Establishing a Systems Engineering Center of Excellence within PEO GCS

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The TACOM LCMC unites all of the organizations that focus on Soldier and Ground Systems. The PEOs and PMs are able to work as an integral part of the Logistics and Technology efforts of the LCMC, while enterprise level partnerships are maintained with the Research, Development, and Engineering Centers (RDECs).
TACOM LCMC Vision
Providing our warfighters with overwhelming lethality, survivability, mobility, and sustainment for battlefield dominance, now and in the future.

TACOM LCMC Mission
Develop, acquire, field, and sustain soldier and ground systems for the warfighter through the integration of effective and timely acquisition, logistics, and cutting-edge technology.
**Vision**
Exceed Warfighter expectations as the Army’s Lifecycle Manager and systems integrator for current and future Ground Combat Systems.

**Mission**
Manage the development, systems integration, acquisition, testing, fielding, sustainment and Improvement of ground combat systems in accordance with the Army’s initiatives to provide mission-capable systems to the Warfighter while meeting cost, schedule and Performance goals.
Supporting the Army Vision Requires Synchronized Modernization

WHAT WORKED BEFORE...

- GCS Platform infrastructure has remained relatively constant since the last development/improvement program
- Requirements are evolving and expanding which requires integration of new capabilities
  - New/Updated CDDs/CPDs under development
  - Integrating new capability to already strained power, space, and weight claims
- Integrating more in current vehicle configuration impacts crew and vehicle capability

...DOESN’T NECESSARILY WORK NOW!

We are at the degradation point

WHY?
SECOE
Systems Engineering Center of Excellence
Systems Engineering Center Of Excellence is an operational organization infused with common SE processes and tools to optimize execution of acquisition programs

DEVELOPMENT TENETS:

- Comprehensive system-of-systems integration methodologies
- Support senior management fact-based decision making
- End-to-end processes that are tailorable, scalable, & portable
- Focus on PEO-wide problem sets
- Maximize common tools and processes

A branch of engineering whose responsibility is creating and executing an interdisciplinary process to ensure that customer and stakeholder's needs are satisfied in a high quality, trustworthy, cost efficient and schedule compliant manner throughout a system's entire life cycle, from development to operation to disposal.

- International Council on Systems Engineering (INCOSE)
The transition plan brings a PEO from its initial SE capability to a mature capability.
SECOE COMPONENTS

**Process**
A set of formalized methodologies that guide program execution

**Tools**
Software applications that enable the execution of processes

**Training**
Increasing knowledge of SE processes and SE ability of the staff executing the acquisition programs

**Standard Operational Procedures**
Procedures that describe how processes, tools, and training are applied to bring about an SE capability

**Transition Plan**
Plan that moves PEO from its initial state to desired SE culture

**Resources**
The personnel, funding, and facilities necessary to execute the processes, tools, and training
Growing Core Capabilities

**PROCESSES**
- IMP/IMS Development
- IMS Maintenance
- Capability Alignment
- SEP Development
- Risk Management

**TOOLS**
- Tools Plan
- Risk Management Tool
- Requirements Mgmt
- Integrated Scheduling

**TRAINING**
- Training Plan
- SE Curriculum

**STANDARD OPERATIONAL PROCEDURES**
- Systems Engineering Integration Team Review and Approval SOP
- Risk Management Process/Tool Application SOP
- PEO IMP/IMS SOP

**Current Efforts**
- Technical Reviews
- Requirements Mgmt
- Unit Set Fielding
- Tech Readiness Assmmt
- Mfg Readiness Assmmt

**Near Term Plans**
- Fielding Management
- Automated IMP Template
- Configuration Mgmt
- Data Management
- Modeling and Simulation
- Architecture Tools
- Reliability Tools

- Workforce SE Orientation
- Pilot Training Program
- Professional Affiliations
- SE Training Coordinator
- Academic Partnerships
- SE Library
Integrated Scheduling
Aligning Across Platforms

Individual Schedules
Differing formats
Differing detail
Differing software

Scheduling Tools
Built using off-the-shelf software SOPs being developed

PEO GCS
Integrated Master Master Schedule

Schedule Maintenance Tool
Enterprise Project Management (EPM)
MS Project

PEO GCS Knowledge Center

Scheduling Opportunities
- PEO and PMs gaining better insight across programs
- Focusing on sustainment & modernization
- Managing Schedule Risk
- Identifying Commonality Opportunities
- Supporting “What If Drills”
- Synchronizing/Standardizing schedules across PEO
Risk Management

- PEO GCS risk management tool is being used to automate the risk management process
- Integrated in the PEO GCS Knowledge Center
- The process is based on and aligns with DOD risk guidance
- The tool is portable and tailorable to other PEOs

