

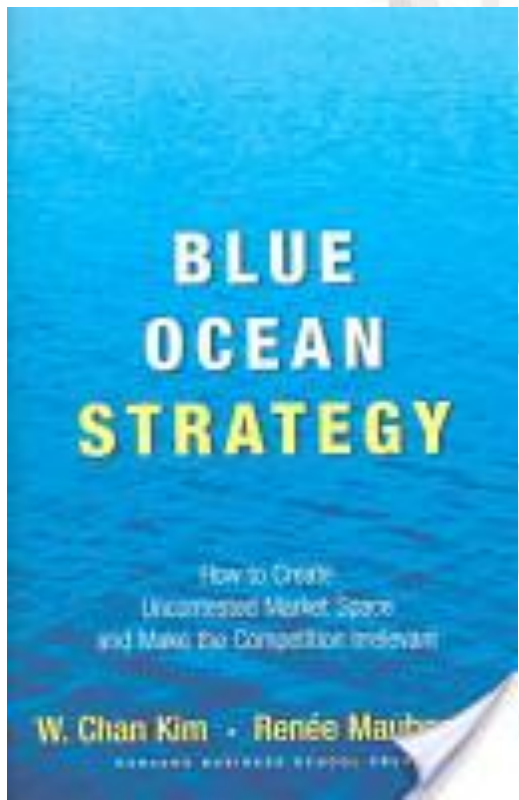
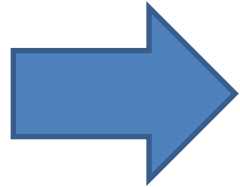
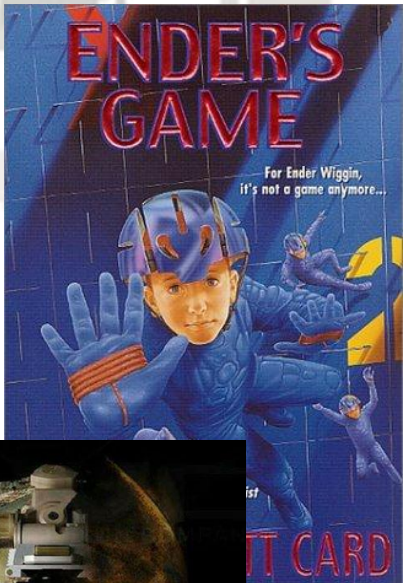
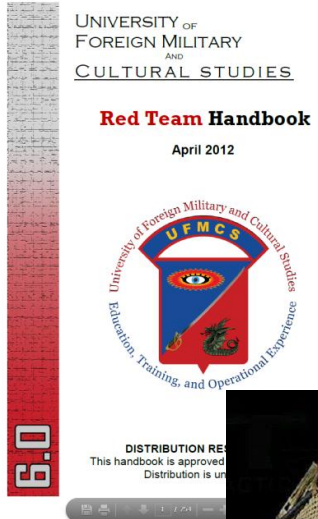


“Red Teaming” Agility

*Dr. Kira Hutchinson
TRADOC G2 Forward*



Bottom Line Up Front



Challenge Analysis



Experimentation

Futures

Innovation

The nexus of red teaming and experimentation in the context of the future operational environment enables the Army to measure the agility of systems, and inform investment in future research, science and technology



C2 Agility



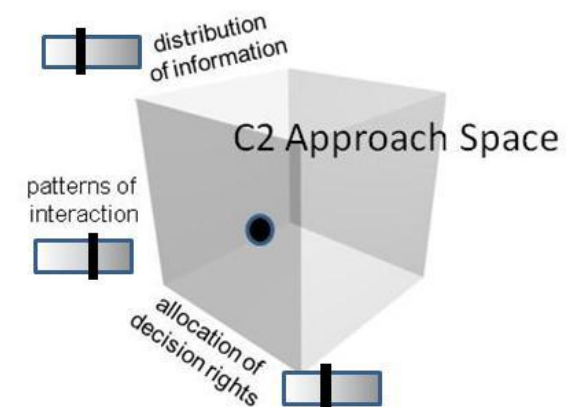
(Institute for Defense Analyses, *The Agility Imperative - Expanding Operational Adaptability*, 01 FEB 13)

What is C2 Agility?

