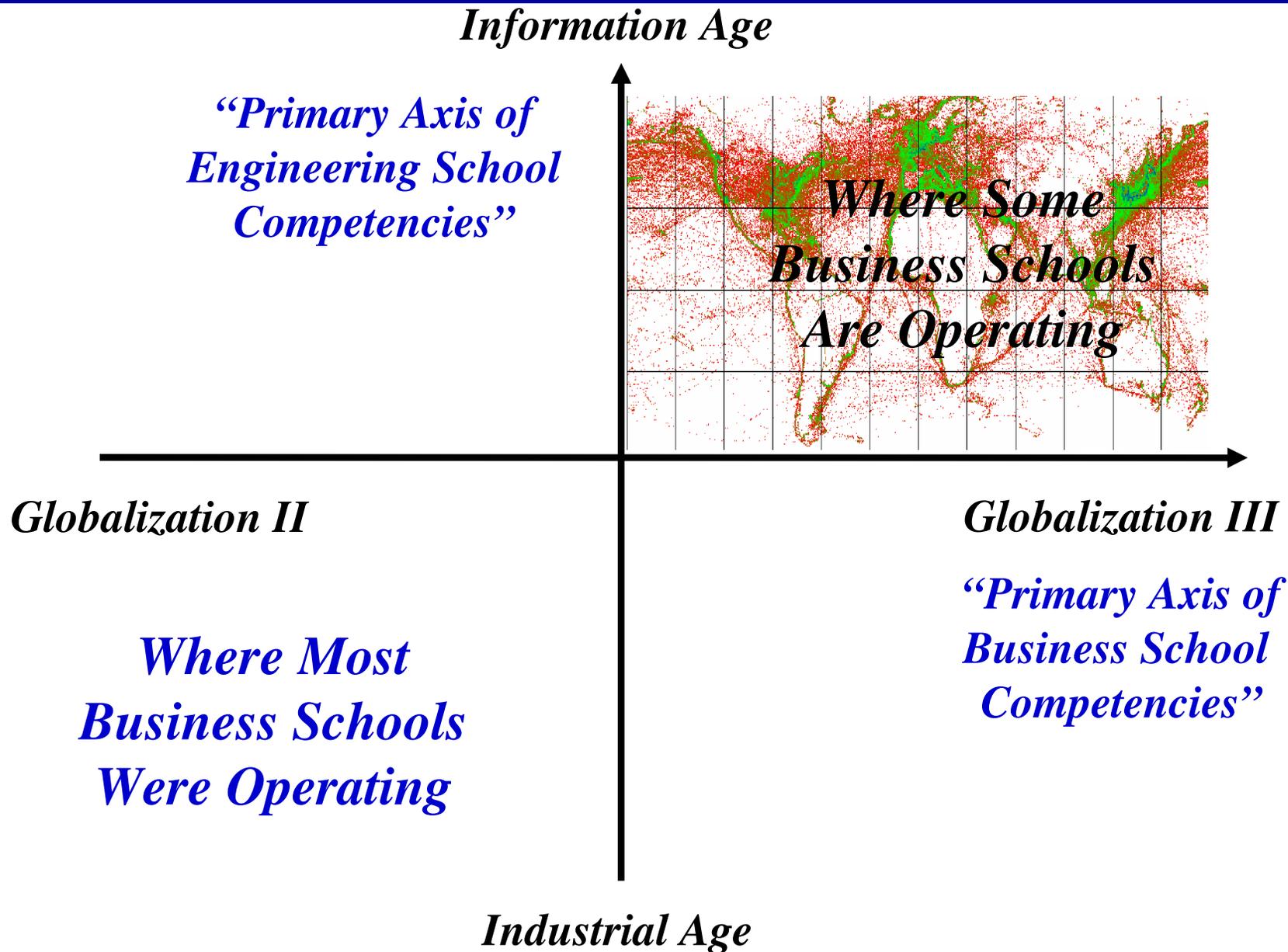




Parallel Challenges in the Commercial Sector



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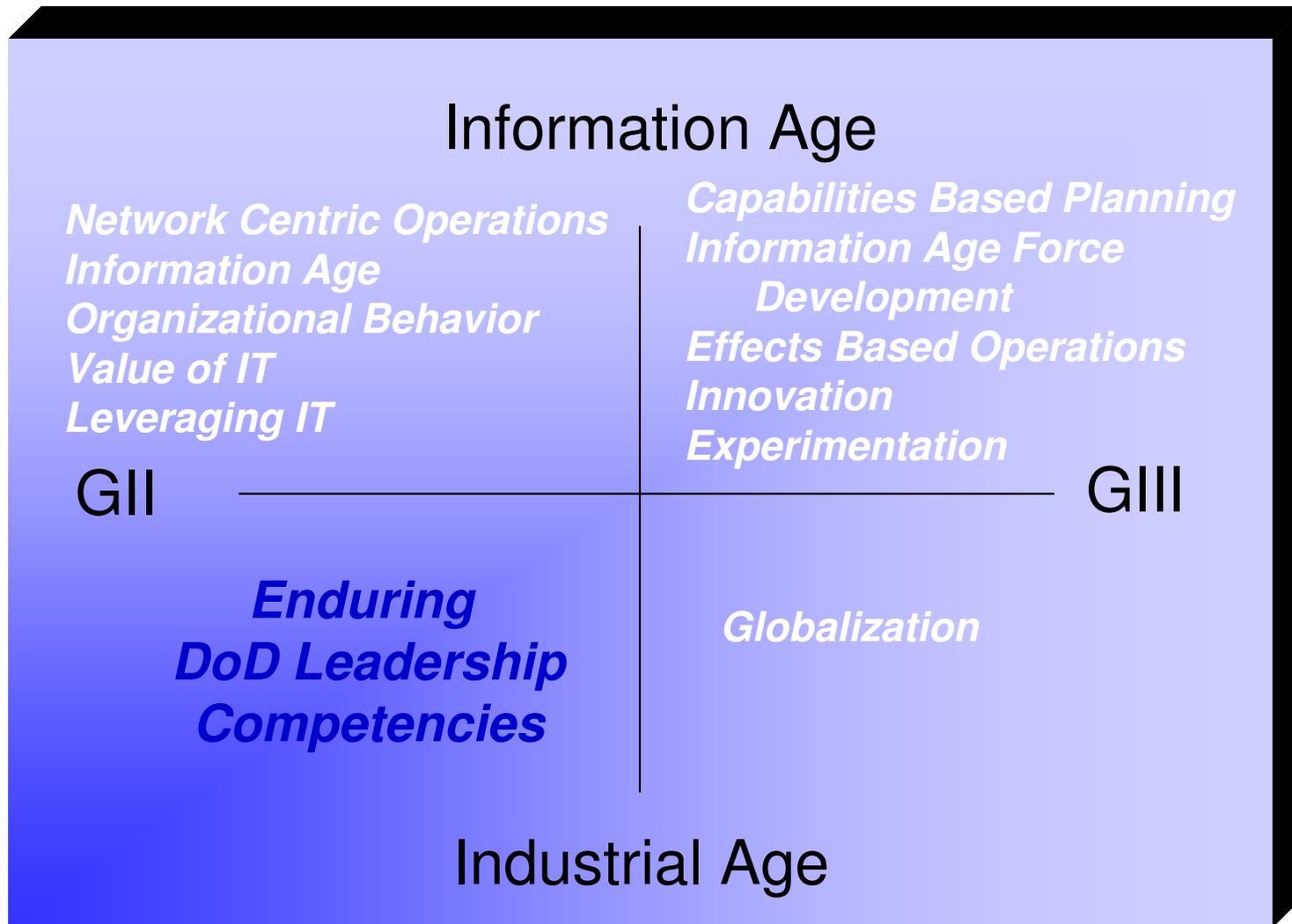




