
LAI Report

Compilation of Lean Now! Project Reports

Version 1.0 – October 2010

Prepared by:

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Dr. Eric Rebentisch

1 About LAI

The Lean Advancement Initiative (LAI) at MIT, together with its Educational Network (EdNet), offers organizational members from industry, government, and academia the newest and best thinking, products, and tools related to lean enterprise architecting and transformation. LAI is a unique research consortium that provides a neutral forum for sharing research findings, lessons learned, and best practices.

LAI offers:

- unique opportunities to engage with customers, suppliers, and partners to solve problems and share organizational transformation experiences
- a portfolio of thought-provoking knowledge exchange events and meetings
- innovative enterprise transformation products, tools, and methodologies

LAI researches, develops, and promulgates practices, tools, and knowledge that enable and accelerate enterprise transformation. LAI accelerates lean deployment through identified best practices, shared communication, common goals, and strategic and implementation tools honed from collaborative experience. LAI also promotes cooperation at all levels and facets of an enterprise to eliminate traditional barriers to improving industry and government teamwork.

The greatest benefits of lean result when the operating, technical, business, and administrative units of an enterprise strive for enterprise-wide lean performance. LAI is completing its fifth Enterprise Value phase, during which LAI has engaged in transforming aerospace entities into total lean enterprises and delivered more value to all stakeholders than would have been possible through conventional approaches.

Contact Information

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2 Overview of the LAI “Lean Now!” Initiative

In August 2002, the Principal Deputy to the Assistant Secretary of the Air Force for Acquisition and government co-chairperson of the Lean Aerospace Initiative (LAI), decided it was time for Air Force acquisitions to embrace the concepts of lean. At her request, the LAI Executive Board developed a concept and methodology to employ lean into the Air Force’s acquisition culture and processes. This was the birth of the “Lean Now” initiative. An enterprise-wide approach was used, involving Air Force System Program Offices (SPOs), aerospace industry, and several Department of Defense agencies. The aim of Lean Now was to focus on the process interfaces between these enterprise stakeholders to eliminate barriers that impede progress. Any best practices developed would be institutionalized throughout the Air Force and the Department of Defense. The industry members of LAI agreed to help accelerate the government-industry transformation by donating lean Subject Matter Experts (SMEs) to mentor, train, and facilitate the lean events of each enterprise. The industry SMEs and the Massachusetts Institute of Technology worked together to help the Air Force develop its own lean infrastructure of training courses and Air Force lean SMEs.

The focus of Lean Now! was to:

- Apply lean principles to government-industry critical processes
- Align organizational capabilities with war fighter requirements
- Leverage industry experience in process re-engineering, transformation and improving capabilities.

This document is a simple compilation of various “Lean Now!” project briefings that illustrate the different cases. The documents are:

1. Introduction to Lean Now!	Page 6
2. Lean Now! F/A-22 Briefing 1	Page 38
3. Lean Now! F/A-22 Briefing 2	Page 57
4. Lean Now! F-16 Briefing	Page 76
5. Lean Now! Global Hawk Briefing 1	Page 94
6. Lean Now! Global Hawk Briefing 2	Page 119
7. Lean Now! Global Hawk Briefing 3	Page 143
8. Lean Now! Turbine Engine Development Briefing	Page 151
9. Lean Now! Purchase Request Process Briefing	Page 165

Additionally, the following document is available at the LAI Website:

Jobo, R.S.: Applying the Lessons of “Lean Now!” to Transform the US Aerospace Enterprise – A Study Guide for Government Lean Transformation (83 pages). LAI Research Report, August 2003. Available at the LAI homepage [via this download link](#).

3 Summary of Key Points of Two Lean Now! Case Studies

3.1 F/A-22 Results

3.1.1 OFP Preparation and Load

- Touch Time - Reduced by 30%
- Span Time - Reduced by 52%
- Number of People Involved - Reduced by 43%
- Rework - Reduced 100%
- Non-Value Added Steps - Reduced 60%
- Process Team Members Understand the Complete Process.
- A True Team was Formed for the Future Process Refinements

3.1.2 Maintenance Process Value Stream Analysis

- Instrumentation Lab 6S Project
- Pratt & Whitney Data Delay Resolution
- Timely Flight Squawks Resolution
- Green Belt Training
- Established a CTF Continuous Improvement Plan

3.1.3 Ground operations and Crew Chief Communications

- Improved Communications with Ground Ops/Maintainers/FTEs
- Cross Trained Maintainers to do “Engineering” Duties
- Improved engineering coverage across all shifts
- Test constraints affecting AC reconfiguration and resource availability identified to CTF Management

3.1.4 Action Request (AR)

- Touch time reduced by 78%
- Span time reduced by 97%
- 98% of all expedite AR’s should meet goal of 4 hours or less

3.1.5 Missile separation tests

- Reduce span times for separation by 20%
- Avionics missile launch span reduced by 26%
- Reduced data analysis process time for separation by 21%
- Reduced avionics missile launch analysis time by 45%

3.2 Global Hawk Results

3.2.1 Supplier Improvements

- 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

3.2.2 Cycle Time Reduction

- Alpha Contracting: 37% Initial Reduction of 5 Months
- Change Process: 63% Reduction from 95 to 35 Days
- Production Delivery Cycle: 38% Reduction per Schedule BL-10
- Supplier Delivery Reductions Documented

3.2.3 Enterprise Value Stream Mapping

- Completed Tier I Enterprise VSM
- Updated Tier II Production VSM
- Supplier VSM's for Raytheon, L-3, Aurora
- Engineering Development VSM
- Process Level Value Stream Maps: Alpha Contracting and Change Process

3.2.4 General Achievements

- 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

Part 1: Introduction to Lean Now!