- C2 Agility is defined as the **ability to maintain mission effectiveness proactively in the face of changing circumstances and stresses, including the ability to conceptualize, design, create and deploy a successful endeavor** (Source: NATO Studies, Analyses, and Simulation (SAS) Research Study Group 065, 2006-2009)
- Function of and enabled by *People, Organizations, Processes, and Systems*
- Emphasis on capability to successfully cope with changes in circumstances
- Attributes include patterns of interaction, distribution of information, and allocation of decision rights
 - Each attribute can be defined, observed, and measured; and comprise the “C2 Approach Space”

Why C2 Agility?

- Chairman of the Joint Chiefs of Staff Mission Command and Joint Education White Papers:
 - Response to increasingly complex environment and need for change
 - Calls for changes in Mission Command (C2) and Joint Education
 - Stresses that Joint Education must ensure leaders can:
 - Understand security environment and elements of national power;
 - Deal with surprise and uncertainty;
 - Anticipate and recognize change and lead transitions;
 - Operate on intent through trust, empowerment, and understanding



Operational Adaptability is a form of Agility



Converging Thoughts



C2 Agility

Leaders must...

- Understand security environment and elements of national power;
- Deal with surprise and uncertainty;
- Anticipate and recognize change and lead transitions;
- Operate on intent through trust, empowerment, and understanding

Mission Command

Principles of Mission Command

- Create shared understanding
- Provide clear commander's intent
- Exercise disciplined initiative
- Use mission orders
- Accept prudent risk
- Build cohesive teams through mutual trust



Similar Characteristics

- Affects organizational effectiveness, efficiency, and force agility
- Ability to move in C2 approach space in response to changing circumstances
- Ability to change C2 approach is essential
- Need for more agility in spite of declining resources



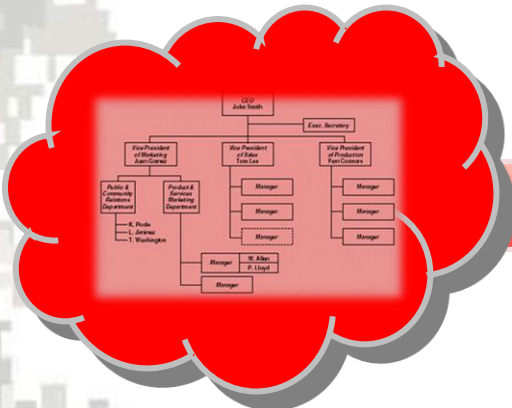
- Requires judgment (delegating authority, making decisions, degree of control, and allocating resources)
- Human skill sharpened by experience, study, and observation
- Systems and procedures used to improve the commander's understanding
- Supports Art of Command based on objectivity, facts, empirical methods, and analysis
- Used to overcome the physical and procedural constraints under which units operate



