Developmental Test & Evaluation Policy Vectors

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T&E Policy

Developmental Test & Evaluation

OUSD(AT&L)/Systems & Software Engineering

DEVELOPMENTAL T&E

➢ Intro to OSD DT&E

➢ DT&E Mission, Roles and Functions

➢ DT&E Priorities

Common Threads Through Breached Programs

- **Nine key failures visible in current Nunn-McCurdy breaches:**

    - **Change in doctrine, driving quantity or mission changes**

    - **Requirements problems (unrealistic, not stable, creep, etc.)**

    - **Lack of a robust baseline**

    - **Inadequate SE / T&E, risk management, and or FMECA**

    - **Inadequate staffing / experience / oversight levels**

    - **Poor reliability**

    - **Acquisition reform**

    - **Schedule / cost realism (concurrency, estimation, etc.)**

    - **Contract (warranty, price curves, TSMR, etc.)**
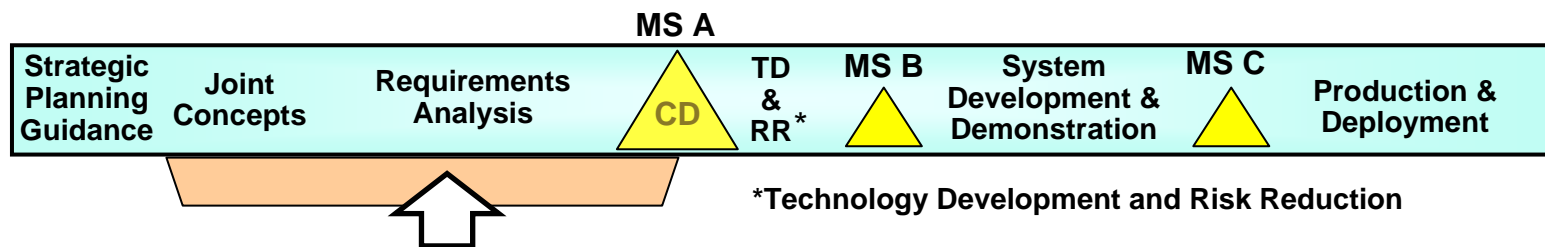
Top 10 Emerging Systemic Issues

1. **Management**
   - **IPT roles, responsibilities, authority, poor communication**
   - **Inexperienced staff, lack of technical expertise**

2. **Requirements**
   - **Creep/stability**
   - **Tangible, measurable, testable**

3. **Systems Engineering**
   - **Lack of a rigorous approach, technical expertise**
   - **Process compliance**

4. **Staffing**
   - **Inadequate Government program office staff**

5. **Reliability**
   - **Ambitious growth curves, unrealistic requirements**
   - **Inadequate "test time" for statistical calculations**

6. **Acquisition Strategy**
   - **Competing budget priorities, schedule-driven**
   - **Contracting issues, poor technical assumptions**

7. **Schedule**
   - **Realism, compression**

8. **Test Planning**
   - **Breadth, depth, resources**

9. **Software**
   - **Architecture, design/development discipline**
   - **Staffing/skill levels, organizational competency (process)**

10. **Maintainability/Logistics**
    - **Sustainment costs not fully considered (short-sighted)**
    - **Supportability considerations traded**

