



**LAI Mission Accomplishments
Facilitate Enterprise Transformations**

Lean Now the Beginning



AFMC Commander's Intent



- **Expeditionary mindset and culture**
- **Innovative, adaptive, and responsive**
- **Easy to do business with**
- **Effective and efficient**

Deliver effects-based capability to the war fighter

**Enabled by capable processes shared by
government and industry**



Air Force Lean Now Initiative Established in Collaboration with LAI

- **What: Lean Transformation of Air Force Material Command**
- **Why: Provide On Time, Effects Based Capability to the War Fighter**
- **Who: Lean Aerospace Initiative Consortium Members Teamed with AFMC within the LAI venue**



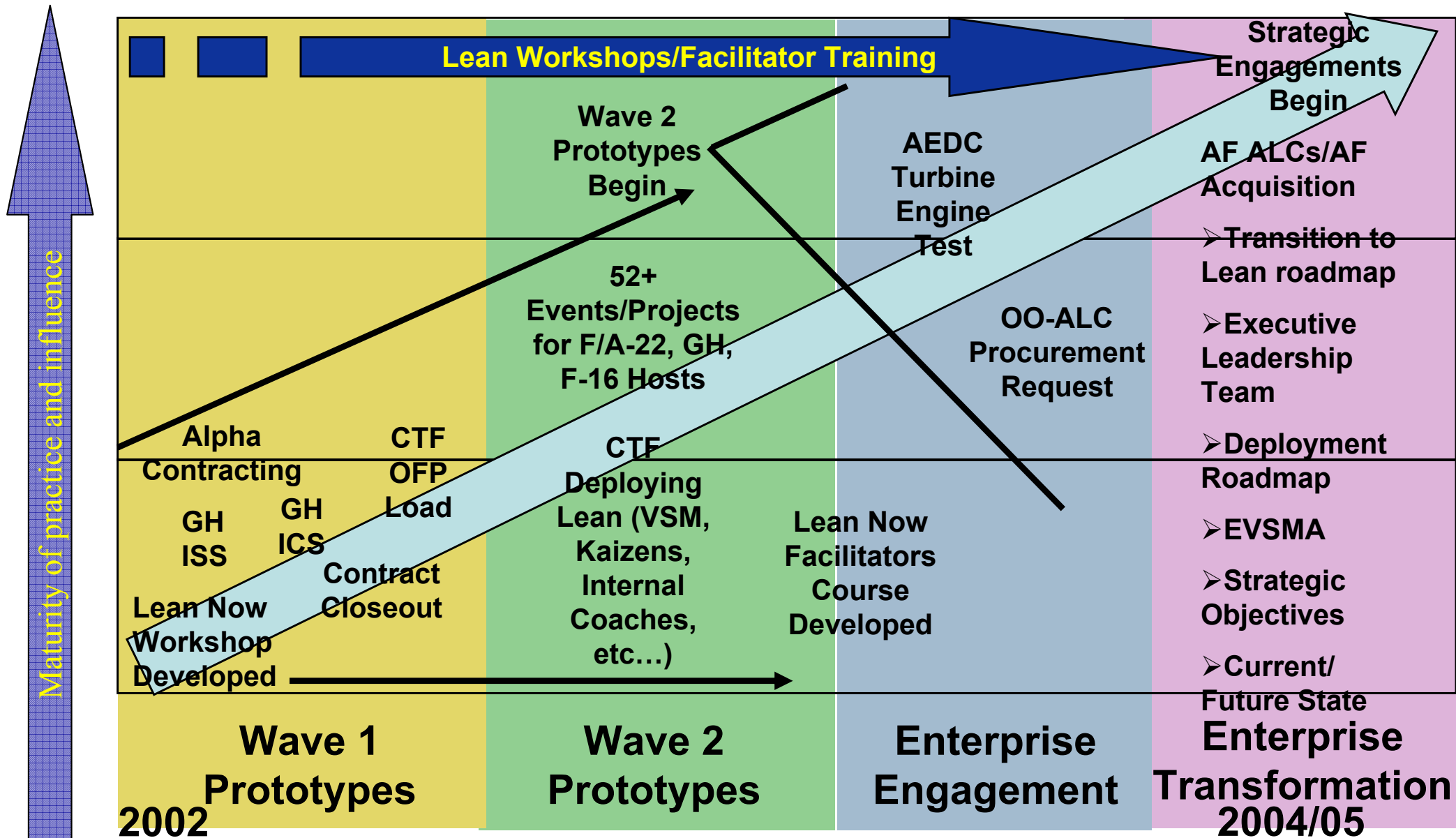
Lean Now Objective... Enterprise Transformation (Non-Manufacturing)

TRANSFORM THE WAY WE DO BUSINESS IN GREATER ENTERPRISE

- **Collectively Accelerate Lean Deployment Within AFMC**
- **Identify Opportunities For Improvement And Change**
- **Eliminate Barriers That Impede Progress**
- **Increase Communication And Understanding**
- **Win-Win For All: Create Value For All Stakeholders Through Elimination Of Waste**
 - **Adapt Quickly To New Challenges**
 - **Get It Faster With Fewer Resources**

**Collectively Accelerate The Process...
Get Effects Based Capability To The War Fighter**

Enabling Capabilities of Lean Enterprise Transformation



Local Results and Behavior Change... New Capabilities and Skills,

CTF OFP Load (F/A-22)

- **Selected improvements within processes:**
 - Software Install Time Reduced from 97 hours to 46 hours
 - Validated on the F/A-22
 - 50-95% Span Time Reduction
 - 56% reduction in non-value added steps
 - 91% reduction in part traveled distance
- **Implemented web based spares ordering system**
- **Process improvements:**
 - Parts purging within CTF compound
 - Dedicated parts research
- **CTF deploying lean (VSM, Kaizens, Internal Coaches, etc...)**

Alpha Contracting (Global Hawk)

- **37% Initial cycle time reduction for Alpha Contracting**
- **Created Enterprise Level Tier I and Production Tier II VSM's**
- **Project Plans Ongoing (10 Major Events Completed):**
 - ISS \$2M savings per ship set / \$49M life cycle savings
 - AICS/GICS \$33.8M life cycle savings
 - 38% Production delivery cycle time reduction per BL-10
 - Additional \$5M Est. Savings for Producibility Initiatives



Strategic Imperative: **Facilitate Enterprise Transformations**
Government Major Accomplishments & Measures

Global Hawk

- **Global Hawk was chosen as one of three AF “Lean Now” prototype programs – Oct/Nov 2002**
 - “Lean Now” opened the dialogue between government and industry
- **Lean embraced by SPO leadership as vital to evolutionary acquisition—business as usual doesn’t work with spirals**
 - Provides deliberate method and structure for change
 - Transforms traditional process to meet demands of spiral acquisition
 - Lean is a keystone of meeting affordability targets
 - Over 35 Lean Events since Dec 2002
- **Lean has taken hold and is spreading across the total Global Hawk Enterprise**
 - Applied to manufacturing and non-manufacturing processes at SPO and contractors
 - SPO, NG, and most subcontractors have full-time lean change agents
 - Global Hawk Lean Community of Practice formed to bring together enterprise lean practitioners to share information and leverage expertise



Global Hawk "Lean Now" Major Accomplishments

Supplier Focused Events

- Raytheon
 - \$49M Savings for ISS Deliveries
 - Increased Units from 3 to 6 per Year
- L-3 Communications
 - \$33.8M Savings for AICS/GICS Deliveries
- Aurora
 - Aft Fuselage 42 Day Cycle Time Gain P3

Enterprise Value Stream Mapping

- Completed Tier I Enterprise VSM – Feb. 03
- Updated Tier II Production VSM – May 03
- Supplier VSM's for Raytheon, L-3, Aurora
- Eng. Development VSM – Aug. 03
- Process Level Value Stream Maps
 - Alpha Contracting
 - Change Process

