Transformation of Army Test and Evaluation

Army Views on T&E/SE Interactions

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Outline

- Systems Engineering and Verification
- Future Combat Systems (FCS) Overview
- FCS “V Chart” w/ Tools Links
  - Combined Test Organization
  - SoSIL
  - Distributive Test Capability
  - Synthetic Test Capability
  - Built-in Test (BIT) and Training
- Highlights
Developmental Test Command

Systems Engineering and Verification
Previous Implementation

System Functional Review
System Level Design Requirements

Preliminary Design Review
Item Level Design Requirements

Critical Design Review
Fabricate

Test Readiness Review
System Verification Review

Test

System
Subsystems
Configuration Items
Assemblies
Components
Developmental Test Command
FCS Description:

- Comprised of a Family of Systems
  - Advanced, networked air- and ground-based maneuver, maneuver support, and sustainment systems
  - Includes manned and unmanned platforms
  - Networked via a C4ISR architecture

- Will operate as a System of Systems
  - Network existing systems, systems already under development, and new systems to be developed to meet the needs of the UA.
  - Network will enable:
    - improved Information Surveillance Reconnaissance, enhanced analytical tools, joint exchange of blue and red force tracking down to the tactical level, real time sensor-shooter linkages, and increased synergy between echelons and within small units
    - the UA to connect to UE, joint capabilities, and national assets
Army FCS Transformation
Mission to Capability Trace

Missions

Tasks

to accomplish

to perform

Capabilities

Materiel

comprise

enabled by

as supplied by

provides

Maintains the SoS Focus

Developmental Test Command

* Doctrine, Organization, Training, Matériel, Leadership and Education, Personnel, Facilities
Army FCS Transformation
Mission to Capability Trace

Missions

comprise

TO accomplish

Tasks

enabled by

ORD and AoAs

Capabilities

to perform

Operational Test

Developmental Test

provides

Materiel

Answers the “So What?” Question

Aligns: Systems Eng, Test, Evaluation, Force Development, Training

Developmental Test Command

* Doctrine, Organization, Training, Matériel, Leadership and Education, Personnel, Facilities
Developmental Test Command

Systems Engineering and Verification

Combined Test Organization (CTO)

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Preliminary Design Review

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Fabricate, Integrate and Test

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Developmental Test Command
Combined Test Organization (CTO)

- Equal Partnership – PMO / ATEC / LSI
- Supplants PMO Test Management and Augments ATEC and LSI Top Level Test Management
- Strives for Most Efficient Testing Through Integration, Combination, and Sharing
- PMO, ATEC, and LSI have Pledged Commitment and Support

Plan Together, Test Once, Share the Data

Developmental Test Command
Systems Engineering and Verification

Combined Test Organization (CTO)

Sys of Sys Int Lab (SoSIL)

Fabricate, Integrate and Test

Developmental Test Command

System Functional Review

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Design

Test Readiness Review

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System

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System of Systems Integration Lab (SoSIL)

SoS Integration & Test

Test Data Management Center

Classified ACE

IRCC

UAMBL

Connection to TRADOC Sites

Connection to ATEC Sites

WAN Network Equipment

Data Center

SoS Integration & Test

Framework

Mobile Node

Viewing Portal

Nationwide Distributed FCS Test Environment
Synthetic Test Capabilities

Developmental Test Command

FCS Subsystems and/or Representations

Tactical Comm Subsystem

Sensor Subsystem

Weapon Subsystem

C4I Subsystem

Vehicle Consoles

Common Subsystems

Sensor Stimulator

Weapon Subsystem Framework Interface

Image Generators

Vehicle Simulation Driver

Synthetic Tactical Communications

Scenario Generation

Integrated Synthetic Environment

Terrain Database

Weather Database

Signatures Database

Test Control

Data Collection

Analysis & Reporting

Test Framework Architecture

Tactical Messages

Scene Data

Engagement Data

Scene / Vehicle Data

Terrain, Damage, & States

Environment Data

Object Signatures

Entity States

Signature, Environment, & Terrain Data

Test Run Parameters, Status, Etc.

Tactical Msgs, Truth Data, Etc.

Test Data

Scene & Environment Data

Tactical Messages, Truth Data, Etc.

Entity States

Terrain, Environment, & Terrain Data

Signature, Environment, & Terrain Data

Test Run Parameters, Status, Etc.
Built-in Test and Training

- Embedded Instrumentation
  - Design-in test and training instrumentation

- Test instrumentation
  - Data bus capture
  - Specialized critical test requirements

- Training instrumentation
  - Real-Time Casualty Assessment
  - Tactical Engagement Simulation
  - Embedded training
**Highlights**

- How do we ensure that T&E planning process is integrated into the SE process?
  - Early involvement of the tester.

- How do we integrate the SEP and TEMP?
  - Build them together using a CTO approach.

- How do we ensure the tester is part of the SE process?
  - Get the CTO involved early

- How do we make T&E support verification of the SE process?
  - T&E is the verification part of SE
  - Implement the right tools and proactive planning

- Are there process changes need by industry and Govt?
  - CTO ensures an effective, integrated T&E strategy
How Much is Testing Enough

- To gather information to reduce the risk to a level acceptable to those responsible for the application
- Who is really responsible for the application and can determine the acceptable risk; tester, evaluator, contractor, PM, developer, user, Congress, media, taxpayer, or a combination of these?
- To test until risk has been adequately reduced
- What determines adequately reduced risk; resource constraints, schedule constraints, environmental and safety concerns, a driving requirement to immediately employ the technology, political or social considerations?
How much testing is Enough?

Enough is a function of how **Early** in the development cycle testing is accomplished.

The **Earlier** it is accomplished, the less testing is required and the greater the value.
Understand the Risk

How much **Testing is Enough?**
Risk are we willing to accept?

Testing must be conscious of, highlight, and explore all risk areas.

- Program Failure
- Technological obsolescence
- Life and Limb

Risky Business

Developmental Test Command
Thank you for the invitation to speak here today… any questions?