



14th Annual Research Symposium

Panel #10: Thoughts on Management of Complex Systems Acquisition



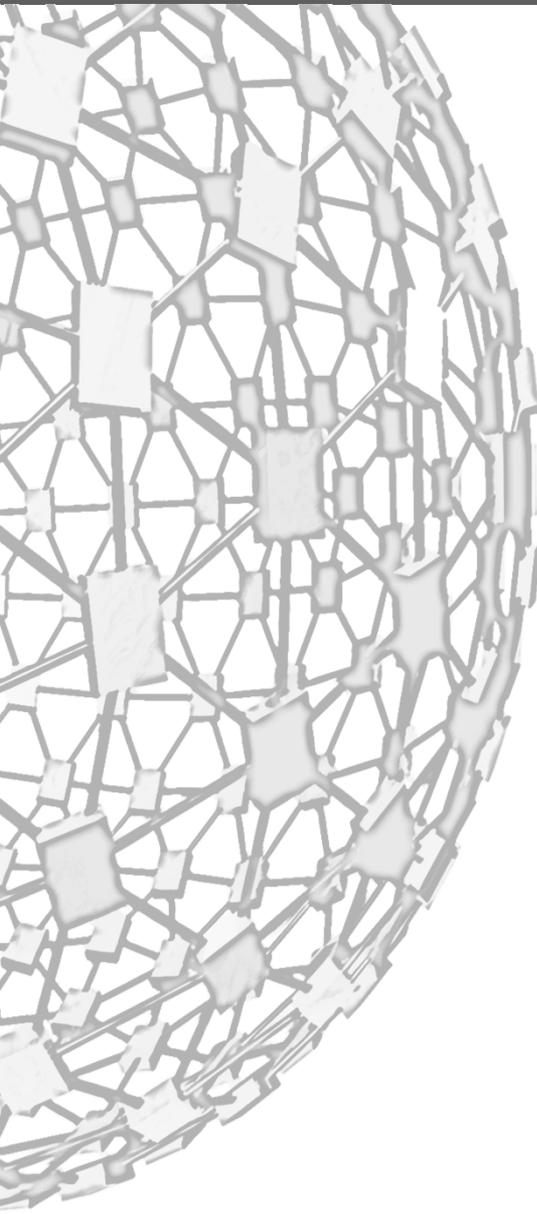
PEO
IEW&S

26 APRIL 2017

Program Executive Office
Intelligence, Electronic Warfare & Sensors

MG Kirk F. Vollmecke – PEO IEW&S

- **A Systems Theoretic-Based Framework to Discover Pathologies in Acquisition System Governance**, Dr. Charles Keating, Old Dominion University
 - A Complex System Governance (CSG) Framework provides a science-based approach to increase effectiveness in dealing with Acquisition realities by exposing deep seated system issues impacting performance, introducing practitioners to new thinking, tools, and methods to address issues, and institutionalizing capabilities to continuously advance the state of Acquisition Governance
- **Optimal Selection of Organizational Structuring for Complex Systems Development and Acquisitions**, Dr. Navindran Davendralingam, Purdue University
 - A quantitative framework that seeks to reduce inefficiencies in development and acquisition of complex systems by addressing the interplay between organizational structure and product structure
- **A Systems Complexity-based Assessment of Risk in Acquisition and Development Programs**, Dr. Roshanak Rose Nilchiani, Stevens Institute of Technology
 - A novel approach to a complexity metric to identify and prioritize redesign opportunities and risk



The Multi-Domain Battle Concept

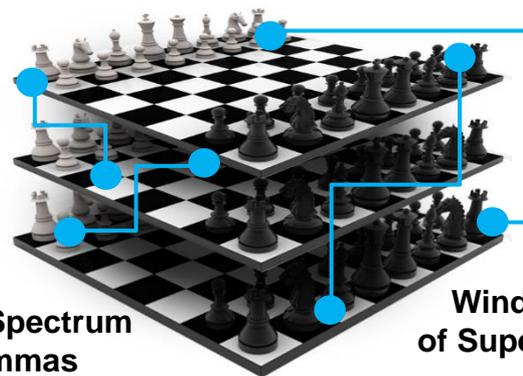
- U.S. supremacy is at risk in the land, air, maritime, space, and cyberspace domains and electro-magnetic spectrum as rivals innovate and leverage technology.
- The Army must be prepared to fight as part of a Joint Force, across multiple domains, to gain the advantage over our enemies and achieve national objectives.
- The Army adapts, evolves and innovates to keep a combat edge by: thinking about future conflict, collaborative learning, analyzing capability gaps, and implementing solutions.

