

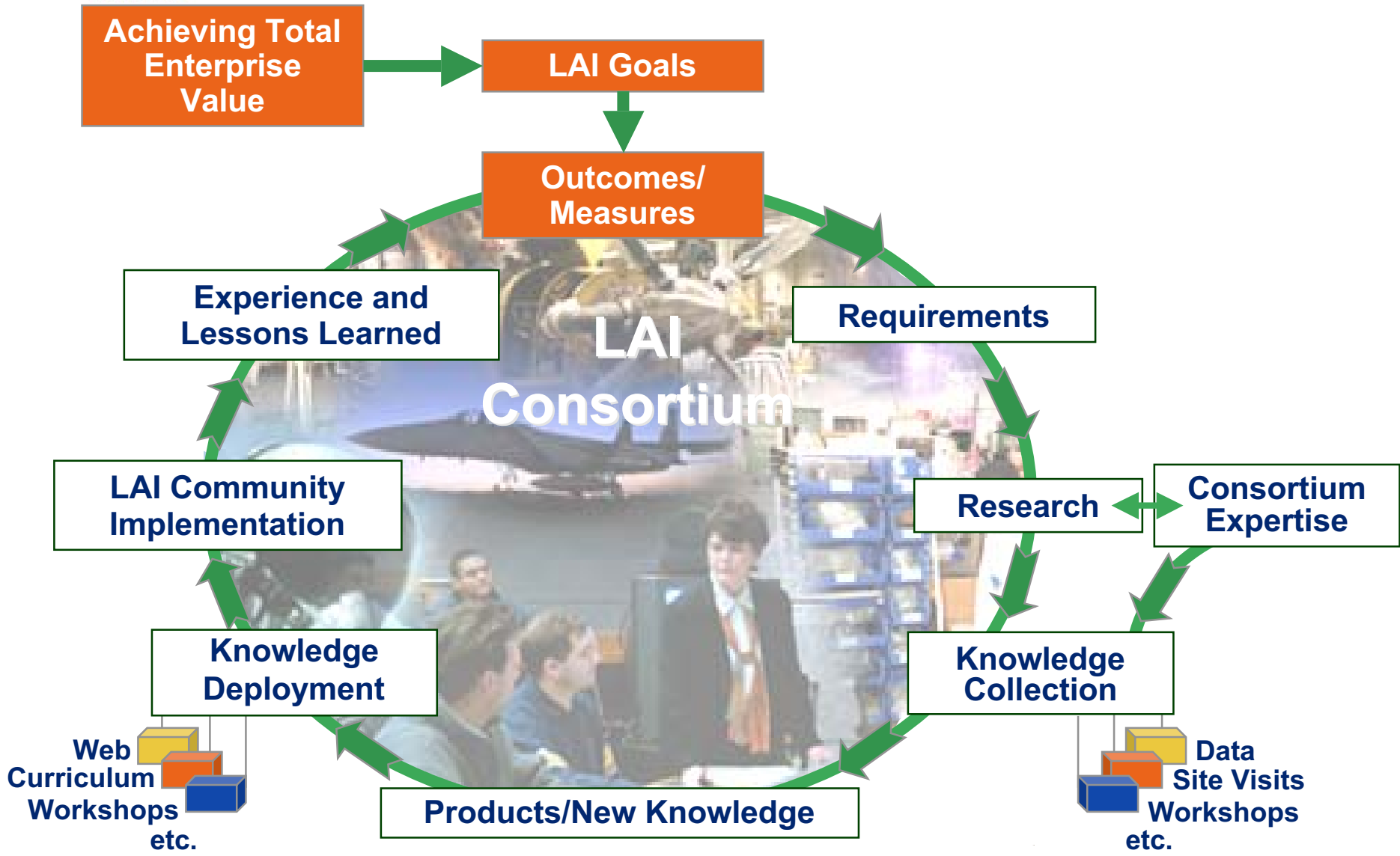


LAI Product Highlights

Lean Now SME Conference
January 28, 2004



LAI Knowledge Cycle





LAI Products

Strategic Enterprise Tools

- Lean Enterprise Model (LEM)
- **Transition-To-Lean (TTL) Roadmap**
- **Lean Enterprise Self-Assessment Tool (LESAT)**
- **Enterprise Value Stream Mapping and Analysis (EVSMA)**

Tactical/Operational Tools

- Product Development Value Stream Mapping (PDVSM)
- Supplier Networks Toolkit
- Manufacturing Systems Design Framework
- Production Operations TTL