Spiral One of Transformation Competencies



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Mass-Based Soldier



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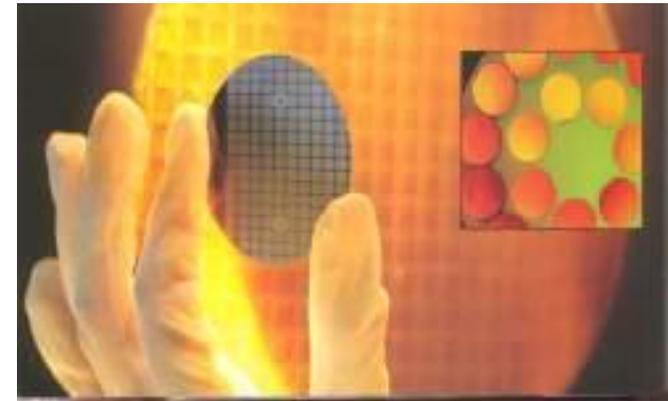




Global Trends Create a New Competitive Landscape



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Information Age

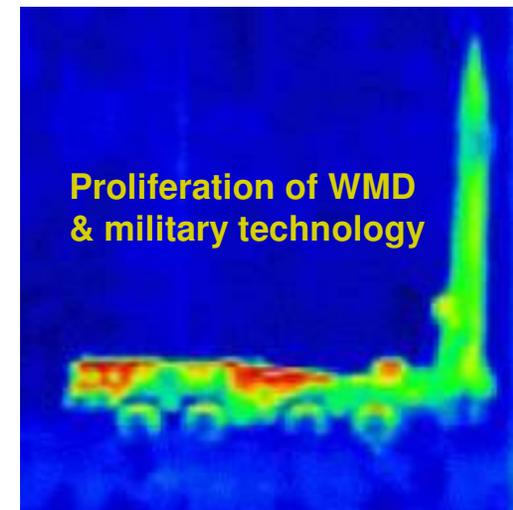
- **New Technological Context**

- Access to highly capable, low-cost IT
- Falling barriers to competitive entry -- sea, space, cyberspace

Globalization III

- **Broadened Threat Context**

- Era of uncertainty with rapidly evolving threats
- State/non-state, nodal/non-nodal
- Asymmetric / conventional
- Unrestricted – deterring the un-deterable





What We Didn't See

...New Lift Concepts



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Operational Maneuver

...From the Sea



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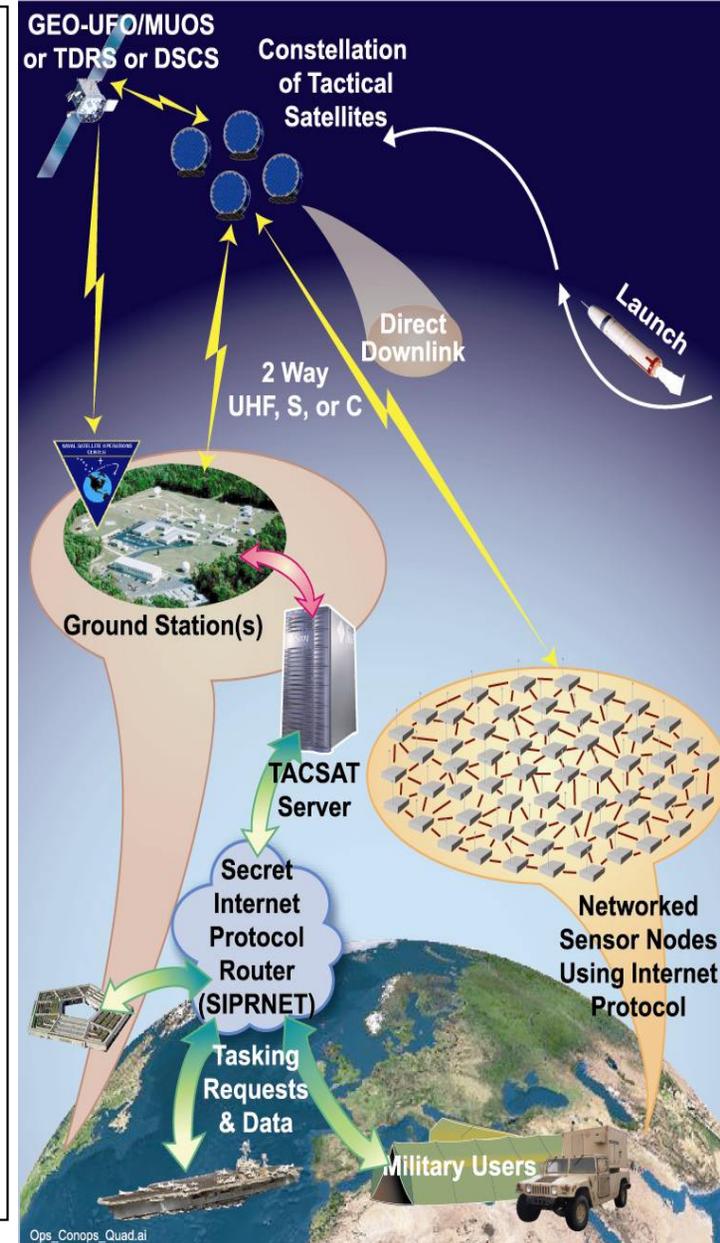


