Lean Now Workshop

Presented By
LAI Lean Experts

November 5, 2003
Agenda – Morning
LAI Lean Now Workshop

0800  Welcome and Introductions
0815  NASCAR Video
0830  Fundamentals of Lean
0915  Break
0930  Lean Concepts and Tools
1030  Manzana Insurance Case
1150  Lunch Assignment
1200  Lunch
Agenda – Afternoon
LAI Lean Now Workshop

1300  Team Discussion - Lunch Exercise
1330  Lean Enterprise
1400  Big Picture
   • Lean Now Support Structure
   • Roles and Responsibilities
   • LAI Overview and Tools
1445  Break
1500  Leading Transformation
1530  Closing Comments
1600  Adjourn
Introductions – Ice Breaker
Introductions

• Name/location

• Position/background (current - be general)

• Lean expertise (1-5, 5 being high)

• Something about you that is unusual or not common knowledge
The “Burning Platform” - Value Creation

- Value stream focus
  - Create value
  - Eliminate waste
  - Adapt quickly to new challenges
- Expeditionary mindset and culture
- Innovative, adaptive and responsive
- Get it faster with fewer resources
Lean Enterprise Value: The Central Concept

Lean is a process of eliminating waste with the goal of creating value for enterprise stakeholders.

- *Lean Enterprise Value*, Murman et al
NASCAR Video
Lean Works Everywhere

- **Export licensing:**
  - 56 steps to 21 steps
  - 52 handoffs to 5 handoffs
  - Cycle time from 60 days to 30 days
  - 50% 1st pass yield to >90% 1st pass yield
  - Payroll:
    - Reduced non-value added steps by 50%
    - 15 forms to 1 form
    - Reduced signatures/approvals by 25%

- **Recruiting:**
  - Cycle time from 14 days to 48 hours
  - 50% reduction of paper resumes

- **Proposal:**
  - Cycle time from 30.6 days to 7 days

- **Program support:**
  - $3M savings

- **Interface management:**
  - Proposal, contract, billing, and collection steps
  - Generated $21M additional cash

- **Engineering order release:**
  - Cycle time from 76 to 4 days
  - Total queue time from 56 days to 60 minutes

- **Process definition:**
  - Work package completion cycle from 4 months to 3 weeks

- **Financial reporting:**
  - 13 weeks to 3 weeks

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Fundamentals of Lean
Lean was Born out of Necessity

August 15, 1945 -- end of war with Japan

- Toyota faced a daunting challenge: How to succeed against Western mass production auto giants poised to enter Japanese market?
- Kiichiro Toyoda to Taiichi Ohno: “Catch up with America in three years.”
- Ohno’s challenge: How to design a production system exploiting central weaknesses of mass production model

Japan’s dilemmas

- Small & fragmented market, depleted workforce, scarce natural resources, little capital
- Lean evolved as a coherent response to this challenge over a number of decades -- a dynamic process of learning and adaptation later labeled as “lean production” by Western observers
Use Less, Offer Greater Variety, Higher Quality, and More Affordable Products in Less Time

- Best Japanese auto companies developed a fundamentally different way of making things
- These companies changed the dynamics of international competition
- New goals in manufacturing systems -- combined benefits of craft and mass production
  - Improved quality
  - High productivity
  - Efficiency at low volumes
  - Production flexibility
  - Rapid, efficient development cycle
  - Product mix diversity
- Lean production contrasts with traditional mass production paradigm
- Systemic principles are transferable
Lean Thinking: Eliminating Waste with the Goal of Creating Value

- **Customer-focused:** Customer needs and expectations “pull” enterprise activities
- **Knowledge-driven:** Draws upon knowledge and innovation from everyone - workers, suppliers
- **Eliminating waste:** Stresses elimination, not just reduction, of all types of waste
- **Creating value:** Puts premium on “growing the pie”, not just reducing costs, to benefit all stakeholders
- **Dynamic and continuous:** Pursues on-going systemic as well as incremental improvement - both innovation and continual improvement
Lean Provides Positively-Reinforcing Concepts, Practices and Tools

