Welcome and Introductions

Process Overview

Systems Engineering "V"

Cross-Cutting Activities

Applying SE to a Project

Establishing SE in your Organization

Process Improvement Discussion

Wrap Up

Session 6: Establishing SE in Your Organization

These materials developed under the RITA National ITS Architecture Program

U.S. Department of Transportation
Research and Innovative Technology Administration

Learning Outcomes

- Identify ways to improve systems engineering capabilities
- List steps to establish systems engineering processes for your organization

Improving Systems Engineering Capability
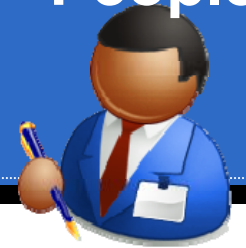
Three aspects should be addressed:

- People – Build systems engineering knowledge

- Process – Establish systems engineering processes for your organization

- Technology – Use SE Tools to make the processes more efficient and effective

Systems Engineering Capability

Technology Process People

Building Systems Engineering Knowledge

People

- Identify systems engineering specialists in your organization
  - Don't overlook the Information Technology Group
- Provide staff training opportunities
  - Can use 100% federal funds from a project to pay for any training
- Hire experienced SE consultants
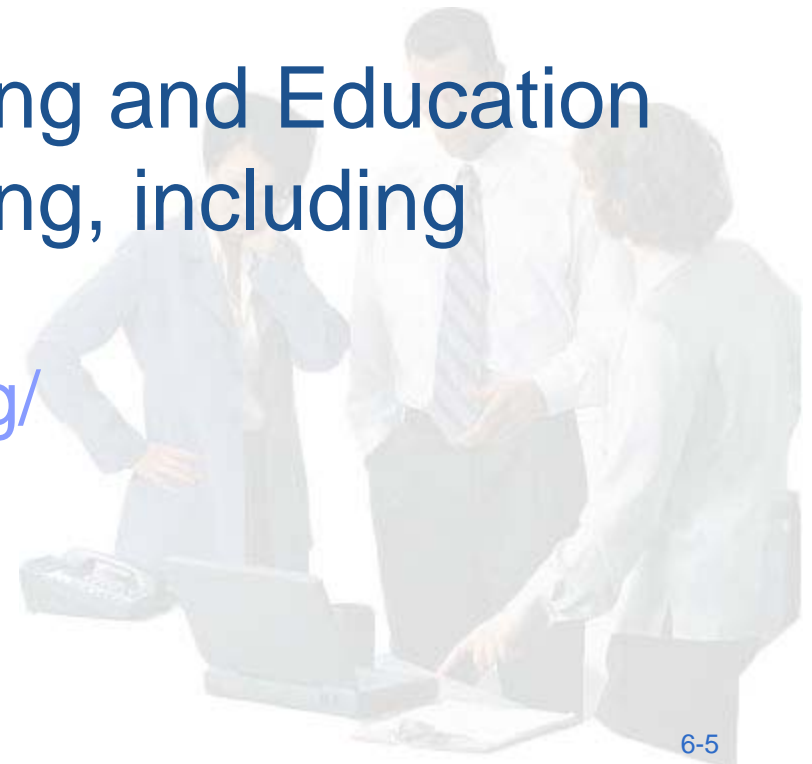 - Still need SE skills within your organization

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Training

- National Highway Institute (NHI -- mostly classroom-based courses)
  http://www.nhi.fhwa.dot.gov/training/down_catalog.aspx

- Consortium for ITS Training and Education (CITE -- web-based training, including "blended learning")
  http://www.citeconsortium.org/

SE Training

- ## Introductory
  - Introduction to SE for Advanced Transportation
    NHI Course #137024 and CITE
  - Managing High Technology Projects in Transportation
    NHI Course #137026 and CITE

- ## Intermediate
  - Software Acquisition for ITS Projects
    NHI Course #137019 and CITE
  - Procurement for ITS Projects
    NHI Course #137020 and CITE

- ## Advanced
  - Advanced SE for Advanced Transportation Projects
    CITE
  - Configuration Management for Traffic Management Systems
    NHI Course #137042 and CITE