Terry Bryan: **Transformation – LAI and the Air Force “Lean Now!” Initiative**. September 2003.
31 pages



Transformation.... LAI and The Air Force “Lean Now” Initiative

Presented By:

Mr. Terry Bryan
MIT-LAI Stakeholder Co-Director

9 September, 2003



Transformation

- **Requires evolutionary changes in business culture, institutions and processes**
- **Rapid response to needs of war-fighter
...reduced acquisition and logistics span times**
- **Budgetary realities focus program managers on total ownership cost**
 - **Improved life cycle effectiveness and efficiency**
- **Learn from those who have “done it”**
 - **Industry based deployment and projects**

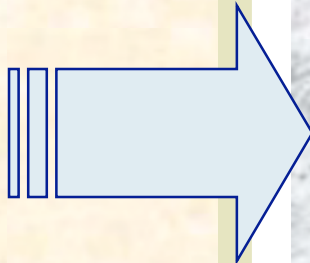


Lean is a process of eliminating waste with the goal of creating value for enterprise stakeholders.

-Lean Enterprise Value, Murman et al

Lean Transformation is about:

- Customer-focus
- Knowledge-driven
- Eliminating waste
- Creating value
- Dynamic and continuous



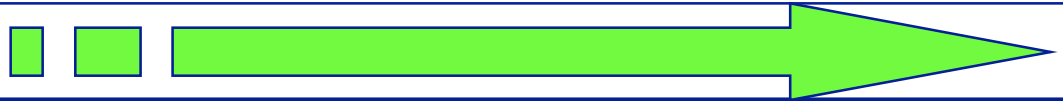
The Fundamentals:

- Specify value
- Identify the value stream
- Make value flow continuously
- Let customers pull value
- Pursue perfection



The Boundaries of Enterprise Transformation are Merging... Unified Framework for Fundamental change

Evolutionary



	Total Quality Management	Reengineering	Traditional Six Sigma	Lean
Goal	Meet Customer Expectations	Breakthrough Solutions	Reduce Variation in Enterprise	Eliminate Waste to Create Value
Focus	Product Quality	Business Processes	All Sources of Product Variation	All Enterprise Processes & People
Change Process	Incremental	Radical	Process-specific; continuous	Evolutionary Systemic
Business Model	Improve Efficiency & Shareholder Value	Increase Enterprise Performance & Customer Value	Minimize Waste & Increase Customer Satisfaction	Deliver Value to All Stakeholders



Concentration is on Government-Industry Interfaces



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

3



LAI: Where We Are Going



Action Oriented, Fact Based . . . Delivering Value to the Total U.S. Aerospace Enterprise

The Total US Aerospace Enterprise Value Creation Leveraging Consortium Knowledge to Accelerate Transformation



The “Burning Platform” - Value Creation



- **Value stream focus**
 - Create value
 - Eliminate waste
 - Adapt quickly to new challenges
- **Get it faster with fewer resources**



Lean Now Objectives



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- **Purpose: Accelerate Transformation of Total Enterprise (Government and Industry)**
 - **Leverage our Collective Knowledge and Efforts**
 - **Support Elimination of Barriers that Impede Progress**
 - **Capitalize on Government and Industry Teamwork**

- **Result: Enterprise-wide Capable and Affordable Processes**
 - **Stimulate an Environment that Quickly Responds to New Challenges and Uncertain Circumstances**



Lean Now!



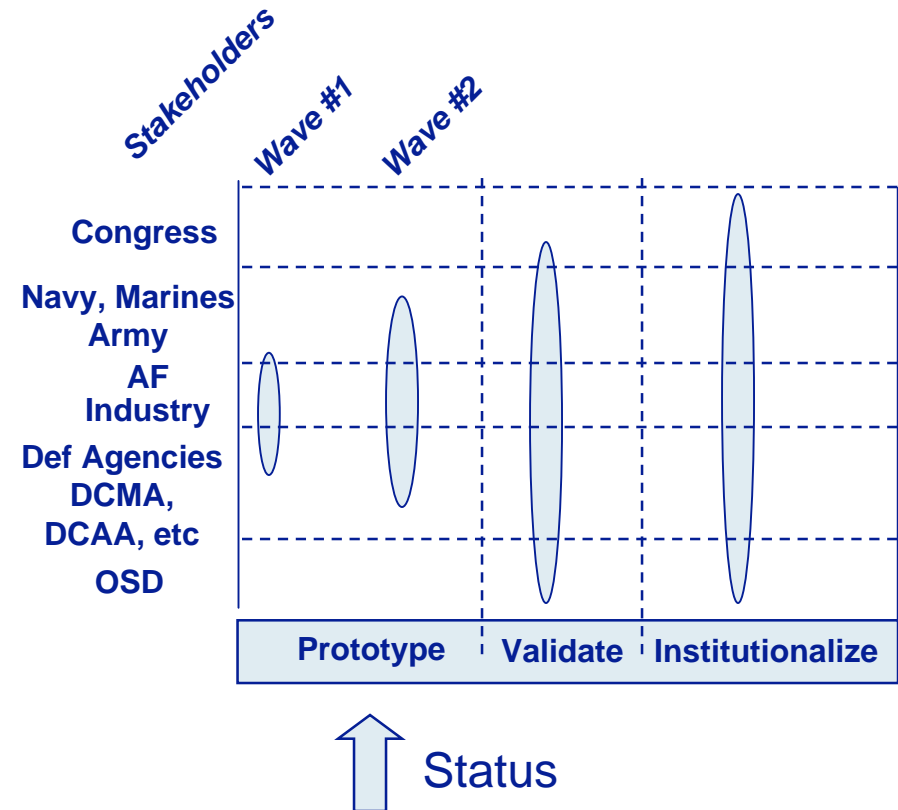
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- **Lean Now Background**