- **Delivering just-in-time**: “Pull” based production
- **Striving for perfect quality**: Completely defect-free parts must flow to each subsequent process; quality designed-in, not based on inspection, mistake proofing
- **Flexibility and responsiveness**: Small processing sizes and quick set-up times; ability to respond to shifts in demand
- **Trust-based relationships**: Mutual commitments and obligations, internally and externally with suppliers
- **Continuous improvement (Kaizen)**: Continuous improvement through work standardization, productive maintenance, root cause analysis, and worker training and empowerment
Five Lean Fundamentals

• **Specify value:** Value is defined by customer in terms of specific products & services

• **Identify the value stream:** Map out all end-to-end linked actions, processes and functions necessary for transforming inputs to outputs to identify and eliminate waste

• **Make value flow continuously:** Having eliminated waste, make remaining value-creating steps “flow”

• **Let customers pull value:** Customer’s “pull” cascades all the way back to the lowest level supplier, enabling just-in-time production

• **Pursue perfection:** Pursue continuous process of improvement striving for perfection

## Lean Thinking is Linked to & Complements Other Systemic Change Initiatives

<table>
<thead>
<tr>
<th></th>
<th>Total Quality Management</th>
<th>Reengineering</th>
<th>Traditional Six Sigma</th>
<th>Lean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal</strong></td>
<td>Meet Customer Expectations</td>
<td>Breakthrough Solutions</td>
<td>Reduce Variation in all Enterprise Operations</td>
<td>Eliminate Waste to Create Value</td>
</tr>
<tr>
<td><strong>Focus</strong></td>
<td>Product Quality</td>
<td>Business Processes</td>
<td>All Sources of Product Variation</td>
<td>All Enterprise Processes &amp; People</td>
</tr>
<tr>
<td><strong>Scope</strong></td>
<td>Business Unit</td>
<td>Business Unit</td>
<td>Enterprise</td>
<td>Enterprise Value Stream</td>
</tr>
<tr>
<td><strong>Change Process</strong></td>
<td>Incremental</td>
<td>Radical Change</td>
<td>Process-specific; continuous</td>
<td>Evolutionary Systemic Change</td>
</tr>
<tr>
<td><strong>Business Model</strong></td>
<td>Improve Efficiency &amp; Shareholder Value</td>
<td>Increase Enterprise Performance &amp; Customer Value</td>
<td>Minimize Waste &amp; Increase Customer Satisfaction</td>
<td>Deliver Value to all Stakeholders</td>
</tr>
</tbody>
</table>
Only Understood Processes Can Be Improved

- Establish models and/or simulations to permit understanding
- Ensure process capability & maturation
- Maintain challenge of existing processes
Lean Concepts and Tools
Continuous Improvement Process

- Visualize
- Commit
- Prioritize
- Characterize
- Improve
- Achieve

Source: Raytheon
Continuous Improvement Process

Visualize: Imagine the Future
- Define case for action
- Visualize desired future state
- Establish goals
- Align with department goals

Commit: to Change
- Secure sponsorship
- Define scope

Prioritize: Determine Improvement Priorities
- Define current state
- Understand undesirable effects
- Determine root causes
- Develop alternative solutions
- Select solution, secure authority to proceed

Characterize: Define Existing Process/Leverage Points
- Collect additional data, if needed to design solution
- Characterize control systems affected by the desired improvement
- Validate project goals, schedule and cost

Achieve: Hold the Gains, Celebrate Achievements, Build for Tomorrow
- Test for meeting established goals
- Recognize achievements
- Capture lessons learned
- Plan for further improvements

Improve: Design & Implement Improvements
- Design the new solution
- Design the control system and metrics
- Plan implementation
- Plan and conduct necessary training
- Implement

Source: Raytheon

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Value Stream Mapping or VSM

- Tool used to visualize a process in order to “see” the value
- Provides a systematic method to improve a process by eliminating waste
- Creates “as is” and “to be” depictions of a process
  - Where you actually are, where you want to be, and how to get there

A good reference:
M. Rother and J. Shook, Learning to See, Lean Enterprise Institute, 1998
What is a Value Stream?

