LAI Products

October 8, 2003
LAI Knowledge Cycle

Achieving Total Enterprise Value → LAI Goals → Outcomes/Measures → Experience and Lessons Learned → LAI Consortium Implementation → Knowledge Deployment → Products/New Knowledge → Knowledge Collection → Research → Consortium Expertise → Data Site Visits Workshops etc. → Web Curriculum Workshops etc. → LAI Goals

LAI Community

Requirements

LAI Goals

Outcomes/Measures

Experience and Lessons Learned

LAI Community Implementation

Knowledge Deployment

Products/New Knowledge

Knowledge Collection

Research

Consortium Expertise

Data Site Visits Workshops etc.

Web Curriculum Workshops etc.

LAI Goals

Outcomes/Measures

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Web Curriculum Workshops etc.
Tool Development Process

Integrate research and consortium knowledge

Develop

Test

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

Closely facilitated by LAI research staff and working group members

Results and experiences converge

Significant updates made

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

Strategic Enterprise
- Government
  - LESAT
  - EVSMA

Tactical Facility/Function
- Supplier Networks Toolset
  - Mfg System Design Framework

Operational Team/Process
- PDVSM
  - Production Operations TTL

Version 1.0
Alpha Beta Version 1.0

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Motivation

• EVSMA is a tool developed by LAI to expand the successful technique of value stream analysis and mapping to enterprise application

• The tool provides a coherent method for analyzing and improving enterprise performance, integrating
  • Strategic objectives
  • Stakeholder interests
  • Process performance

• It also supports for the LAI enterprise Transition-To-Lean (TTL) Roadmap
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
Integrating Processes and the Enterprise Value Proposition

Processes And Value Propositions Of the Total Aerospace Enterprise Are Highly Interrelated

Enterprise Approach Is Key to Optimize Speed, Quality & Efficiency Of Delivery Of Value

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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
EVSMA Methodology

1. EVSMA Set-Up
2. Stakeholder Value Exchange
3. Strategic Objectives
4. Enterprise Processes
5. Enterprise Interactions
6. Enterprise Waste
7. Future State
8. Improvement Plan

Characterize the Current State

Lean Enterprise Self-Assessment Tool
Enterprise Interactions

Strategic Goals

Systematically and explicitly explore the enterprise interactions

Stakeholders

Processes

Life Cycle Processes
- Business Acquisition and Program Management
- Requirements Definition
- Product/Process Development
- Supply Chain Management
- Production
- Distribution and Support

Enabling Infrastructure Processes
- Human Resources
- Facilities and Services
- Environment, Health, and Safety

Enterprise Leadership Processes
- Strategic Planning
- Business Models
- Managing Business Growth
- Organizational Structure and Integration
- Transformation Management
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
LESAT
Government LESAT
What Is LESAT?

- A tool for self-assessing the present state of “leaniness” 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.)
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.


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Lean Maturation

**Maturity Level Definitions Simplified**

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal Awareness</td>
<td>General Awareness</td>
<td>Systematic Approach</td>
<td>Continuous Improvement</td>
<td>Recognized Best Practice</td>
</tr>
</tbody>
</table>

→ **Transformer**

→ **Reformer**

→ **Performer**

→ **Adopter**

→ **Traditional**

World Class

Least Capable
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
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
Transition-To-Lean
Transition-To-Lean Roadmap

**Entry/Re-entry Cycle**

- **Initial Lean Vision**
  - Adopt Lean Paradigm
    - Build Vision
    - Convey Urgency
    - Foster Lean Learning
    - Make the Commitment
    - Obtain Senior Mgmt.
    - Buy-in
  - Develop Lean Structure & Behavior
    - Organize for Lean Implementation
    - Identify & Empower Change Agents
    - Align Incentives
    - Adapt Structure & Systems

- **Focus on the Value Stream**
  - Map Value Stream
  - Internalize Vision
  - Set Goals & Metrics
  - Identify & Involve Key Stakeholders
  - Create & Refine Transformation Plan
    - Monitor Lean Progress
    - Nurture the Process
    - Refine the Plan
    - Capture & Adopt New Knowledge

- **Focus on Continuous Improvement**
  - Develop Lean Initiatives
    - Develop Detailed Plans
    - Implement Lean Activities

- **Environmental Corrective Action Indicators**
  - Detailed Corrective Action Indicators

- **Outcomes on Enterprise Metrics**
  - Implement Lean Initiatives
  - Develop Detailed Plans
  - Capture & Adopt New Knowledge

**Long Term Cycle**

- **Create & Refine Transformation Plan**
  - Identify & Prioritize Activities
  - Commit Resources
  - Provide Education & Training

- **Short Term Cycle**
  - Lean Transformation Framework
  - Develop Lean Structure & Behavior
    - Develop Detailed Plans
    - Implement Lean Activities

**Decision to Pursue Enterprise Transformation**

- **Enterprise Strategic Planning**
  - Create the Business Case for Lean
  - Focus on Customer Value
  - Include Lean in Strategic Planning
  - Leverage the Extended Enterprise
Product Development
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
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

1.0 Define Vision

2.0 Develop Supplier Network Strategic Plan

3.0 Establish Lean Culture and Infrastructure

4.0 Create and Refine Lean Implementation Plan

5.0 Implement Lean Initiatives

6.0 Strive for Continuous Improvement

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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
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

**Phase 0**
Adopt Lean Paradigm
- Build vision
- Establish need
- Foster lean learning
- Make the commitment
- Obtain Sr. Mgmt. buy-in

**Phase 1**
Prepare
- Integrate with Enterprise Level
- Establish an Operations Lean Implementation Team(s)
- Develop implementation strategy
- Develop a plan to address workforce changes
- Address Site Specific Cultural Issues
- Train key people
- Establish target objectives (metrics)

**Phase 2**
Define Value
- Select initial implementation scope
- Define customer
- Define value - Quality, Schedule, and Target Cost

**Phase 3**
Identify Value Stream
- Record current state value stream
- Chart product and information flow
- Chart operator movement
- Chart tool movement
- Collect baseline data

**Phase 4**
Design Production System
- Develop a future state value stream map
- Identify takt time requirements
- Review make/buy decisions
- Plan new layout
- Integrate suppliers
- Design visual control system
- Estimate and justify costs
- Plan TPM system

**Phase 5**
Implement Flow
- Standardize operations
- Mistake proof processes
- Achieve process control
- Implement TPM
- Implement self-inspection
- Eliminate/reduce waste
- Cross train workforce
- Reduce set-up times
- Implement cell layout
- Implement visual controls

**Phase 6**
Implement Total System Pull
- Select appropriate production system control mechanism
- Strive for single item flow
- Level and balance production flow
- Link with suppliers
- Draw down inventories
- Reassign people
- Re-deploy/dispose assets

**Phase 7**
Strive for Perfection
- Team development
- Optimize quality
- Institutionalize 5S
- Institute Kaizen events
- Remove system barriers
- Expand TPM
- Evaluate against target metrics
- Evaluate progress using lean maturity matrices

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