Operationally Responsive Microsat System



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- Produce a responsive and adaptive operationally relevant vehicle for space
 - Develop a near term path for rapidly launching tactical space capabilities
- Experiment with the integration of space and atmospheric vehicles
 - Provide SIPRNET access for shared data/information correlation
- Provide a first-launch micro-satellite which will ...
 - Experiment with new space capabilities at low cost
- Broaden DoD capabilities base and exploit new technologies
 - High capacity, microsats that can rapidly deploy tailored payloads





Security Environment ... Four Challenges



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No hard boundaries distinguishing one category from another



Transforming Defense



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“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*



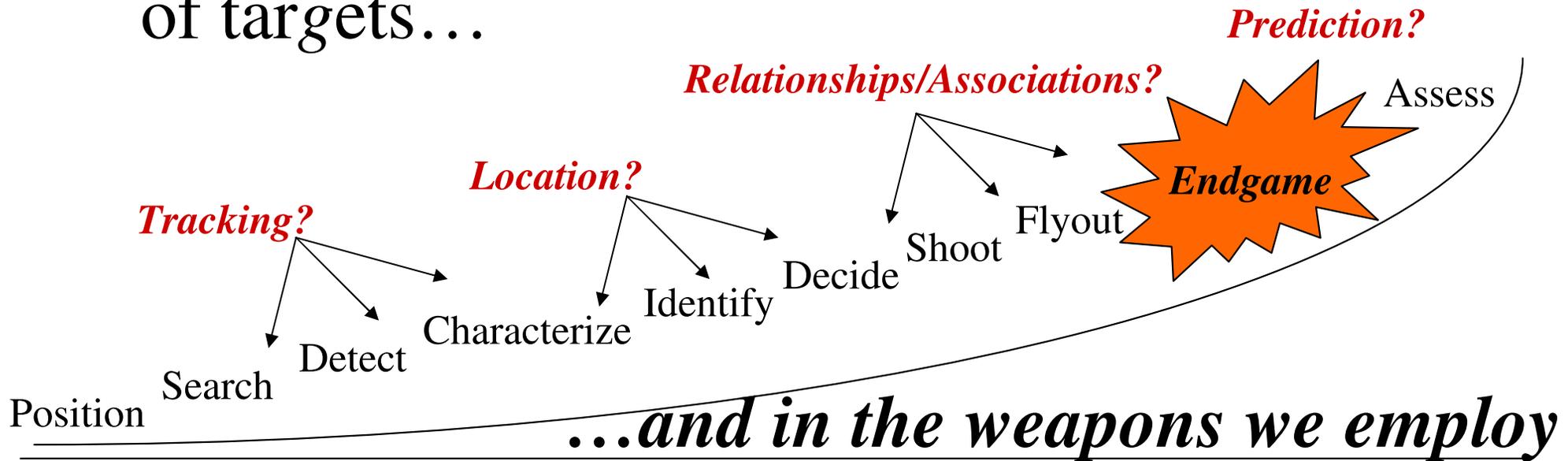
Next Generation Weapons

...Do We Have the Right Weapons For the Right War?



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- There is a need for more discrimination, flexibility and response in the determination of targets...