Related ITS Training

People

- Introduction to the National ITS Architecture
  NHI Course #137013 and CITE

- Advancing Transportation System Management
  and Operations
  NHI Course #133098

- Improving Highway Safety with ITS
  NHI Course #137044

- Turbo Architecture Software Training
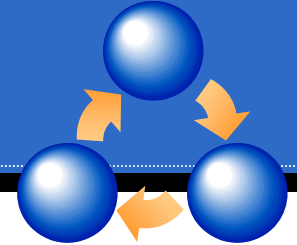 NHI Course #137029A
  NHI Course #137048 (Web Based)

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CMMI Capability Levels are a Proven Process Improvement Approach

Optimizing

5 Focus on process improvement

Quantitatively Managed

4 Process measured and controlled

Defined

3 Process characterized for the **organization** and is proactive

Managed

2 Process characterized for **projects** and is often reactive

Performed

1 Competent people and heroics (Hope for the best)
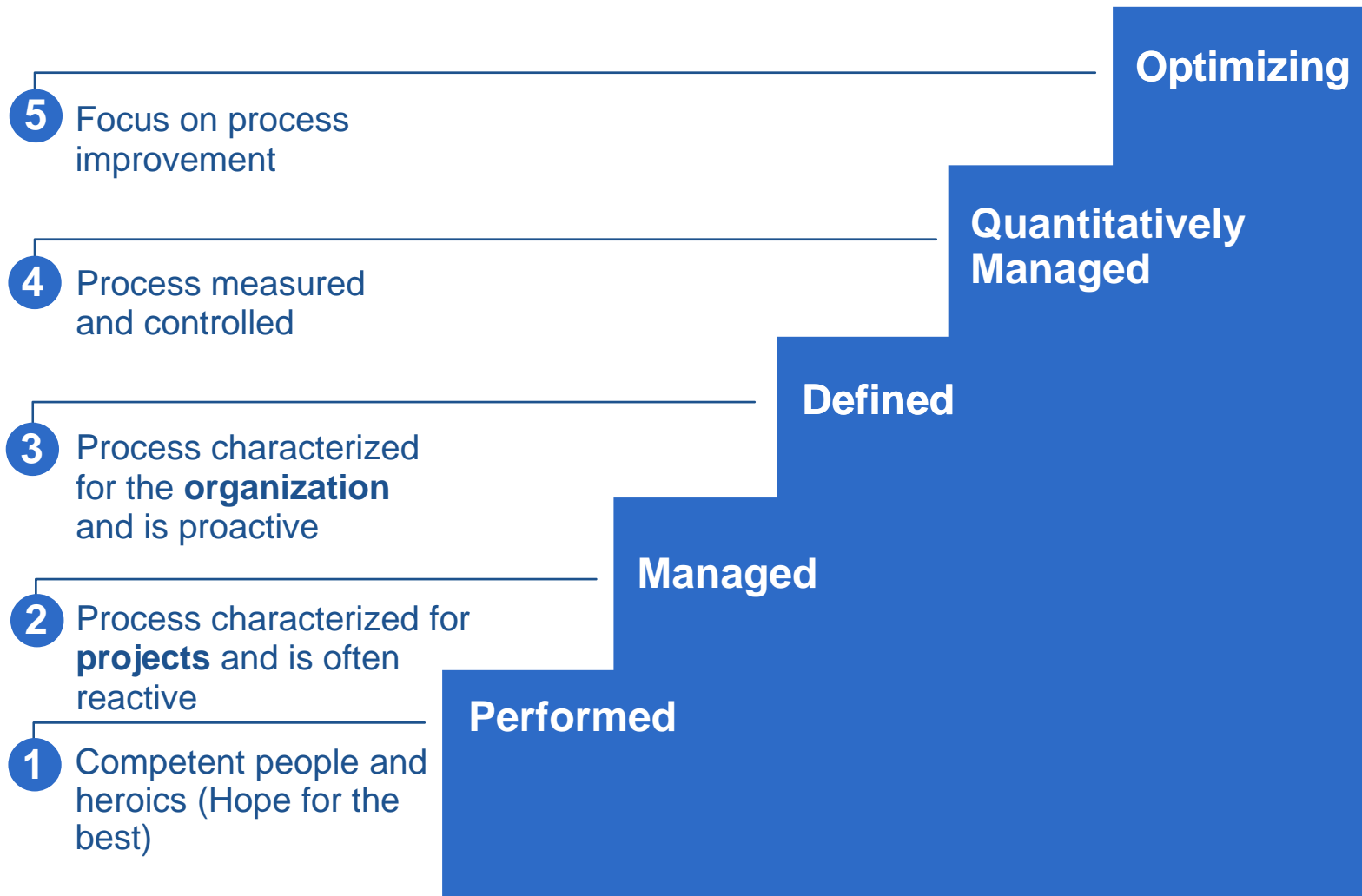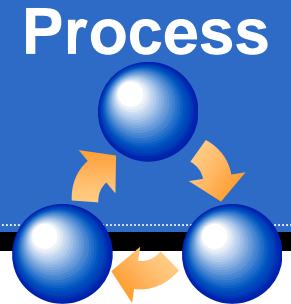
Process Improvement Recommendations