A value stream is...
• ALL the activities that create value
• Starts with raw materials or initial information
• Ends with the end-customer
• Involve several businesses
• Typical only a portion of the overall value stream is analyzed

Value Flows Across Functions
Logistics
Program Management
Engineering
Contracting
Production Management

Product or Service
Material and Information

The Hands of the Warfighter

Source: Lockheed Martin
What Flows Through a Value Stream?

In Manufacturing… materials are what flows

In Services… internal and external customer needs and information are what flows

Identify and Remove Impediments to Flow

Source: Lockheed Martin
Why is VSM a Useful Tool?

- Helps visualize interactions and flows
- Helps identify not only wastes but their sources as well
- Provides a common language for talking about a process
- Makes decision flows apparent
- Forms the basis of an implementation plan
- Shows the linkages between information and material flows
- Identifies the constraint(s) - any resource whose capacity is less than customer demand

Source: M. Rother and J. Shook, *Learning to See*, Lean Enterprise Institute, 1998
Basic Steps to VSM

1. Define the boundaries
2. Define the value
3. “Walk” the process
   • Identify tasks and flows of material and information between them
4. Gather data
   • Identify resources for each task and flow
5. Create the “Current State” map
6. Analyze current conditions
   • Identify value added and waste
   • Reconfigure process to eliminate waste and maximize value
7. Visualize “Ideal State”
8. Create the “Future State” map
9. Develop action plans and tracking
Tips for Creating a VSM

• Involve entire team
• Actually walk the process - follow the material and information through the process, starting at the beginning
• Use post-it notes and butcher paper
• Use symbols or icons that are meaningful to the process but common enough to be understood by all involved
Administrative Process Value Stream Map - Current State

Process Steps: 56
Handoffs: 52
Cycle Time: 60 days
1st Pass Yield: 50%

Source: Raytheon
Administrative Process Value Stream Map - Future State

Process Steps:
21
62% reduction

Handoffs:
5
90% reduction

Cycle Time:
30 days
50% reduction

1st Pass Yield:
100%
100% improvement

Source: Raytheon

web.mit.edu/lean
Keys for Success with VSM

Follow the Process

• Remember that value stream mapping & analysis is a process
• Avoid short-cuts…the steps are important!
• Remind yourself and your team to be disciplined

"We can skip this step"
"We already know how we want to make this"
"Let’s not worry about that for now"

Learn by Doing!

This Process Works!!
Value-Added Activities
- An activity that transforms or shapes material or information
- And the customer wants it
- And it’s done right the first time

Non Value-Added – Needed Activities
- Activities causing no value to be created but which cannot be eliminated based on current state of technology or thinking
- Required (regulatory, customer mandate, legal)
- Necessary (due to non-robustness of process, currently required; current risk tolerance)

Non Value-Added Activities
- Activities that consume resources but create no value in the eyes of the customer
- Pure waste
- If you can’t get rid of the activity, it turns to yellow
The Goal is to Eliminate Waste

Types of Waste
- Defects
- Over Production
- Transportation
- Movement
- Waiting
- Inventory
- Over Processing
## The Seven Types of Waste In Business Processes

<table>
<thead>
<tr>
<th>Type</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defects</td>
<td>incorrect data entry</td>
</tr>
<tr>
<td>Over Production</td>
<td>preparing extra reports, reports not acted upon, multiple copies in data storage</td>
</tr>
<tr>
<td>Transportation</td>
<td>extra steps in the process, distance traveled</td>
</tr>
<tr>
<td>Movement</td>
<td>extra steps, extra data entry</td>
</tr>
<tr>
<td>Waiting</td>
<td>processing monthly, not as the work comes in (i.e. closings)</td>
</tr>
<tr>
<td>Inventory</td>
<td>transactions not processed</td>
</tr>
<tr>
<td>Over Processing</td>
<td>sign-offs</td>
</tr>
</tbody>
</table>

Source: Raytheon
What is Cycle Time?

- Cycle time is the time required to execute activities in a process
- This could be:
  - A single process
  - A single task or activity
  - A group of tasks or activities
  - Customer order to customer delivery
- Cycle time includes actual processing time, as well as any waiting time (in calendar days)

**Dynamic Cycle Time (Little’s Law)**

\[
\text{Cycle Time} = \frac{\text{work in process (WIP)}}{\text{throughput rate}}
\]
What Makes Cycle Time High?