The Engagement Timeline

...is not just about time

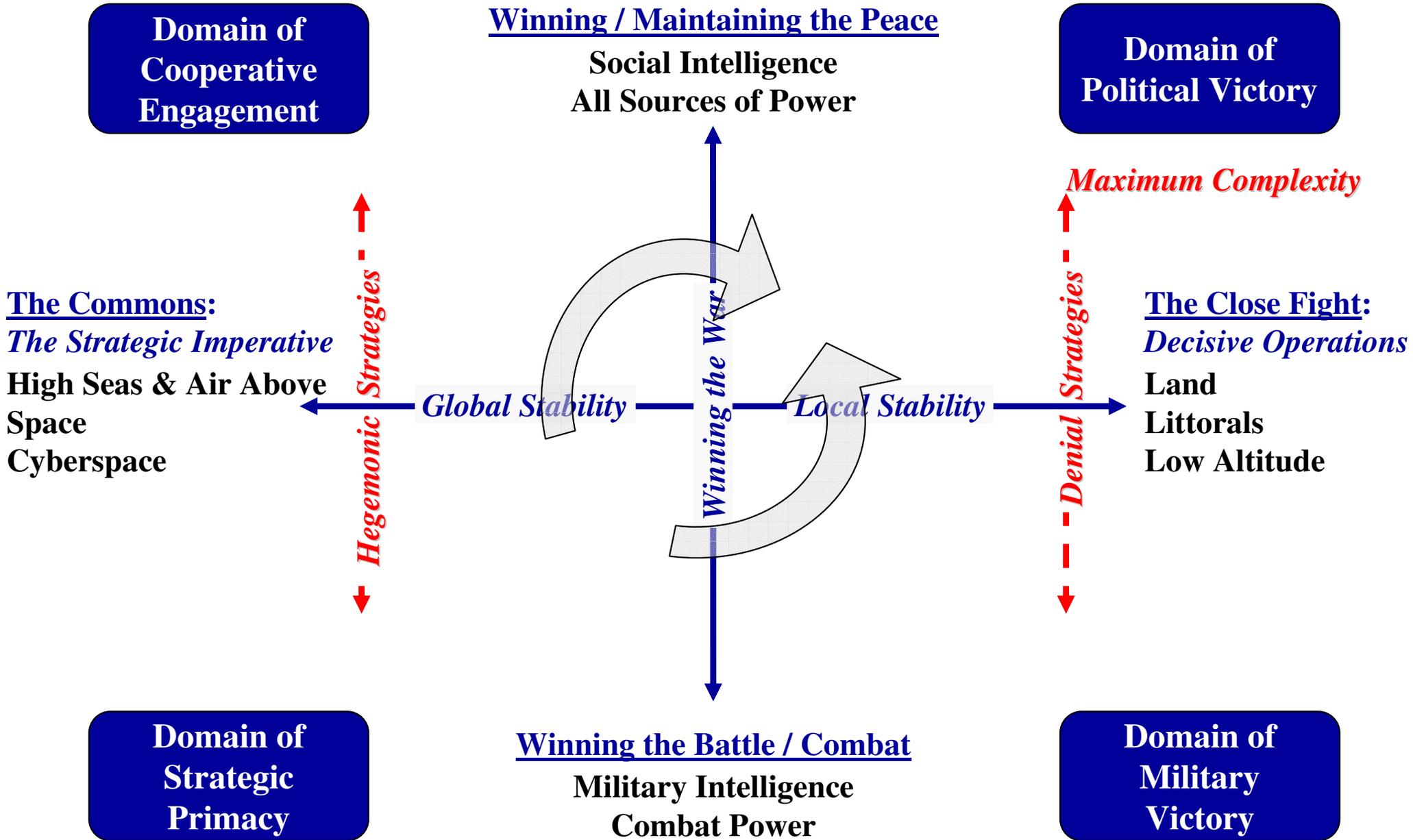


Global Force Balance



... Security = All Else + Defense

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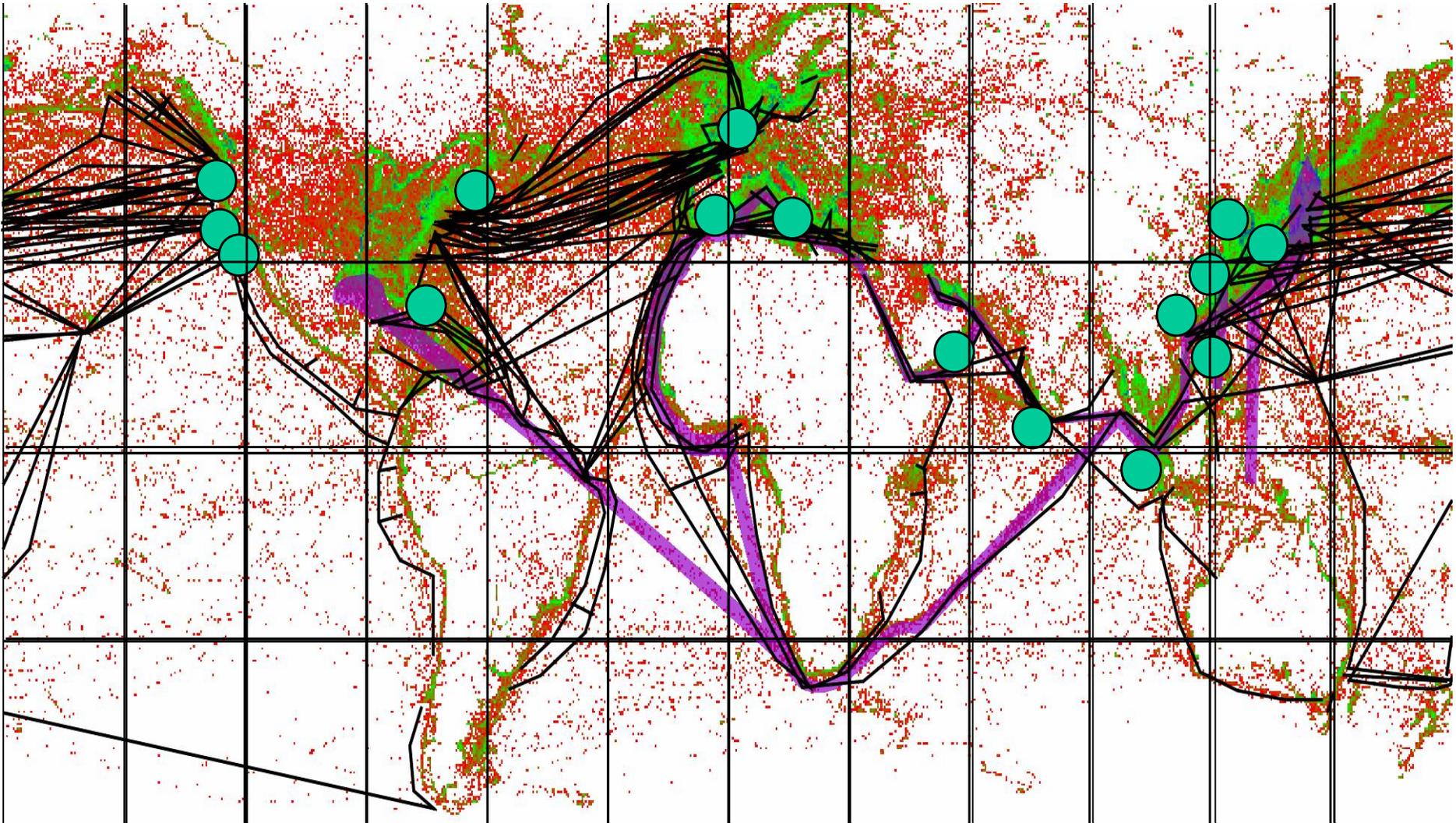
Global Trends

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Globalization II



Globalization III



Industrial Age



Information Age



Military Innovation: Historical Insight



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The history of innovation in carrier aviation says something of great importance about military innovation generally: it is not a process that usually proceeds in a linear way. But hindsight tends to make us think that it does. Because we try to compose coherent histories of innovation, we may actually overlook the uncertainty and chance that inevitably exist.