Cycle Time Reductions

- Alpha Contracting
 - 28% Initial Reduction of 99 M-days
- Change Process
 - 63% Reduction from 95 to 35 Days
- Production Delivery Cycle
 - 38% Reduction per Schedule BL-10
- Supplier Delivery Reductions Documented

Significant Goals Achieved

- Completed 10 Major Events
- Enterprise Collaboration SPO/NG/Suppliers
- Continuous Improvement VSM's In Place
- 97% Award Fee Customer Rating for Affordability Supported by Lean Now Events
- Additional \$5M Opportunity Savings for Identified Production Producibility Initiatives
- Joint SPO / NG LESAT Completed



Alpha Contracting Event II

- **Objective: Reduce time from RFP to formal proposal**
 - **Faster contract time brings capability to warfighter quicker**
- **Initial Alpha Contracting event held in Feb 2003**
 - **Reduced contracting time from 351 M-days to 252 M-days (initial 28% reduction)**
- **Alpha Contracting Event II held 3-6 May 2004**
 - **Objective of further reducing contracting time to support spiral acquisition**
 - **Involved SPO, NG, Raytheon, L-3 Comm, Vought, DCMA, DCAA**
- **Findings**
 - **Three types of contracts identified (Development, Production, Engineering/Contract Changes)**
 - **Each contract type should requires different approaches**
 - **Earlier subcontractor involvement reduces rework and reduces time**
 - **Better method of developing requirements and estimates between SPO and NG defined**



Alpha Contracting II Initial Results

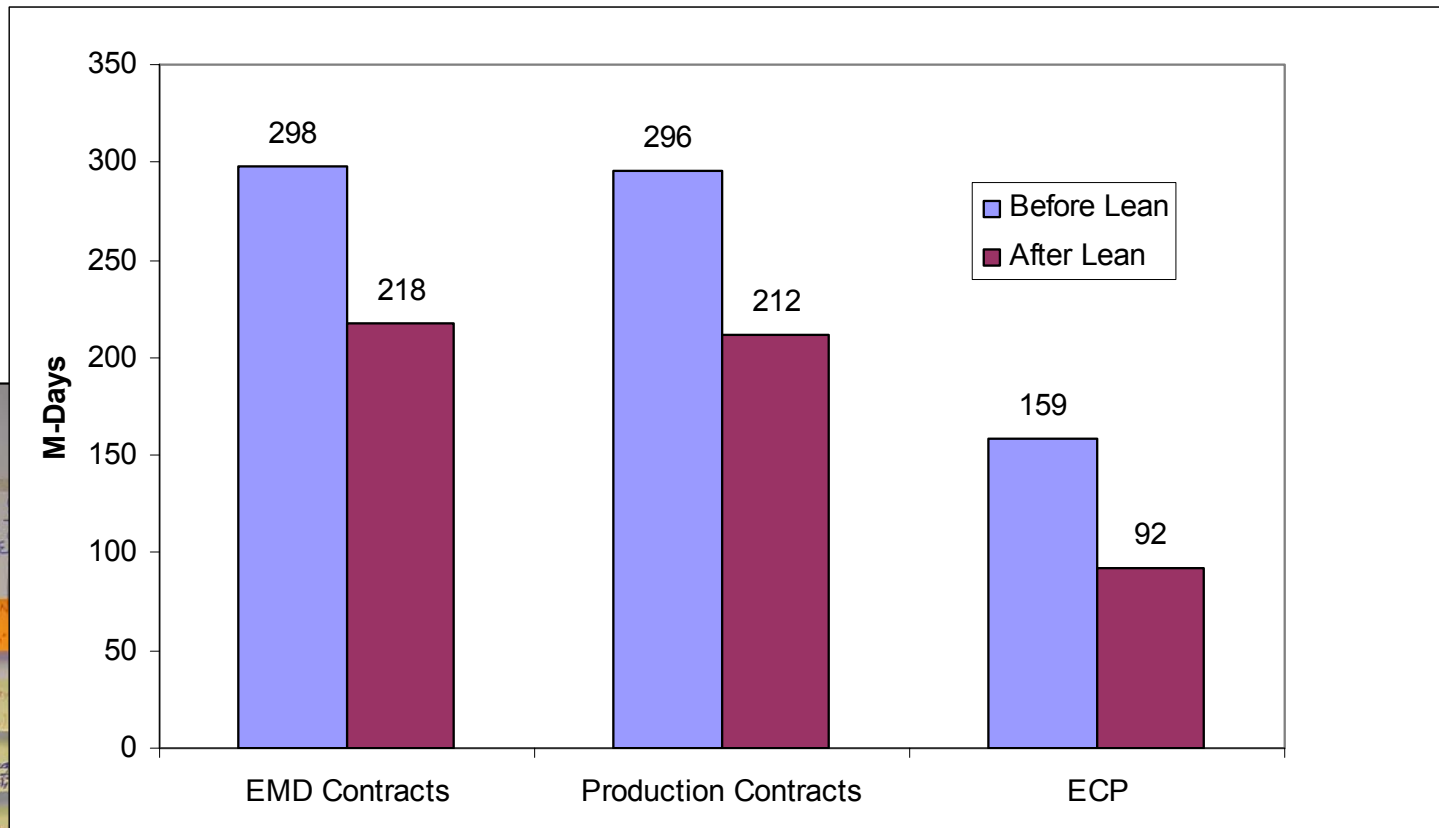
- **Results**

- **Alpha Contracting Guide being revised to address the difference in contract types**
- **First blush cycle time reductions:**
 - **Development Contracts: 218 M-days (37% reduction of original process)**
 - **Production Contracts: 212 M-days (40% reduction of original process)**
 - **ECP/CCP Contracts: 92 M-days (73% reduction of original process)**
- **Further refinement and maturation of processes will lead to expected further reduction**