Intellectual Underpinnings

- Our capabilities must **“Preserve” the Freedom of Maneuver ... for the Commander**
- **Use of Cyberspace as a tool of National Security**
- **Integrated** Electronic Warfare, Signals Intelligence and Cyber capabilities must present the adversaries with **multiple dilemmas...**
...in spectrum, time/space, intensity and duration

Gaining Understanding of the Environment we are faced with...

Dimensional Effect



Impose Spectrum Dilemmas

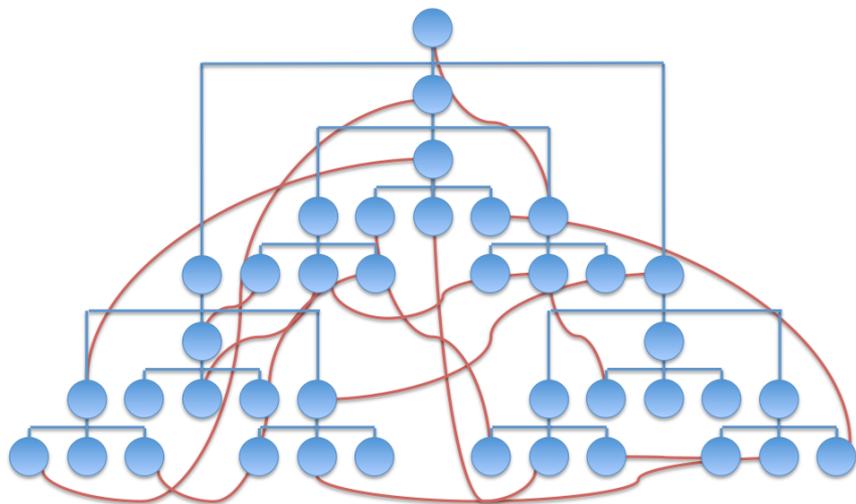
Windows of Superiority

- Define overmatch differently with imperative to impose multiple dilemmas
- Confront technology diffusion and mass surveillance with integrated *EW, SIGINT, and Cyber* convergence
- Enable a cooperative development environment
- Leverage a Joint Combined Arms & Enterprise battle approach

Foster Open and Adaptable Programs to Deliver Now

- **PEO IEW&S Organizational Complexity**

- Report to ASA(ALT)
- Warfighters are the end users
- Congress provides funding
- 6 x Program Manager Offices each with unique management structures and missions
- Requirements owned by multiple TRADOC COEs
- Multiple independent test organizations
- Direct linkage to Intel Community
- Provide solutions to multiple Component Commands



- **System Complexity**

- Systems of systems
 - Intel processing across multiple domains
 - Convergence across Air, Ground, Cyberspace, and Space mission areas
- Subsystems of larger systems in other PEOs
 - Countermeasure systems mounted on helicopters
 - Infrared sensors mounted on tanks
 - Counter IED systems mounted on vehicles



Leading Uncertainty and Friction

Continuous Monitoring: Knowledge Points

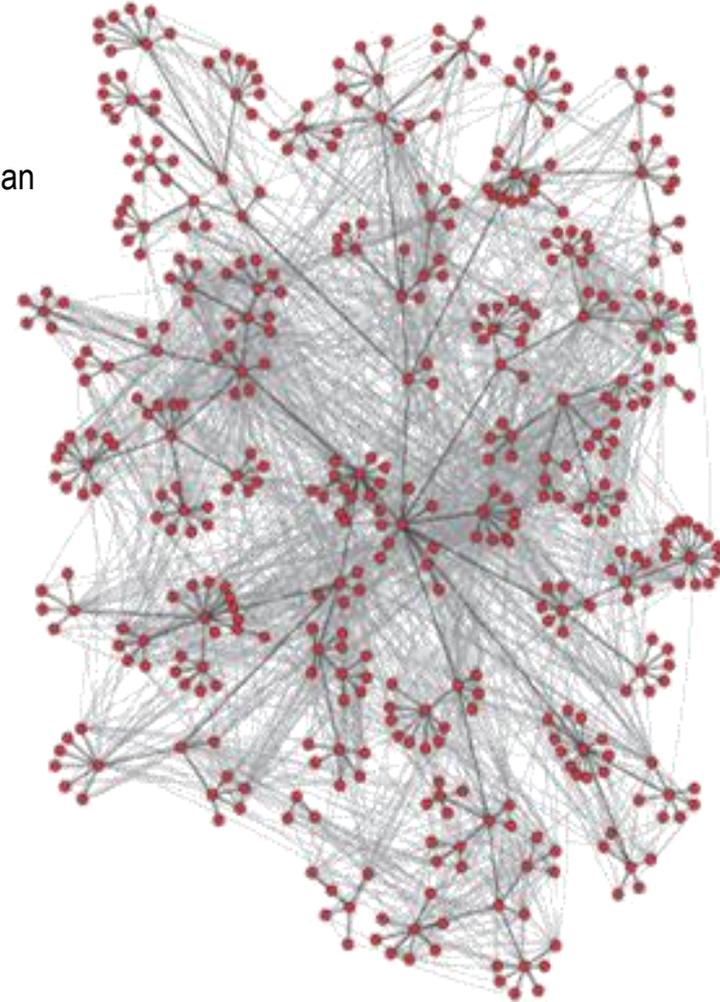
- Characteristics of Complex Systems and Organizations:
 - Highly interdisciplinary pieces
 - Understanding the individual parts does not always convey an understanding of the system
 - High frequency of small fluctuations, with occasional large shift in system conditions