Education/Training Materials

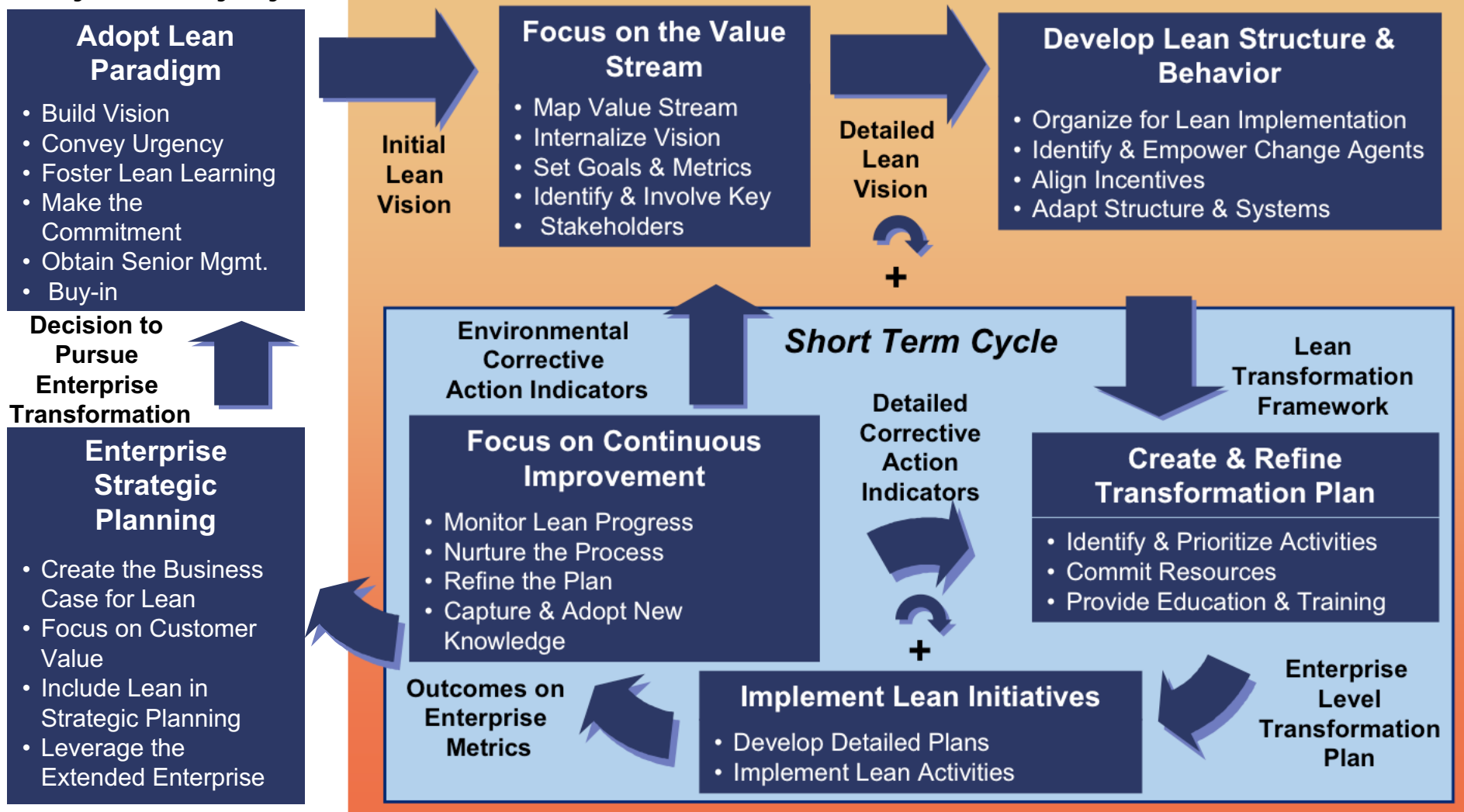
- **Lean Now Workshop (1-day)**
- **Lean Now Facilitator's training (1-week)**
- **Lean Academy™ (1-week)**
- **Lean Enterprise Value Seminars and Simulation (1/2-day to 2 day)**
- LESAT Facilitator's course (1-day)
- On-line Introduction to Lean Enterprise Concepts (3-hour)



Transition-To-Lean Roadmap

Entry/Re-entry Cycle

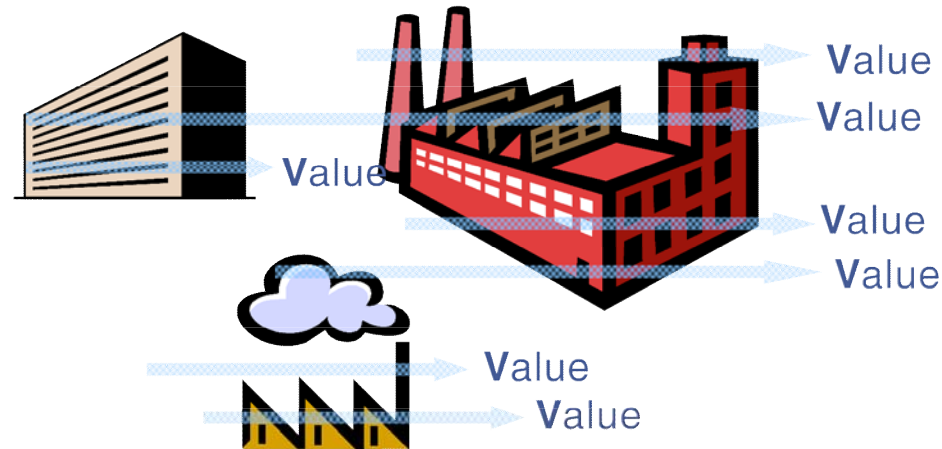
Long Term Cycle





EV SMA

Enterprise Value Stream Is...



A portrayal of the relationships of the enterprise with its external environment and the general ordering and integration of high-level internal enterprise processes



Product VSM and EVSMA

Traditional Value Stream Mapping

- Focuses on delivering value to the customer
- Addresses product lifecycle processes
- Addresses one program or line of business

Enterprise Value Stream Mapping and Analysis

- Focuses on delivering value to all stakeholders
- Addresses lifecycle, enabling, and leadership processes
- Addresses multiple organizations, multiple programs, or business units