Global Hawk Lean Alpha Contracting

Outcomes & Benefits

Cycle Time Reduction of Contracting / Proposal Process



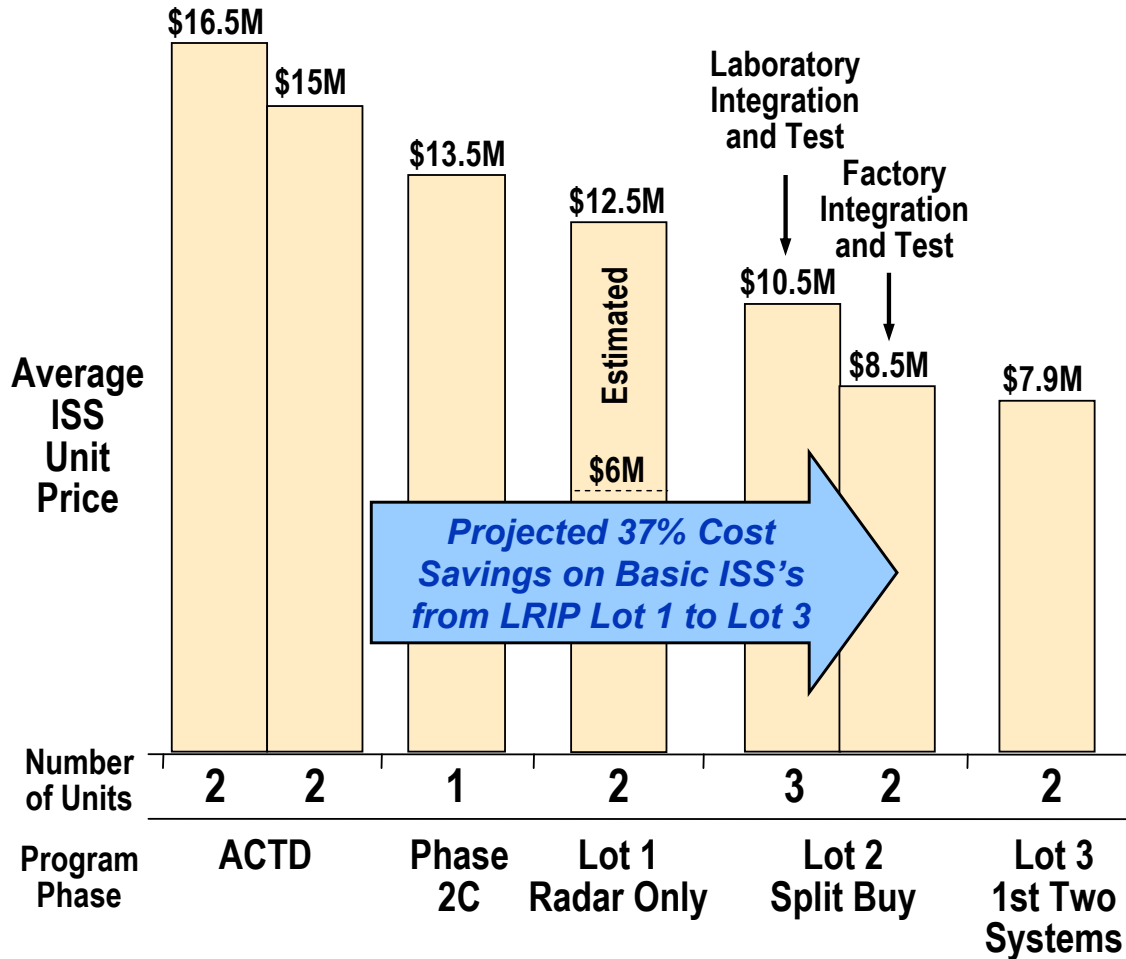
Further Cycle Time Reductions Expected as New Processes Mature



Global Hawk Integrated Sensor Suite

Lean Manufacturing Now In Place

Outcomes & Benefits



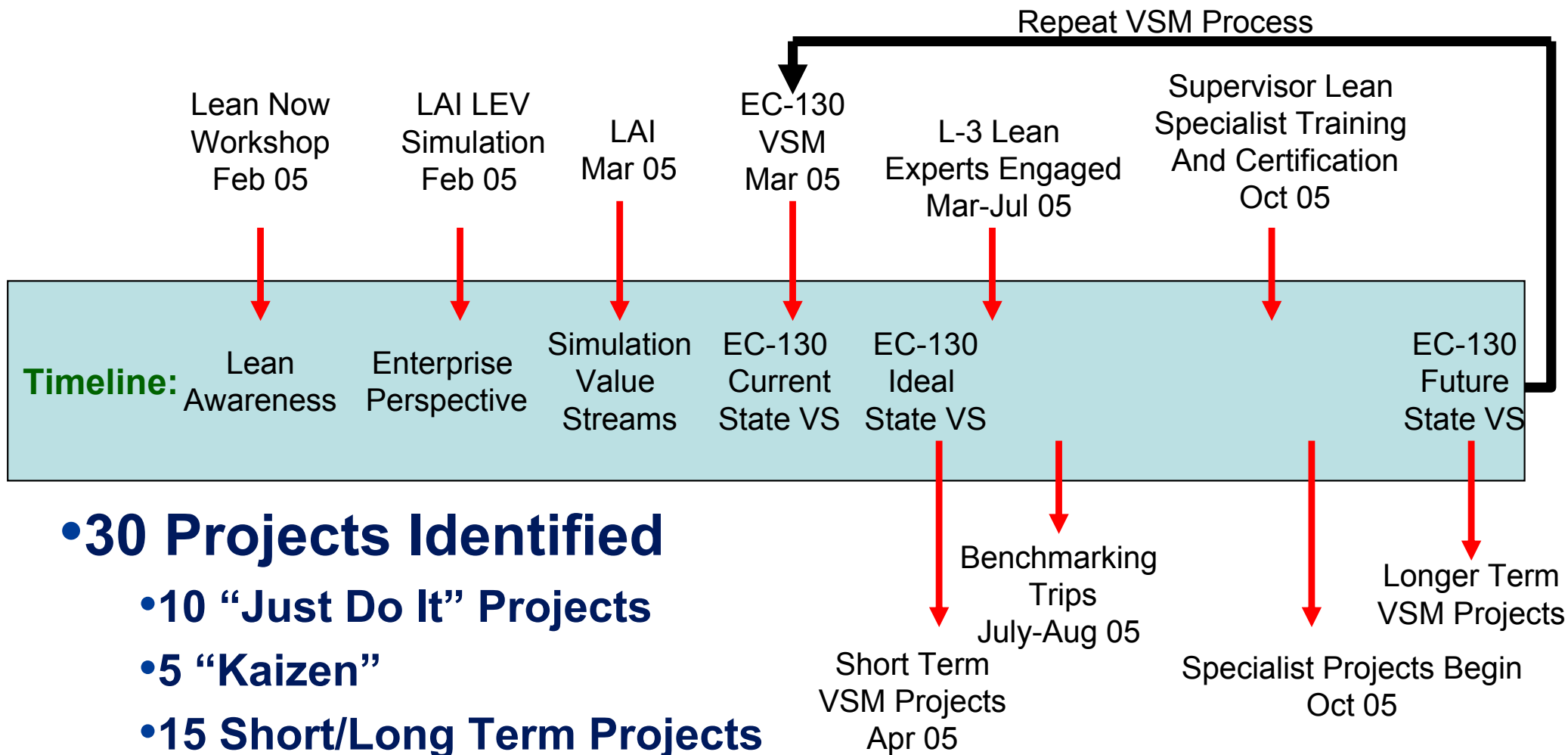
Lean Lowers ISS Cost and Production Cycle Time