- AF & LAI Concept – Supporting Government Transformation
- Focus on Government-Industry *Critical* Interfaces
- LAI Provides Venue, Coaches and Common Methods/Tools
- “Design for Institutionalization”

- **Status of Prototyping**

- Wave #1 – 3 prototypes
 - Contract Close Out (F-16)
 - Test and Evaluation (F/A-22)
 - Alpha Contracting (Global Hawk)
- Wave #2 – Launched

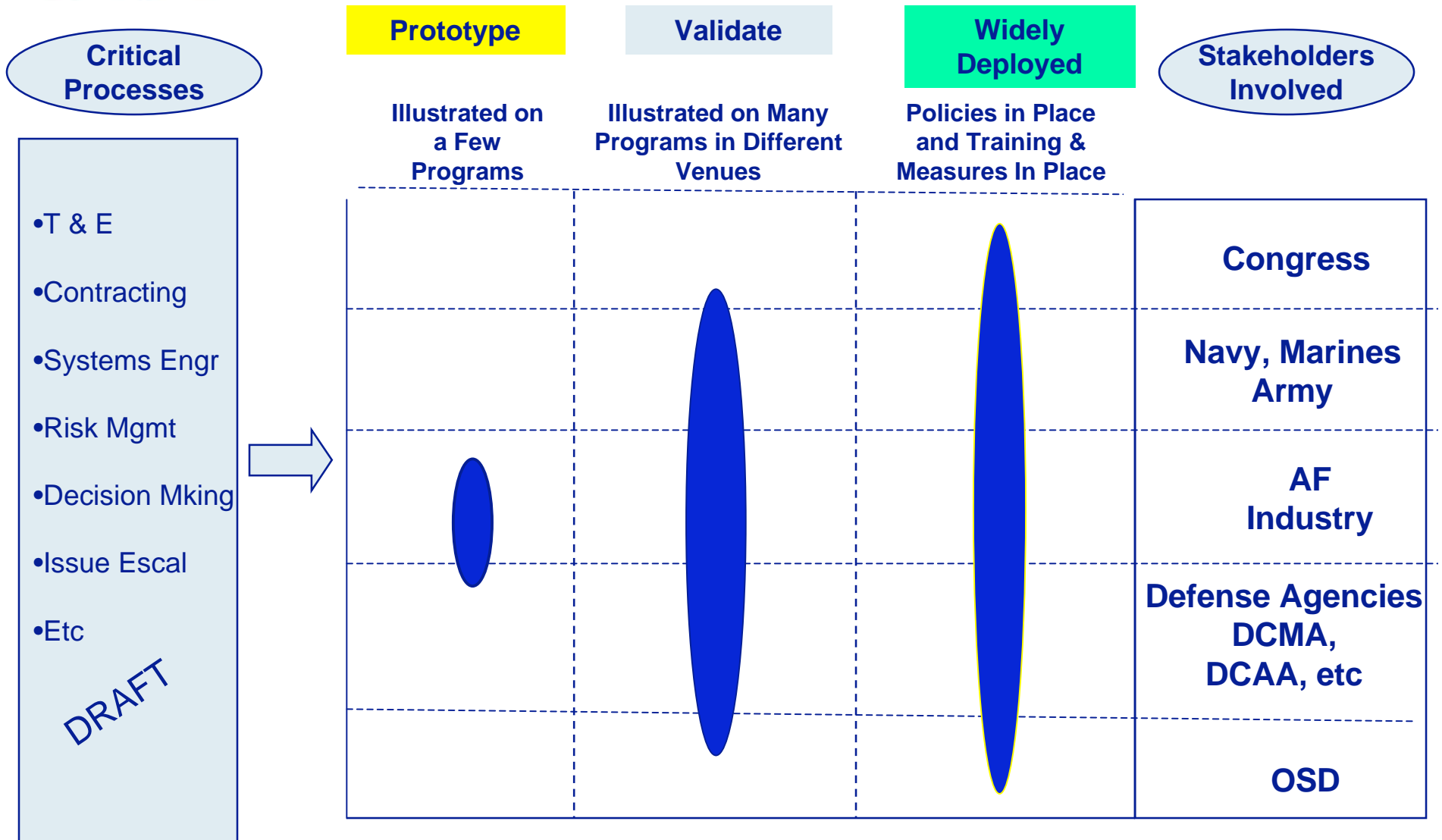


Effective Transformation Involves the Total Enterprise
 ... Lean Now Provides a Mechanism to Catalyze & Speed Transformation