- Pilot SE processes on projects – begin with SE "V" Model

- Leverage parallels in processes
  - SE
  - Capital Projects
  - IT

- Improve cross-cutting capabilities – Project Mgmt, Risk Mgmt, Configuration Mgmt

- Establish policies, document SE process

- Implement across organization

Systems Engineering Tools

- Establish SE library (e.g., templates, best practices, decision support tools)

- Consider range of SE tools as organization gains experience

  - Project Management
  - Requirements Management
  - Systems Architecture
  - Testing/Problem Tracking
  - etc., etc.

- Use complex tools based on project need

Increasing Capability & Complexity

Full Lifecycle Tools (e.g., CORE)

Requirements Mgmt Tools (e.g., DOORS)

Simple Drawing Tools (e.g., Visio)

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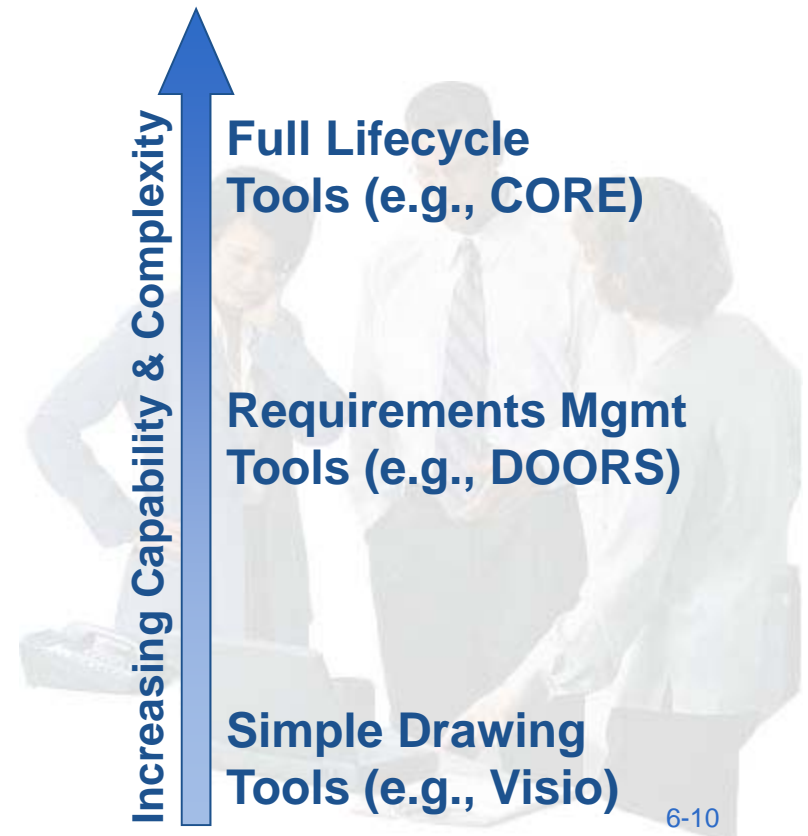
SE Resources