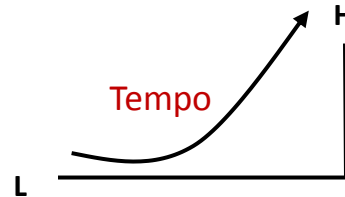
Complex Environment – Working Premise



Current Complex Operational Environment



Structural Complexity + Interactive Complexity =



Human interaction: velocity and mass



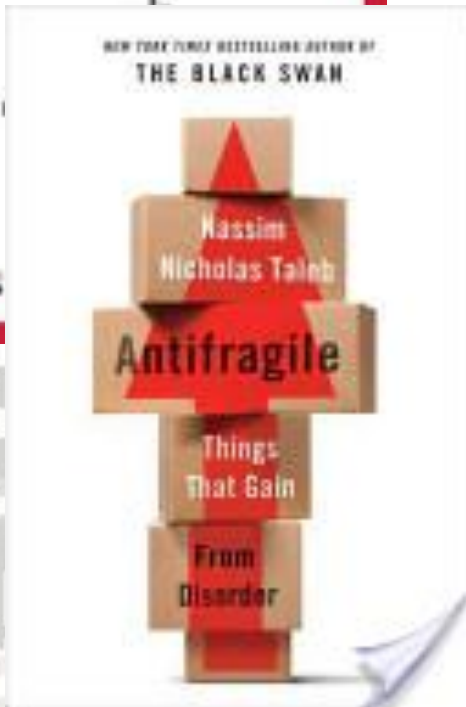
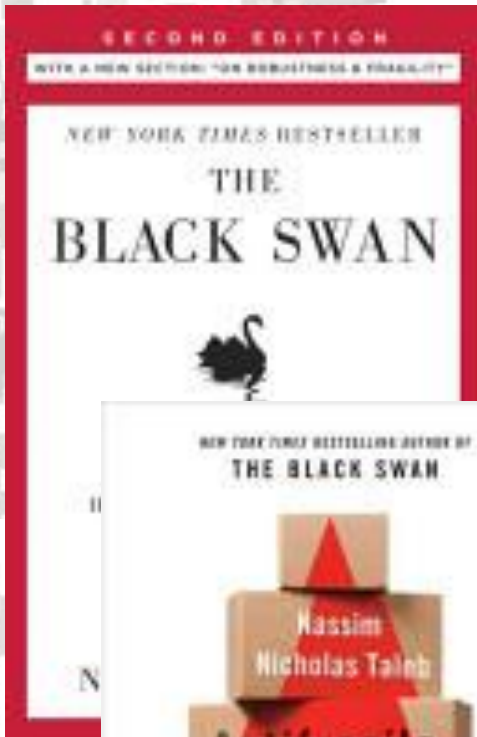
More Complex Operational Environment



Interactive Complexity
Structural Complexity

*Entry of US forces into a complex environment requires a **calculated and controlled mix of engagement, shaping and force.** Change unfavorable “order” – “mitigate disorder”*

Black Swan Model for Deep Red Futures



The future is dominated not by trends, but by outliers, extreme events that lie outside the realm of regular expectations. Extreme events are unknown and improbably based upon current understanding, and they carry with them a disproportionately higher mission impact.

Technology that supports our Warfighters which goes beyond resilient and becomes more capable in environments of incomplete understanding. Such systems that improve under conditions of chaos are termed “antifragile”.

Agility is a measure of antifragile systems



Red Teaming Defined



Red Teaming is a function to provide commanders with an independent capability to fully explore alternatives in plans, operations, concepts, organizations and capabilities in the context of the operational environment and from the perspective of our partners, adversaries and others.

Red Teamers:

- Identify problems; define the end state
- Challenge planning assumptions
- Offer alternative perspectives (alternative hypotheses)
- Ensure staffs are assessing the right things
- Help the staff to determine the next right thing to do



Ensuring staff does not get on a “bus to Abilene”

<http://usacac.army.mil/cac2/UFMCS/mission.asp>



Deployable Force Protection (DFP) Adaptive Red Team (ART) Components

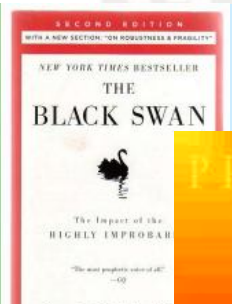


*Government & Industry Participants
Operationally Relevant Environments
Vulnerability Probes*

More Fully Explore Alternatives in Plans, Concepts, Operations, and Organizations

Live Experiment Venues (TSOA) **Virtual / Table -Top Experiment Venues**

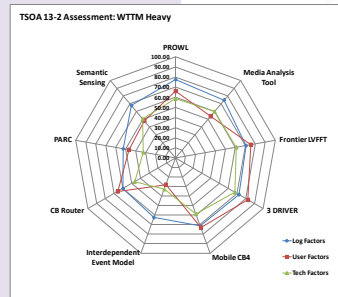
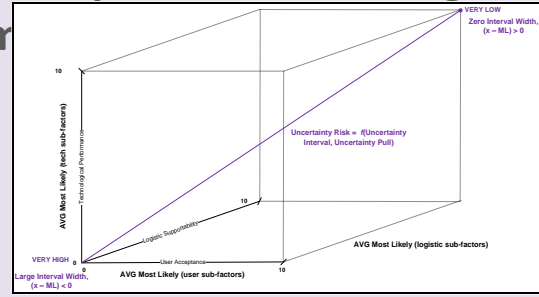
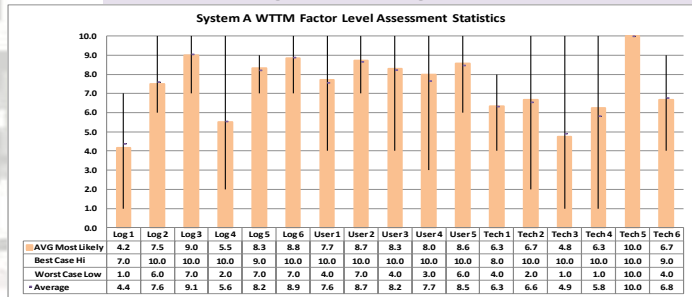
Research Underpinnings