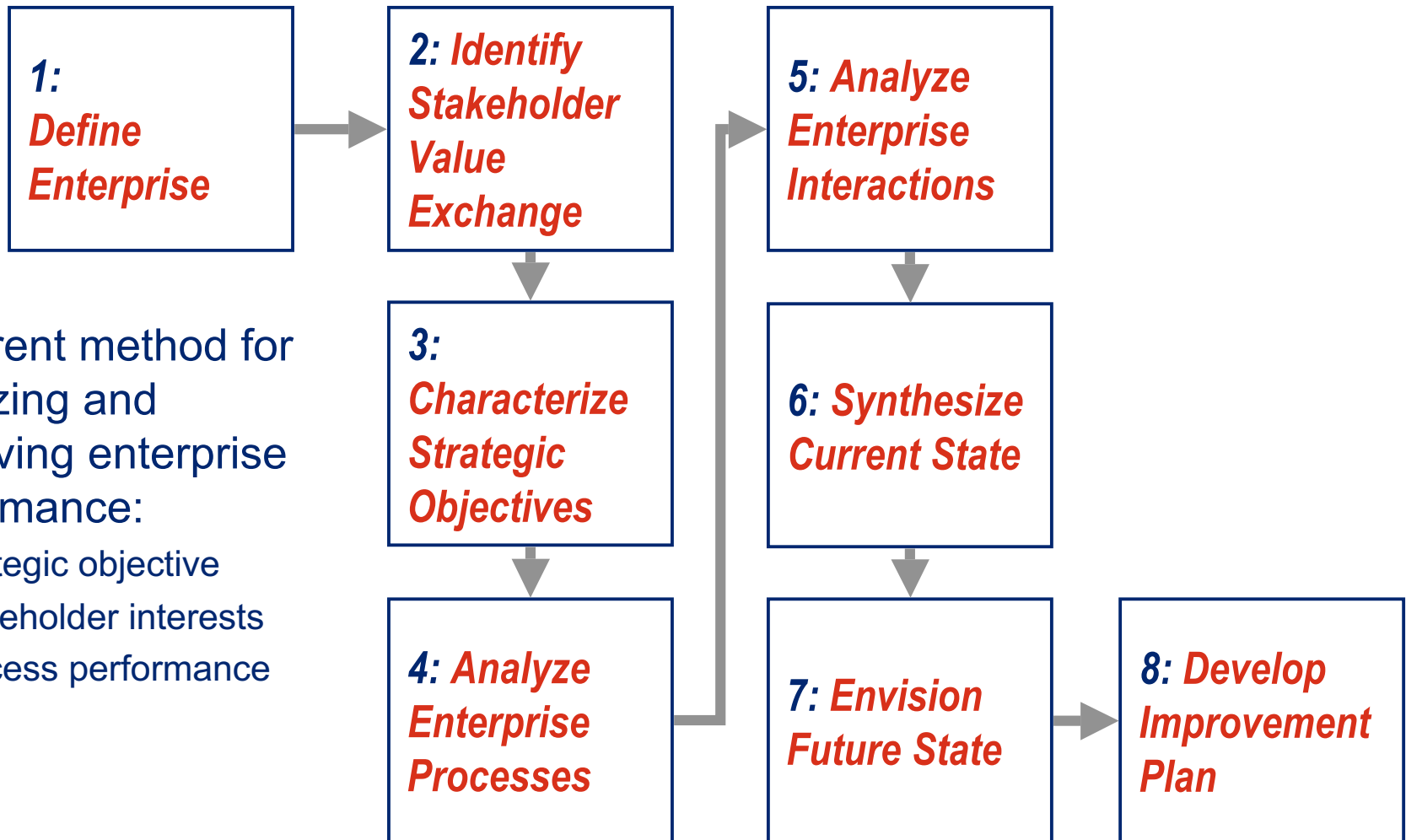
Goal and Resources Required

- Create a vision of a lean enterprise two to three years in the future which optimizes the enterprise value stream
- Executed by a small team including:
 - Enterprise leader as champion or sponsor
 - Team lead, one of the enterprise leader's direct reports
 - Facilitator, with background in lean and EVSMA method
 - Enterprise process owners on an ad hoc basis as needed to provide information

"EVSMA provided our management team with several insights about how our enterprise actually functions. It also provided a way to identify improvement activities that support our total enterprise strategic objectives and optimize functional integration in the value stream."

- Site Director

EV SMA Methodology



Coherent method for analyzing and improving enterprise performance:

- strategic objective
- stakeholder interests
- process performance



LESAT

Government LESAT



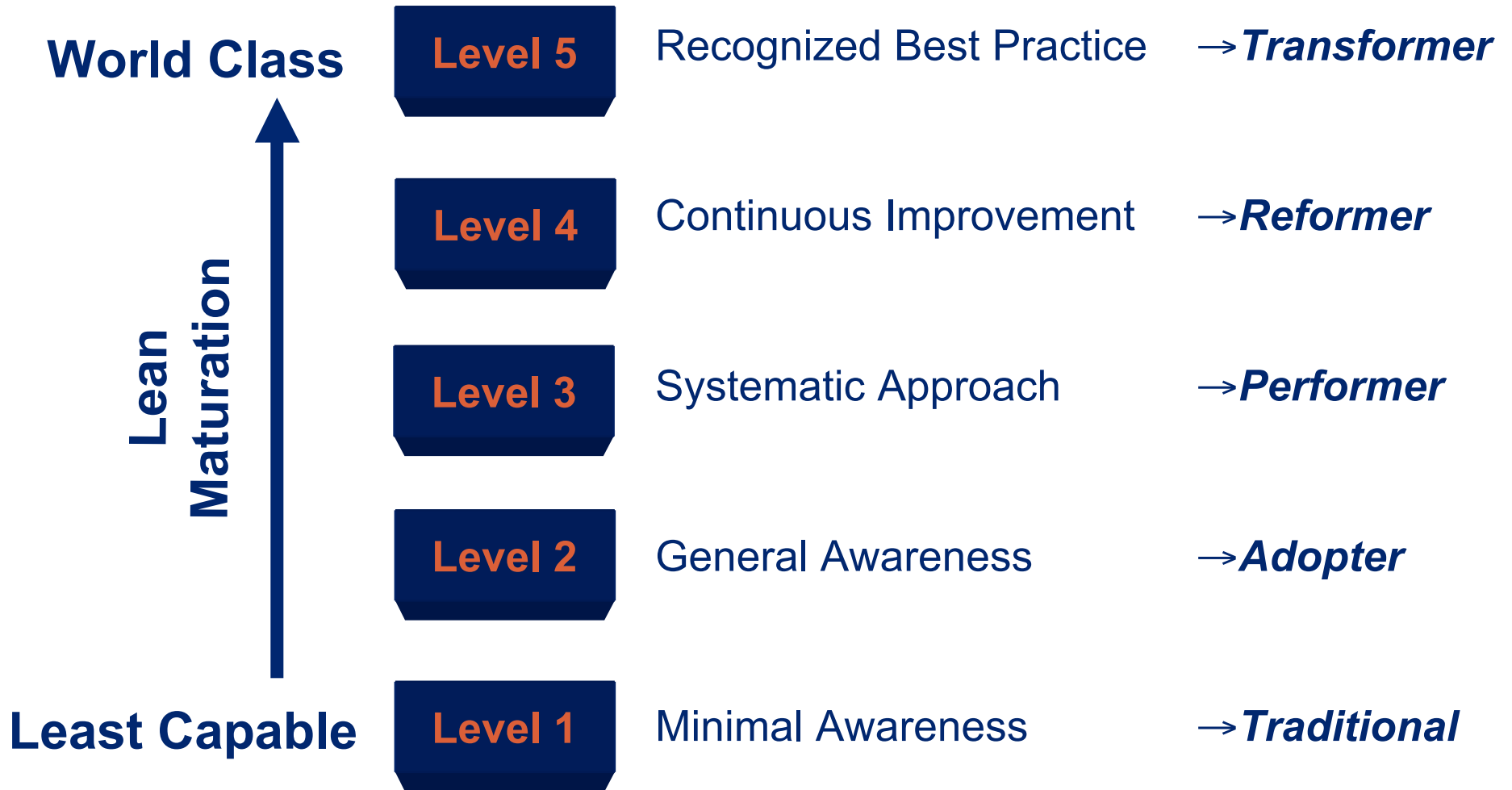
What Is LESAT?



