



DEVELOPMENTAL TEST & EVALUATION

OSD DT&E: Implementing the Technology Maturity Vector

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Outline

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- SSE Mission
- Systems Engineering Revitalization
- Emerging Systemic Issues
- DT&E Revitalization Focus
- DT&E Technology Maturity Initiative
- Pending Guidance Changes



Systems and Software Engineering Mission Statement

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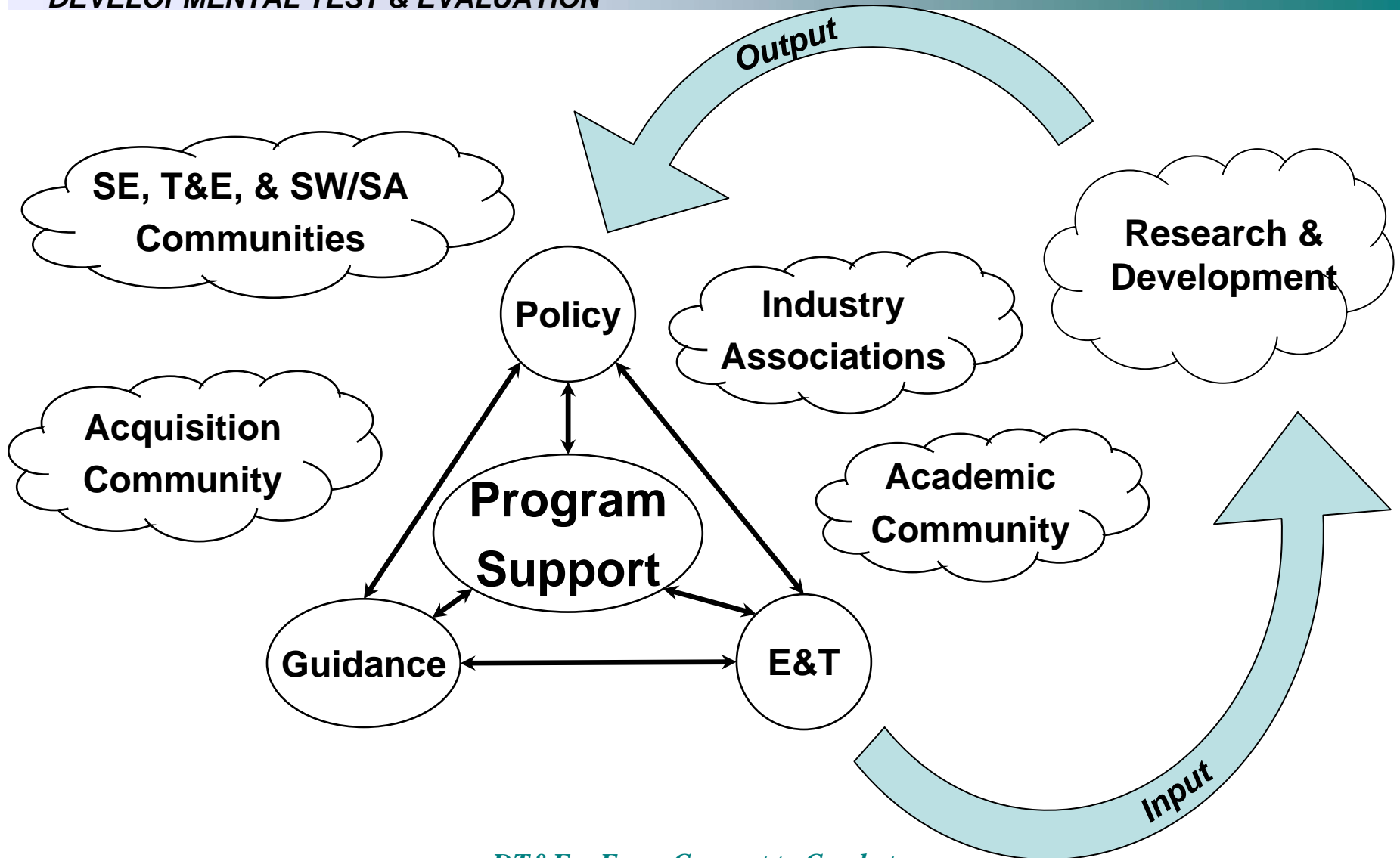
- Shape acquisition solutions and promote early technical planning
- Promote the application of sound systems and software engineering, developmental test and evaluation, and related technical disciplines across the Department's acquisition community and programs
- Raise awareness of the importance of effective systems engineering and drive the state-of-the-practice into program planning and execution
- Establish policy, guidance, best practices, education, and training in collaboration with academia, industry, and government communities
- Provide technical insight to program managers and leadership to support decision making