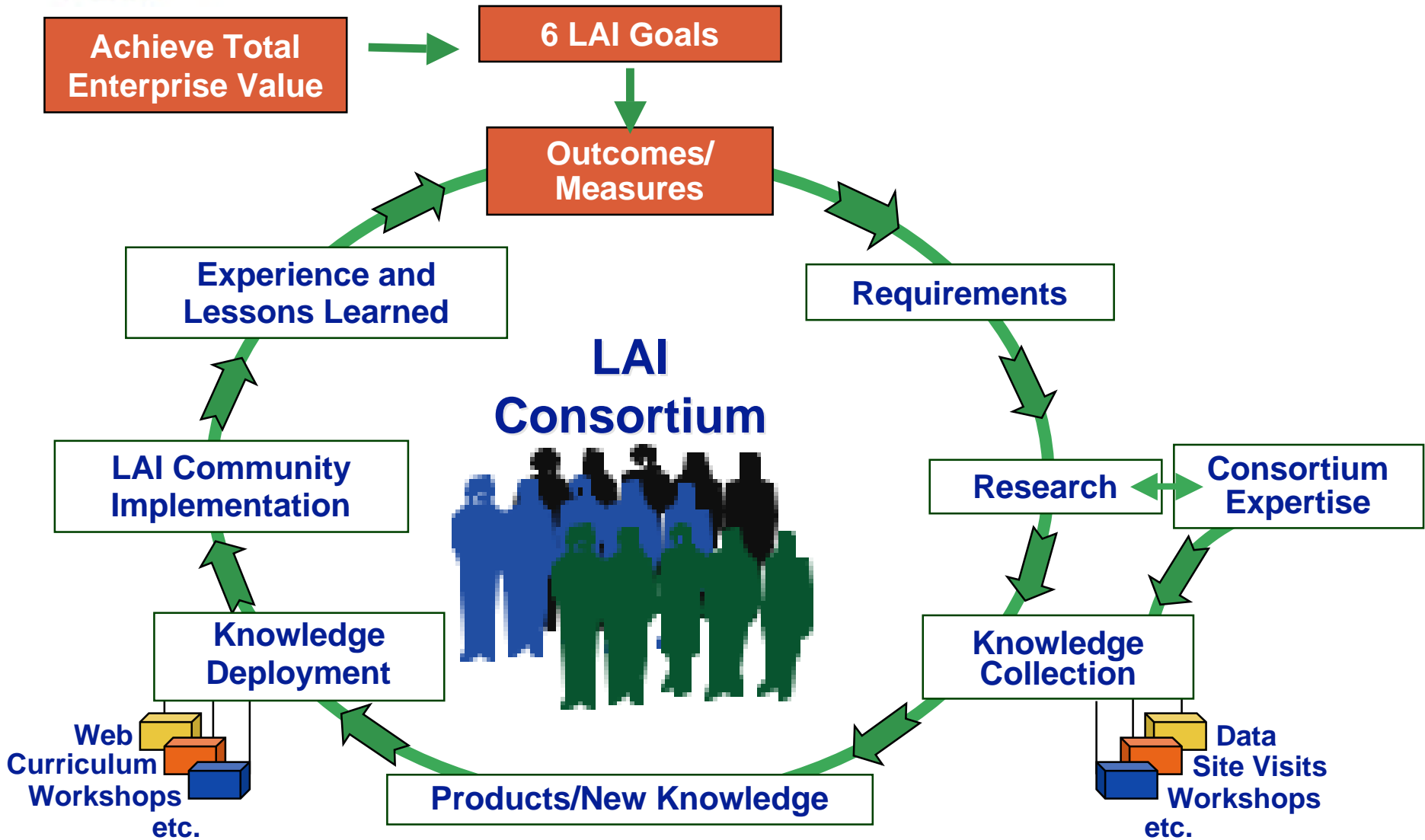
Lean Now Provides a Framework

...for moving from a few prototype illustrations to widely deployed use and achievement of agility?