- A tool for self-assessing the present state of “leanness” of an enterprise and its readiness to change
- Comprised of:
 - Capability maturity model for enterprise leadership, life cycle and enabling processes
 - Supporting materials: (Facilitator’s Guide, Glossary, etc.)



Maturity Level Definitions Simplified





Lean Now Training



Lean Now Workshop

- 1-day lean leadership training
 - Lean awareness for leadership and project teams (industry and government)
 - Focuses on Value Stream Mapping
 - Includes case study application of lean concepts
 - Provides introduction to enterprise-level lean and leading transformation
- Developed from the “best of the best” of industry and MIT!



- Taught over 10 times with over 350 people trained



Lean Now Facilitator's Course



- Piloted in September 2003 with 23 students at Ogden ALC
- 1-week training for new Air Force facilitators
 - Provides introduction of lean and quality tools
 - Includes simulation to apply learning
 - Includes “soft skills”: communication, team dynamics, roles and responsibilities, project management
- Developed from the “best of the best” of industry and MIT and reviewed by DAU, AF ACE, AFIT



Lean Academy™



Lean Academy

- Audience:
 - Undergraduate students and faculty working with LAI member organizations, particularly through member summer internship programs (also appropriate for co-op students and new hires)
- Objectives:
 - Provide students with lean training and a well scoped company mentored project during an internship employment experience
 - Provide faculty with case study/research opportunity
 - Provide companies with recommended students and prospective recruits trained in lean

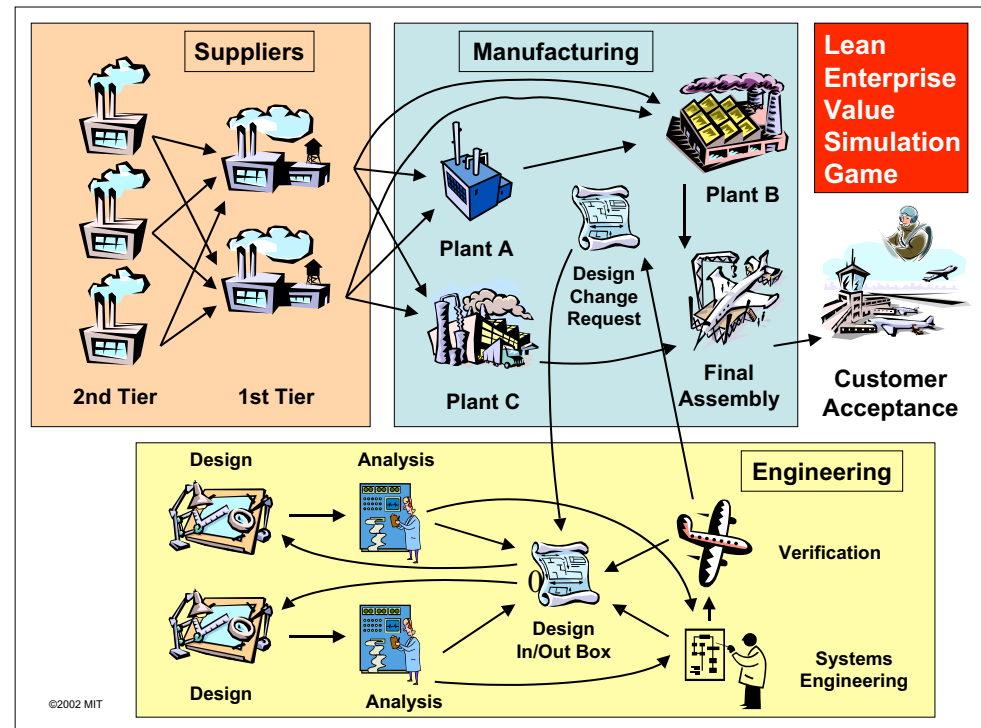




Lean Enterprise Value Seminars and Simulation

Lean Enterprise Value Simulation Game

- A simulation of a complex aerospace enterprise
- Philosophy draws heavily on LAI research and the recent book *Lean Enterprise Value*
- Content and cases based on LAI member experience
- Three modular simulations (manufacturing, product development, supplier network) can be used separately or combined to teach enterprise principles
- Integrated with lecture material to provide intellectual basis, tools, and experiential learning



Evolving development (to date):

Lean Enterprise Value short course
 Lean engineering training and improvement
 Lean/Six-Sigma expert training course
 Student/intern introduction to lean principles



Back Ups

Tool Development Process

**Integrate research
and consortium
knowledge**

Results and
experiences
converge

Develop

**Release tool to
the consortium
for “off the shelf”
use**

Significant
updates made

Test

Closely facilitated
by LAI research
staff and working
group members

- Alpha
 - Test methodology and approach
- Beta
 - Test usability and clarity
- Version 1.0
 - Consortium release



LEM



LEM Overarching Practices

Address People and Process

People Practices

- Promote lean leadership at all levels
- Relationships based on mutual trust and commitment
- Make decisions at lowest appropriate level
- Optimize capability and utilization of people
- Continuous focus on the customer
- Nurture a learning environment

Process Practices

- Assure seamless information flow
- Implement integrated product and process development (IPPD)
- Ensure process capability and maturation
- Maintain challenges of existing processes
- Identify and optimize enterprise flow
- Maintain stability in changing environment

Lean Enterprise Model



- Internet accessed database available at <http://web.mit.edu/lean> under “Products”
- Contains over 500 links to data sheets from LAI research and external sources
- Categorized by practice and metric



LESAT

Government LESAT



LESAT Capability Maturity Levels

Level 1

Some awareness of this practice; sporadic improvement activities may be underway in a few areas.