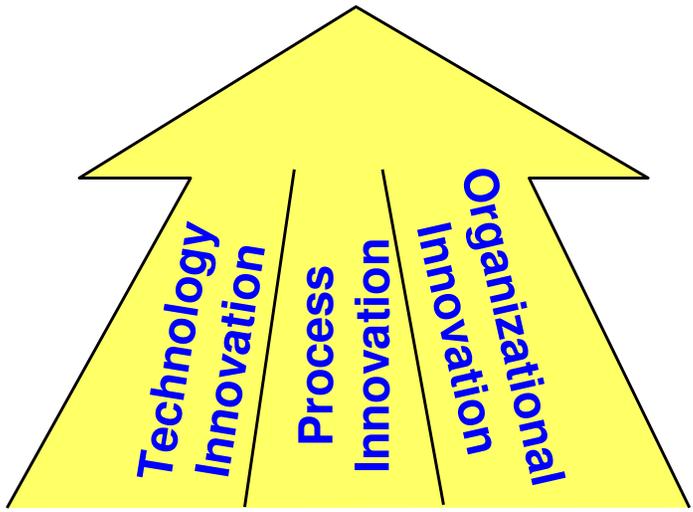
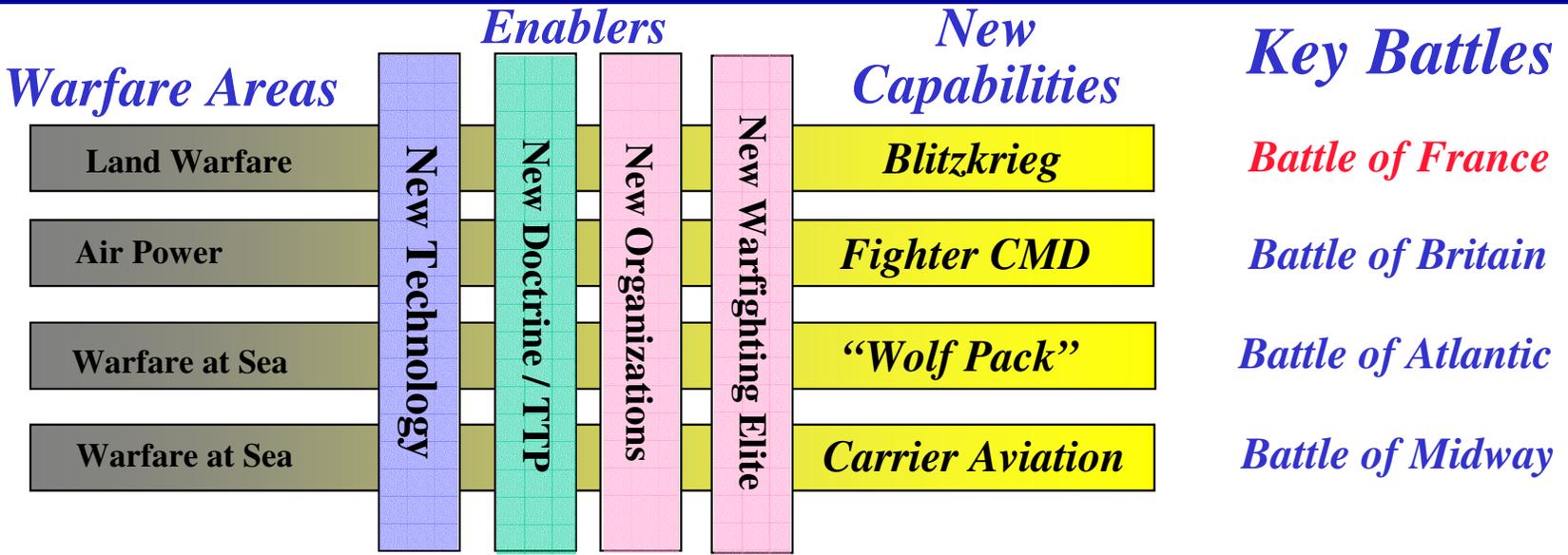
American & British Aircraft Carrier Development: 1914-1941



Creating Competitive Advantage: Warfighting Innovation



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Warfighting Innovation → Competitive Advantage



Trends in Security Competition



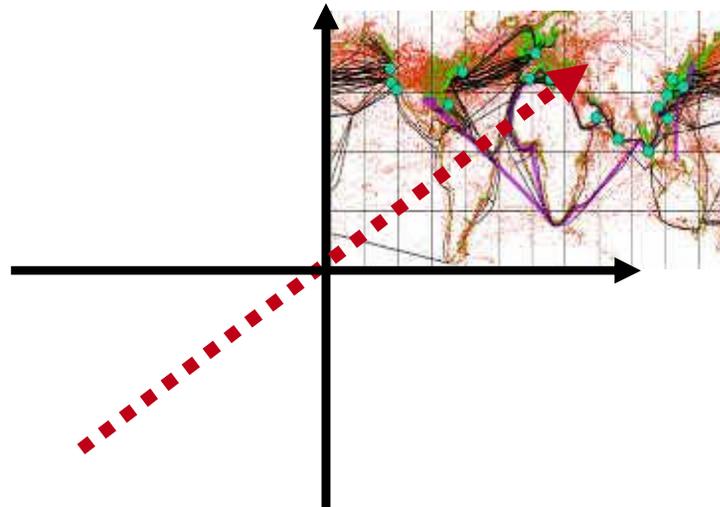
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Information Age

- Short Cycle Time
- New Competencies
- 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
- Well Developed Tools / Processes
- Deliberate Planning
- Tortured Interoperability



Strategic Posture

...Exporting security

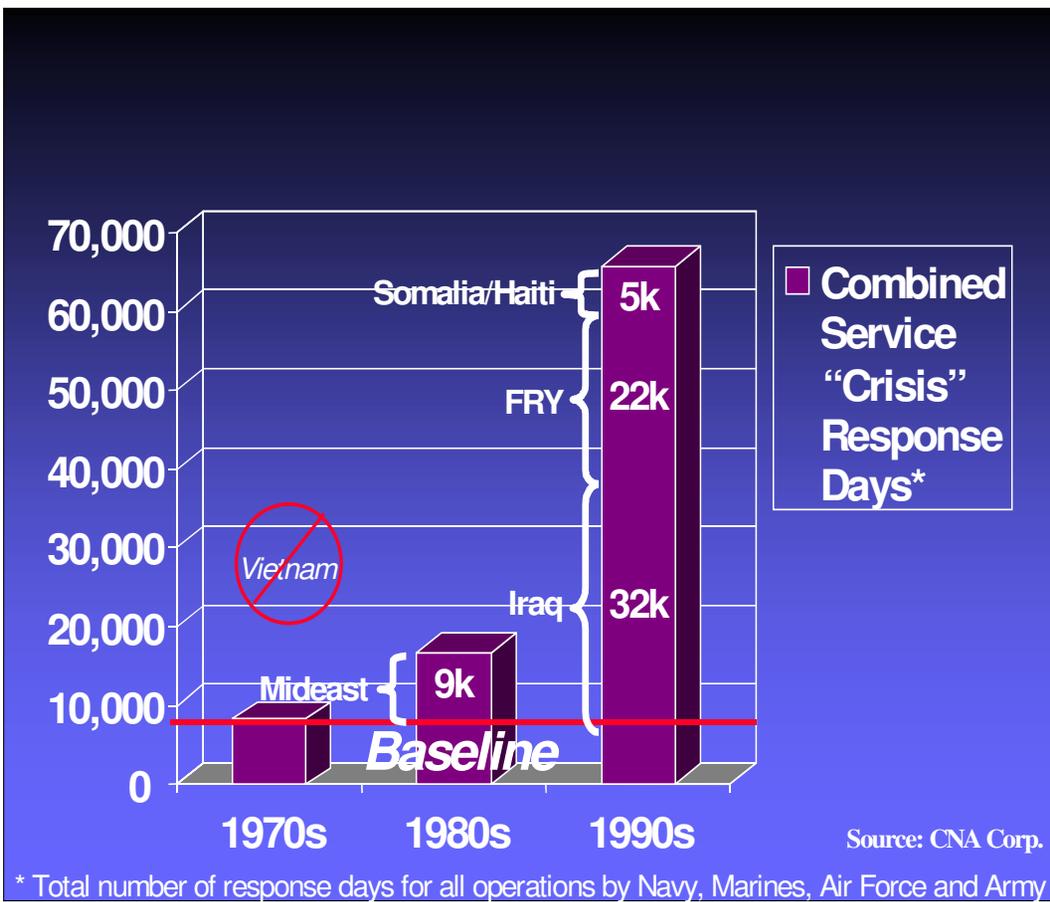


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U.S. Military Responses to Situations, 1990-2002

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



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

The Red Zone...