Big Safari Programs Compass Call VSM Project Status

September 30, 2005

LEAN OPERATION STRATEGIC PLAN

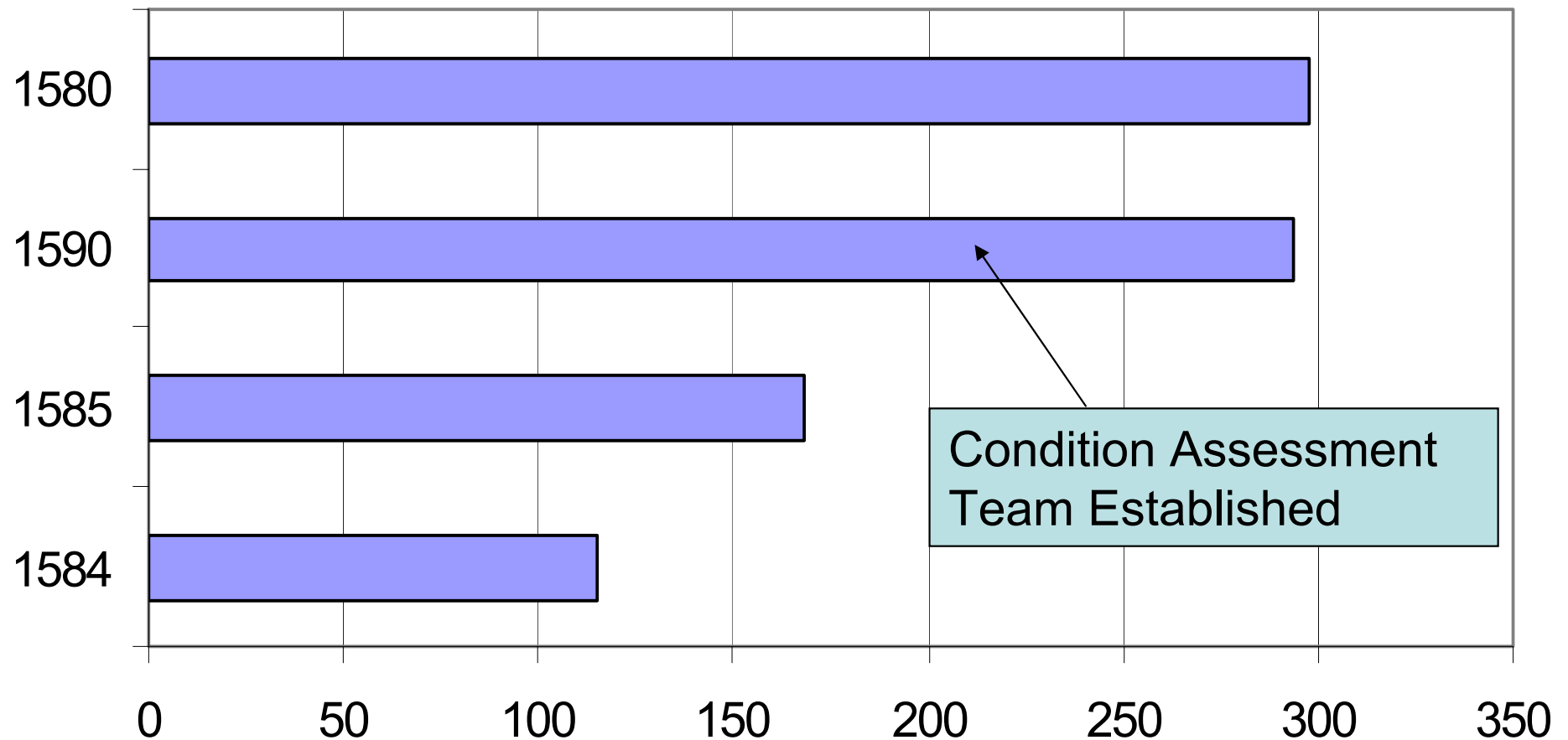




Projects Producing Measurable Cycle Time Improvement

- **Analyze Quality Processes and Procedures**
 - Kaizen completed - 30 days of measured performance
 - Reduced backlog of work tasks waiting for inspection by 75%
 - Cycle time improved from 11 days to 2 days for first two aircraft implemented
- **Create HDL Specialty Teams**
 - Develop dedicated SWAT teams for large critical path tasks
 - Teams formed were proofed on Aircraft 1580 (Preservation, Landing Gear, Flight Controls, Assessment, Paint, Fuel Tanks, Engines, Electrical Test and Ring-out)
 - Condition Assessment Process – Team formed was proofed on Aircraft 1590, last aircraft completed had cycle time improvement of more than 40% compared to aircraft before Assessment Team developed

Number of days from A/C arrival to Condition Assessment Complete





Projects Producing Measurable Cycle Time Improvement

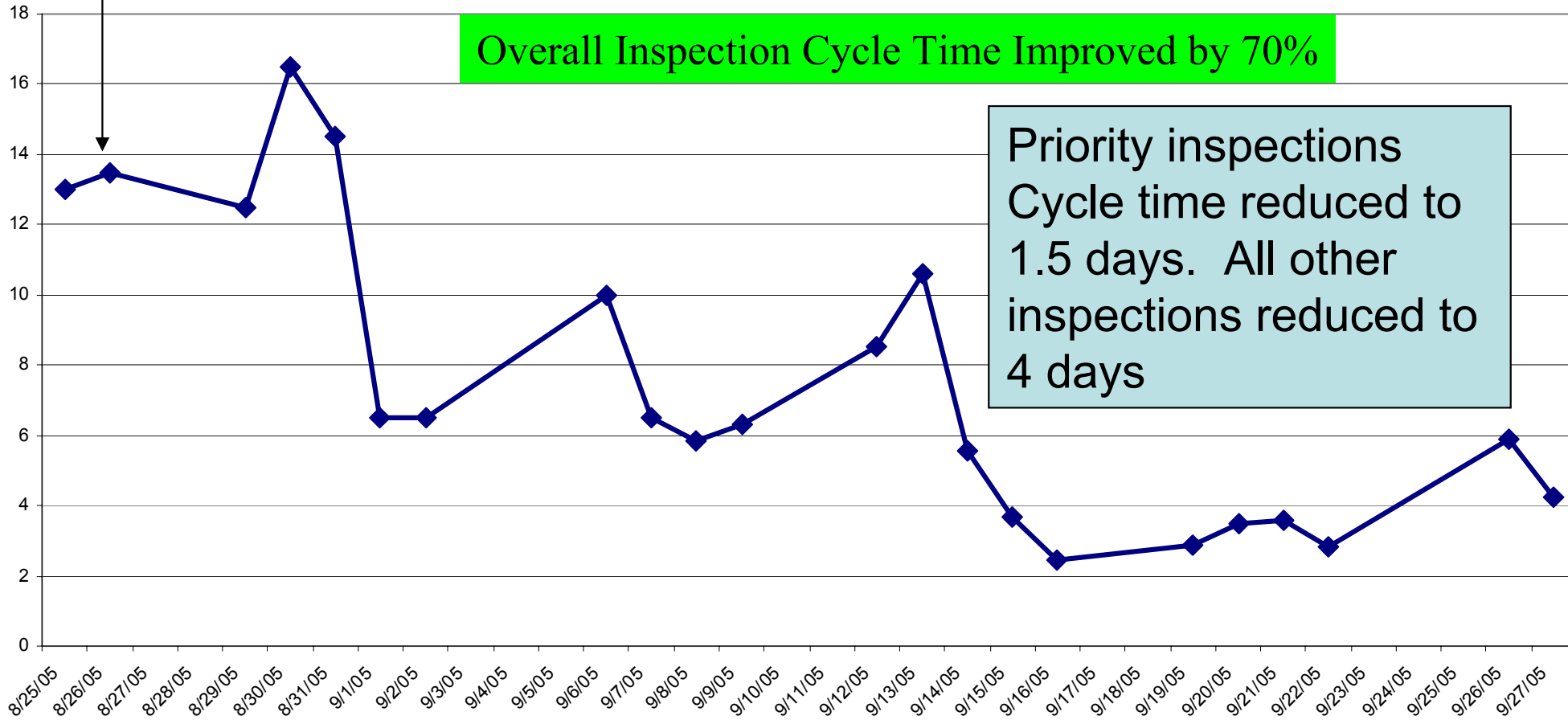
- **Issue parts direct from Mfg to A/C – eliminated warehousing steps for handling all L-3 fabricated material for Aircraft**
 - **Cycle time reduced more than 90% - From 24 hours to 2 hours**
- **Warehouse staffing for L-3 Project Stock in 7801- moved material handling process to appropriate warehouse process**
 - **Decreased delivery turn around from 42 hrs to 6 hrs**

These two types of material represent more than 50% of material required by each aircraft



Quality Process Kaizen

Average Days in Inspection Queue for AC 1585 and AC 1590





Lean Now Provided the Catalyst for Large Scale Transformation

Lean Now Wave 1

- Alpha Contracting – Global Hawk
- Combined Test Force – F/A-22
- Inactive Contract Closeout – F-16

Lean Now Wave 2

- Turbine Engine Test – AEDC**
- Procurement Request Process – Ogden ALC

Large Scale Enterprise Engagements

- Ogden ALC
- Oklahoma City ALC
- C-17 Program
- Robins ALC
- AF Acquisition
- Lean Now Wave 3

- Culture Change
- Self Sufficiency
- Measurable Results
- Multiple Stakeholders
- Multiple Interfaces
- “Pull” for Lean
- High Degree of SME Knowledge Sharing

Future Engagements?