Adaptable Programs: Alignment to the Threat

- Complexity Theory Guidelines for Action:
 - Simple rules will generate complex behavior
 - Examine the system with multiple scales to gain better perspective
 - Achieve a holistic picture by recognizing interdependence
 - Continually adapt to a changing environment

Proactive Management: Leading Indicators

- Complexity Theory Demands Adaptive Management
 - Careful monitoring of systems
 - PEO IEW&S instituting Leading Indicator framework
 - Repeated interventions as the systems/organizations evolve



QUESTIONS



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BACK UP

Rapid Acquisition Enabled by Open, Adaptable Programs to Combat Complexity

- PEO IEW&S leading threat agile solutions for Airborne Survivability and Offensive Cyber
- Streamlined acquisition process focusing on small, frequent releases of capability
- Early and frequent involvement with system users and small, qualified, dynamic teams focused on each capability delivery will be critical components to rapid acquisitions of complex systems

JUONS/ONS

EW & Offensive Cyber

Space

Aerial ISR

Aircraft Survivability



A shift toward Rapid Acquisition is required to keep pace with the threat and enable relevant technologies in complex systems.

MISSION:

Deliver capability now through affordable and adaptable programs that pace the threat.

VISION:

Outpace the threat with technical excellence, adaptability and rapid solutions that support a broad range of operating environments.



PEO IEW&S HEADQUARTERS & SENIOR EXECUTIVE LEADERSHIP



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Mr. Tim Baker
Program Integration & Cost Team Division Chief



Ms. Clarissa Lane
Product Support Management Division Chief



Mr. Mark Kitz
System of Systems Engineering Division Chief

PM ASE
Aircraft Survivability Equipment

PM DoD BIOMETRICS

PM DCGS-A
Distributed Common Ground System-Army

PM EW&C
Electronic Warfare & Cyber

PM SAI
Sensors-Aerial Intelligence

PM TS
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Biometrics Enabling Capability
Mr. Brian Rafferty
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DCGS-A Increment I
LTC Donald Burton
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LTC Gregory Gastan
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LTC Christopher Hill
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Sensors-Unmanned & Rotary Wing
LTC Chevonne Williams
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EO/IR Payloads
LTC Kecia Troy
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Acting Product Director

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A shift toward Rapid Acquisition is required to keep pace with the threat and enable relevant technologies in complex systems.

EXAMPLE: Electronic Warfare Planning and Management Tool (EWPMT) Complexity

- EWPMT is a software suite that enhances a Cyber-Electromagnetic Activities (CEMA) element's ability to plan, coordinate, and synchronize electronic warfare (EW), spectrum management (SM), and Cyber operations (CO)
- Configuration management of multiple fielded software baselines across different networks
- Why is this complex?



EXAMPLE: 3rd GEN FLIR Performance Complexity

- 3rd Gen FLIR (Third Generation Forward Looking Infrared), the sight for the Abrams and Bradley, is required to work in extreme conditions, pushing the laws of physics, and a systems of systems.
- Part of a larger system of systems that is produced by a large team of contractors tracking to different cost, schedule, and performance risks and goals.

*The PEO IEW&S is a Complex Organization
Chartered to Deliver Complex Systems to the Warfighter*