



*C2 at the Edge of Chaos*  
*The Real Transformation to Enable*  
*Network Warfare*

*We make a difference...*

*one student at a time*

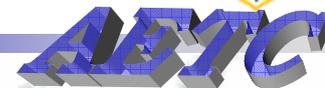
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**U. S. Army**  
**Student, Air War College**



# How This Paper Got To Be



Develop America's Airmen Today ... for Tomorrow



**Requirement for  
a research paper  
at AWC**

Transformed Army  
Brigade Combat Team

Transformed  
Staff Organization?

Col Boyd  
And  
The OODA Loop

Edge  
Organizations

How Build Trust  
And  
Other Required Traits?

Networks  
And  
Digital Dashboards

Chaos  
And  
Complexity

Personnel Policies  
Enable Networking

**Trust**

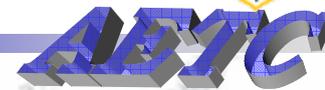
**Trust**



# Agenda



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- **Introduction**
- **From Networks to Complex Adaptive Systems**
- **It's the People, Stupid**
- **What Leadership Traits Enable the Network?**
- **What is to be Done**
- **Questions Left Unanswered**
- **Conclusion**



# Introduction



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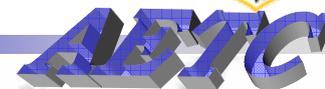
- **Personal experience of the good and bad in Network Warfare**
  - **Swarming: just enough control**
  - **Commander seeing more than subordinate: Imposing too much control**
- **Evolution of network theories to Complex Adaptive Systems**
- **The centrality of people and continued friction in conflict**
- **Trust and intuitive thinking are sought after traits**
- **Real transformation is in how recruit, train, promote and assign people to enable network operations**
- **Finally, some questions left unanswered**



# From Networks to Complex Adaptive Systems



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- **What's in a name?**
  - **US: Network-Centric Operations**
  - **British: Network Enabled Capability**
  - **US Army: Network Enabled Battle Command**
- **“First Generation” of theories focused on networks and technologies**
- **“Second Generation” theories puts humans back in loop – complexity of human to human interface on battlefield mean continued friction**
- **War is between people and people interact in non-linear and complex ways – War is the realm of chaos and complexity**



# From Networks to Complex Adaptive Systems



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- **Complexity:** disproportionate outcomes, unpredictable chains of cause and effect, some degree of order
- **Chaos:** disorganized behavior with little or no predictability
- **Complex Adaptive Systems:** required in complex and chaotic environment, greater variety than own environment, inefficient
- **The Sweet Spot:** place the organization at the edge of chaos – just enough control to not go over the edge and enough variety to operate effectively
- **Leadership:** required to maintain cohesion – balance, intent, trust



# It's the People Stupid!



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- **“Machines don’t fight wars. Terrain doesn’t fight wars. Humans fight wars. You must get into the minds of humans. That’s where the battles are won.” Col John Boyd**
- **People need leaders and networks are most useful to connect leader and led – How lead?**
- **Col Boyd OODA Loop**
  - **Hierarchy too slow decision-making**
  - **To attain speed need smaller OODA loops**
  - **Smaller faster decision cycles within larger overarching OODA loop**
  - **Must balance faster decision and cohesion**
- **How achieve harmony of decision and cohesion?**
  - **Command Intent**
  - **Implicit Trust**
  - **Balance Freedom and Work within intent**



# It's the People Stupid!



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- **The practitioners of blitzkrieg were edge organizations – the first loosening of hierarchies in warfare**
- **Blitzkrieg is the advent of implicit over explicit control**
- **A contract between leader and led – trust of freedom of maneuver if operate within command intent**
- **Requires long term building of trust and shared experiences**



# What Traits Enable the Network?



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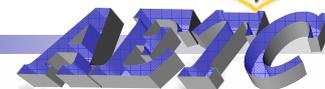
- **Trust between leader and led – freedom of maneuver within command intent**
- **Complexity in warfare means friction and fog do not go away with network operations**
- **Seeking certainty degrades agility**
- **Require implicit trust and ability to deal with uncertainty**
- **How to develop this?**
- **Look to the German Army in the interwar years – when the conditions were set for blitzkrieg**



# What Traits Enable the Network?



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General Von Seeckt saw opportunity in the Treaty of Versailles to create a new German Army based on;

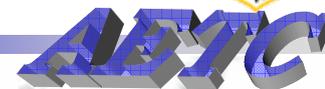
- **Mutual Trust**
- **Relentless training to gain shared experiences – develop intuitive thinking**
- **After Action Reviews – open and frank discussions**
- **Decentralized Operations**
- **An environment of open and frank debate and discussion**
- **Education based on creative and critical thinking**