Combined ALCs
AFMC
Other Services

** Arnold Engineering Development Center



LAI Mission Accomplishments
Facilitate Enterprise Transformations
C-17

C-17 Systems Group

Delivering and sustaining a quality C-17 fleet

CONTINUOUS IMPROVEMENT SUCCESS
STORIES
11 JUL 05

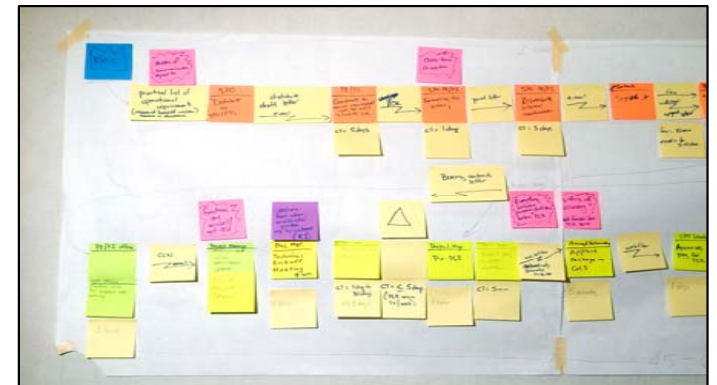


U.S. AIR FORCE

Proposal Process Action Team

Wright Patterson AFB: C17SG Proposal Cycle Time Reduction

- Employed IPT-Pricing concepts - Increased teaming with Contractor and DCMA
- Improved quality of ROM/Basis Of Estimate (BOE) development
- Promoted incremental CAR/PAR which allows earlier start of tech evaluations
- Improved requirements definition and reduced proposal iterations
- Reduced Cycle Time
 - From: Average Cycle Time- 19.6 Calendar Months
 - To: Average Cycle Time – 10.4 Calendar Months





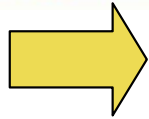
Industry (Boeing) *Outcomes & Benefits*

- **More than 450 AIWs held since 1998**
 - ROI Average > 8.1
- **Multiple Initiatives/Multiple Results, i.e.,**
 - **Kitting Standard Items Initiative**
 - 34% Reduction in Non Value Added Time
 - **Single Line Initiative – Long Beach**
 - 20% Cycle Time Reduction
 - Entire Bay Recovered (150K+ square feet)
 - **Ergonomics Initiative**
 - Driving Down Injuries by 50%

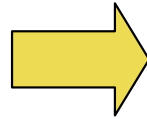


LAI Strategic Support

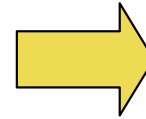
MIT



LAI



Implementation
Projects
Deployment



DOD SE

- Systems Engineering Process
- Improved Requirements Flowdown

AEDC

- Systems Validation Process
- Faster / Cheaper Config Changes

AF Acquisition Team

- EVSMA
- Cycle Time, Credibility
- Enterprise Operating Expense

OC-ALC

- Systems Support Process (s)
- Optimize Availability to War fighter

FA22 RLT

- Raptor Lean Team
- Optimizing Mgmt Process -Affordability

Depot Transformation

- Optimize Overhaul Maintenance Processes
- Introduce new Lena practices/Principles\

UTC Quality Council

- PW, PWC, Sikorsky, HS, PW Rocketdyne, UTC
- Share LAI Activities

History with PW
History with USAF Leadership

Academic Arm
Industry Benchmarking
Government

- P&W Cannot Be World Class Unless Our Customers Are World Class
- Supporting Air Force Transformation to Enable Expeditionary War Fighter With Cost Effective Sustainment
- Sharing of Best Practices (ACE)
 - Research
 - Knowledge Integration
 - Tool Creation
 - Deployment
- P&W Employees Learning New Tools/Implementing to Support Customer Satisfaction & Business Growth
 - Reduced Inventory
 - Reduced Cycle Time
 - Increased Reliability
 - Reduced Total Cost



LAI and P&W Benefits

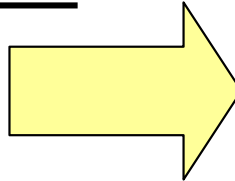
Benefits

Project

Description

AEDC

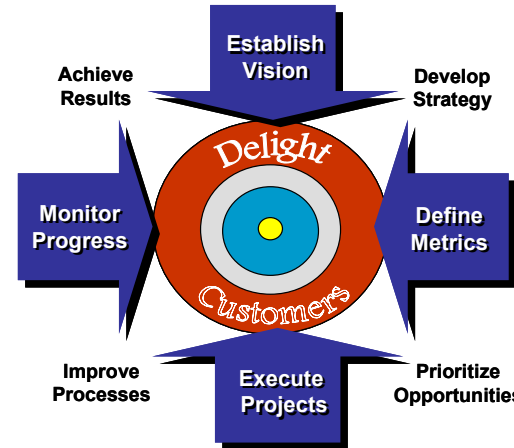
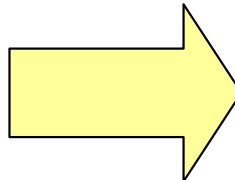
**Turbine Engine
Test & Evaluation**



- Test defect databases – 15 to 7
- Paperwork reduction – base entry
- Reduce C Plant Pre-Op Time by 43%
- Test program schedules
- Engine installation time cut by 50%

**Tool
Application**

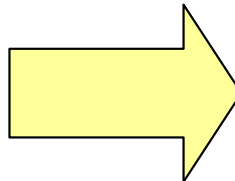
**LESAT
EVSMA**



- ACE Council
- DCMA/Internal Teams
- Business unit assessments

**System
Engineering**

**Systems
Engineering
Revitalization**

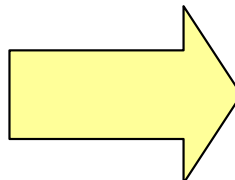


- Superior products for Government & Airline Customers – concept to sustainment
- Knowledge and learning for better products and services

Research

Student Projects

- Systems Thinking
- High Performing Teams





LAI Mission Accomplishments
Facilitate Enterprise Transformations
Air Logistics Centers



Strategic Imperative: **Facilitate Enterprise Transformations
Government/Industry Major Accomplishments &
Measures**

Air Logistic Centers

- **Conducted large enterprise transformations at Ogden, Oklahoma City, & Warner- Robins Air Logistic Centers:**
 - **Value steam mapping of ALC enterprises**
 - **Engaged senior leadership teams**
 - **Analyses and defined vision of future state**
 - **Improvement plans in-place for key enterprise results areas**
 - **Culture change spread to other Air Force processes**

Ogden Air Logistics Center

**OO-ALC
Transformation Journey**

29 September 2005

**Maj Gen Kevin Sullivan
Commander OO-ALC**

2002 -- Where We Started

OGDEN AIR LOGISTICS CENTER

- **Mar 2002: Benchmarking, 6S, Kaizen Events - Not Structured**
- **AUG 2002: Transformation Office Opened**
 - **Manpower: 6 Instructor-Facilitators**
- **2002 LEAN Efforts: Landing Gear and Commodities**

Rolling Start – Focus on Shop Floor

2002 -- Where We Started (cont)

OGDEN AIR LOGISTICS CENTER

- **Jan - Dec 2003: Accelerated Shop Floor Events**
- **Apr - Nov 2003: Expanded Events Above & Beyond Shop Floor**
 - **Point of Use Supply**
 - **Landing Gear “Factory” Study**
 - **Purchase Request Process**
 - **Civilian Personnel Staffing**
 - **Orderly Room Process**

Picking Up Speed - Widening the Focus

2004 – The Epiphany

Enterprise Transformation Strategy

OGDEN AIR LOGISTICS CENTER

Tactical Cycle

Focus on Continuous Improvement

- Balanced Score Card
- Knowledge Management
- Review/Capture/Update

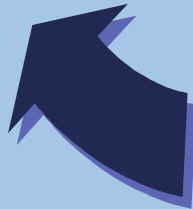
Create & Refine Transformation Capability

- Improvement Plans
- Training
- ID Team Resources

We Were Here

Implement Lean Initiatives - Targeted Improvements

- PR
- Mainstream, etc...