VSO FP = Village Stability Operations Force Protection

TSOA = Technical Support and Operational Analysis

Warfighter Technology Tradespace Methodologies (WTTM), Quantitative Analysis, Risk Modeling, and



Uncover Vulnerabilities and Improve System Performance through Scenario-Driven Exercises & Soldier Involvement



ART / TSOA Characteristics



- Live experiment, conducted quarterly, at various venues including Camp Roberts, CA; Fort AP Hill, MD; Camp Blanding, FL; Stennis, MS; Quantico, VA, and Playas, NM
- Accelerates government / industry development across the Services
- **Warfighter Driven**
- Collaborative - Takes advantage of the austere location, attending personnel, and participant investment to further capability development
- Try New Things / Learn New Things - *Challenge the Limits of Your Technology*
 - Integration with other systems / Common Operating Pictures / Common Message Protocol
 - Vulnerability Analysis: Joint Vulnerability Assessment Branch (JVAB)
- **No penalty if “it” doesn’t work - Benefit from learning environment**
- Experiment and assess - Feedback and assessments provided to developers for their information and application as they see fit
- Participants include government and industry; they pay their way but leverage warfighters, vulnerability probe teams (e.g JVAB), infrastructure, and other participants
- From ART data collection, industry invests their R&D to correct the vulnerabilities exposed and/or implement lessons learned

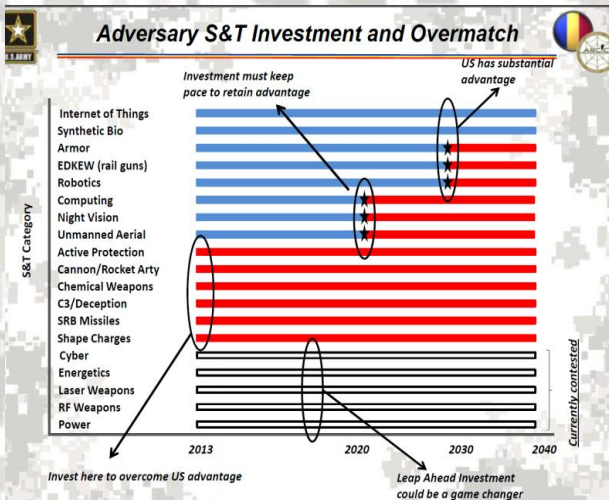
Not a formal test event or substitute for developmental or operational test and evaluation



Agility Model within Adaptive Red Teaming



Experiments



Purpose: Provide a conceptual framework, methodology, and a set of metrics needed to observe and measure the agility of Deployable Force Protection and the processes, systems, and tools that contribute.

Objective Inform science and technology long term investment decisions by empirical evidence obtained by experimentation

Agility is required to ensure Force Protection in scenarios in which the adversary seeks to counter our technical capabilities with low-cost technologies. TSOA must measure agility in order to inform future science and technology investment opportunities.



