Lean Enterprise Transformation: Ogden ALC Case Study

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Overview

• Developing a strategy for enterprise transformation
• Building capability for managing change
• Learning and results
Background

• Ogden ALC began lean journey in 2002 by Benchmarking, Balanced Scorecard and Activity Based Costing efforts
  – Initial lean efforts focused on the factory floor
  – Facilitation provided by consultants

• Transformation Office opened on site Aug 2002
  – Develop in-house capability to facilitate change

• In 2003 lean factory projects expanded and accelerated
  – Projects above the shop floor begun

• Strategic focus was missing
Lean Aerospace Initiative – Lean Now

• Lean Aerospace Initiative (LAI) entered Enterprise Value phase in 2002
  – Lean Now projects developed to focus on Air Force value streams
    F/A 22, Global Hawk, other pilot programs

• Ogden and Oklahoma City ALCs develop strategic engagement with LAI in 2003
  – Leverage Government-Industry experience in Large-Scale Transformation
  – Utilize MIT/LAI toolbox
    Transition To Lean (TTL) Roadmap
    Lean Enterprise Self Assessment Tool (LESAT)
    Enterprise Value Stream Mapping and Analysis (EVSMA)
Initial Deployment Schedule

**INPUTS**
- Define Enterprise Boundaries
- ELT
- Transformation Office
- LAI Consortium
- Training Materials
- Industry Tools/Templates
- Change Agent Candidate Criteria

**OUTPUTS**
- Transformation Office Credibility
- Continuous Improvement Culture
- EVSMA Completed with Projects ID'd
- Initial Black Belts ID'd and Training Initiated
- Long Term Strategic Plan Completed

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**Legend**
- ELT
- Transformation Office
- LAI
- HR
- Project Teams

**Change Agent Career Path**
- Conduct Project(s)
- Low Hanging Fruit Captured / Completed

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EVSMA Process (alpha version)

- Enterprise Value Stream Mapping and Analysis (EVSMA) piloted at Ogden ALC in 2004
  - Process facilitated by MIT, Raytheon, and Boeing

Source: Massachusetts Institute of Technology
EVSMA Set Up (Step 1)

- Strategic transformation effort linked to Center-wide goals

- Executive team identified and EVSMA effort chartered

- High-level training conducted
  - Burning Platform
  - Business Case
  - Leading Change
  - Lean Principles
  - Value Stream Mapping
Stakeholder Value Exchange (Step 2)

- Stakeholder perspectives included:
  End Users  Customers  Employees  Suppliers
- Shareholder example below reflects views of Taxpayers and Congress
  Economical Force Multiplier represents an opportunity from this perspective

<table>
<thead>
<tr>
<th>Current Performance</th>
<th>Relative Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
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</tbody>
</table>

- Compliant Fed Law Local Law
- Accountability
- Economic Use Of Funds
- Viable Force Multiplier for National Security
Strategic Objectives (Step 3)

• Analysis coincided with development of draft strategic plan for the Center
• Intent was to leverage the Balanced Scorecard work done earlier
• Center leadership was in transition
  – New Commander
  – No Vice Commander
  – No Executive Director

• Result: No significant/meaningful analysis was done at this step

• There was a strategic pause on this step
Enterprise Processes (Step 4)

- Five enterprise level processes were mapped:
  - Depot
  - Supply Chain
  - Program Mgmt
  - Readiness
  - plus Enablers

Depot example shows seven primary steps from marketing thru overhaul to ship
Enterprise Interactions (Step 5)

- Interrelationships among the five enterprise level processes were mapped
  - Yarn demonstrates handoffs
  - Interrelationships assessed using color coded dots
    Red, yellow, green
Current State Synthesis (Step 6)

• Conducted LESAT - scores were low (average 1.6)

• Identified sources of waste in the enterprise and opportunities for improvement based on previous steps
  – Training
  – Cost reduction
  – Acquisition process (total)
  – Getting the right metrics/fewest # needed
  – Sustainment activities in PM
  – Schedule effectiveness
  – Demand planning in SCM
  – Sustainment feedback to requirements definition
  – Effective communication
    Internal & external
Future State (Step 7)

Be America’s Best!
We will be the Benchmark provider of logistics capability sustaining our Nation’s war fighters.
- Support system availability at 90% or better
- Support Readiness at 100%
- 50% reduction in flow time
- 25% cost reduction
Improvement Plan (Step 8)

- Seven high-level projects were sponsored focusing on 2-3 year goals determined in Strategic Visioning Exercise
  - Warfighter
    - F-16 aircraft availability
    - A-10 aircraft availability
    - Deployment Process
  - Stakeholders
    - Customer Survey
  - Resources
    - Blackbelt/Greenbelt Plan
  - Internal Business Processes
    - High Impact Process
  - Learning and Growth
    - Training Now Team