...Our Response



Operational Maneuver From the Sea



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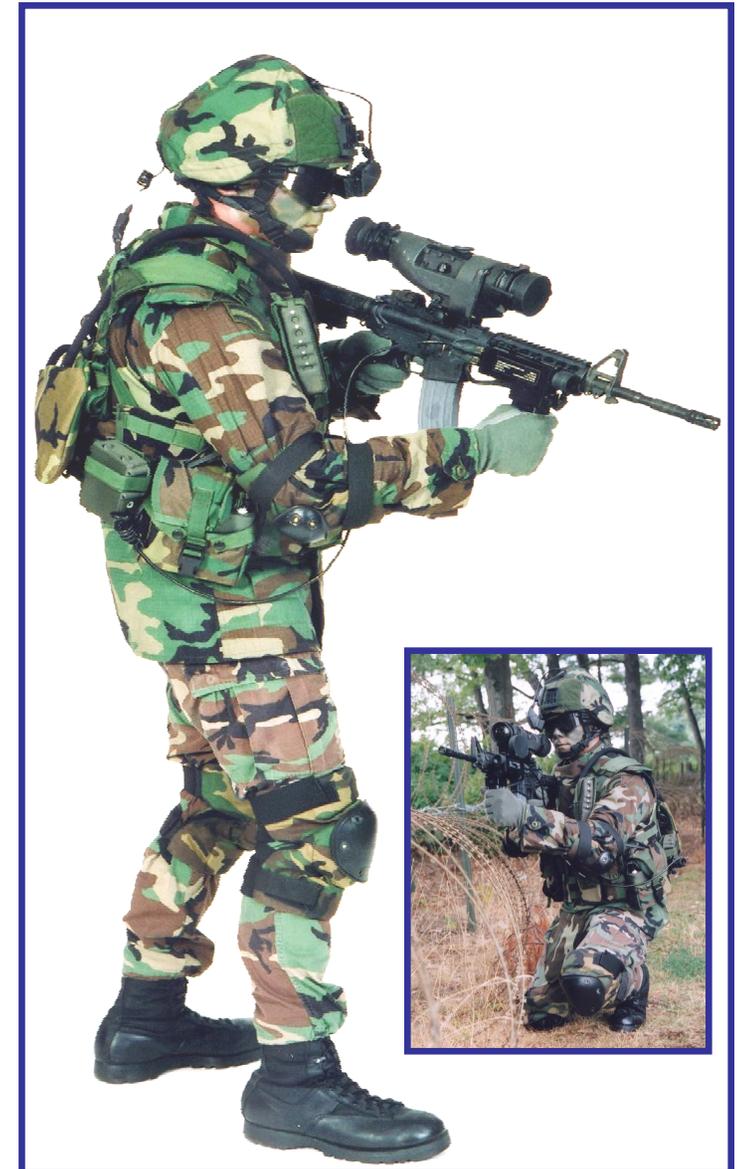
Information-Based Soldier



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Fully integrated Infantry Fighting System

- *Combines Sensors, Computers, Lasers, Geo Location and Radio with Soldier Mission Equipment*
- *Digitized reporting; brings dismounted soldier into digital battlefield/situational awareness*
- *Video capture and transmission*





Next Generation Weapons

...Do We Have the Right Weapons For the Right War?



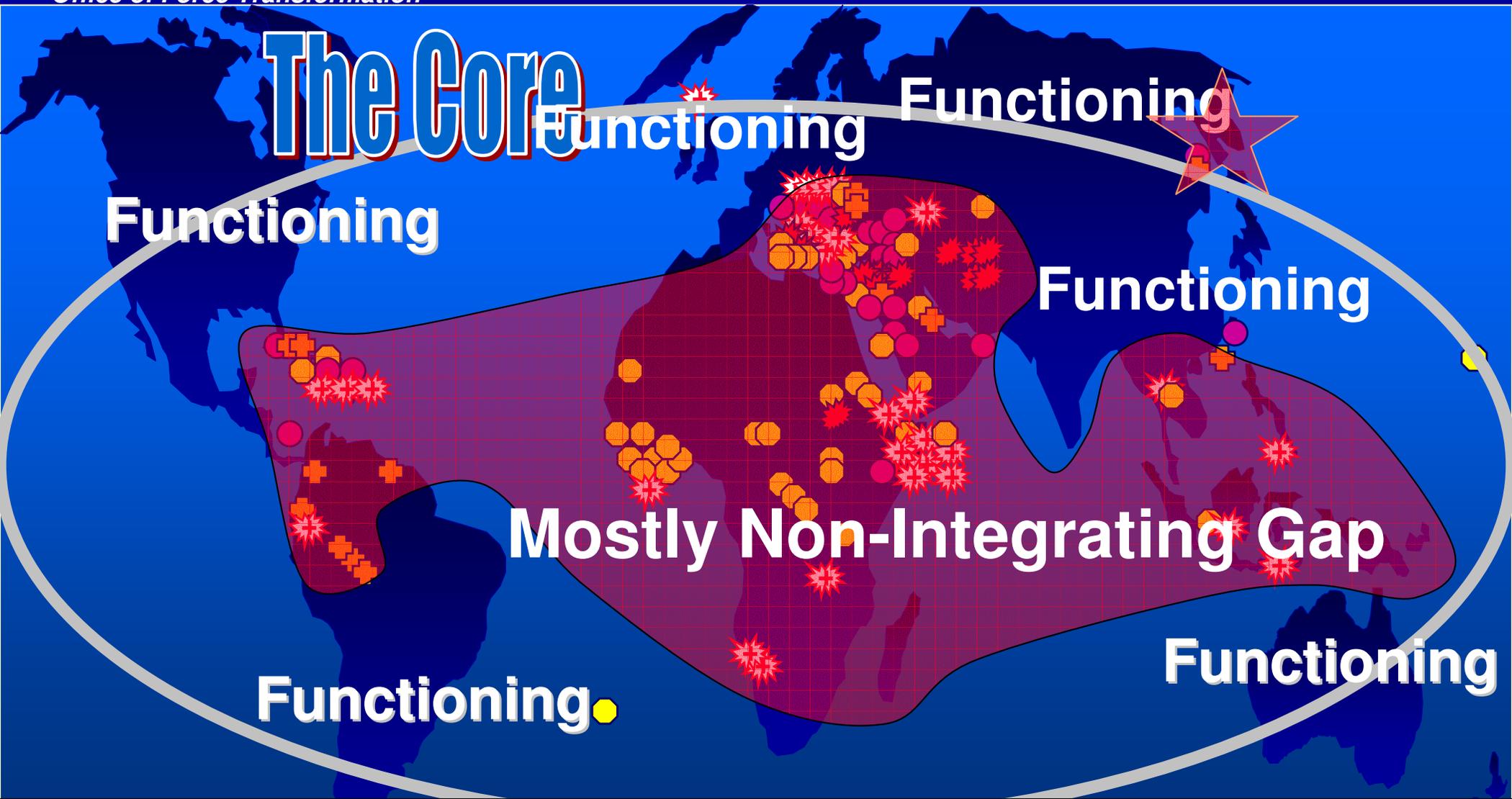
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- *Are we making enough investment in physics and energy transfer – the potential for leap vs step technologies?*
- *What is the development direction for critical materials?*
- *Do we have the networked communication and sensors necessary to support the degree of discrimination required in the future conflict environment?*
- *When will we start thinking of targets per weapon vs weapon per target in Land Warfare?*
- *When will we see speed of light weapons on the battlefield?*



