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# 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


F-16 Fighting Falcon

A-10 Warthog

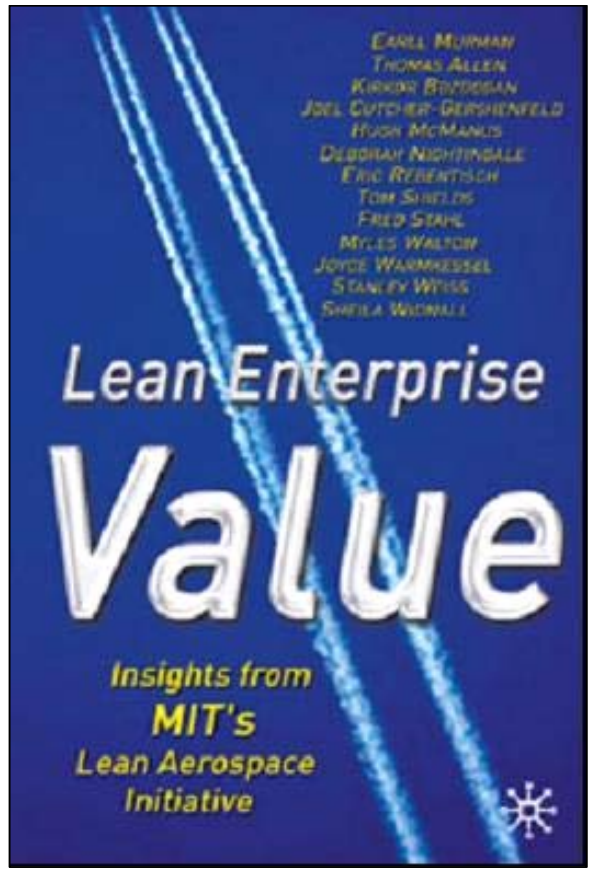
# Background

- 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

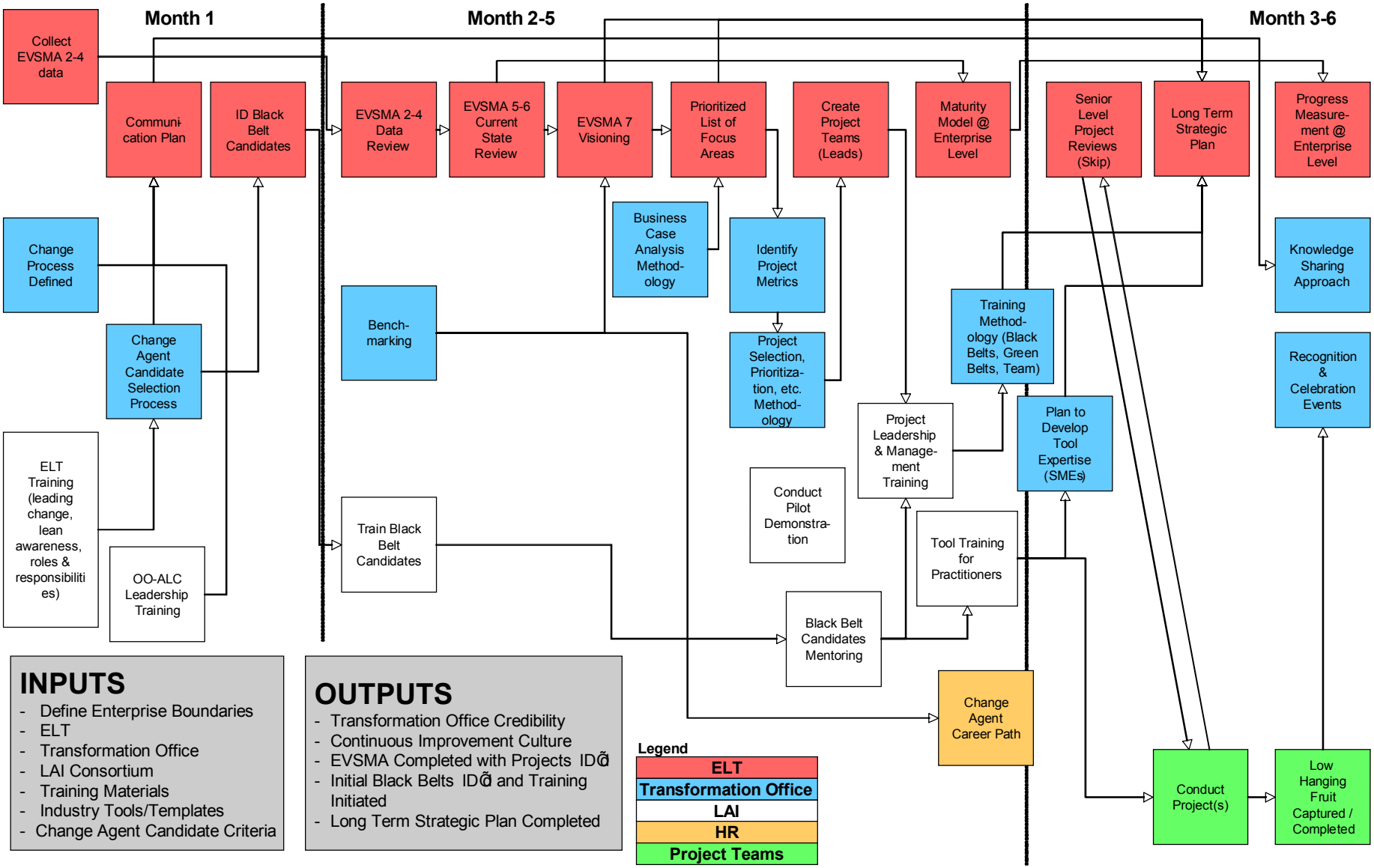
Early project in Landing Gear