Product flow variability

Complexity of processes

Inventory or work in progress (WIP)

Source: Raytheon
Time Value Charts

Cycle Time

Task to In Box

First Task

In Process

Work Completed

In Box Wait Time

In the Mail
Components of Cycle Time
- An Example -

Total actual cycle time: 43 days

Processing Time:
- Value added processing: 3 days
- Non-value added processing: 9 days

Wait Time:
- For processing: 31 days

The big cycle time savings comes from the reduction of time product spends waiting in front of these operations.

Source: Raytheon
Takt Time - Measure of Customer Demand

Takt Time is...

- from the German word for meter which establishes the pace or beat
- a reference number that provides a drum beat for the process

\[
\text{Takt Time} = \frac{\text{available time}}{\text{customer demand rate}}
\]

Cycle Time

Takt Time

Takt Time
Level Loading Work

Incoming Order Requests

<table>
<thead>
<tr>
<th></th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>5</td>
<td>4</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Tuesday</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Wednesday</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Thursday</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Friday</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Average Order Requests Per Day**

- Week 1: $\frac{10}{5} = 2$ per day
- Week 2: $\frac{8}{5} = 1.6$ per day
- Week 3: $\frac{12}{5} = 2.4$ per day
- Week 4: $\frac{10}{5} = 2$ per day

Level Load: 2 per day
Standard Work

- Best process currently known, understood, and used today

- Tomorrow it should be better based on continuous improvement
  - Standard work must be revised to incorporate improvements
Case Study – Manzana Insurance
Observations Discussion

- Group discussion (30 minutes)
- Each group identify possible reasons for Manzana’s difficulties in reducing turn-around times
- Consider possible solutions based on lean tools discussed this morning
- Group Report Out
Process Discussion

Some Reasons for long turnaround time:

• Varying priorities
• Work load distribution
• Poor scheduling
• Process variation
• Waste
Discussion - Takt Time

Is one-day turnaround (as promised by competitor), even feasible at Fruitvale Branch?

- Takt Time calculations
  - 40 requests per day (RUNs, RERUNs, RAINs, RAPs)
  - 7.5 hr/day X 60 minutes/hr = 450 available minutes per day
  - Takt Time (T/T) = available time/requests
  - T/T = 450/40 = 11.25 minutes per request

T/T = 11.25 minutes

Source: Boeing
Discussion - Process Capability

“As-Is” Operations Flow (Exhibit 2)

- **Distribution clerks (4)**
  - Requests
  - 45.6 minutes*

- **Underwriting Team 1 (1 UW/1 TA)**

- **Underwriting Team 2 (1 UW/1 TA)**

- **Underwriting Team 3 (1 UW/1 TA)**
  - 31.9 minutes*

- **Raters (8)**
  - RAPS
  - 73.5 minutes*

- **Agents**
  - 85% Lost
  - 15% RUNS

- **Policy writers (5)**
  - 54.8 minutes*

*Average Standard Turnaround Time (Exhibit 4)

(x) = Headcount

Source: Boeing
Discussion - Standard Work Sheet

"As-Is" Standard Work Sheet

- **Distribution**: 11.4 min, 45.6 min/4
- **Underwriting**: 10.6 min, 31.9 min/3
- **Rating**: 9.2 min, 73.5 min/8
- **Policy Writing**: 11.0 min, 54.8 min/5

**T/T = 11.25 min**

Source: Boeing
Suggested Changes

What changes would need to be incorporated to accomplish one-day turnaround time?

- Process redesign “Lean Flow” (perform to takt)
- Utilize true FIFO (no need to schedule due dates)
- Utilize RERUNs to level-load demand if necessary
- Distribute underwriting work evenly by abolishing dedicated teams (balance line)
- Use standard work to reduce process time variations
- Other?

Source: Boeing
Transition to New Process

How could the transition to the new process be accomplished?