Major contributors to poor program performance
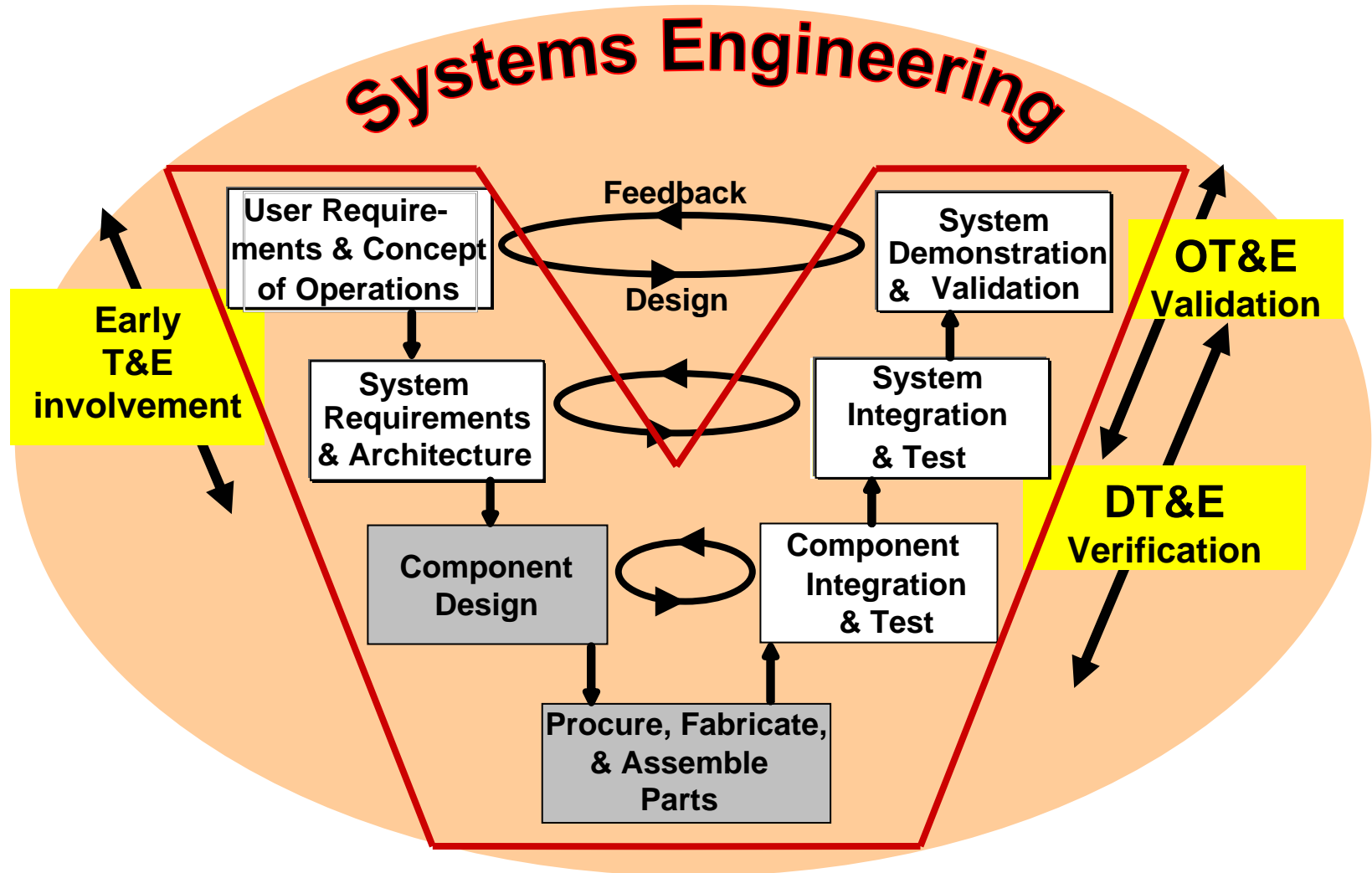
Early Lifecycle Planning

- **Early lifecycle involvement of Systems Engineering to:**
    - Inform evaluation of alternatives with technical insights
    - Ensure solutions balance requirements with technical feasibility
    - Ensure solutions can be validated and verified
    - Use Modeling & Simulation to help refine warfighter concept of operations/system requirements, evaluate design alternatives, and identify potential technology/human interface constraints
- **Appropriate resourcing (personnel/funding) required**
- **Include in requirements, specifications, and contracts**

Strategic Planning Guidance	Joint Concepts	Requirements Analysis	MS A / CD	TD & RR*	MS B	System Development & Demonstration	MS C	Production & Deployment