# 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)

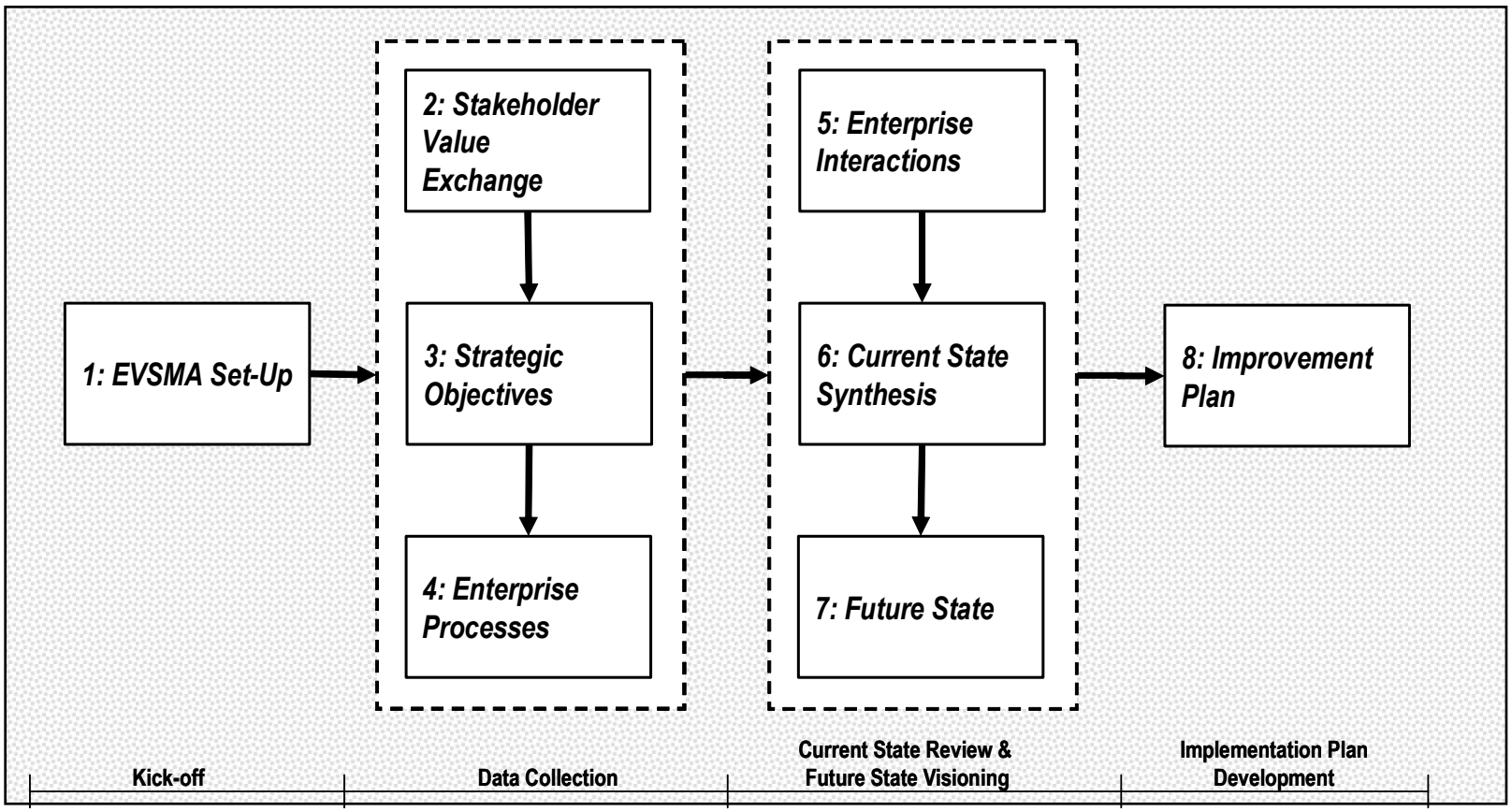


# Initial Deployment Schedule



# EVSMA Process (alpha version)

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



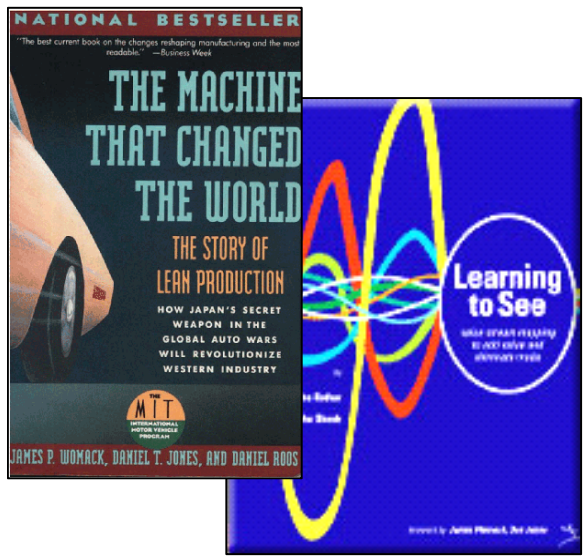

Source: Massachusetts Institute of Technology