Improving Risk Management

- Proactively Managing Risk
- PEO and PMs using a common understanding of program risk
- Supporting “What If Drills”
SE Analyses Processes & Tools

Modernization & Commonality Analysis

What does it do?
- Functional
  - CONOPS
  - OV-1
  - Use Case Diagrams
  - Use Case Text

How does a user perform the behavior?
- Human Factors
  - Operator Interface
  - Roles
  - PDDs

On what assets is the behavior performed?
- Cross Platform analysis
  - Physical Block Diagrams
  - Align Schedules

What is the total cost impact to the program?
- Life Cycle Analysis
  - Life Cycle Costs
  - Program/System Risks

How well, how fast and at what frequency?
- Performance
  - Timing
  - TPMs
  - Performance Analysis

Which subsystem does it impact?
- Division of Responsibilities
  - Sequence Diagrams
  - FFBDS
  - Spreadsheets

Heritage
- Modernization & Commonality Analysis

Systems Engineering-Based Analysis Processes Being Improved
Two-Level Platform Analysis

System Wide Analysis of Potential Components

Component
Performance/Capability
Needed Power
Space Claim
Thermal

Vehicle
Performance Needs
Available Power
Space Claim
Thermal Limits

Needed Vehicle Infrastructure Improvements

Component Mods to support vehicle needs

Coordinated
Vehicle Modernization Plans
& Component Development Plans

Commonality Analysis

Move
Shoot
Comm
Survive

Commonality Optimization
SE Training

• SECOE Training Objectives:
  – Train a SE qualified workforce
    • Trained to understand systems engineering
    • Trained to manage systems engineering
  – Increase visibility into available SE training and certifications
  – Establish single training tracking tool for SE training & certifications
    • Working with DAU to customize & implement PEO GCS training
      – Available to PEO CS/CSS, TARDEC, and TACOM
      – Focusing on growing number of Level III certified SPRDE, Program Systems Engineers
    • Working with professional organizations, academia
      – Aligning and educating workforce on available SE certifications and degree programs for those interested
  – Utilize existing TACOM training databases (e.g., TEDS) to implement

• Near Term Timeline:
  – Sep 08: Draft Training Plan
  – Sep 08: Draft Training Curriculum
  – Nov 08: SE Workforce Briefing Complete
  – Nov 08: Pilot Training Delivery
  – Dec 08: SE Library Initiated
  – Jan 09: Professional Development Opportunities Identified
  – Feb 09: SE Training Process Approved
Approval Process

**Process Flow**

1. Identify SE Product Need
2. Define Scope and High-level Solution Concept
3. Present Draft SE Project Directive to SEIT for Approval
4. Present Draft SE Project Directive to SEAC for Approval
5. Present Final Product to PEO GCS for Approval
6. User Execution
7. Maintain and Continuously Improve Product

**Process Steps**

**Phase 1: Need and Concept**
1. Identify SE Product Need
2. Define Scope and High-level Solution Concept
3. Present Draft SE Project Directive to SEIT for Approval
4. Present Draft SE Project Directive to SEAC for Approval

**Phase 2: Draft Development**
1. Form IPT to Develop Product
2. Develop Draft Product
3. Present Draft Product to SEIT for Guidance
4. Deliver Training to the User

**Phase 3: Final Development**
1. Develop Final Product
2. Develop Associated Training
3. Present Final Product to SEIT for Approval
4. Present Final Product to SEAC for Approval
5. Present Final Product to PEO GCS for Approval

**Phase 4: Implementation**
1. Add Product to the PEO GCS Baseline
2. Deliver Training to the User
3. Maintain and Continuously Improve Product

Systems Engineering & Integration (SEIT) Membership: *PEO Lead SE (chair), PM Lead SEs, CIO*

Systems Engineering Advisory Council (SEAC) Membership: *PEO Lead SE (chair), PMs, CIO*
SECOE Steady State

A Lifecycle of Continuous Improvement
SECOE Stakeholder Benefits

Army Benefits
PEOs executing acquisition programs with greater efficiency while reducing turbulence and disruption to the Unit

APEO SEIO

TACOM Community
Benefits Growing systems engineering capabilities within the community and building for the future

Other Orgs (PEO CS/CSS, TARDEC, …)

PEO

PMs

PEO/PM Benefits
Provides synchronized views across the PMs

PM Benefits
Suite of processes, tools, and training to enable more efficient program planning and execution in terms of cost, schedule, and performance
The Future

• Update on PEO GCS progress will be provided at NDIA 12th Annual Systems Engineering Conference

• In the meantime, contact me if you want to:
  - Contribute good ideas to our effort
  - Steal good ideas from our effort

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