*Technology Development and Risk Reduction

Sustainment must be included up front and early

T&E in Support of Systems Engineering

T&E – From Concept to Combat
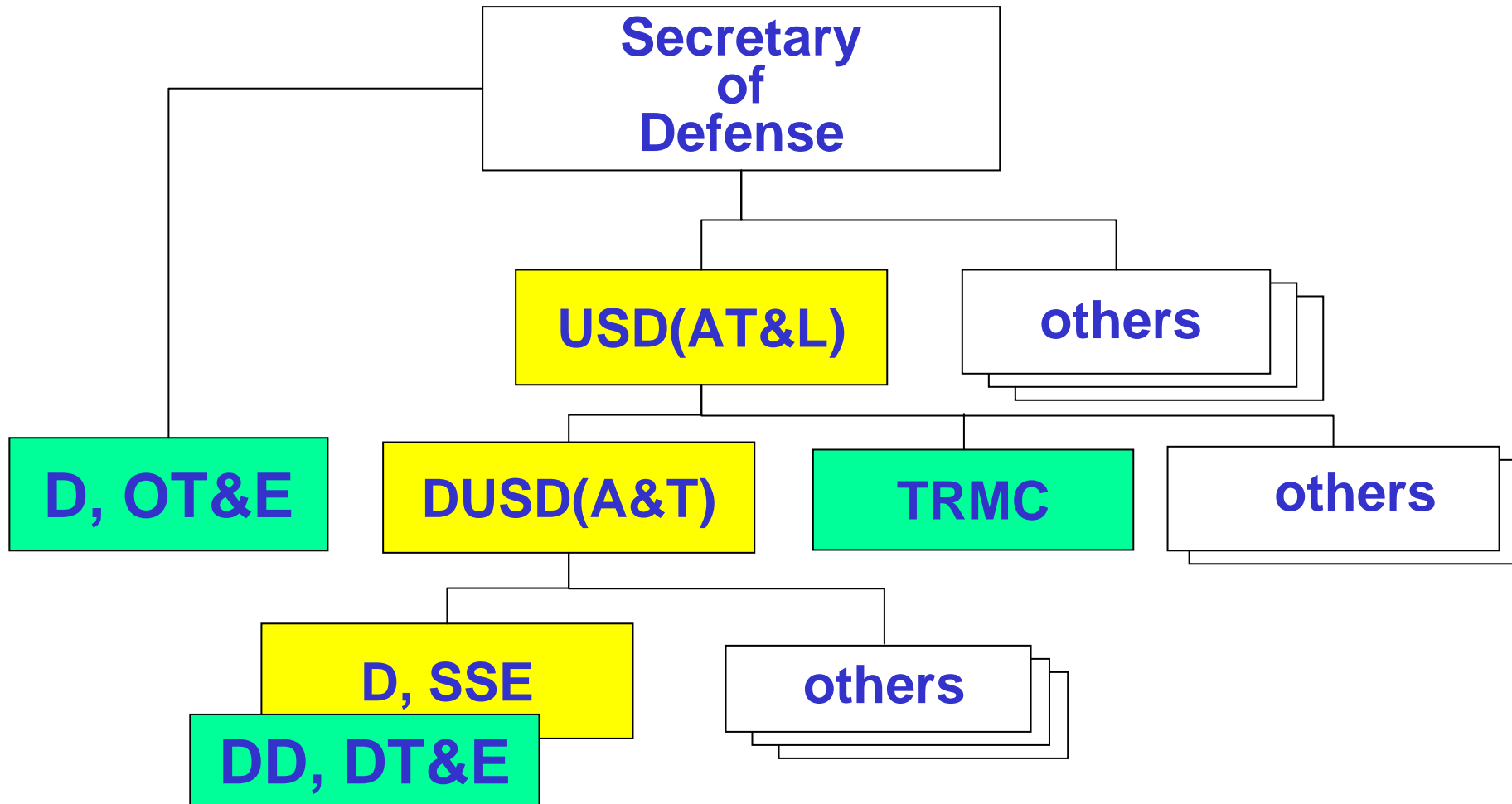
Our Mission

- Lead office within the DoD for all matters pertaining to developmental test and evaluation
  - Develops OSD policy concerning DT&E
  - OSD advocate for testers concerning DT&E
  - Responsible for education/training of the T&E acquisition workforce
- Office of primary responsibility for DoD Energy acquisition policy
  - Emerging area of emphasis on new weapon system development
- Lead office for acquisition M&S and System Safety

The Direction We are Heading

- Revitalizing DT&E
  - Department initiative to place more emphasis on government DT&E during system development
- Integrated Test policy
  - Standardizing definitions and execution guidance throughout the Services and OSD
- Testing in a Joint Environment
  - Several ongoing initiatives (JTEM, L-V-C, DMO, etc)

DEVELOPMENTAL T&E

- Too many acquisition programs not operationally effective or suitable

    - Several reasons postulated as cause – reduction in governmental DT&E?