Level 2

General awareness; informal approach deployed in a few areas with varying degrees of effectiveness and sustainment.

Level 3

A systematic approach/methodology deployed in varying stages across most areas; facilitated with metrics; good sustainment.

Level 4

On-going refinement and continuous improvement across the enterprise; improvement gains are sustained.

Level 5

Exceptional, well-defined, innovative approach is fully deployed across the extended enterprise (across internal and external value streams); recognized as best practice.



LESAT: Where We Stand

- Majority of LAI industry members are using or are planning to use LESAT
- Government LESAT developed and currently in Alpha testing
- Exploratory work to address enterprise interfaces using LESAT and Government LESAT in a program context
- LESAT is creating a common framework for “Enterprise” thinking
- LESAT is providing a common language for Lean permeation throughout the enterprise
- Linking LESAT to business strategy prioritizes key areas for lean focus



EV SMA



Benefits of EVSMA

- Provides a cohesive method for diagnosing an enterprise in order to expose sources of waste and to identify barriers to value delivery
- Identifies process interfaces, disconnects and delays
- Identifies and prioritizes improvement opportunities that will benefit the entire enterprise



Product Development Value Stream Mapping

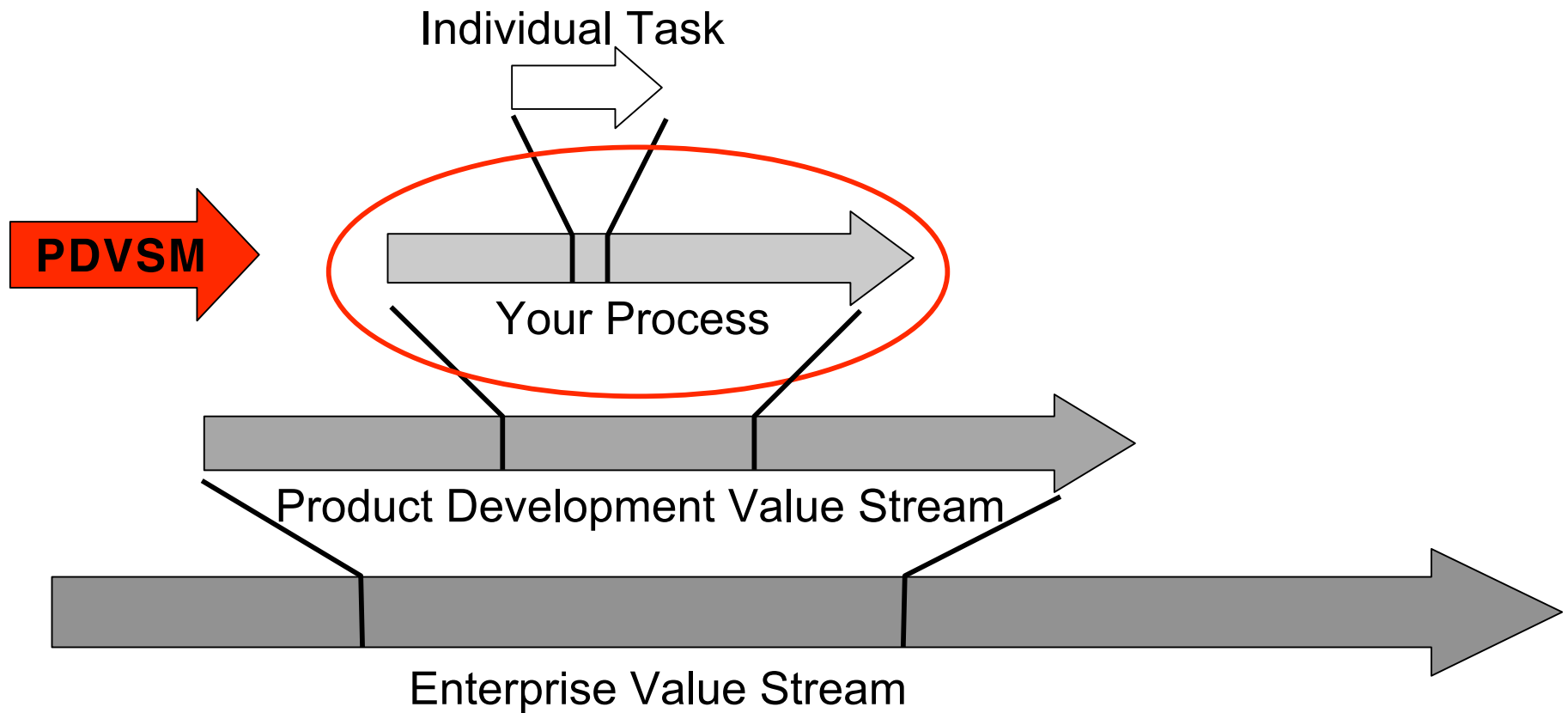


Practical Guide to PD Value Stream Mapping

- A “Rother and Shook” for Product Development
 - More details necessary for the complexities of PD
 - Details and background for lean experts
 - Practical advice for in-the-field use
- Repository of LAI knowledge
 - Four+ years of PD team experience
 - References and attributions
 - Not an academic product
- Member Best Practices
 - Suggested “cookbook”
 - Options and resources
 - Running examples and other aids