Evolving System Engineering Challenges



Systems Engineering Revitalization Cycle

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Top 10 Emerging Systemic Issues

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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

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DT&E Revitalization Focus

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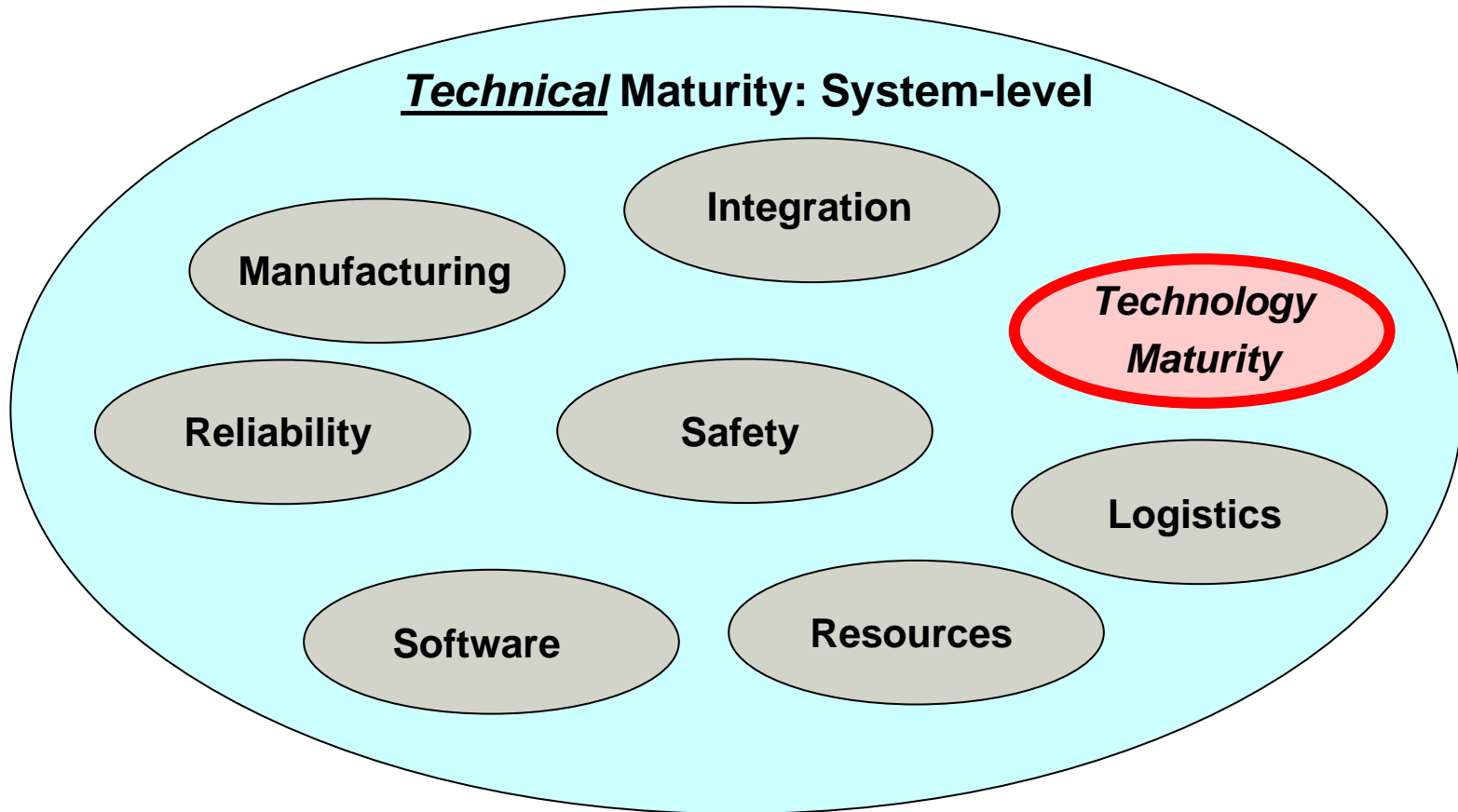
- Support Faster Fielding of Improved Capabilities
- **Reduce Risk of Immature Technology in Systems Development**
- Revitalize T&E Workforce Education
- Promote Joint T&E in Live-Virtual-Constructive Environments
- Provide Effective Acquisition Policy and Practices for DT&E