- Policy has languished concerning governmental involvement during system development

- DT data typically not relevant to the evaluation of a system's operational readiness

    - Scope is concentrated on more technical parameters

- DT focused on single system development

    - Needs wider emphasis on system of system and/or system employment in a joint context

T&E – From Concept to Combat

A New Vector for DT&E

- Support Faster Fielding of Improved Capabilities

- Reduce Risk of Immature Technology in Systems Development

- Revitalize T&E Workforce Education

- Promote Joint T&E in Live-Virtual-Constructive Environments

- Provide Effective Acquisition Policy and Practices for DT&E

Support Faster Fielding of Improved Capabilities

Objective: Develop T&E policy, practices, and procedures to support Departmental efforts in shortening the time to field capabilities

➢ Issues:

  ➢ Not pass-fail; but based on capabilities and limitations

  ➢ Integrate T&E strategy - CT, DT, OT

  ➢ Incorporate operational context in DT

  ➢ Collect once, and use data often – Integrated Testing

  ➢ Ensure testable requirements are in EoA / CD

  ➢ Ensure T&E requirements are in SOWs and RFPs

  ➢ Ensure T&E documents consistent with and support:

    ➢ Systems Engineering Plan (SEP)

    ➢ Acquisition Strategy (AS)

    ➢ Capability Documents (ICD, CDD, and CPD)

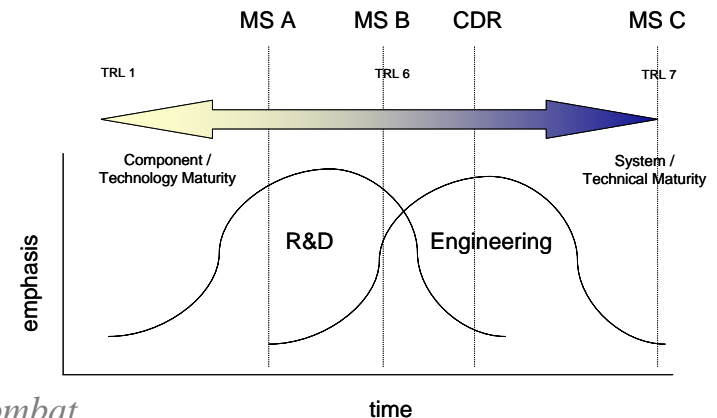# Reduce Risk of Immature Technology in Systems Development

Objective:

- Add Technology Maturity focus into the Systems Engineering and DT&E processes to:
  - Reduce technical, cost, and schedule risk
  - Increase the rigor of SE
  - Plan for alternatives in the event of TM difficulty
  - Verify TRLs during DT&E

Scope

- Leverage existing acquisition review structure
- Use existing DDR&E Technology Readiness Assessment (TRA) methodology