# 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

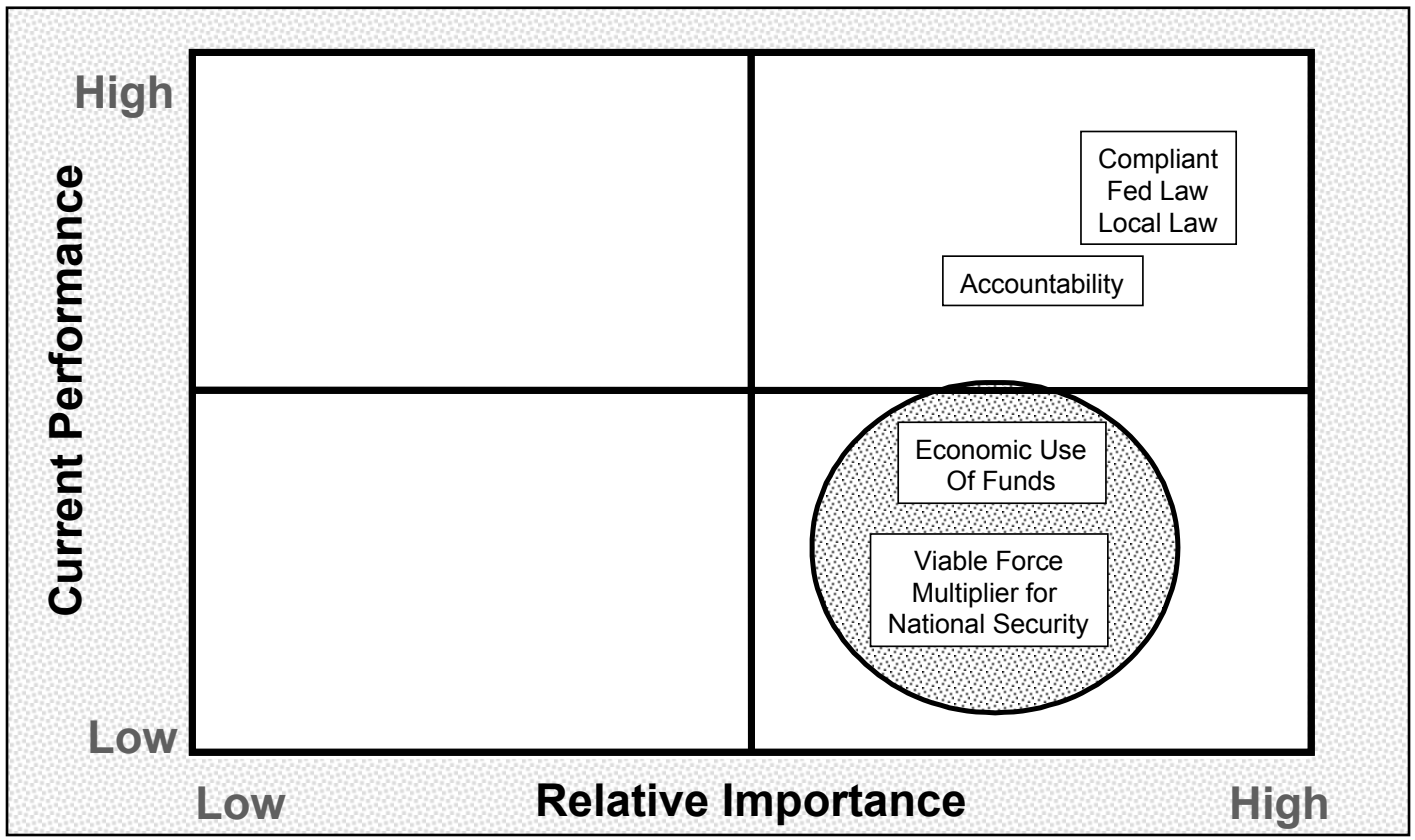



# Stakeholder Value Exchange (Step 2)

- 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



# 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

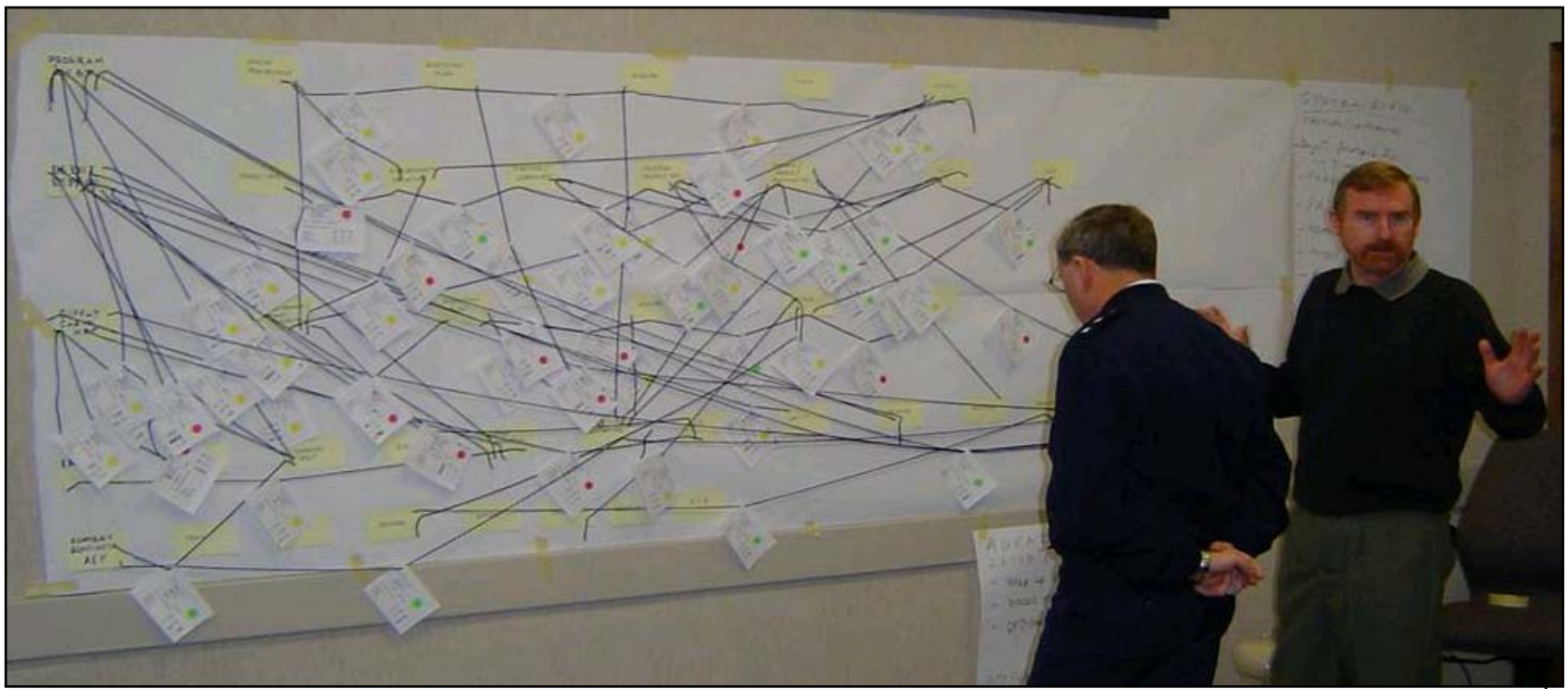
# Enterprise Processes (Step 4)