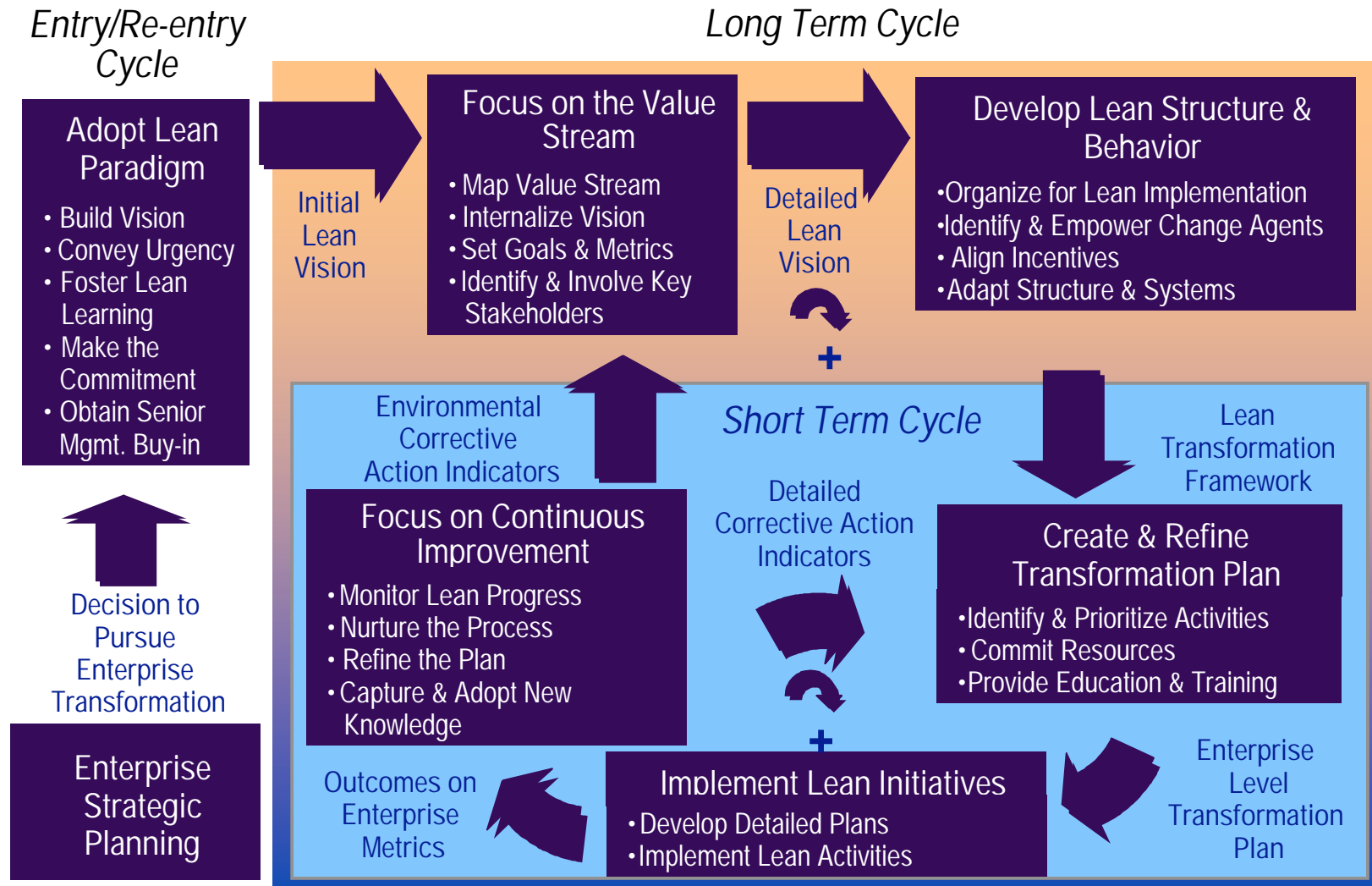


Engaging Stakeholders Through the LAI Knowledge Cycle





Transition-To-Lean Roadmap





Lean Now...Supporting and Accelerating the Lean Transformation of Government

Lean Now

- **A Government Initiative...a Total Enterprise Team Facilitated Through The LAI Venue**
- **Leverages Collective Knowledge To Eliminate Barriers...capitalize On Government And Industry Teamwork**
- **Industries Experience In Large Scale Change**
- **Cadre Of Coaches... Subject Matter Experts**
- **Spiral Approach**

Accelerate Value Creation And Eliminate Non-essential Activity – Apply Lean Principles To Government-industry Critical Processes:

- 1.User-SPO-industry Program Interfaces**
- 2.AF-industry Business Processes**
- 3.AF-industry Operating Processes**



Lean Now: The Collaborative LAI, AF/DOD, and Industry Initiative

The Process

**Government
Industry
Labor
Academe**

- **Select Candidate Processes**
- **Select Candidate Programs**
- **Assign SMEs (Gove/Industry)**
- **Launch Prototype Projects**

**Outcome: Rapidly
Deliver Capability to
War Fighter**

- 1: Leverage Collective knowledge and efforts**
- 2: Eliminate barriers**
- 3: Capitalize government and industry teamwork**
- 4: Leverage prototypes to drive deployment**
- 5: Create environment that quickly responds to new challenges and uncertain circumstances**



Applying Lean Principles ...LAI Tools & Methodologies Deployed for Lean Now

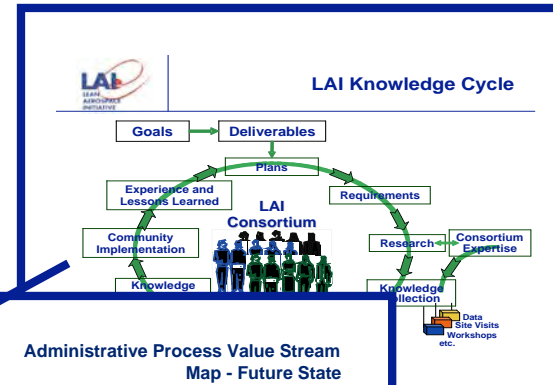
Knowledge Deployment

Ten Years of Collaborative
Research and Experience
Pays Off!

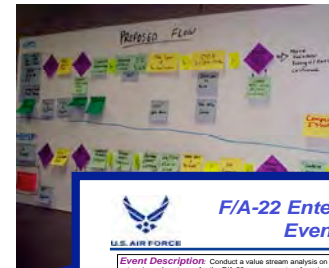
Lean Now Tools & Methods

- LESAT (GLESAT)/TTC
- Lean Now Workshop
- Prototype Selection Protocol
- Event Planning Template
- Enterprise VSMs
- Root Cause Analysis

LAI venue allows coaches & trainers from all member companies to support Government initiatives



Administrative Process Value Stream Map - Future State



Project Finalists

Projects	Criteria Meets	Desires		No Neg. Impact on 2012	No Neg. Impact on 2013	No Neg. Impact on 2014	No Neg. Impact on 2015	No Neg. Impact on 2016	No Neg. Impact on 2017	No Neg. Impact on 2018	No Neg. Impact on 2019	No Neg. Impact on 2020	No Neg. Impact on 2021	No Neg. Impact on 2022	No Neg. Impact on 2023	No Neg. Impact on 2024	No Neg. Impact on 2025	No Neg. Impact on 2026	No Neg. Impact on 2027	No Neg. Impact on 2028	No Neg. Impact on 2029	No Neg. Impact on 2030	Score
		Yes=3	No=1																				
1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	155
2	3	1	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	148
3	1	3	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	144
4	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	144

F/A-22 Enterprise VSM Event Summary

Event Description: Conduct a value stream analysis on the enterprise value stream for the F/A-22 weapon system focusing on the interface processes between the F/A-22 Team Members.

Event Dates: February 3-7, 2013
Wright-Patterson AFB

Co-Leaders: Don Hendell (LM F/A-22)
TBD (F/A-22 SPO)

Team Members:
Roger LAM (TBD (F/A-22 SPO))
Randy LAM (TBD (F/A-22 SPO))
Steve LAM (TBD (F/A-22 SPO))
Scott Chen - TBD (LM) (TBD (F/A-22 SPO))

Preliminary Objectives:
Development of a detailed lean improvement plan
- Clear, achievable targets in cost and span reductions
- Data driven decisions on improvement areas
- Milestone-driven schedule of lean events to achieve targets

Value Proposition: This activity will document the breadth of the F/A-22 value stream running from issuing RFP to processes that support the fielded system. It will include the vertical integration of SPO, DCMA, LM, Boeing & RWV. Key milestones at the horizontal and vertical boundaries will be documented and analyzed.

Process Information: Value stream mapping has been used as a tool on the F/A-22 Program. Future VSM activity will be used as input for this event.