T&E – From Concept to Combat

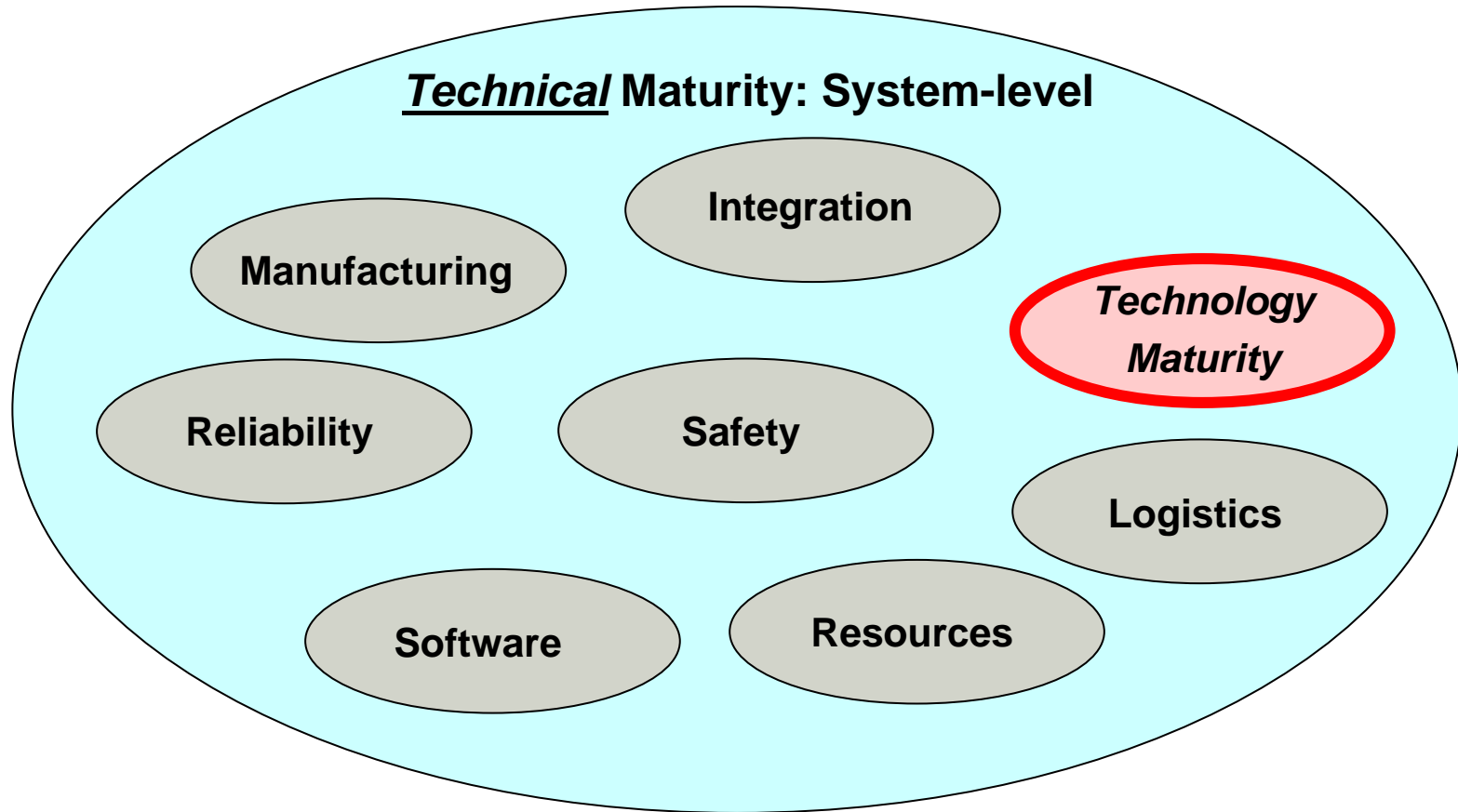# *Reduce Risk of Immature Technology in Systems Development*

Issues:

- Studies find that immature technology is a primary source of cost and schedule risk

    - GAO   -- DAPA
    - QDR   -- SSE/AS Program Support Reviews

- "Programs that started development with immature technologies experienced an average acquisition unit cost increase of nearly 21 percent" (GAO-05-301, March 2005)

- FY06, PL 109-163, Section 801 requires USD(AT&L) certification, before Milestone B, that *"the technology in the program has been demonstrated in a relevant environment"*

    - Above wording equates to Technology Readiness Level (TRL) 6

Technology vs. Technical Maturity

Technical Maturity: System-level

- Integration
- Manufacturing
- Technology Maturity
- Reliability
- Safety
- Logistics
- Software
- Resources

Technology Maturity is a component- or subsystem-level issue

Increased TM emphasis in OSD Oversight

- Program Support Review (PSR)

  - ID Critical Technology components/sub-systems?