- Leadership
- Communication
- Managing the cut-over to the new process
  - Starting at the end of the process
  - Phased approach to minimize disruption
  - Managing the backlog

Source: Boeing
Lunch Exercise
# 5 and 5

## 5 Opportunities
1. 
2. 
3. 
4. 
5. 

## 5 Obstacles
1. 
2. 
3. 
4. 
5. 

## Monuments
Agenda – Afternoon  
LAI Lean Now Workshop

1300  Team Discussion - Lunch Exercise
1330  Lean Enterprise
1400  Big Picture
   • Lean Now Support Structure
   • Roles and Responsibilities
   • LAI Overview and Tools
1445  Break
1500  Leading Transformation
1530  Closing Comments
1600  Adjourn
Team Discussions - Lunch Exercise

Goal: Identify 5 and 5 for the team
Developing an Enterprise View
“The Lean Enterprise”
Enterprise Defined

“One or more organizations having related activities, unified operation, and a common business purpose”

Source: Blacks Law Dictionary, 1999
Program Value Stream
Multi-Program Value Stream
National and International Value Stream

INTERNATIONAL

US
Identify Three Levels of Enterprises

Program

Multi-Program

National or International

F/A-22

Boeing, USAF, Lockheed Martin

Primes, Suppliers, Government
JSF Example of a Program Enterprise

Centralized Control

Decentralized Execution

Status at a Glance Metrics

Rapid Decision Making

Flexible Repositioning

World Class Team

supply chain management

UK Ownership

BAE SYSTEMS

NJ ACS

LM Aero

LMIS

JSFPO

Major Critical Suppliers

Vehicle Systems

Mission Systems

Support

Airframe

Training

World Class Team

Air Force Acquisition Enterprise

DAE

AFAE

AF

AFMC

Staff

Major/Selected Program Management

Other Program Management

Acquisition Policy Implementation Support, and Processes

Product/Air Logistics Center

Majors/Selected Program Management

Technical/Logistics/Contracts Support

Lab Support

Test Support

PEOs

PMs

PMs

Acq. Staff

Labs

Test Wings

Test Centers

“Any group or individual who can affect or is affected by the achievements of the organization’s objective”

Source: Freeman, Strategic Management: A Stakeholder Perspective, Pittman, 1984
Define Enterprise in a Lean Context

“A lean enterprise is an integrated entity that efficiently creates value for its multiple stakeholders by employing lean principles and practices.”

Source: Murman et al., Lean Enterprise Value, Palgrave, 2002
Identify the Focus of Lean Enterprises

- Waste minimization
- Responsiveness to change
- Right thing at right place, and in right quantity
- Effective relationships within the value stream
- Continuous improvement
- Quality from the beginning
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
Identify Principles Applicable to Lean Enterprises

• Create lean value by doing the job right and by doing the right job.
• Deliver value only after identifying stakeholder value and constructing robust value propositions.
• Fully realize lean value only by adopting an enterprise perspective.
• Address the interdependencies across enterprise levels to increase lean value.
• People, not just process, effectuate lean value.
Lean Thinking Focus on Enterprise, Process, Lifecycle

- Enterprise perspective
- Process focus
- Functional integration
- Lifecycle orientation
Big Picture
Leverage and Institutionalize the Findings

Intent for Each Program (facilitated by LAI SMEs)
- Determine “current reality”
- Compare to LEM practices
- ID Gaps & Set Req’d Outcomes
- Gap Closure Plan
- Implement
- Show Results

F/A-22 (Test and Evaluation)
Lead LAI SME - LM
LAI SME Coaching Team
- Boeing
- AF SME

F-16 (Contract /Closeout)
Lead LAI SME - LM
LAI SME Coaching Team
- AF SME
- DCMA
- TBD (Spiral 2)

Global Hawk (Alpha Contracting)
Lead LAI SME - NG
LAI SME Coaching Team
- Raytheon
- AF SME

LAI ExBd
How to institutionalize the key results?