Focus: Door to Door PD Process





PDVSM Manual Outline

1. Introduction: Lean Engineering Process Improvement
2. Getting Started
3. Mapping the Current State Value Stream
4. Identifying and Eliminating Waste
5. Improving the Process
6. Striving for Perfection

Also Includes:

- On-going example
- Metrics and other aids
- Appendices
 - A. Methods and Effectiveness
 - B. Sample Data Collection Form
 - C. Second Example
 - D. PDVSM Checklist
- Notes and References



Supplier Networks Toolkit

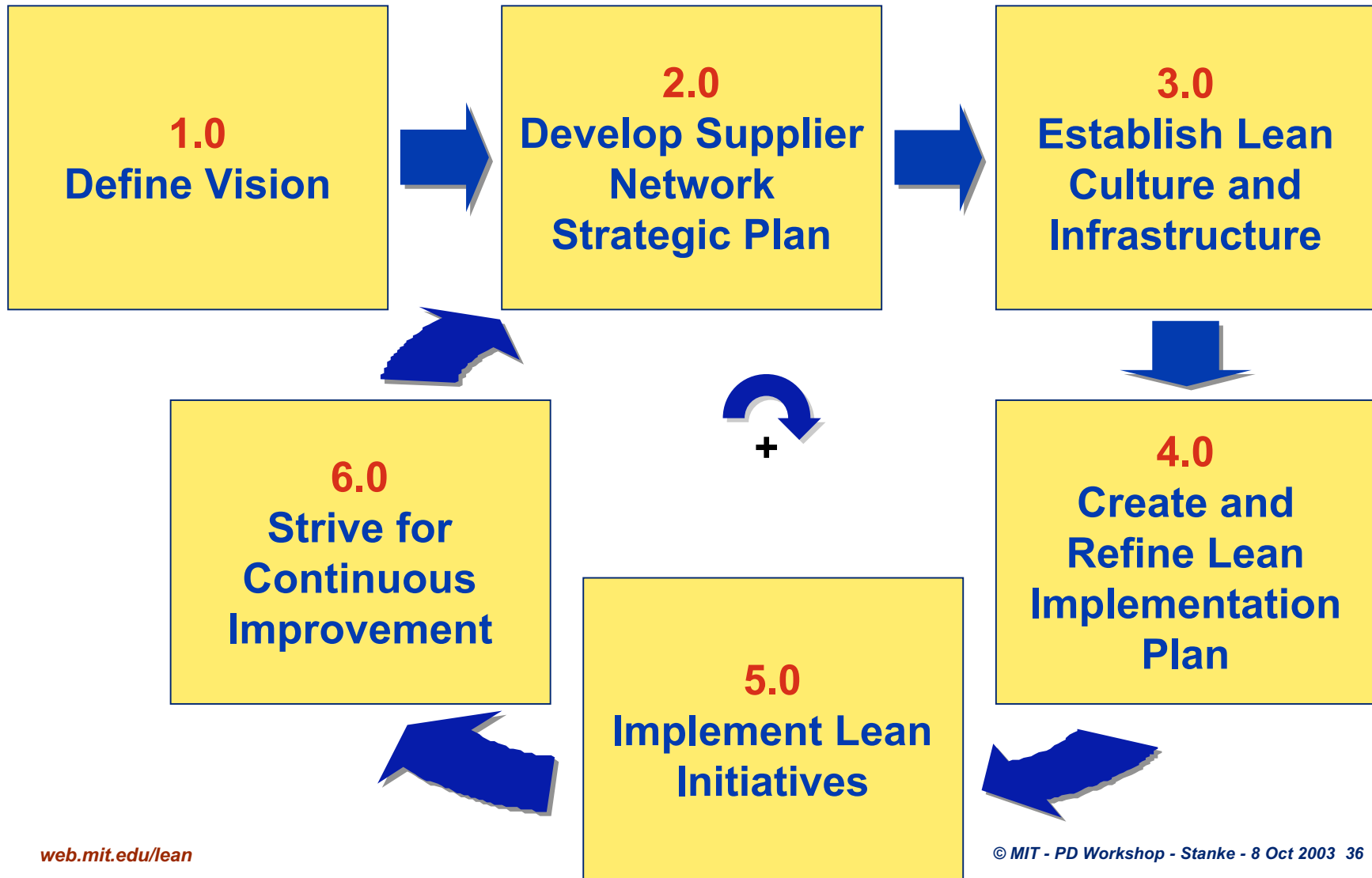


Supplier Networks Toolset

- Transformation Roadmap
 - “How-to” implementation guide defining major building blocks & specific action steps -- sequences & relationships
 - Maps out process template -- inputs, outputs, barriers, enablers, metrics, tools & methods, “how-to” discussions, and references
- Supplier Management Self-Assessment Tool
 - EXCEL-based self-scoring tool for gauging enterprise’s progress in evolving lean supply chain management practices
 - Links up with Lean Enterprise Self-Assessment Tool (LESAT)
 - Based on capability maturity model (5 capability levels)
 - Defines (8) overarching and (30) enabling practices
 - Provides diagnostic questions, lean indicators, and metrics
- Reference Guide
 - Basics of Lean and Six Sigma
 - Key concepts and principles for building lean supplier networks
 - Glossary



Transformation Roadmap: Major Building Blocks





Assessment Tool: Defines a Set of Major Lean Supply Chain Management Practices

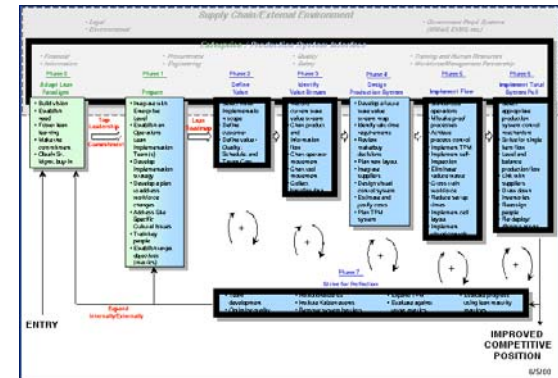
1. Design supplier network architecture
2. Develop complementary supplier capabilities
3. Create flow and pull throughout supplier network
4. Establish cooperative relationships and effective coordination mechanisms
5. Maximize flexibility and responsiveness
6. Pursue supplier-integrated product and process development
7. Integrate knowledge and foster innovation
8. Demonstrate continuous improvement