- Systems Engineering Handbook
- Systems Engineering Guidebook
- Guide to Contracting ITS
- Lessons Learned Database
- Comprehensive list of resources included in your workbook

Systems Engineering Handbook

On-Line at:

http://ops.fhwa.dot.gov/publications/seitsguide/index.htm

CD in your workbook

Systems Engineering for Intelligent Transportation Systems

An Introduction for Transportation Professionals

January 2007
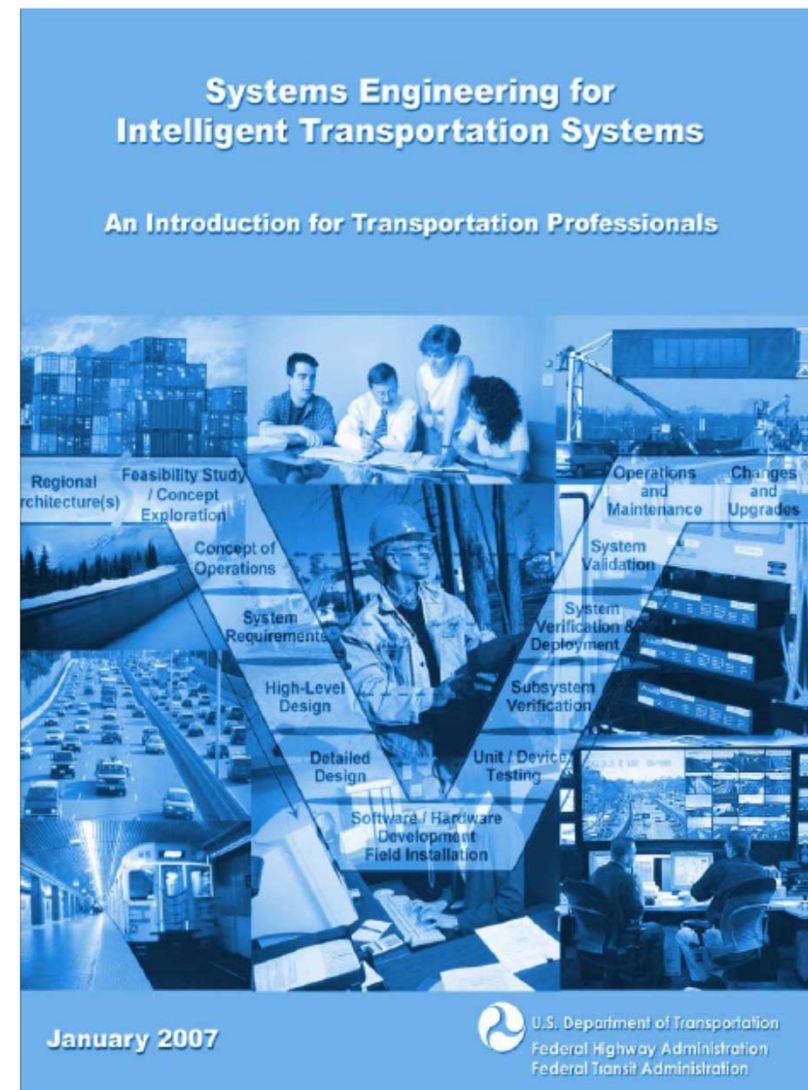
U.S. Department of Transportation
Federal Highway Administration
Federal Transit Administration

Systems Engineering Guidebook

http://www.fhwa.dot.gov/cadiv/segb/

Choosing the Right Contracting Approach

http://www.citeconsortium.org/Model/index.htm

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Lessons Learned Database

http://www.itslessons.its.dot.gov/its/benecost.nsf/LessonSystemsEng

Review Learning Outcomes

- Identify ways to improve systems engineering capabilities
- List steps to take to establish systems engineering processes for your organization