Project Coordination Network

- Spiral 4
- Spiral 3
- Spiral 2
- Spiral 1
The LAI Lean Experts
... As of Nov 02

- Spiral 1 to focus on three projects/processes
- Four Lean Experts from industry on board
  - Boeing
  - Lockheed Martin
  - Northrop-Grumman
  - Raytheon
- Each Lean Expert is an experienced expert in transition and lean
- Committed to one year assignment with LAI Lean Now Change agent, mentor and trainer
- AF committed to providing four Lean Expert candidates
- Other LAI member companies stand ready to help
Initial Engagement Plan Based on F/A-22 Prototype

LAI Lean Experts Selected

Candidate Process/Programs Selected

AF Lean Experts Selected

Team Workshops

VSM Event

Progress Review

- Pre Workshop Event(s)
- AF Lean Expert Training/Certification
- Communication – reviews/status
- Final report out
  - Results
  - Benefits
  - Sustaining The Gain
- ID next project(s) for continuing improvement
Roles and Responsibilities
LAI Lean Experts

- Coach/Sensei
- Facilitate
- Train/Certify
- Mentor
- Lean knowledge experts
- Feedback
  - To Air Force
  - To LAI
- Network across projects (Support system)
- Communicate
- Follow the process
- Establish certification criteria

Long Term Commitment to Lean Transformation
Roles and Responsibilities
Air Force Lean Experts

- Become a Coach/Sensei
- Facilitate
- Become trained and certified
- Mentor projects as needed
- Become a lean knowledge expert
- Provide feedback to Air Force
  - To LAI
- Network across projects (support system)
- Train next wave of AF Lean Experts
- Become a change agent
- Communicate
- Follow the process

Long Term Commitment to Lean Transformation
Air Force Prototype Team Lead

- Be a collaborative leader
- Communicate
  - Progress
  - Metrics
- RAA (Responsibility, Authority, Accountability)
- Assign and follow-up on action items
- Manage scope
- Be a team member (see other roles)
- Rely on Lean Experts for guidance
Prototype Team Members

- Plan and manage project
- Supply process expertise
- Collect process data
- Generate/supply improvement ideas
- Advocate change
- Be a team player
- Follow through with implementation
- Learn
- Become lean advocates
- Communicate
- Keep smiling and have fun!
LAI Overview
Lean Aerospace Initiative Consortium

- Airframe, engine, avionics, missile and space companies
- Air Force agencies and System Program Offices (C-17, F-22, JSF, Training)
- NASA, Army, Navy, NRO
- Pentagon - OSD, AF HQ
- International Association of Machinists
- MIT
The LAI Community

Avionics/Missiles
BAE Systems North America
Northrop Grumman ESSS
Raytheon Systems Co.
Raytheon Systems and Electronics Sector
Rockwell Collins, Inc.
Textron Systems Division

Space
Boeing Space & Communications
GenCorp Aerojet
Lockheed Martin Space & Strategic Missiles
Northrop Grumman ESSS Space Sector
TRW Space and Electronics

Airframe
Boeing Military Aircraft & Missiles
Boeing Commercial Airplane Group
Boeing Phantom Works
Lockheed Martin Aeronautical Systems
Northrop Grumman ISS
Raytheon Aircraft Co.
Sikorsky

MIT
Center for Technology, Policy, and Industrial Development
School of Engineering:
Aerospace
Mechanical
Sloan School of Management

Other Participants
IAM
AIA
DAU
IDA
International Collaborations:
Linköping University
Warwick, Bath, Cranfield
Nottingham Universities

Propulsion/Systems
Rolls Royce (North America)
Pratt & Whitney
Hamilton Sundstrand
Curtiss-Wright Flight Systems
Harris Government Comm.

US Air Force
SAF/AQ
Aeronautical Systems Center
Air Force Research Laboratory
(Materials and Manufacturing Directorate)
Space and Missile Center
SPOs: JSF, F-22, C-17, Training (JPATS)

Other Government
DCMA
NASA
NAVAIR
AMCOM
OUSD(AT&L)
NRO
LAI Accelerates Transformation to Lean

Industry letter

“In effect, the LAI is responsible for taking years off our changeover from traditional to lean practices…”
Enterprise Value Phase Vision & Mission

**Vision:** U.S. aerospace enterprises reliably and efficiently creating value and rapidly adapting to change

**Mission:** Research, develop and promulgate practices, tools and knowledge to enable and accelerate the envisioned transformation of the greater US aerospace enterprise through people and processes
Key Stakeholder Value Expectations

Gen Lester Lyles, Commander, AFMC and LAI Co-Chair
- Get the word out; create and teach lean curriculum across the country
- “Kick it up a notch!”