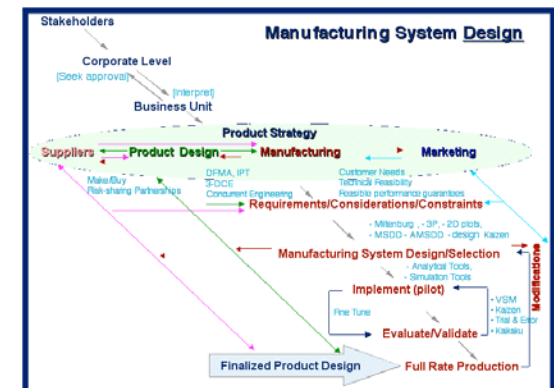
Manufacturing Systems Tools

Manufacturing Systems Tools

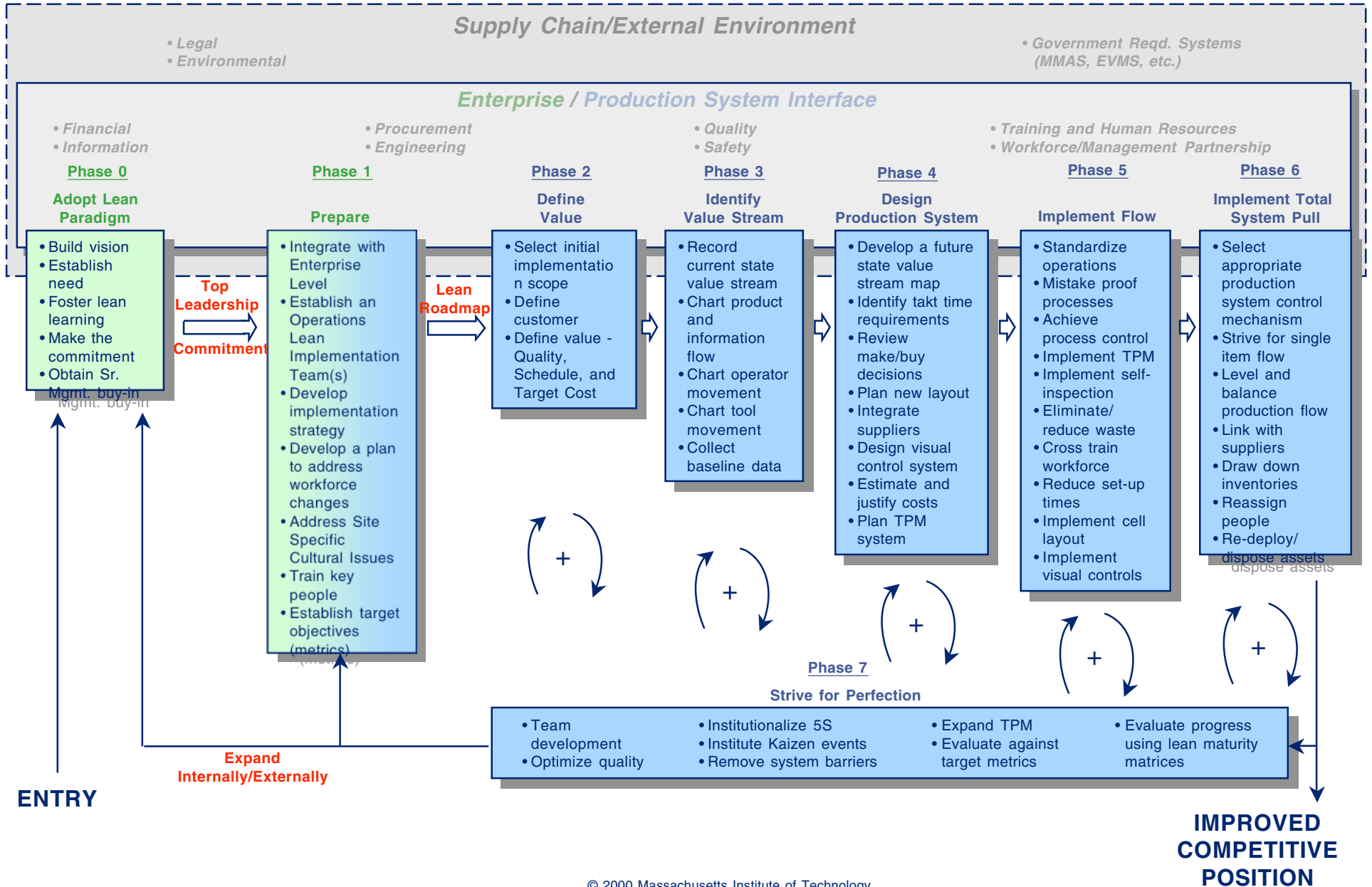
- Production Operations Transition-To-Lean Roadmap
 - Supports both a grass root and top-down transformation
 - Links with the Enterprise Transition-to-Lean
 - Manual explaining each phase part of tool