  - Current TRLs known?

  - ID Mature alternative components/sub-systems?

  - TRL monitoring, Alternative decision date?

- Assessment of Operational Test Readiness (AOTR)

  - TM verification results

  - DT&E performance results

  - IOT&E predictive analysis/M&S

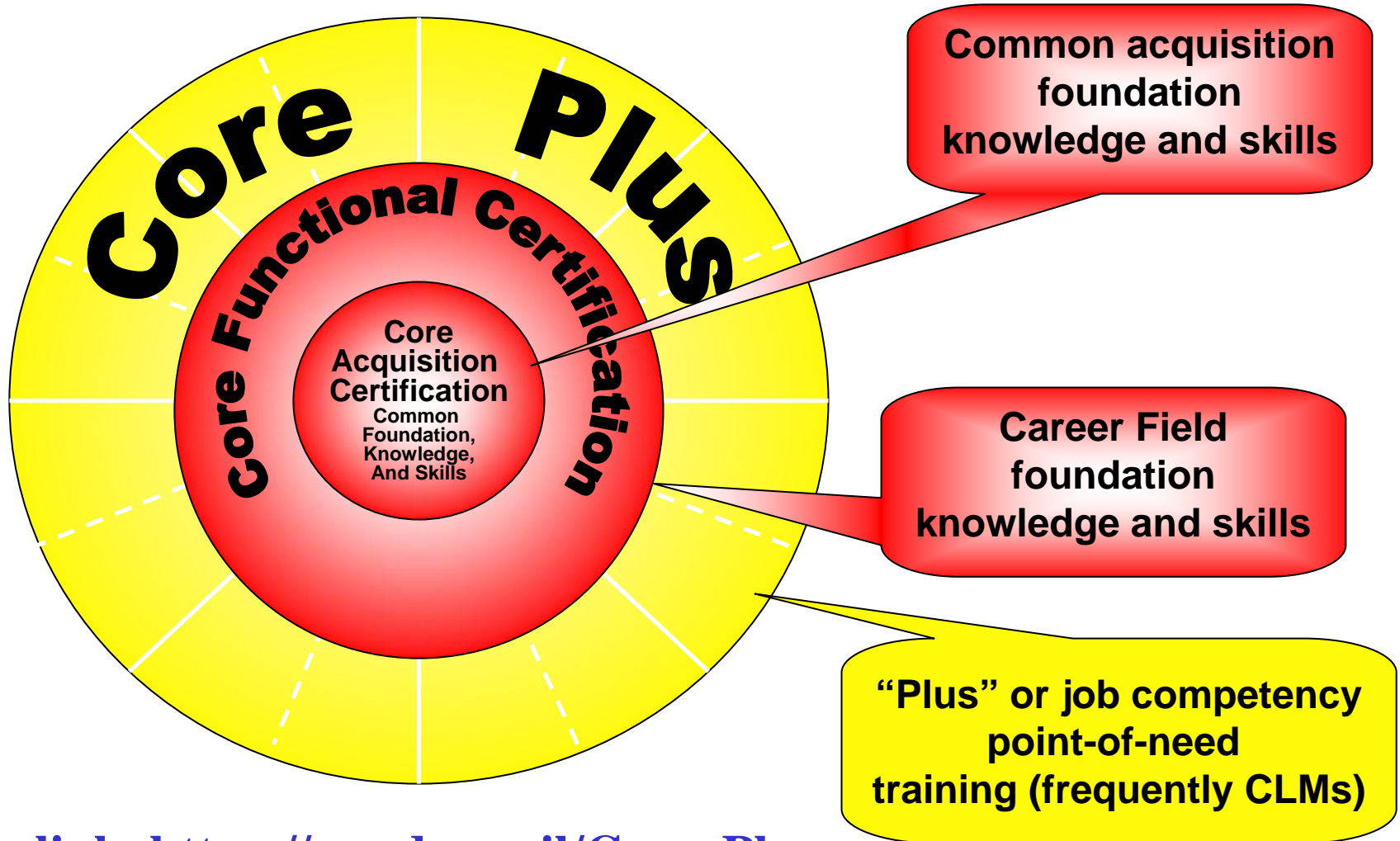# *Revitalize T&E Acquisition Workforce Education*