Reconciliation Root Cause Analysis

- **Issue:**
 - Many of the inactive and active old, ugly contracts are unreconcilable
- **Root Causes:**
 - Missing records/not reproducible
 - i.e. Mods, Letters of Completion (LOCs), Letters of Transmittal
 - Payment discrepancies (invoices not equal to funds received)
 - Misapplied work in progress (WIP) (a.k.a unliquidated progress payments)
 - Mismatched disbursements
 - Contractor bills by CLIN; DFAS pays by ACRN
 - Payment instructions not followed – algorithm applied
 - Contract complexity - # of mods, # of ACRNs, # of CLINs
- **By Product:**
 - Utilizing many stakeholder resources
 - Diverted from other contract closeout work
 - Many "tiger teams" established over many years
 - Extra billings and contract mods
 - Closeout delays (years)



Lean Now Prototypes...Summarized

- **F/A-22: Operational Flight Program (OFP) install timeline (Lockheed Martin, Boeing)**
 - Decreased timeline from 34 to 8 days
 - Aggressively attacking new areas
- **F-16: Contract closeout (Lockheed Martin, Boeing)**
 - Attacking policy constraints blocking efficient and logical contract closeout
 - Leveraging DCMA, DCAA, and DFAS participation
 - Closing contracts with 3000 mods will free up huge resources in manpower and funding (\$Bs in Unliquidated Obligations)
- **GLOBAL HAWK: Alpha Contracting (Northrop-Grumman, Raytheon)**
 - First ever enterprise-wide VSM
 - Attacking key cycle times and cost drivers
 - Building better acquisition strategy





Workshops Conducted Throughout Prototype Projects



17 - LMSC 8-9 September, 2003



F/A-22 Combined Test Force (CTF)



18 - LMSC 8-9 September, 2003

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F/A-22 CTF OFP Prep & Load Results

- **Quantitative:**
 - **Touch Time - Reduced by 30%**
 - **Span Time - Reduced by 52%**
 - **Number of People Involved - Reduced by 43%**
 - **Rework - Reduced 100%**
 - **Non-Value Added Steps - Reduced 60%**
- **Intangibles:**
 - **Team Members Understand the Complete Process.**
 - **Team formed for Future Process Improvements**
- **Similar event ran on production floor in Marietta, in Aug 02, with similar results**



Where Are We Headed?

- **Perform LESAT in Summer of 03**
 - **Performed initial LESAT in Spring of 02**
 - **Measure progress**
- **Follow-up on many F/A-22 Program identified areas of improvement opportunities**
 - **Elevate to folks that care & can influence change when necessary**
- **Begin focusing on development of lean supplier networks**
- **Compile Lean Now journey lessons learned & observations**
 - **Communicate & share with wave 2 prototypes**



F-16 Inactive Contract Closeout



21 - LMSC 8-9 September, 2003

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Contract Close Out Prototype

...F-16 Team & LAI's Structured Approach



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- **Lean Now: Objectives of Prototype**
 - **Reduce Waste:** backlog, cycle time, inefficient use of human resources
 - **Add Value:** Cost avoidance, savings, and reduce cycle time
- **Total Enterprise Team Involved**
 - SPO & ASC Business Management
 - DCMA (Contract Management Offices, District and HQ)
 - DCAA (Field Support Offices, Regions)
 - DFAS (Columbus, HQ AFMC Client Exec)
 - LM PO & Functional Business Mgmt
 - LM Shared Services





F-16 Contract Closeout Lean Initiative Current Actions

- **Expansion of DCMA Q-Final authority to cost-type contracts**
 - Estimated \$0.24M cost avoidance on existing F-16 contract backlog
- **Develop cost-effective approach to closeout of small value cost-type contracts (\$10K or less)**
 - Estimated \$2.4M cost avoidance on existing F-16 closeout backlog
- **Settlement process (versus ACRN bottom-line reconciliation)**
 - Estimated three-to-seven year contract closeout cycle time reduction
- **Subcontract closure guidelines for assist audits**
 - May eliminate need for assist audits if Sub audited under another contract



Global Hawk Alpha Contracting



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Current Actions

- **Documenting cost savings**
 - **Affordability metrics being developed to track and confirm gains**
- **Evaluating proposals on Integrated Comm Suite for STE and CMS**
- **Implementing alpha contracting process**
 - **Event-based vs. schedule-based – exercising Goldblatt’s Theory of Constraints**
- **Maturing Enterprise VSM beyond Tier I**
 - **Focused on cycle time reductions for production and development**
 - **“Speed-to-market” critical for spiral development**



Future Plans

- **Solidify gains via documentation and metrics**
 - **New EMD Award Fee language requires contractor to practice lean and document results**
- **Develop other lean team leaders within program office**
 - **Facilitates culture change and reduces bottleneck**



The Wave 2 Prototypes

Process Focus	Prototype	Supporting Industry Member
AEDC		
Engine Development	Turbine Engine Development	Rolls Royce (N.A), Pratt & Whitney
ESC		
Flight Manual Development	Joint Stars Flight Manuals	Northrop Grumman, Rockwell Collins
OO-ALC		
Supply Chain Management	Traveling Wave Tube Repair	Raytheon, Textron
DAU		
Course Development	Course Development Cycle Time	Raytheon (RLI), MIT

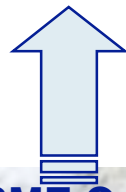


Wave 2 Launched... The Journey Continues

- Turbine Engine Development /Sustainment
- Flight Manual Development
- Supply Chain Management
- DAU Course Development

Supporting LAI Members

- Boeing, Lockheed Martin, MIT, Northrop Grumman, Pratt and Whitney, Raytheon, Rockwell Collins, Rolls-Royce, Textron