Mrs. Darleen Druyun, Principal Deputy Assistant Secretary, SAF/AQ and LAI Co-Chair
- Lean promises and can deliver big improvements in productivity and efficiency
- Expand beyond the factory floor and into the rest of the organization, where the big costs are
- Lean must be driven into the supplier base
- Support Acquisition Center of Excellence
# Enterprise Value Phase Goals

**Overarching Goal:** Accelerate the lean enterprise transformation of the U.S. aerospace enterprise

**Overarching Metric:** Meeting LAI stakeholders’ expectations

| **Goal 1:** | Support the ongoing lean transformation of industry |
| **Goal 2:** | Enable lean, value-creating supplier base |
| **Goal 3:** | Support lean transformation of the government |
| **Goal 4:** | Educate and train stakeholders in value-creating lean principles and practices |
| **Goal 5:** | Enhance the effectiveness of the national workforce |
| **Goal 6:** | Support member implementation efforts by sustaining tools and knowledge base and by organizing outreach events |
Lean Aerospace Journey And LAI Products

Lean Enterprise

Lean Factory

Lean Auto Factory

Toyota Production System

LAI Phase I 1993

LAI Phase II 1996

LAI Phase III 1999

LAI EV Phase 2002

Lean Enterprise Model

Transition to Lean Roadmaps (TTL)

Lean Enterprise Self Assessment Tool (LESAT)

LAI Book

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Lean Enterprise Toolset

How do I transform my enterprise to lean?

TTL Roadmap

LEM Principles & Practices

LESAT

How do I assess my progress?

What are lean principles and practices?

Assessment

Lessons Learned

Best Practices
**Transition-To-Lean Roadmap**

**Entry/Re-entry Cycle**
- Adopt Lean Paradigm
  - Build Vision
  - Convey Urgency
  - Foster Lean Learning
  - Make the Commitment
  - Obtain Senior Mgmt. Buy-in
- Decision to Pursue Enterprise Transformation
- Initial Lean Vision

**Long Term Cycle**
- Focus on the Value Stream
  - Map Value Stream
  - Internalize Vision
  - Set Goals & Metrics
  - Identify & Involve Key Stakeholders
- Detailed Lean Vision
- Develop Lean Structure & Behavior
  - Organize for Lean Implementation
  - Identify & Empower Change Agents
  - Align Incentives
  - Adapt Structure & Systems

**Short Term Cycle**
- Focus on Continuous Improvement
  - Monitor Lean Progress
  - Nurture the Process
  - Refine the Plan
  - Capture & Adopt New Knowledge
- Detailed Corrective Action Indicators
- Create & Refine Transformation Plan
  - Identify & Prioritize Activities
  - Commit Resources
  - Provide Education & Training
- Implement Lean Initiatives
  - Develop Detailed Plans
  - Implement Lean Activities
- Outcomes on Enterprise Metrics
- Lean Transformation Framework

**Enterprise Strategic Planning**
web.mit.edu/lean
Evidence of Lean Potential in An Enterprise

- F-16 maintained sales price and decreased order-to-delivery time by up to 42% while production rate decreased 75%
- C-17 unit priced decreased from $260M to $178M for final 80 aircraft of 120 aircraft buy
- Northrop Grumman ISS lean enterprise implementation reduced throughput times for major systems by 21 to 42%
- F/A18-E/F EMD completed on time, within budget (without rebaseline) while meeting or exceeding performance requirements
- Raytheon realized $300M FY 2000 bottom line benefits from its enterprise wide Six Sigma program
Leading Transformation
Continuous Improvement Process

- Achieve
- Improve
- Characterize
- Prioritize
- Commit
- Visualize

Source: Raytheon
Things We Hide Behind . . .

BARRIERS:

- NIH
- Politics
- Resistance to Change
- Mixed Signals
- Lack of Trust
- Skepticism
- Lack of Commitment
- Inconsistent Direction

Source: Raytheon
Barriers to Improvement

- Concepts
- Theories
- Philosophies

<table>
<thead>
<tr>
<th>NIH</th>
<th>Politics</th>
<th>Resistance to Change</th>
<th>Mixed Signals</th>
<th>Lack of Trust</th>
<th>Skepticism</th>
<th>Lack of Commitment</th>
<th>Inconsistent Direction</th>
</tr>
</thead>
</table>

Source: Raytheon
Breakthrough!