- 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

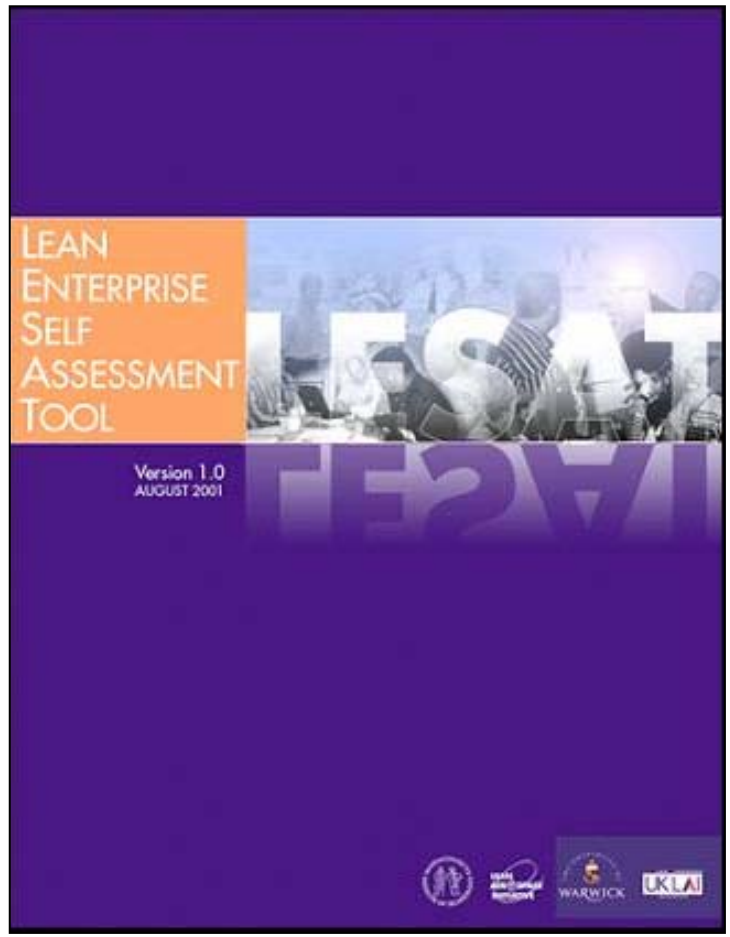
# Enterprise Interactions (Step 5)

- Interrelationships among the five enterprise level processes were mapped
  - Yarn demonstrates handoffs
  - Interrelationships assessed using color coded dots
    - Red, yellow, green