Notional Force Protection Technology



Benign Environment

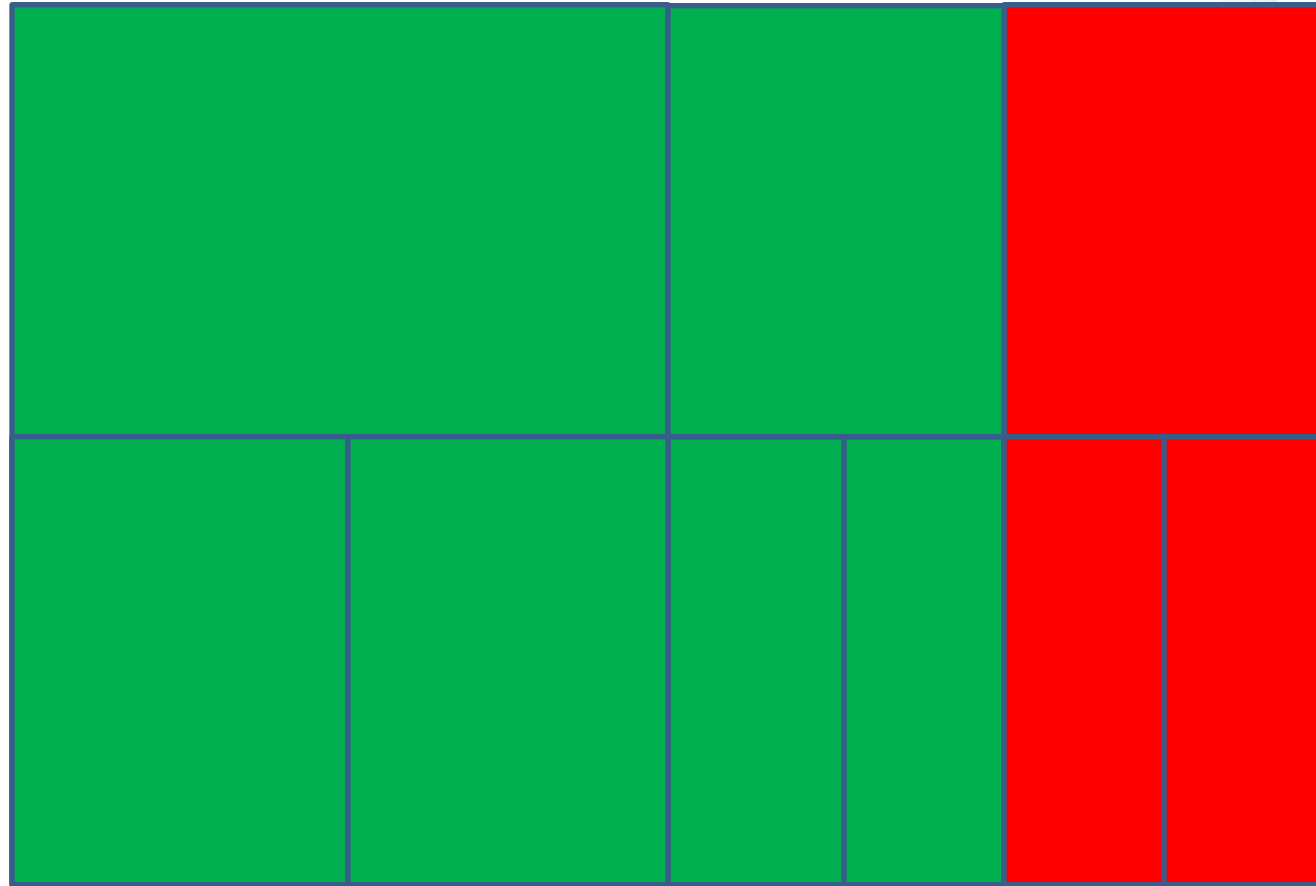
Hostile Environment

UAV adversarial

GPS-Denied

Uncluttered

Cluttered



Urban

Forest

Urban

Forest

Urban

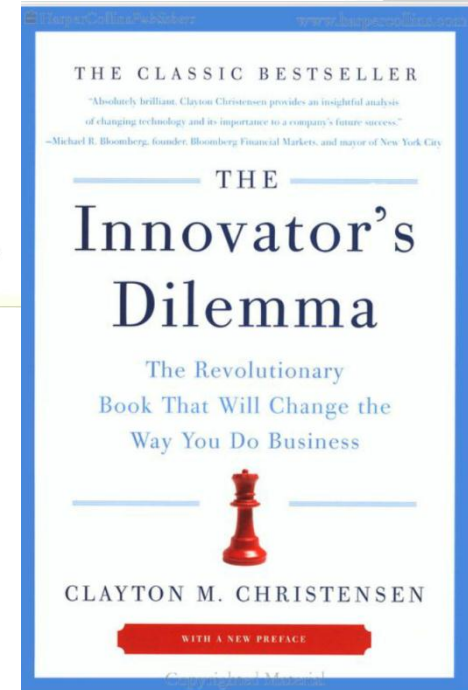
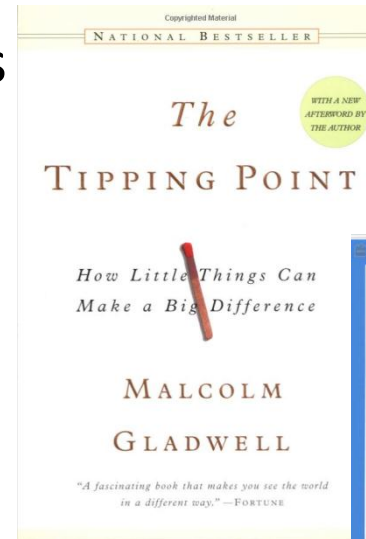
Forest