# What Traits Enable the Network?



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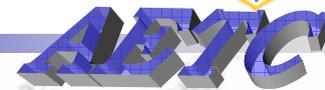
- **Blitzkrieg was a transformation in technology, training and doctrine but the real emphasis was on training and doctrine**
- **The true genius of the blitzkrieg never envisioned Panzer Divisions but he created the leaders that commanded at the edge of chaos**
- **Commanders mentored subordinates through multiple iterations of problem solving resulting in common views**
- **Moving personnel between different types of unit to gain understanding of operations and greater trust**
- **Trust and Shared Experiences = Implicit Trust**



# What is to be Done?



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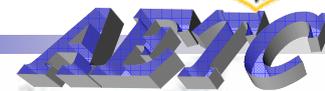
- **Networks based on relationships between people  
- must develop longevity within the network**
- **Training together over time leads to trust between teams**
- **Train the pieces of decisions versus whole contingencies**
- **Training many realistic contingencies leads to recognizing patterns even if the situation is not exactly the same**
- **How can the US Army achieve this?**



# What is to be Done?



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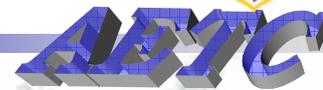
- **Continued emphasis on intuitive thinking**
  - Performance in school not as important as performance in duty – focus on creative and critical thinking
  - Combat training centers focused on tough realistic training teams in collective decision-making
- Recent changes to a Brigade-centric Army and Army Forces Generation (ARFORGEN) provide conditions for greater change
- Emphasis on the Brigade Combat Team (combined arms teams that forms, trains, fights together)



# What is to be Done?



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- **ARFORGEN is partial improvement – Brigade Combat Team forms, trains, deploys, and partially disbands in a three year cycle**
- **Long term trust will come when soldiers/officers are assigned to one Brigade Combat Team throughout their career**
- **Results in common shared experience and trust**



# Questions Left Unanswered



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- **Doctrine must dictate implementation of network warfare or dependent on individual leaders' accepting and enforcing acceptance**
- **Need a fresh look at Joint and Service doctrine on fighting as networks. Doctrine must support the ability to rapidly shift authorities, architectures and support relationships. Further, must change ideas of geographical, service, functional and operational command boundaries**



# Questions Left Unanswered



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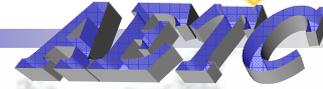
- Paper focused on building trust in the Army – How do same in Joint Forces?
- Lower the Joint Line from component level to lowest level possible within Services (Brigade Combat Team for Army)
- Increased assignment of personnel between services into units



# Questions Left Unanswered



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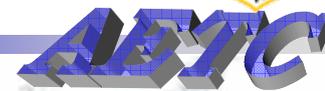
- **Physical organizations will have to change to fight as networks – may be the toughest change to institute**
- **A future Infantry Company should not look like an Infantry Company today though may still be called a Company**
- **Take lessons from Stryker Brigades and Special Operations Forces to look at organizational structure**
- **Hierarchies within Networks:**
  - **Current transformation in Army is growth at Brigade, Division and Corps staff with not change at lower levels – instead instead of currently seen growth in higher headquarters**
  - **Change current staff structure to smaller groups to cross-functional teams spread over all organizational levels.**



# Conclusion



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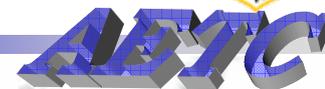
- **Warfare is a place of chaos and complexity because it is a conflict between people**
- **The sweet spot to reach for greatest effectiveness is at the edge of chaos**
- **Operating at the edge of chaos requires leadership to avoid going over the edge**
- **Effectively operating at the edge of chaos requires trust – contract between leader and led**
- **Complexity and chaos mean continued uncertainty – seeking certainty will decrease agility**



# Conclusion



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- **Complexity and chaos mean continued uncertainty – seeking certainty will decrease agility**
- **Certain environments provide opportunities for change – Von Seeckt used the Treaty of Versailles as an opportunity to change the German Army**
- **That change enabled the blitzkrieg – an edge organization**
- **Current environment provided opportunity for changes in US Army but further change is needed to enable networking**
- **Need a personnel policy that supports building trust and shared experiences**
- **Need a Regimental-like system for Brigade Combat Teams**



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**AETC**

# *Questions*

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*Integrity - Service - Excellence*