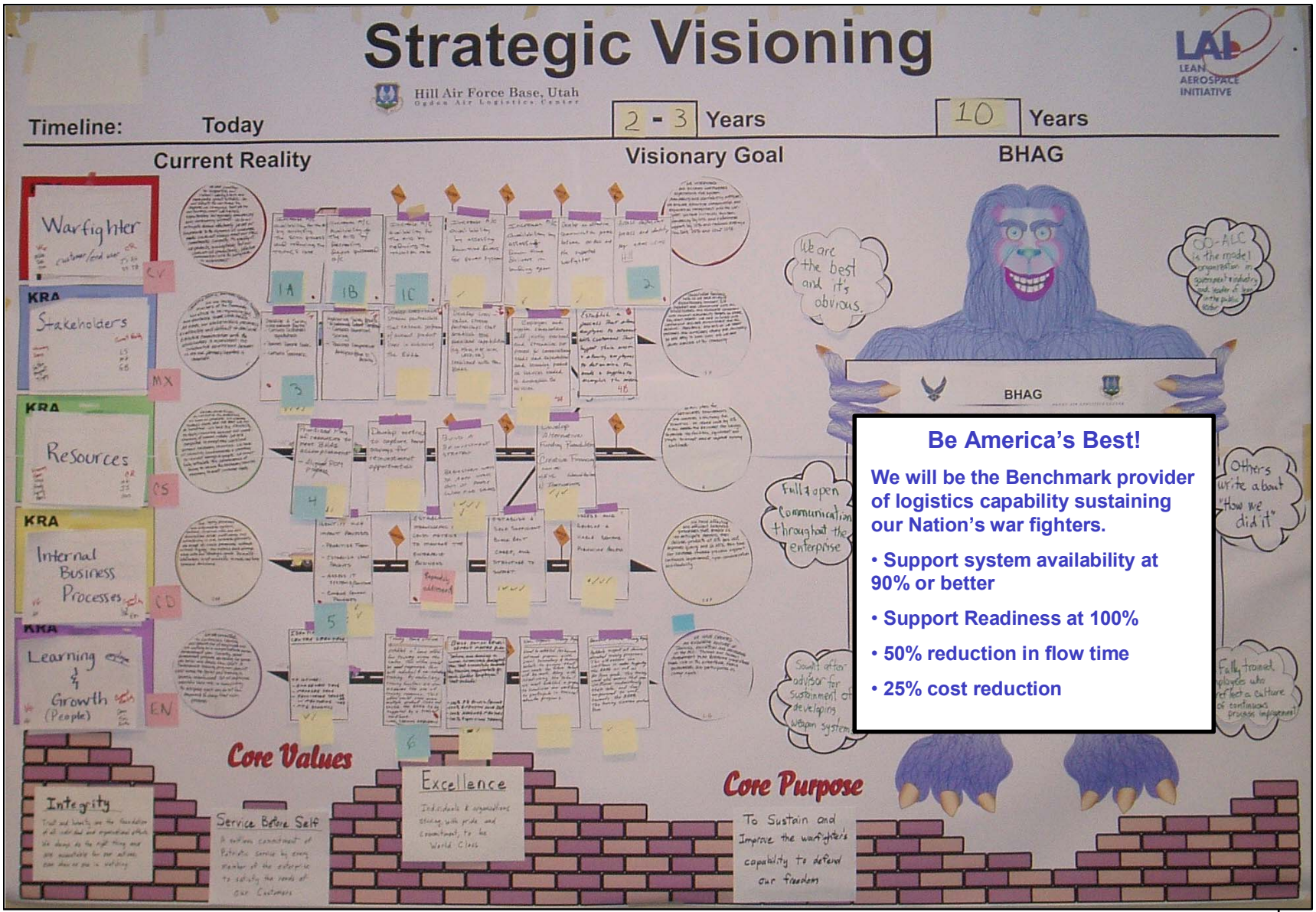


# Current State Synthesis (Step 6)

- 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



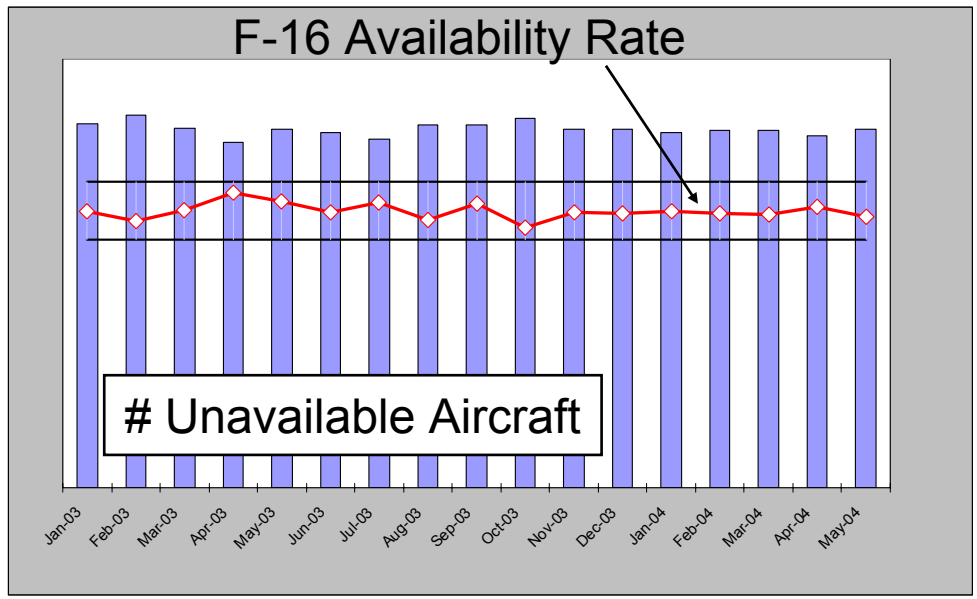
# Future State (Step 7)