Agility Model will continue to Grow/Develop



“We are also increasing our investments in vulnerability assessments of both technology and systems as well as expanding our **Red Teaming efforts** to identify potential vulnerabilities in emerging technologies, systems and systems-of-systems, including performance degradation in contested environments, interoperability, adaptability, and training/ease of use.”



STATEMENT BY MS. MARY J. MILLER DEPUTY ASSISTANT SECRETARY OF THE ARMY FOR RESEARCH AND TECHNOLOGY BEFORE THE INTELLIGENCE, EMERGING THREATS AND CAPABILITIES SUBCOMMITTEE OF THE HOUSE ARMED SERVICES COMMITTEE ON THE UNITED STATES ARMY'S SCIENCE AND TECHNOLOGY (S&T) PROGRAM FOR FISCAL YEAR 2015 SECOND SESSION, 113TH CONGRESS March 26, 2014

Deep Red Futures Informing Agility

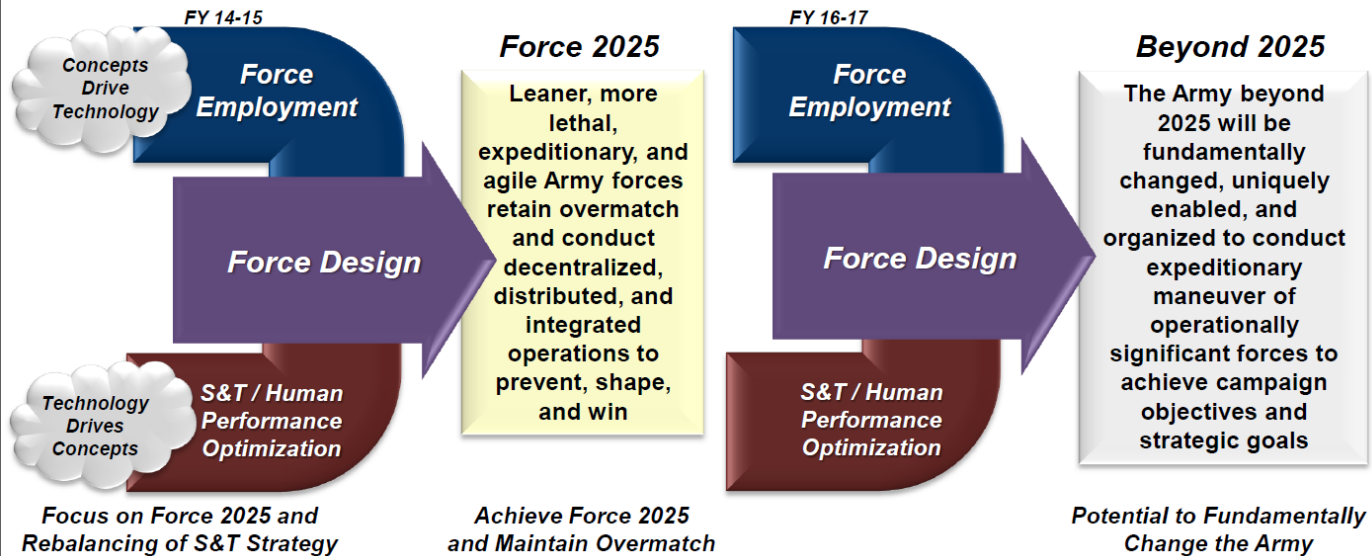


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Army Vision – Force 2025 and Beyond

Problem: To meet the demands of the future strategic environment in alignment with its strategic vision and priorities, the Army must make the BCT and enablers leaner while retaining capability, prevent overmatch through 2025, and set the conditions for fundamental change by 2030-40