Wave 2 Project SME Conference - Hosted By LM Aeronautics, Marietta, GA

- Orientation for new SMEs
 - Wave 1 project reviews, lessons learned and
 - Wave 2 project introduction
- Initial Engagement with Government teams

Strategic Planning Events

Critical to Success of Lean Now Initiative

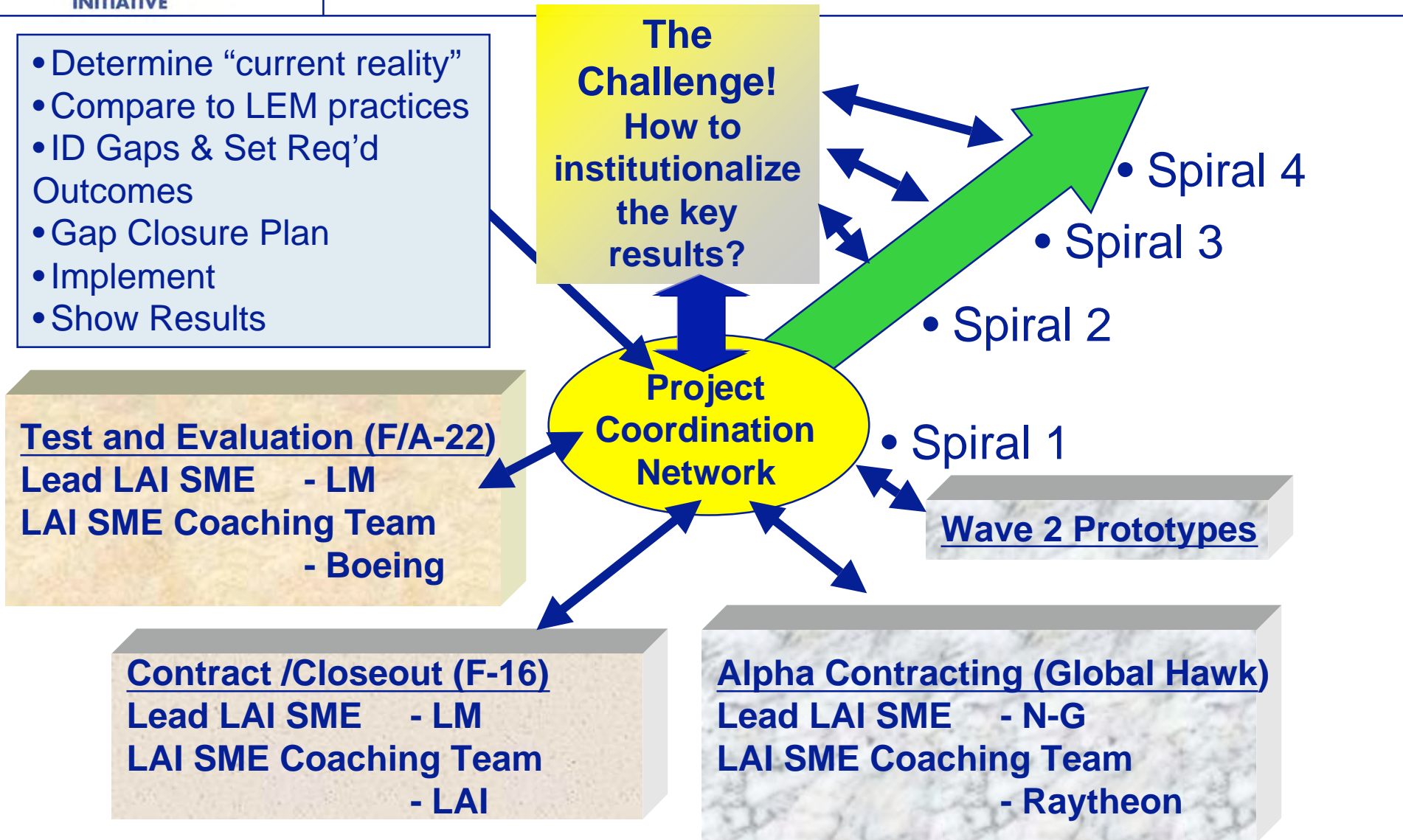
- Enterprise Definition/Boundary Conditions
- LAI Interface
- Agile Acquisition and Lean Now

September, 2003

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The Challenge...Leverage and Institutionalize the Findings





Summary and Next Steps

- ***Lean Now* Provides a Mechanism to Support and Accelerate Transformation Across the Total Enterprise**
- **AF is Using *Lean Now* as one Approach to Identify Improvement Initiatives for AF Corporate Board Escalation to OSD**
- **Continued HQ DCMA & OSD participation in LAI and *Lean Now* is Requested**
 - **The LAI Venue Of Government – Industry – Labor – Academia is Aligned To Support Government Transformation**
 - **Lean Now is Focused on “Multi-Organizational Interfaces” and Provides a Path to Institutionalizing**



Just Do it



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Part 2: Lean Now! F/A-22 Briefing 1

Greg Staley: **F/A-22 Lean Now! – Status Briefing to the LAI Plenary Conference**. March 2003.
18 pages



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F/A-22 Lean Now

**Status Briefing to the LAI Plenary
Conference**

26 March 2003

Greg Staley, ASC/YFPO

Don Handell, Lockheed Martin



F/A-22 Lean Now Agenda



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F/A-22 Lean Now Team

Spiral 1 Event, 3 - 6 December 2002

F/A-22 Operational Flight Program (OFP) Preparation and Load Process At Edwards AFB Combined Test Force (CTF)

CTF Operations Value Stream Map (VSM) Event, 27- 29 January 2003

Spiral 2 Event, 3 - 7 February 2003

F/A-22 Enterprise VSM Event

Generated 20 Program Improvement Actions

Future Plans

Follow F/A-22 Strategic Lean Implementation Plan

Communicate Experiences With Other Programs & Organizations

F/A-22 Lean Implementation Observations



F/A-22 Lean Now Team



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Core Team (Trained Lean Facilitators)