Objective: Ensure the T&E acquisition workforce is of sufficient size and adequately trained to perform the T&E tasks required in today's and tomorrow's product/system acquisition process

Issues:

➢ Continue to ensure current & relevant education, experience, training requirements

➢ Track new DAU course releases

➢ Identify the T&E education requirements for SoS and FoS

➢ Champion the development of new CLMs - such as "M&S for T&E"

DT&E Acquisition Education & Training

Core

Plus

Core Functional Certification

Core
Acquisition
Certification
Common
Foundation,
Knowledge,
And Skills

Common acquisition foundation knowledge and skills

Career Field foundation knowledge and skills

"Plus" or job competency point-of-need training (frequently CLMs)

- **Web-link, https://acc.dau.mil/Core_Plus**

Promote Joint T&E in Live-Virtual-Constructive Environments

Objective: Define the role of DT&E in the joint T&E arena and partner with DOT&E, Joint Staff, and Components in defining and developing the necessary polices, practices, and procedures for the conduct of efficient and effective joint T&E

Issues:

➢ Establishing L-V-C standards

➢ Defining LVC environment functional requirements

➢ Identify capabilities & limitations of LVC architectures

➢ Map capabilities & limitations to requirements

➢ Compare middleware, business models, standards management, alternatives

➢ Create roadmap, and socialize it widely

➢ Define business processes

➢ Establish a Transition Plan to include: who pays, legacy implementation, etc.

Testing in a Joint Mission Environment

- **Upcoming changes in OSD policy will likely:**
  - ➢ **Require testing in a joint environment for capabilities-based acquisitions**
  - ➢ **Establish governance on the use of the joint mission infrastructure**
  - ➢ **Enable smaller programs to participate and contribute to the joint environment**
  - ➢ **Increase demonstration venues for systems earlier in acquisition cycle**
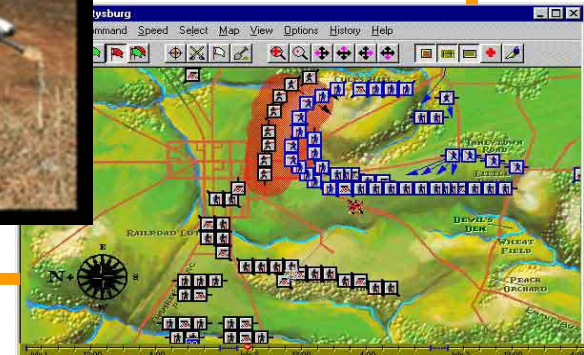
T&E – From Concept to Combat

Provide Effective Acquisition Policy and Practices for DT&E

Objective: Develop and socialize the necessary changes to DT&E policy, practices, and procedures to support the overall AT&L acquisition lifecycle management framework and process

Issues:

➢ More involvement in the Evaluation of Alternatives and Concept Decision

➢ Involvement in Capabilities design & SoS T&E

➢ Develop a format for T&E Strategy (TES)

➢ Reinforce Integrated T&E approach in TES / TEMP

➢ Enforce linkage of T&E and SE planning documents

➢ Incorporate Industry best practices

➢ Incorporate DT&E standards for:

  ➢ Early involvement (requirements definition in Concept Refinement)

  ➢ Increased operational perspective, operator involvement

  ➢ System sustainment issues

  ➢ Open processes and data availability

  ➢ M&S part of T&E strategy; live test data used to improve M&S

2007 NDIA SE/DT&E Committee Focus

- Three Focus Teams:
  - Earlier contractor and tester involvement
  - Integrated DT/OT and DT operational relevance (combined)
  - Suitability
- Recommend policy changes
  - Input to FY2008 DoD 5000 update

T&E – From Concept to Combat

New Approaches to Acquisition:

- Emphasis on evolutionary acquisition

- Joint capabilities focus

- Net Centricity

- System-of-Systems

- Testing in a joint mission environment

Need a revitalized DT&E capability to be a productive team member

Backup