- Concepts
- Theories
- Philosophies

Knowledge

Understanding

Empowerment

Skills

Leadership

Barriers

Roadblocks

Source: Raytheon
What Makes People Want to Change?

- Pain (burning platform)
- Despair (over long period of time)
- Discovery that change is possible
Which Organization is Likely to Lead the Way to the 21st Century?

Traditional
- Multiple reviews
- “Institutionalizes” waste
- Hierarchical approval
- Multiple processes & systems
- Sub-optimization
- “Push”

Lean
- Minimal meetings
- Focuses on “eliminating waste”
- Accountability
- Common processes & systems
- Business optimization
- “Pull”

Lean Is a Journey NOT an Event

Source: Northrop Grumman
What is Meaningful Change?

Unfreezing
Resistance to change
Education and awareness

Refreezing
Application of reinforcement
Feedback – Measurements
Rewards

Movement
Change agents
Change in behavior
Empowerment

When the desired state is better than the existing state.

Meaningful change is the disruption of the status quo for a better state.
Elements of Success

All the elements to succeed are in place.....

- High and visible commitment
- Advanced information and focus
- Total involvement
- Process owners are the change agents
- Honest evaluations
- A good diagnosis (VSMs)
- Linked to mission and goals
- Professionalism

...... you are ready to succeed!

Take action, Lean Now!

Source: Northrop Grumman
Templates
# Insert Prototype Name

<table>
<thead>
<tr>
<th><strong>Prototype Description:</strong></th>
<th><strong>Start Date:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>One or two sentences that describe the team’s task.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Preliminary Objectives:</strong></th>
<th><strong>Team Leader:</strong> Person responsible for pre &amp; post work follow up.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The objectives are the measurable outcomes that the sponsor desires from the prototype. Usually two or three measurable objectives along the lines of reducing cycle time, handoffs, approvals, defects and/or costs are included.</td>
<td><strong>Co-Leader:</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Value:</strong></th>
<th><strong>Team Members:</strong> People that need to participate on the team</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Value to the end customer is...?</td>
<td></td>
</tr>
<tr>
<td>The portion of the value-added by this prototype area is ...?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Process Information:</strong></th>
<th><strong>Process Owner:</strong> Person(s) who owns the process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Should include:</td>
<td></td>
</tr>
<tr>
<td>• Prototype boundaries (where does this process begin &amp; end)</td>
<td></td>
</tr>
<tr>
<td>• Any commandments or monuments</td>
<td></td>
</tr>
<tr>
<td>• Listing of available process data</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>LAI Lean Expert:</strong> Person who will facilitate the event</th>
<th><strong>Case For Action:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>One or two sentences that describe the problem the team is addressing and answers the “Why This Prototype, Why Now?” question</td>
</tr>
</tbody>
</table>
Contract for Change

We, the Leadership, pledge to support the Lean transformation through the following actions:

- We will write and communicate a vision and strategy for the area which makes the Lean Transformation.
- We shall appoint a “Core Team” which will figure out the specific approach to Lean for this area.
- We shall participate in the Value Stream Analysis by attending the daily or weekly outbriefs, consensing on major opportunities and improvement approaches and finally signing the contract for change.
- We shall lead the improvement process through our work on the Steering committee and shall assign appropriate resources to ensure that the transformation is successful.

__________________________  ____________________________  __________________________
__________________________  ____________________________  __________________________
__________________________  ____________________________  __________________________
Contract for Participation

• I will focus my energy for the next 3 months on doing a complete and thorough analysis to help determine the path to the future
• I will work cross-functionally and keep an open mind
• I will solicit participation from other key stakeholders and do a good job of communicating the intent to all who input to the process
• I will seek to rely on “facts” to guide the decisions that the team recommends

________________________  ____________________  __________________
________________________  ____________________  __________________
________________________  ____________________  __________________
________________________  ____________________  __________________