Availability Rate = \frac{\text{# available aircraft}}{\text{total # planes}}

F-16 Availability Rate

- # Unavailable Aircraft

Jan ’03 – May ’04 data
Increasing Warfighter Satisfaction

• On-going lean events in Depot can’t achieve 90% availability goal
  – Depot possesses only 1/3 of all unavailable planes
  – Must work off the shop floor

F-16 Unavailable Aircraft Breakdown

Two-thirds of unavailable aircraft are not in the depot

On-going lean events focused on depot-possessed aircraft

Maintenance
Supply
Depot

Jan ’03 – Nov ’04 data
Blackbelt Program

• Initial cadre of 11 Blackbelts with plan to grow to 70 within 24 months
  – 4 weeks of training provided by Raytheon
  – Blackbelts mentored by Raytheon

• Develop self-sufficiency at Ogden within 24 months
  – Training and Mentoring of Blackbelts by Ogden Blackbelts
Greenbelt Program

- Plan to grow from zero to 500 in 24 months
  - 40hr course adapted from LAI facilitator training
    Taught by Hill Blackbelts
  - Topics include:
    Center Transformation
    Lean Awareness/Tools
    Team Dynamics
    Facilitator Skills/Tools
    Data Analysis
    Design Tools
    Project Management
Continuous Improvement Process

Imagine the Future

Commit to Change

Prioritize Improvement Priorities

Define Existing Process/Leverage Points

Characterize

Design & Implement Improvements

Hold the Gains, Celebrate Achievements, Build for Tomorrow

Achieve

Improve

Commit

Visualize

Source: Raytheon
Business Diagnostic on Supply

- Business Diagnostic encompasses first three steps of improvement process
  - Visualize
  - Commit
  - Prioritize

### Pareto of TNMCS hours

<table>
<thead>
<tr>
<th>Component</th>
<th>Hours</th>
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<tbody>
<tr>
<td>PUMP, HYD, ENG DRIVEN</td>
<td></td>
</tr>
<tr>
<td>RADAR ANTENNA</td>
<td></td>
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<tr>
<td>MODULAR LPRF</td>
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<tr>
<td>POTENTIOMTR FEEDBACK</td>
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<td>BRAKE ASSY</td>
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<td>VALVE MLG BRKE CONT</td>
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<td>GEARBOX ACCESS DR</td>
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Top two opportunities equate to 9-10 aircraft
Radar Antenna Project

• Antenna is repaired in “backshop” at Ogden ALC

• Project to focus on reducing TNMCS hrs, leverage previous improvement methods
  – Characterize
    End-to-end Value Stream Map (VSM) to be conducted on Antenna
  – Improve
    Improvements to focus on constraints from VSM
  – Achieve
    Results anticipated by mid-2005

Lean Brake project reduced flow time by 90%
Increasing Warfighter Satisfaction

F-16s in Field Maintenance

- Opportunity Analyses conducted on Field Maintenance
  - Focusing on Phase and Fuel System
  - 70% of Phase hours are at Air National Guard (ANG) sites

Top two opportunities equate to nearly 40 aircraft
Increasing Warfighter Satisfaction

F-16s in Depot

• Common Configuration Implementation Program (CCIP) impacts significant portion of the F-16 fleet
  – Prior to Blackbelt program, cellular flow line designed to reduce number of CCIP planes in depot by 10%

• Upcoming Structural Augmentation Roadmap (STAR) will require large amounts of depot capacity
  – Develop lean plan for STAR similar to CCIP

1st F-16 CCIP plane completed two weeks ahead of schedule using new pulse cell CCIP line
  Oct 2004

Source: Hilltop Times
Lessons Learned

• Active learning for executive leadership team through EVSMA
• Enterprise transformation requires significant capability to lead and manage change
• Availability can be improved without additional budget
• Lean events held exclusively on the shop floor can’t meet long-term aircraft availability goals
• Rotation of military leadership creates challenges for continuity of alignment on long-term goals

F-16 Availability Rate

Jan ’03 – Nov ’04 data
Further Development

• EVSMA process was updated to incorporate lessons learned
  – More logical order of analysis steps
  – More focused analysis of pertinent data
  – Reduced analysis time (from 6+ months down to 3 months)
  – Deployed at Oklahoma City ALC
    Tinker AFB

• Implications for future aircraft
  – Apply lessons learned on F-16 and A-10 to JSF (and others)
    Improve aircraft availability rate over future life cycles
Summary

- Strategy for enterprise transformation developed and deployed
- Capability for managing change initiated
- Learning and results summarized