DT&E Revitalization Vectors



Technology vs. Technical Maturity

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Technology Maturity is a component- or subsystem-level issue



Reduce Risk of Immature Technology in Systems Development

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- **Immature technology is a primary source of cost and schedule risk**
 - GAO
 - QDR
 - DAPA
 - SSE 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)
- Milestone B – USD(AT&L) certification that *“the technology in the program has been demonstrated in a relevant environment”* - Technology Readiness Level (TRL) 6 (FY06, PL 109-163, Section 801)



DT&E Technology Maturity Initiative

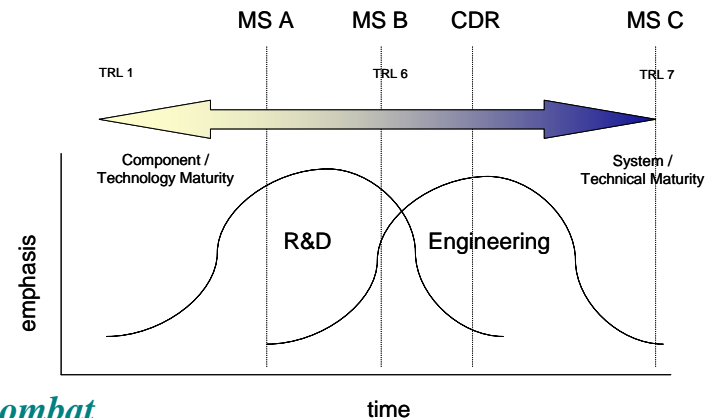
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Purpose

- 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



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Pending Guidance Changes

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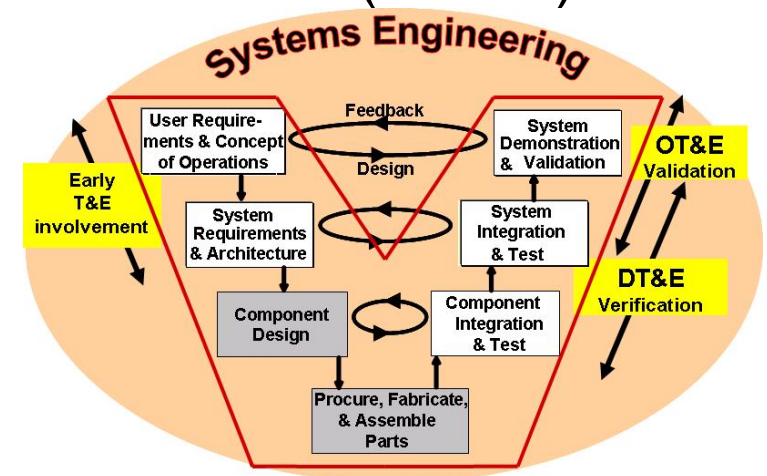
- Defense Acquisition Guidebook
 - Chapter 4 (SE)
 - For immature critical technology elements (CTE), identify mature alternative
 - If a CTE is not likely to reach TRL 6 before MS B, substitution of the mature alternative may be required
 - Chapter 9 (T&E)
 - Validate technology maturation during Technology Development phase
 - DT supports decisions to shift to alternative technology



Increased TM emphasis in OSD Oversight

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- Program Support Review (PSR)
 - ID Critical Technology Elements?
 - 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



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