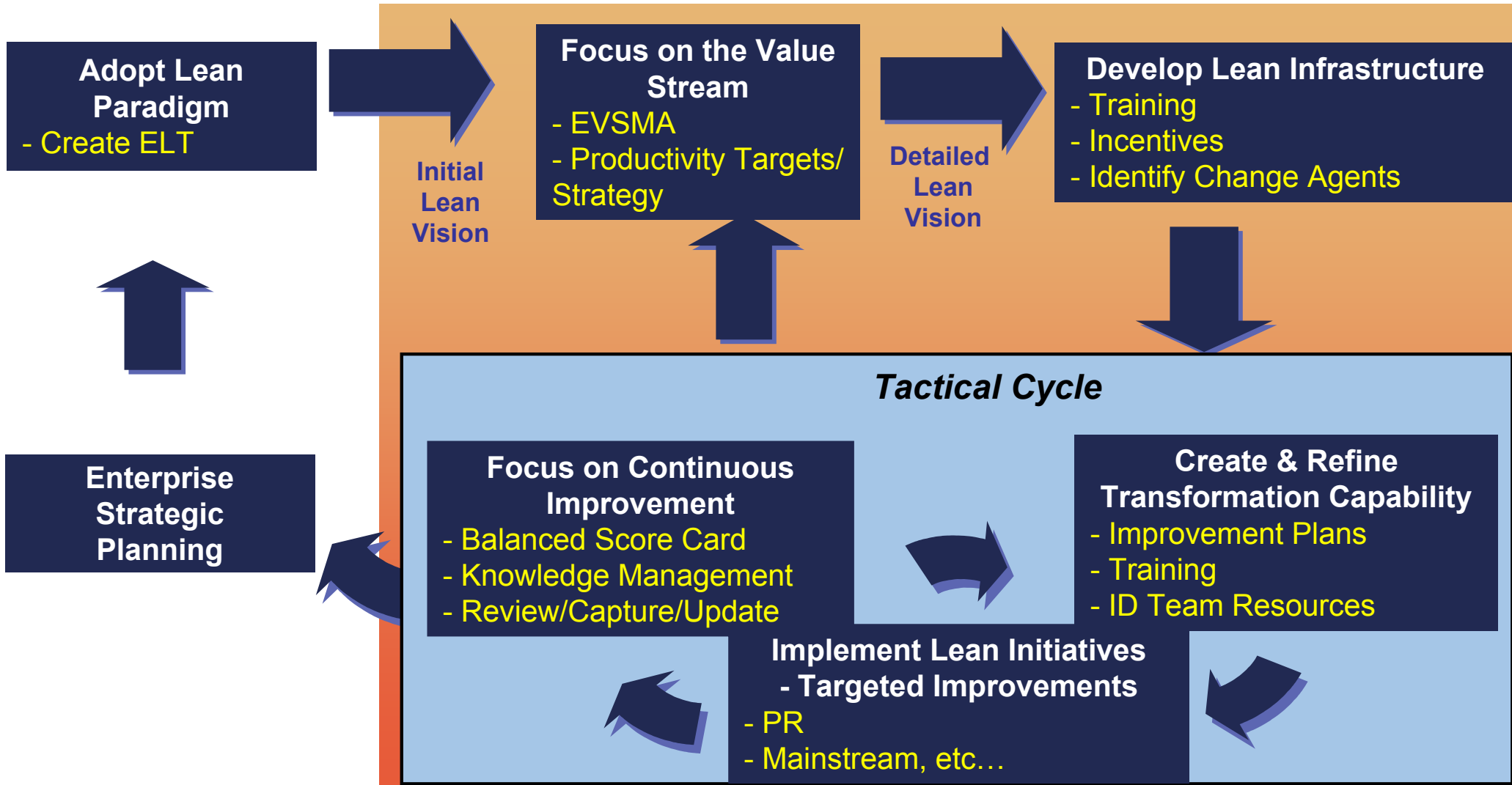


2004 – The Epiphany

Enterprise Transformation Strategy

OGDEN AIR LOGISTICS CENTER

Strategic Cycle





OO-ALC

Enterprise Transformation Framework

OGDEN AIR LOGISTICS CENTER

Be a Valued Team Member...

Be America's Best – Sustaining war-winning capabilities ... on time, on cost

Balanced Scorecard

Improve Weapon System Avail to 90%+

Support Readiness @ 100%

Reduce Flow Time 50%

Reduce Cost 25%

Exceed warfighters expectations for system avail & expeditionary sprt

Effective & efficient business practices; we anticipate demand and deliver products on time and on cost

An enduring culture of training, education, mentoring and CPI

Continuous Process Improvement

Challenges Met

OGDEN AIR LOGISTICS CENTER

- **Jan - Nov 2004: ELT Completed EVSMA**
 - Validated Vision – Be America’s Best
 - Established 10 yr BHAG and Initial Initiatives
 - First Cadre of Center Lean Experts Trained
 - Transitioned ELT to EEC
- **Jan 2004: F-16 Improved Aircraft Availability Initiative**
- **Dec 2004: Defined Center Governance**
- **Jan 2005: Defined Strategy Deployment Model**
- **Jun 2005: Senior Leader Lean Event Participation**
- **Aug 2005: Completed Center Balanced Score Card**
- **Sep 2005: Two Public Sector Shingo Award Winners**

Enterprise-wide Involvement – Bigger Production Targets

Challenges Yet

OGDEN AIR LOGISTICS CENTER

- **Continue maturation of our Transformation “Home Office”**
- **Continue Balanced Score Card development at Wing and Functional levels**
- **Establish Wing CPI Implementation Plans**
- **Continue lean infrastructure development**
- **Integrate dealt initiatives (PSCM, PSC, DMT etc)**
- **CPI Contract**
- **Customer expectations management**
- **Cultural change, acceptance & advocacy**