# 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

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



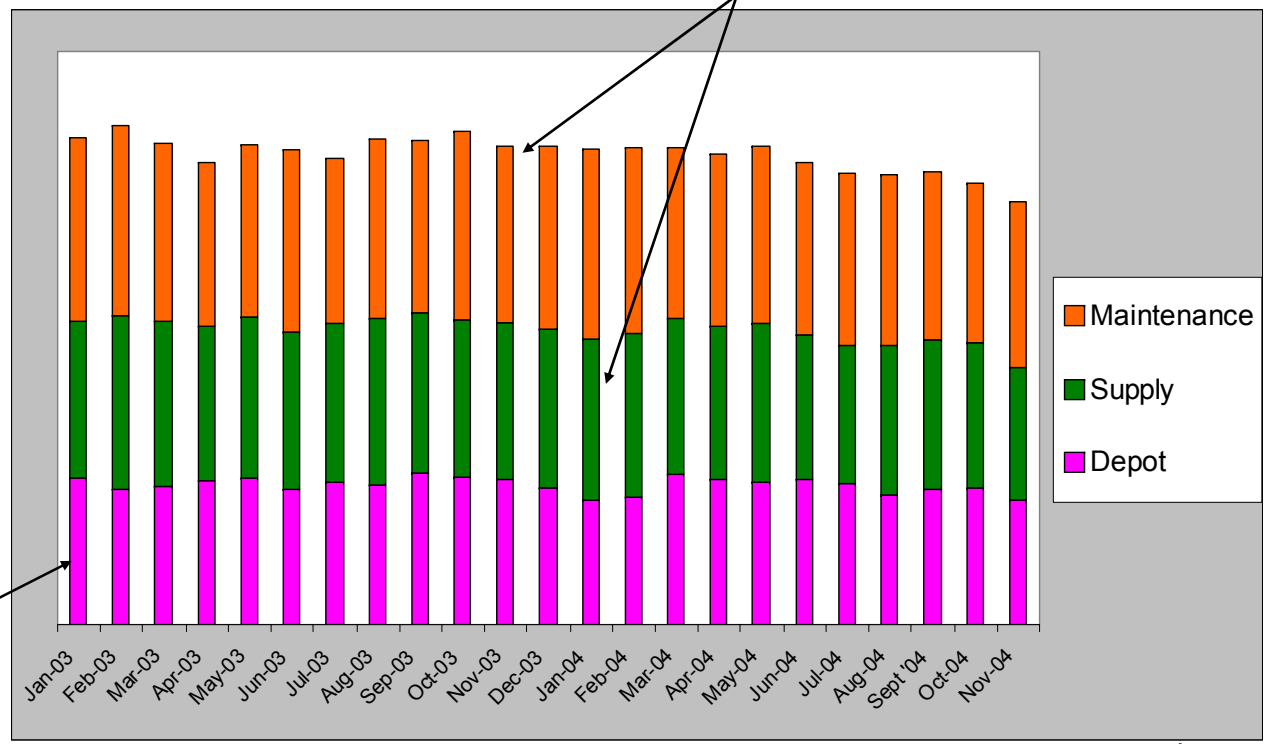

Jan '03 – May '04 data

# 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

Two-thirds of unavailable aircraft are not in the depot

**F-16 Unavailable Aircraft Breakdown**




On-going lean events focused on depot-possessed aircraft

Jan '03 – Nov '04 data

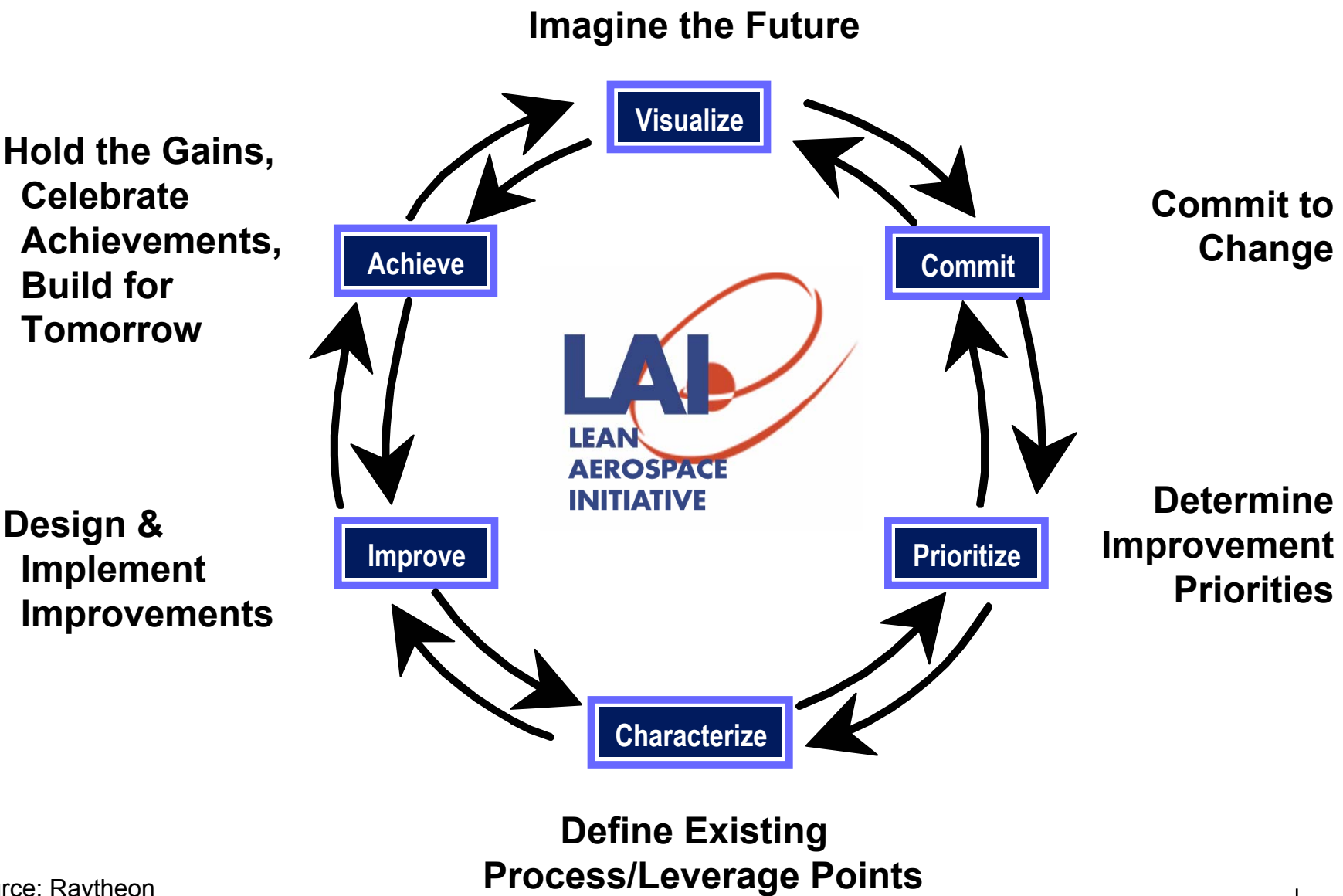
# Blackbelt Program

- 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