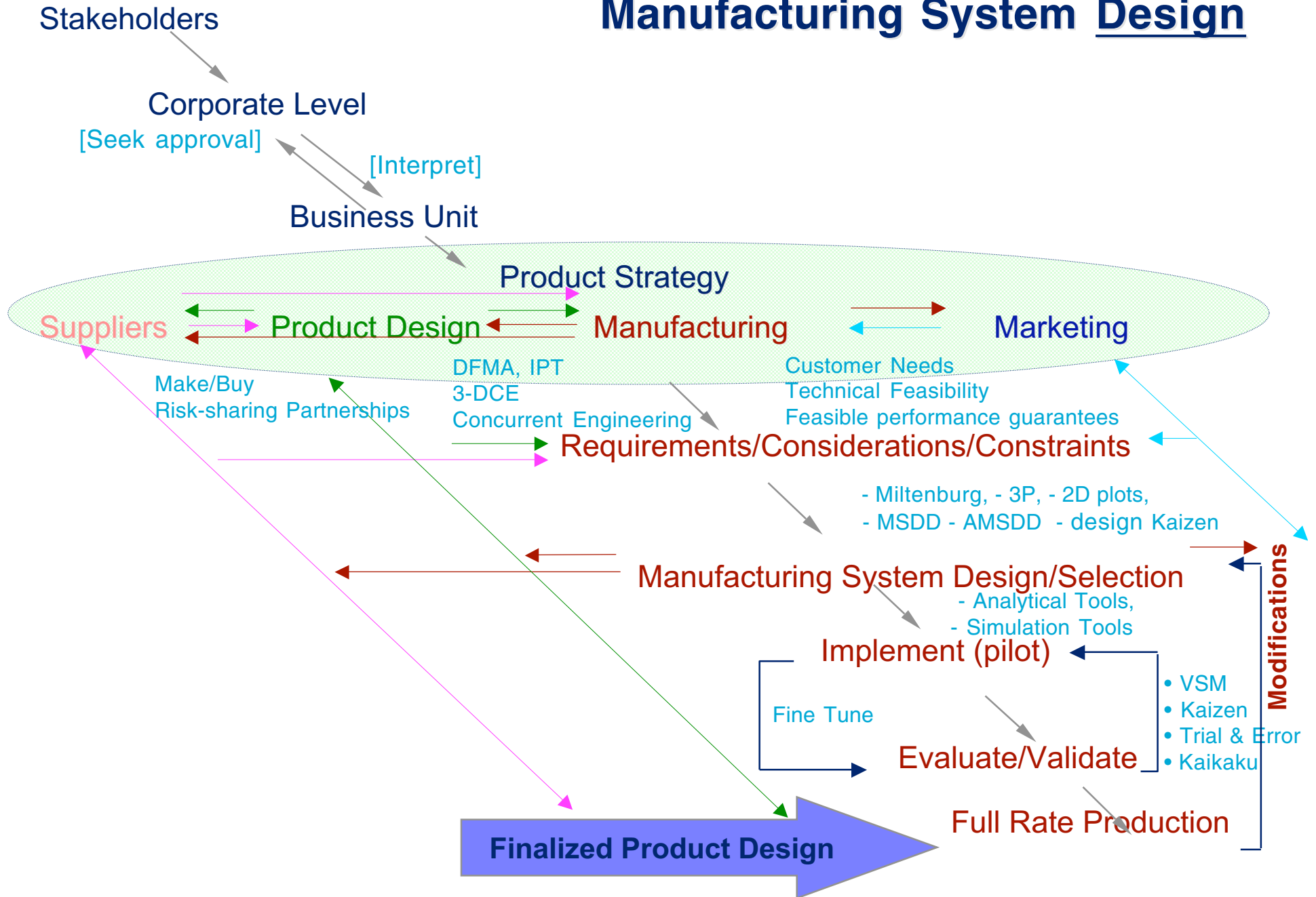
- Manufacturing System Design Framework
 - Addresses the holistic integration between strategy and functions
 - Addresses both the infrastructure and structure of manufacturing system design
 - Provides framework for manufacturing system design
 - Manual explaining framework and design tools part of tool



Production Operations Transition-To-Lean Roadmap



Manufacturing System Design





Lean Academy™



Lean Academy

- Progress:
 - Pilot during Summer 2003 at Rolls-Royce with 25 interns
 - January 2004 Lean Academy for Instructor train-the-trainer session; approx. 20 new instructors trained
 - Second generation curriculum in development
 - Planning for 6 Lean Academies for June 2004
- Participants:
 - Purdue University, Massachusetts Institute of Technology, Rolls-Royce, University of Southern California, Loyola Marymount, Arizona State University, St. Louis University, University of Missouri-Rolla, University of Tennessee, Embry-Riddle, Georgia Tech, Worcester Polytechnic Institute, Boeing, Lockheed Martin, Northrop Grumman, Rockwell Collins



On-Line Introduction to Lean Enterprise Concepts



Introduction to Lean Enterprise Concepts

A screenshot of a web browser window displaying the 'Introduction to Lean Enterprise Concepts' course page. The browser's address bar shows 'Course Window'. The page header includes the DAU logo and 'Continuous Learning Center' on the left, and 'Welcome to Introduction to Lean Enterprise Concepts' and '8 pages' on the right. The main content area is titled 'DAU and MIT Partnership' and contains text describing the course's development and a formal partnership agreement signed on May 22, 2002. A photograph shows Dr. Deborah Nightingale of MIT and Mr. Frank Anderson, President of the Defense Acquisition University, signing documents at a table. Below the photo is a caption identifying the individuals. A navigation bar at the bottom of the page includes links for 'MENU', 'NOTEPAD', 'BOOKMARKS', 'QUICK REFERENCES', '<BACK', and 'NEXT>'. A red instruction 'Select the Next button to continue.' is visible on the page.

DAU and MIT Partnership

This course has been jointly developed by the DAU and the Lean Aerospace Initiative to improve the professional knowledge of the DoD acquisition workforce, MIT students and any other organizations interested in Lean Enterprise Principles.

DAU and LAI signed a formal strategic partnership on May 22, 2002, designed to foster joint education and research efforts.

Select the Next button to continue.

Dr. Deborah Nightingale of MIT and Mr. Frank Anderson, President of the Defense Acquisition University.

MENU NOTEPAD BOOKMARKS QUICK REFERENCES <BACK NEXT>

- 3.5 hour on-line course
 - Results of strategic partnership with DAU
 - Available to everyone free of charge
 - Available through DAU Continuous Learning Center <http://clc.dau.mil>