Globalization III

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

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



Global Force Balance



... Security = All Else + Defense

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Winning / Maintaining the Peace

Social Intelligence
All Sources of Power

Domain of
Political Victory

The Commons:

The Strategic Imperative

High Seas & Air Above
Space
Cyberspace



The Close Fight:

Decisive Operations

Land
Littorals
Low Altitude

Winning the War

Winning the Battle / Combat

Military Intelligence
Combat Power

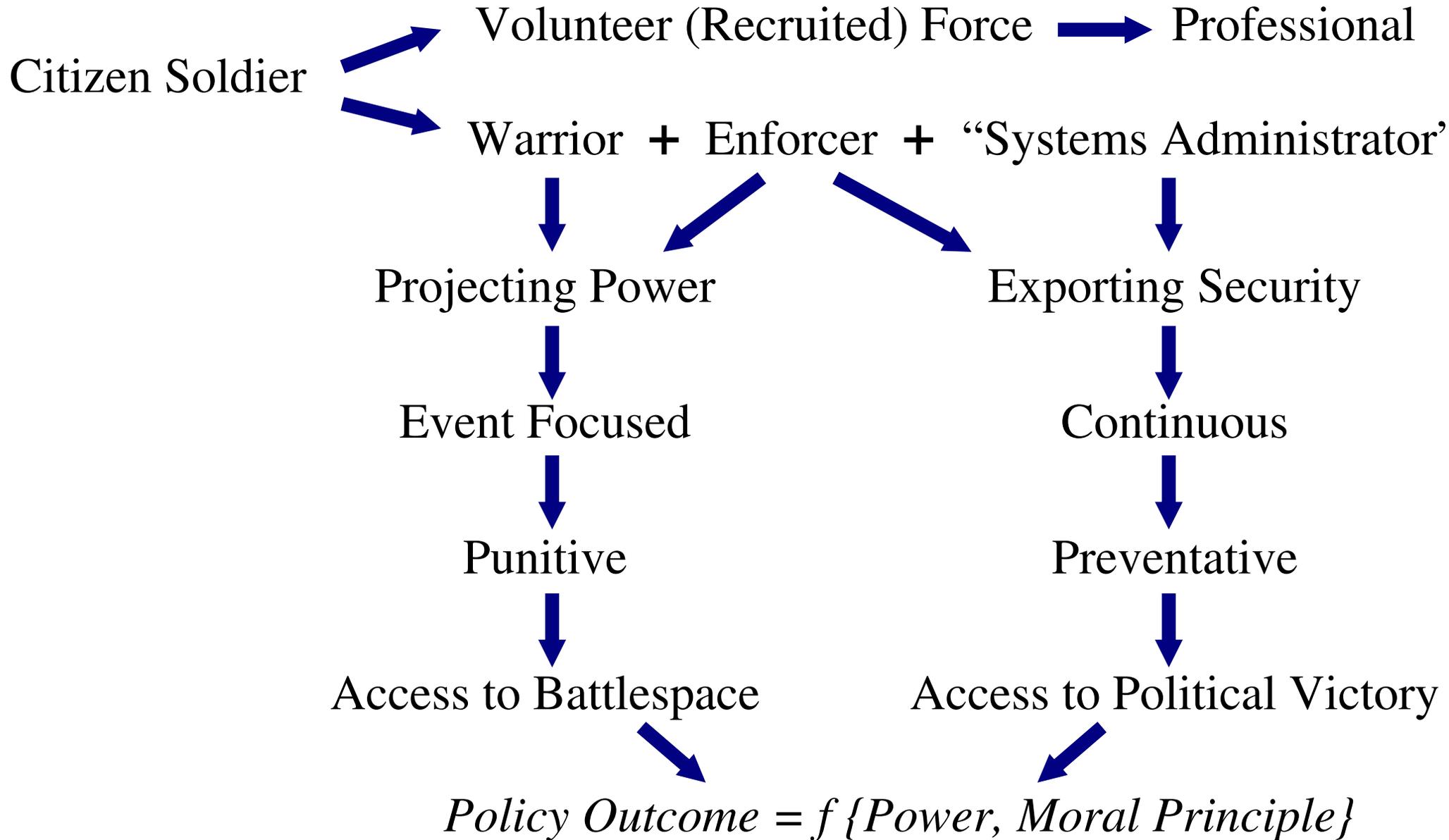


Top Level Issues

...Culture: Values, Beliefs, Attitudes



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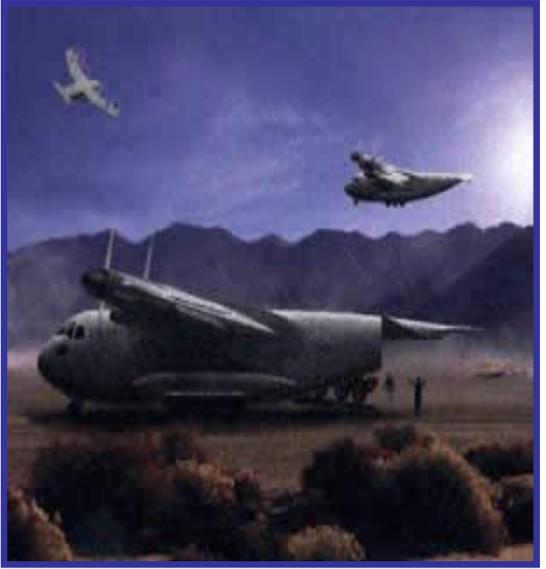
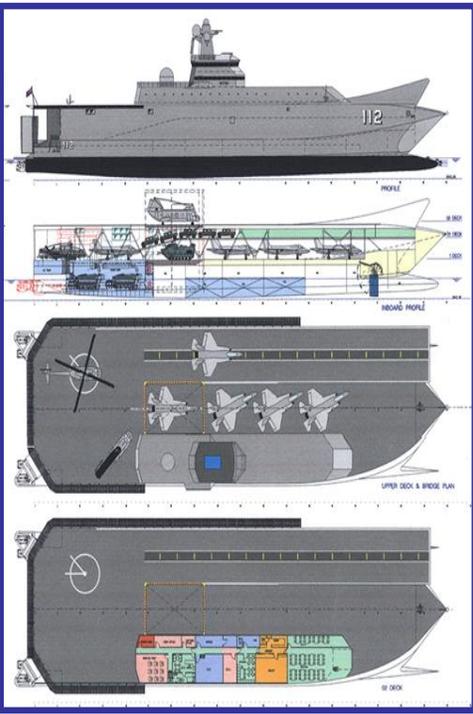
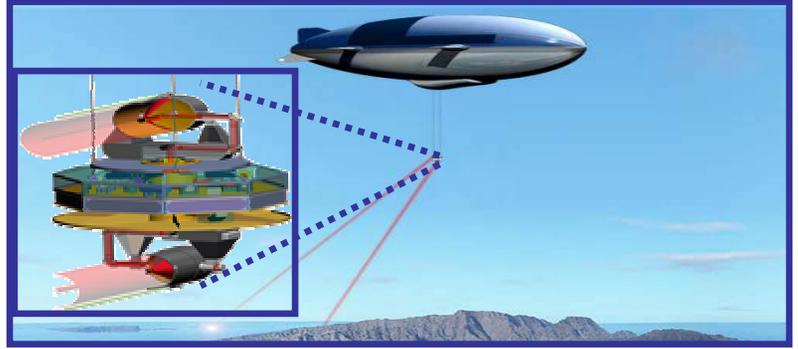
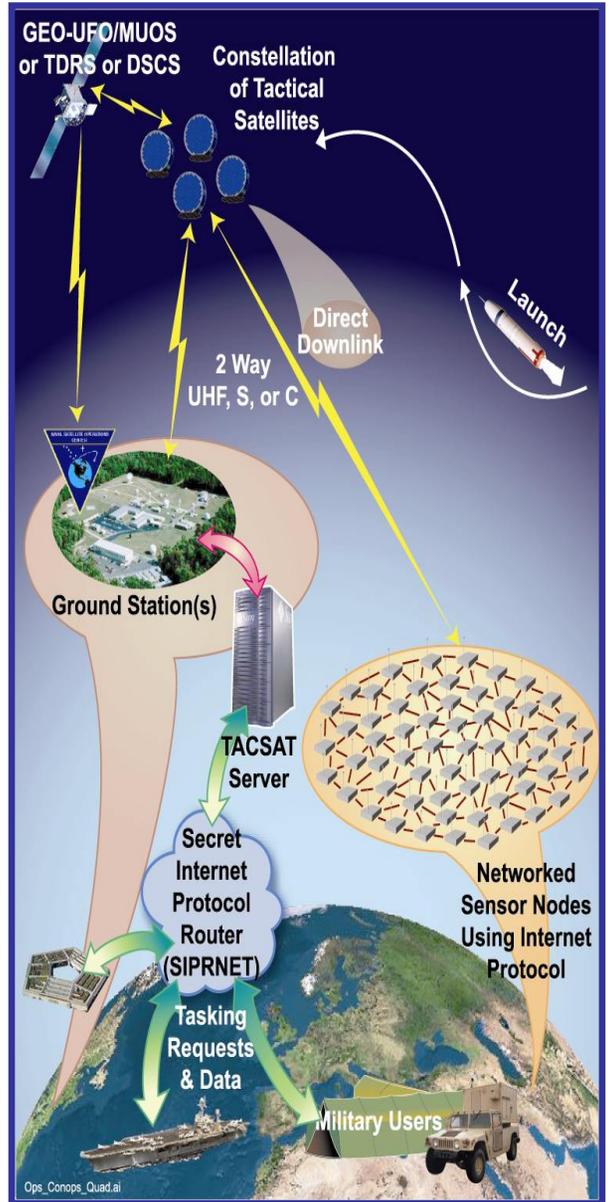
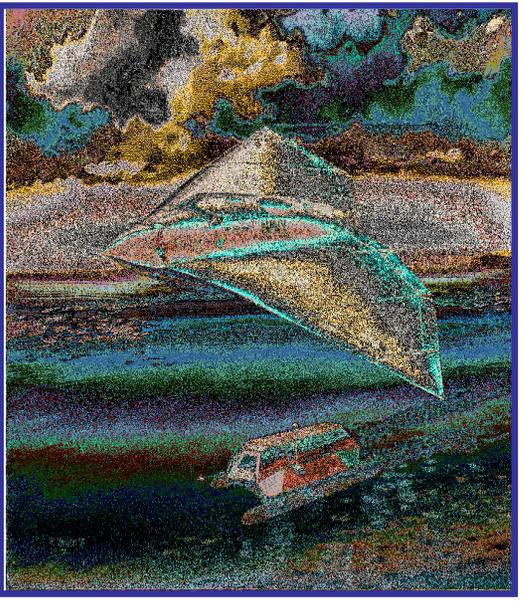


The Path Not Taken

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