Institutionalize Continuous Process Improvement Foundation

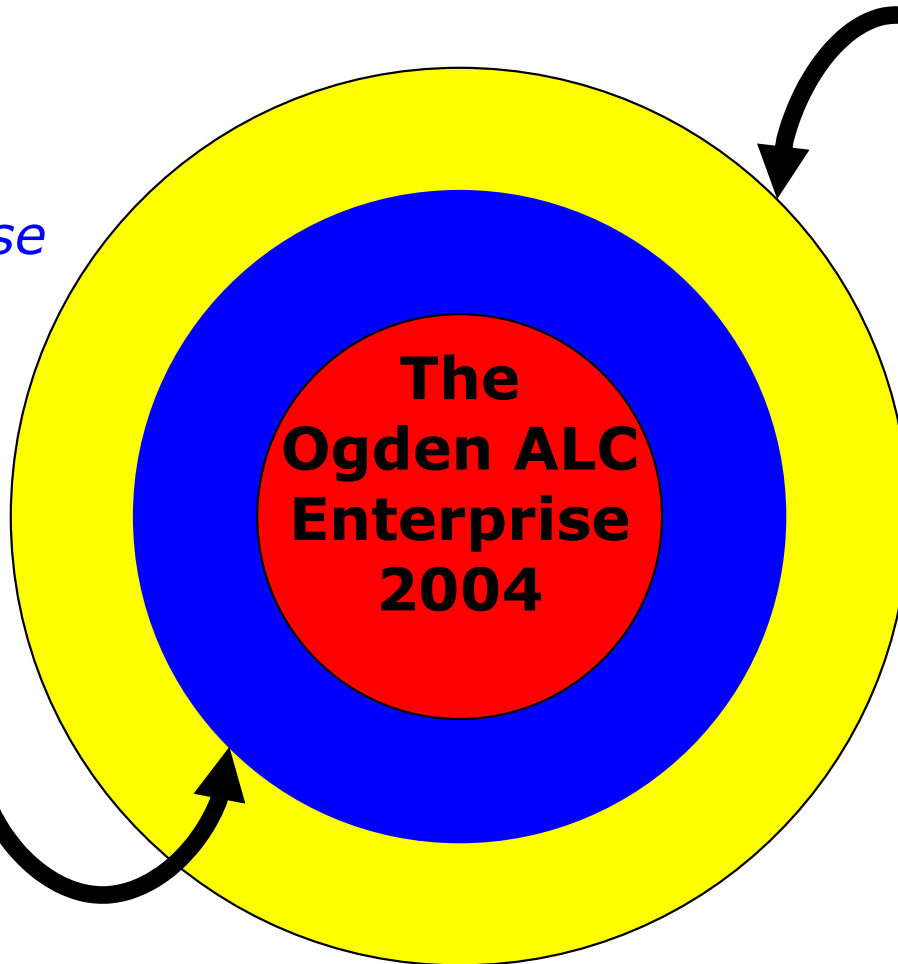
Enterprise 2005+

OGDEN AIR LOGISTICS CENTER

2005-2007—

Air Force Enterprise

- Other ALCs
- Product Ctrs
- Customers
- AF Stakeholders
- Partners
- Suppliers



2007-2014—

Aerospace Enterprise

- Other Services
- Other Federal
- Educational Instit
- All Stakeholders
- International Partners



OC-ALC

War-Winning Capabilities ... On Time, On Cost

Enterprise Transformation
“Where We Are Today”

US Air Force

Integrity - Service - Excellence

Be the undisputed best at performance based logistics and integrated sustainment

Develop a world class workforce, each person with the right credentials, training and experience

Make Tinker the partner of choice

**America's Air
Logistics Center -
the World's Leader
in Sustaining
Combat Capability**

Modernize the workplace with state-of-the-art tools, equipment and facilities

Best value to force providers
24/7

Lean key processes to increase equipment availability by 20% with 10% cost reduction over FYDP

Enterprise Strategy TODAY

AFMC Vision

“A valued team member...”

“America’s Air Logistics Center – The World’s Leader
In Sustaining Combat Capability...On-Time, On-Cost”

THEME EFFECTS

Provide a Mission
Ready &
Expeditionary
Focused
Workforce

Provide First Class
Customer Service Making
Tinker the Desired Place
to Work,
Play, and Live

Operate as a Single
Integrated Enterprise – Ever
Faster, Better, and More Cost
Effectively

Deliver War Winning
Capability to the
Warfighter Through
On-Time, On-Cost
Quality Products

Value Streams:

Aircraft

Engines

Commodities

Software

Fleet Support

Depot Maintenance

CENTER PROCESSES

Product Support

Purchasing & Supply Chain Mgmt

Mission Support

Enabling Processes

Engineering - Finance - Personnel - Information Technology - Plans & Programs - Contracting

INSTALLATION CAPABILITIES

Performance Assessment

Strategic Objectives



Initiative Prioritization Criteria

- **Deliver War-Winning Capability On-Time, On-Cost**
- **Operate as an Integrated Enterprise**
- **Provide Mission Ready Workforce**
- **Provide First-Class Customer Service**
- **Make Tinker the Desired Place to Work, Play and Live**

- **Strategic Focus**
- **Time to Completion**
- **Expected Return on Investment**
- **Financial Resource Availability**
- **Time to 75% of Expected Benefits**
- **Interdependencies**
- **People & Skills**



Summary

- **Transformation Underway**
 - **Changing our Culture**
 - **Marching to the Warfighter's Beat**
- **Integration Across Entire Value Stream**
- **Delivering Capability On-Time, On-Cost**

Guiding Principle

Focused Transformation of our Core Processes to Improve Reliability, Timeliness, Cost and Quality of the Capability We Provide in Support of the Combatant Commander

EVSSMA Role
in
Transforming
the ALC



Transforming the ALC: *The Challenge*

Transform:

- The Focus
- The Structure
- The Processes
- The Culture

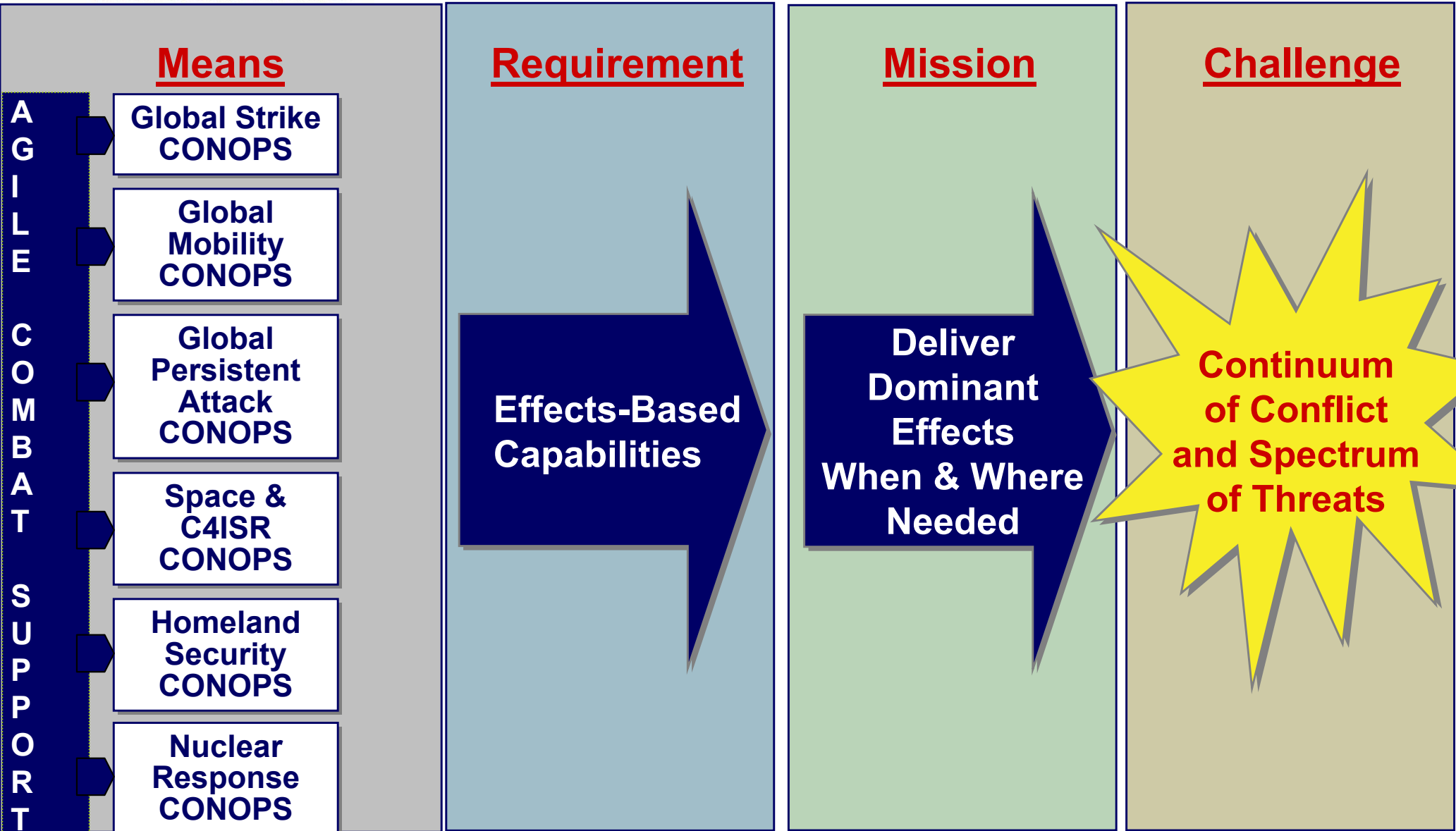
...enterprise wide

...within existing resources

...without putting our people at risk

While Fighting – and Winning The War!