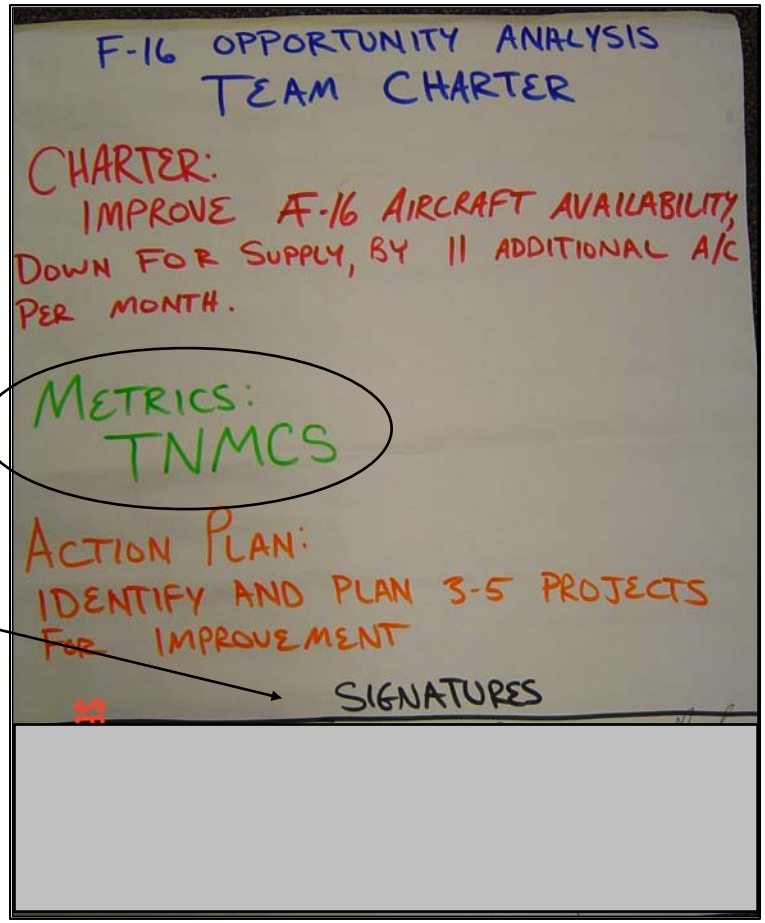
# Continuous Improvement Process

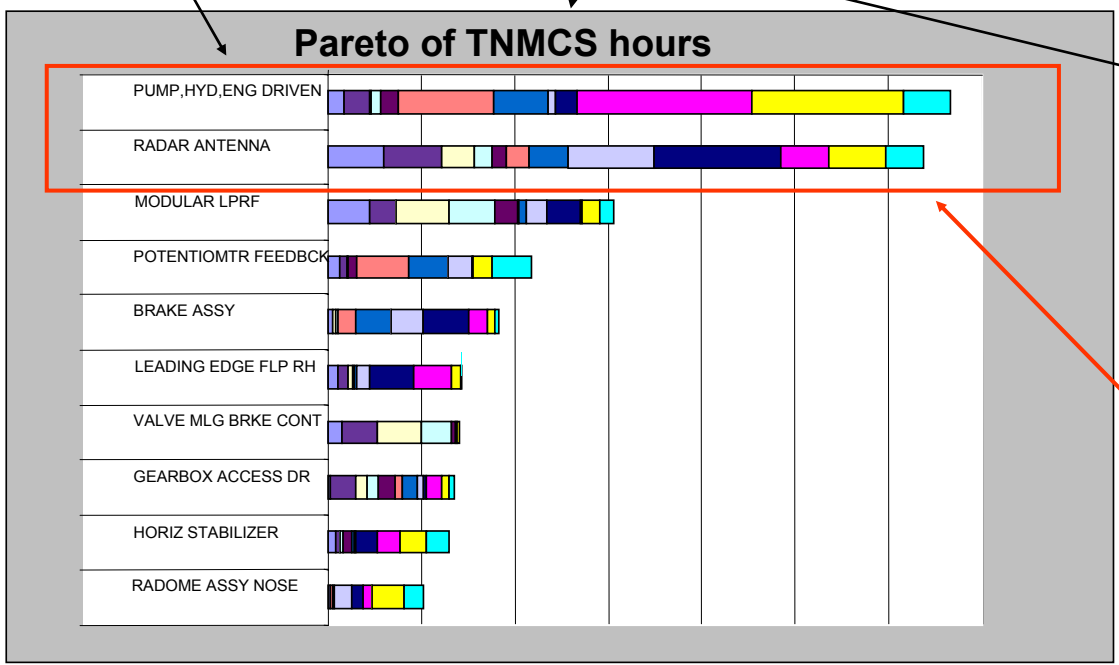



Source: Raytheon

# Business Diagnostic on Supply

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




Top two opportunities equate to 9-10 aircraft

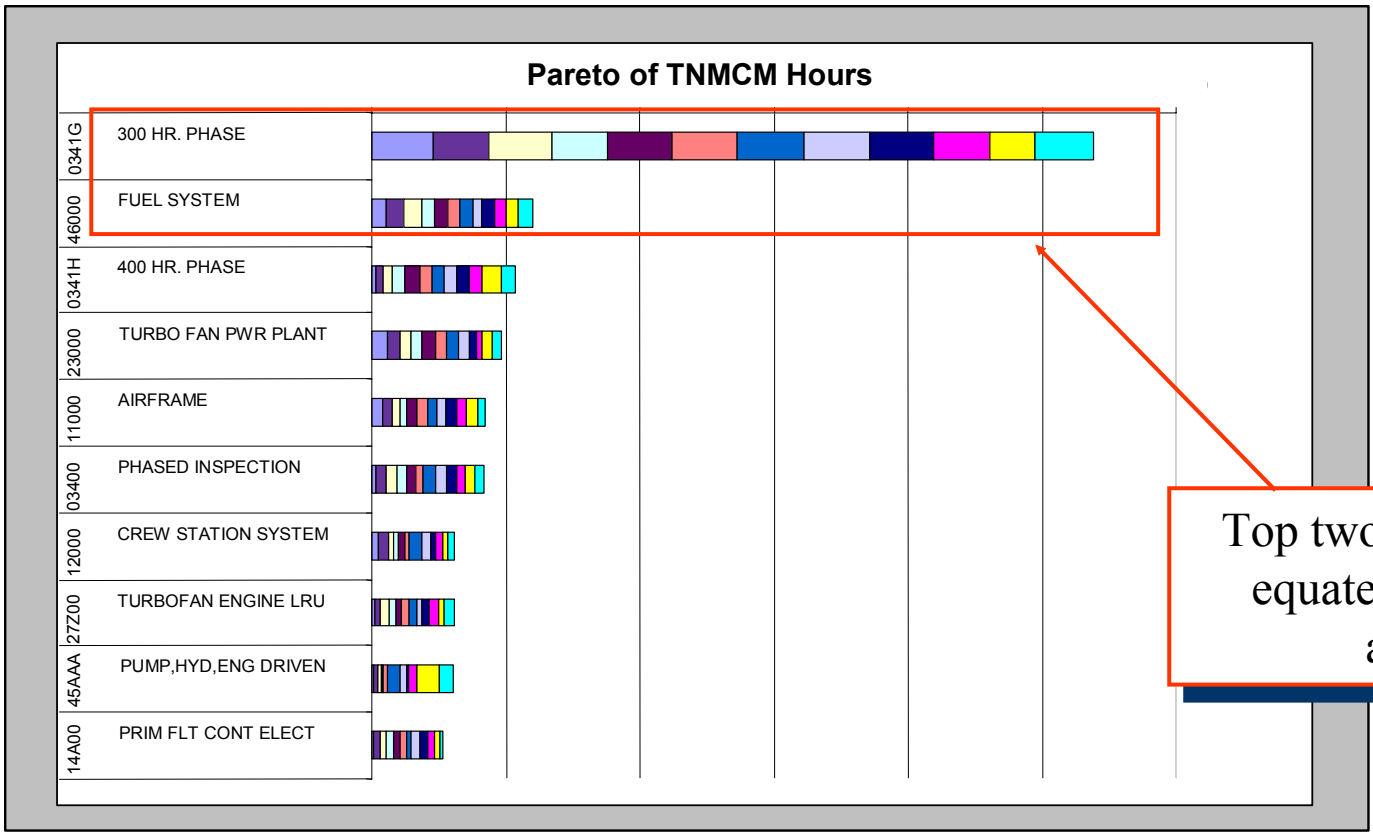
# Radar Antenna Project

- 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%

# 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

# F-16s in Depot

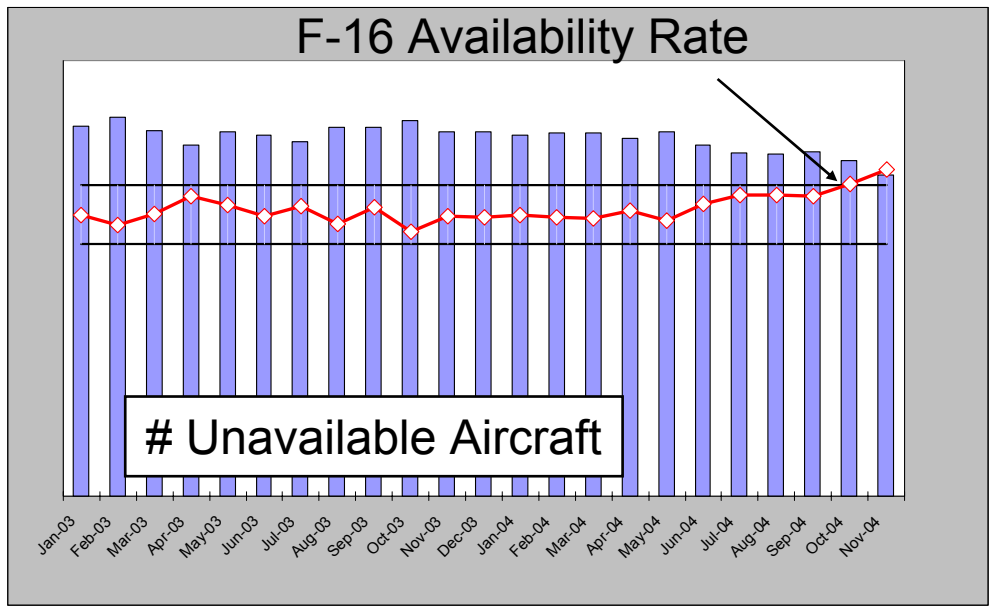
- Common Configuration Implementation Program (CCIP) impacts significant portion of the F-16 fleet
  - Prior to Blackbelt program, cellular flow line designed to reduce number of CCIP planes in depot by 10%
- Upcoming Structural Augmentation Roadmap (STAR) will require large amounts of depot capacity
  - 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




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

F100 engine for F-16

F-35 Joint Strike Fighter (JSF)

# Summary

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