By 2025, the Army must operate differently, enable differently, and organize differently to maintain overmatch and to set the conditions for fundamental long-term change

22 Jan 2014

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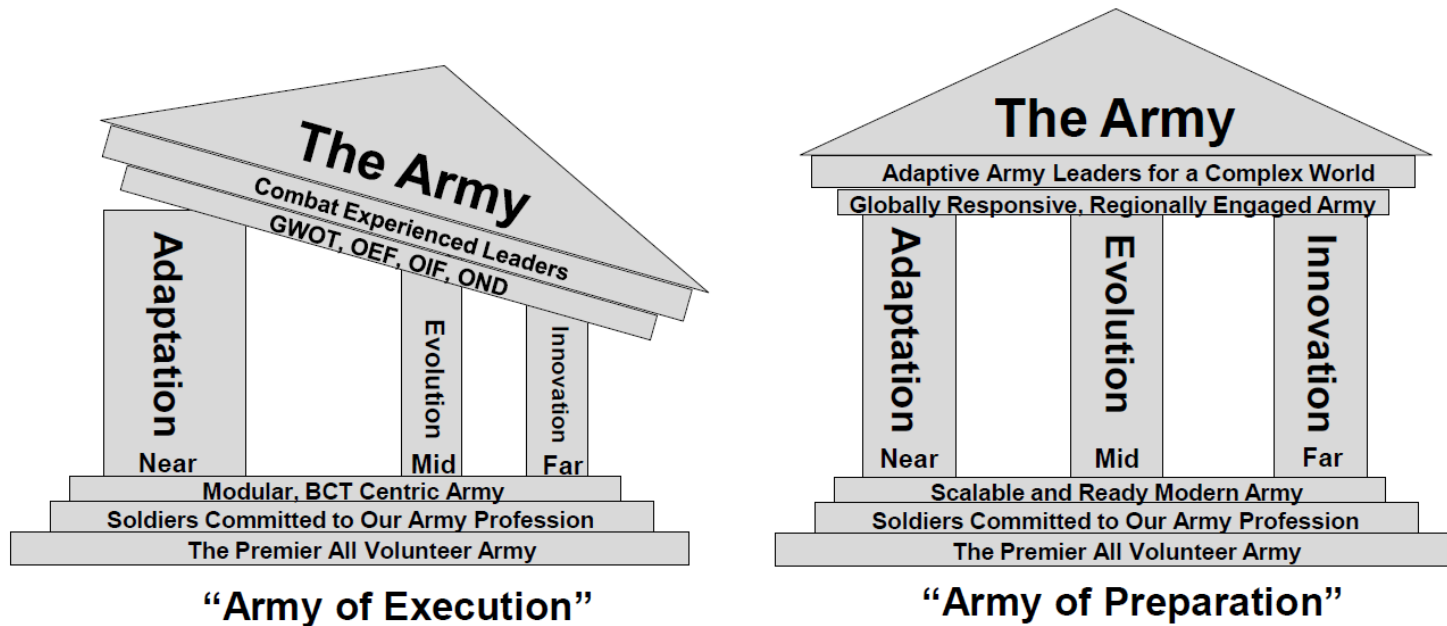
Deep Red Futures Program: a framework to systematically project multiple variants of the far future operational environment in which future capabilities, doctrines and force structures are formulated, gamed and tested.

Conclusion

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The Army Transition Challenge

Rebalancing Investment to Meet Future Challenges



The Army is going to be CONUS-based for the first time since WWII...future Operational Environment challenges requires the force to both leverage and look beyond previous innovation ideas towards a Vision of the Future Army

Agility is a fundamental aspect of innovation for the Army: agile processes and agile technology-enabled capabilities



Special Recognition



Dr. David Alberts, IDA

Professor Chris Arney, USMA Mathematics Department

Professor Patrick Driscoll, USMA Engineering Department

Mr. Phillip Burum, NAVAIR China Lake

Mr. Garret Scott, DoE, NNSA, Oak Ridge

John Klopfenstein, George Gilkes, and Mary O'Dea, ARL

Dr. Niki Goerger, ERDC Vicksburg, ART Program Manager

Mr. Thomas Greco, TRADOC G2 Director

Dr. Susan Canedy, TRADOC G2 Chief of Staff

Mr. Thomas Pappas, TRADOC G2 Futures

Thank You