Transforming the ALC: *The Context*





Scope of Lean

- **Umbrella for all Continuous Process Improvement (CPI) activities**
 - Lean, Benchmarking, Six Sigma, Software CMMI, and Theory of Constraints
- **Comprehensive Approach to CPI**
 - Orchestrate/integrate at Center level
 - Formal training for CPI experts
 - Standard work for standard processes
 - Measure both process improvement and organizational maturity
 - Lean concepts into Center strategic planning
 - 21 Change Manager, 78 core team facilitators
 - Over 1200 Lean events conducted, Average 30+ per month

Change Agents: Commanders & Directors



Why do EVSMA?

- **Robins had been “doing Lean” for six years**
 - Reaped “low hanging fruit”
 - Expanded Lean across depot maintenance
 - Achieved some significant breakthroughs (e.g., C-5 PDM)
- **But...**
 - Lean perceived as good for only industrial processes
 - Events were more ad hoc than integrated
 - Tactical versus strategic approach
 - Every Center “doing their own thing”

Needed an Enterprise Strategy for Lean

Why an EVSM?

Phase I

Phase II

World Class

Impose / Push / Manage
Tactical Level
Activity Based
Narrow in Scope
Random Selected Activity
High Visibility Events/Easy
Activity Measures
Lean Forum

Maturity Level 2

ALC Strategic Focus
Broad Scope
Based on Facts and Priorities
VSM to Achieve Future State
Integration
Performance or Output
Measures
Executive Council

Maturity Level 3

Strategic Partnerships
CPI Organization
Open Communication
High Performance
Work Teams
Supplier of Choice
Real Time Action
Data at All Levels
90% at Maturity
Level 4

Years 1 to 3

Years 4 to 5

Years 6 to 7

We were stuck!



EVSMA

What we did...

- **Worked with LAI to “Compress” the process**
 - Built on previous work
 - Standardized our approach with other ALCs

- **Senior Leadership worked Steps 1-5**
 - Validated much of previous understanding
 - Created new insights
 - Established strategic framework for Enterprise Transformation Integration



EV SMA *The Results*

- **Created our “BHAG”**

Be America’s Dominant Air and Space Sustainer

- **Confirmed**

- **Our Core Values**

Integrity, Service, Excellence

- **Our Core Purpose**

Provide capabilities to the war fighter

- **To protect our freedom**
- **To enable our Airman to securely execute their mission**
- **To export freedom to others**



EVSMA

The Results

- **Validated our goals**
 - **Create a normalized Air Force culture**
 - **Provide quality goods & services on time and on cost**
 - **Operate a quality installation with trained and enabled people**
- **Established specific action themes to achieve our goals**
- **Created strategic understanding of our stakeholders and their values**



EVSMA *The Results*

- **Identified and validated enterprise processes and their interaction**
- **Created alignment**
 - **Goals tied to values**
 - **Outputs tied to goals**
 - **Processes tied to outputs**
 - **Metrics tied to ALL**
- **Created vivid future state visions**



After EVSMA... Step 6

- **Strategic Alignment and Deployment (SA&D) is used to deploy strategic plans developed during our EVSMA process**
- **SA&D takes strategic themes to a tactical level**

SA&D...

Making our plans a reality



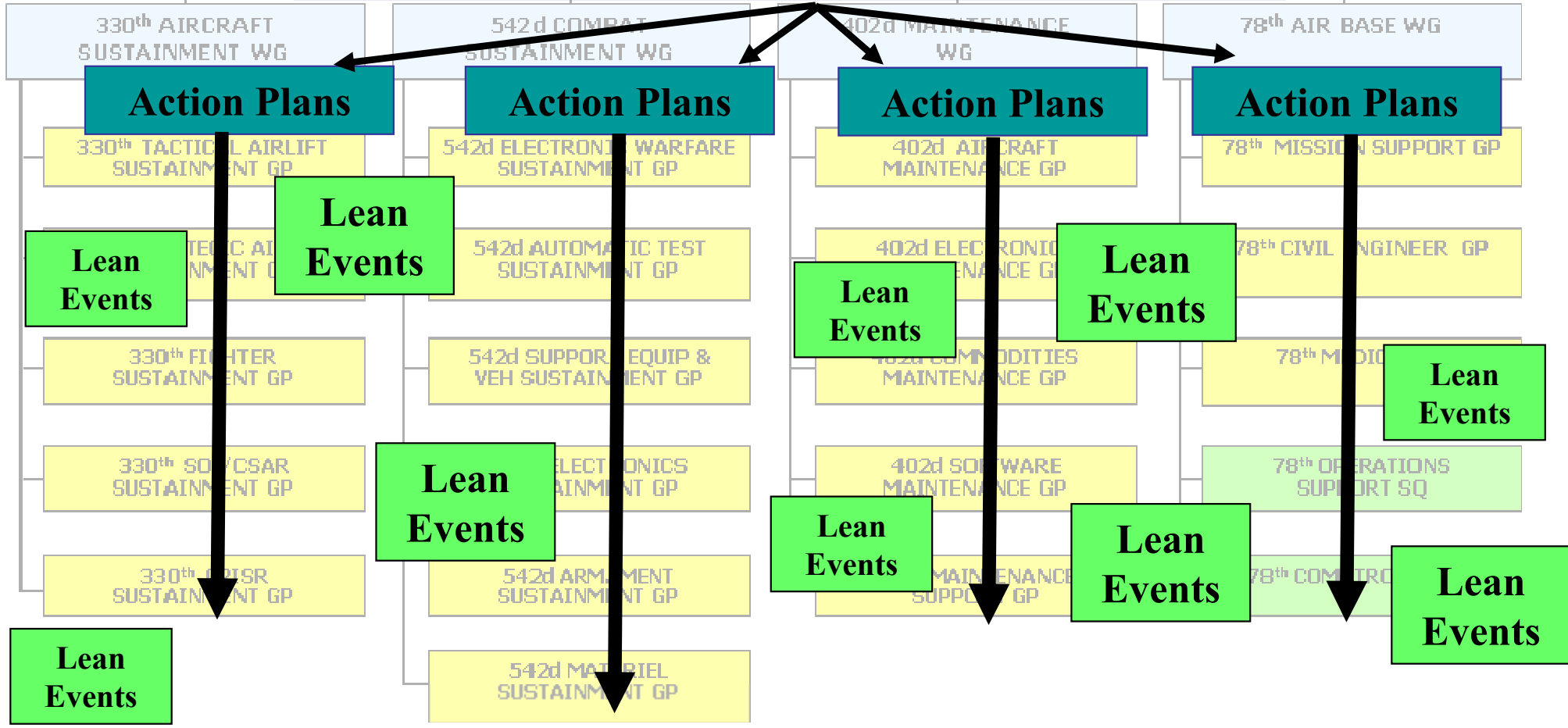
Integrated Enterprise Transformation

Goal and Objectives

WR / CG / CV / CD

STAFF OFFICES

Action Themes (cut across Enterprise)



Action on the Ground

Measuring Success

- **Current Performance Review Measures**

- 100% Training Attendance
- 50% Injury Reduction
- 10% Reduction in Grievances, EEO, MEO
- DUI Incidents
- 95% Due Date Performance
- 20% Increase in Aircraft Availability
- 10% Reduction in MICAPs, Back Orders, CWT
- Improve Technology Insertion
- 2% Reduction of Total Cost (DMAG Indirect)
- 5% or Less Price Change Impact to Net Sales
- 100% Lean Ship Training
- Medical Screenings
- 100% Training Templates Created
- Improve Work Environment

Aligned with Balanced Scorecard

More to Come...