LAI Stakeholder Co-Director – Terry Bryan

LAI Lean Expert Lead – Tracy Houpt (LM Aero)

LAI Lean Expert – Wes Switzer (Boeing)

F/A-22 Lean Coordinator – Don Handell

F/A-22 SPO Lean Expert – Brian Townsend

F/A-22 SPO Lean Team – Greg Staley

Boeing F/A-22 Lean Expert – Rhonda Smith

P&W F119 Engine Lean Integrator – Ida Gall

Event Teams

Subject Matter Experts as Required By Each Event

Will Include Needed Stakeholders and Key Discipline Experts



F/A-22 CTF OFP Prep & Load Event Plan Summary



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<p>Date: 03 - 06 Dec 02</p> <p>Prototype Description: F/A-22 CTF OFP Prep & Load Lean Event</p>	<p>Team Leader: Bill Parker, LM Aero Co-Leader: MSgt Keith Douglas, F/A-22 SPO MSgt Ray Blecher, ACC/SMO-22 IMIS</p>
<p>Preliminary Objectives: Define and lean the process to validate aircraft hardware/software configuration for loading a new software release on a F/A-22 at CTF to reduce the span time by 33 – 50%.</p>	<p>Team Members: Edwards Configuration Management - Jeff Mack Edwards IMIS - TSgt Miller Edwards QA - Peter Thime IMIS Systems Engineer - Bob Weller IMIS Palmdale – Kevin Reilly Systems Engineering - Tom Curry Palmdale SQA - Bill Pruin F/A-22 SPO Avionics Production - Greg Staley LM 21 SME – Venkat Ramnath LM21 SME - David Schoenwetter LM Aero Black Belt – Randle Wright LAI Lean Expert (Boeing) – Wes Switser LAI Stakeholder Co-Director – Terry Bryan Pratt&Whitney – Eric Ogren AFOTEC – SMSgt Chicado</p>
<p>Value Proposition: Software load is critical & challenging step in the flight test value stream. Topic focused event will enable better CTF – Palmdale asset management & guide future related events for further improvement in test sortie generation.</p>	<p>Process Owner: Bill Parker and David Lloyd LAI SME: Tracy Houpt (LAI) LM SME: Rich See (LM F/A-22) Case For Action: Takes too long, with many issues related to hardware /software configuration compatibility</p>
<p>Process Information: This process starts when a new software release is available and completes when the F/A-22 aircraft software is installed and documented.</p>	

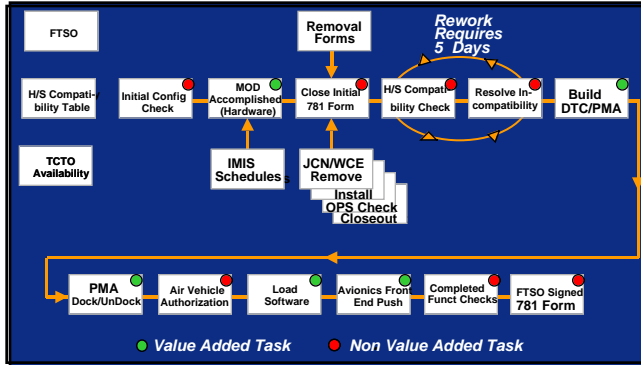


F/A-22 CTF OFP Prep & Load Process



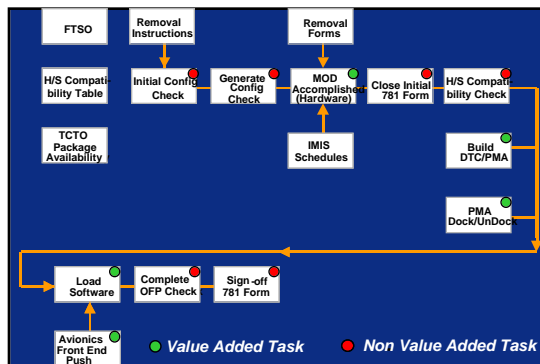
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As – Is Flow



144 Suggestions
Covering 15
Major Issue Categories

To – Be Flow



21 Event “Newspaper”
Actions to address
Issues



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F/A-22 CTF OFP Prep & Load Results



- Quantitative:
 - Touch Time - Reduced by 30%
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 - Rework - Reduced 100%
 - Non-Value Added Steps - Reduced 60%
- Intangibles:
 - Process Team Members Understand the Complete Process.
 - A True Team was Formed for the Future Process Refinements
- Team To Run Similar Event For Nellis AFB F/A-22 Maintainers In 2nd Quarter Of 2003



F/A-22 CTF VSM Event Plan Summary



U.S. AIR FORCE

<p>Event description: Conduct a Value Stream Analysis (VSA) of the CTF (Arrival to departure of an F/A-22 Aircraft)</p>	<p>Event Date: 27-29 January Champion: John Piper Team Leader: Sam Autry</p>
<p>Preliminary Objectives:</p> <ul style="list-style-type: none"> Conduct a VSA at the CTF (Arrival to departure of an F/A-22) - Map current process state and identify waste - Identify improvements and opportunities - Develop a Strategic Plan that will mitigate risk and expedite aircraft processing - Begin institution of 6S Principles <p><i>A key product of the event will be a strategy for a 6-12 month plan to eliminate waste, standardize work and improve process capability and flow at the CTF.</i></p>	<p>Team Members:</p> <ul style="list-style-type: none"> Jim Coleman - Lean POC at CTF John Becker - MRP Jim King - Customer Support Larry McPeak - Operations Planning Ron Hoerner - Industrial Engineering Morris Myers - DCMA Jeff Bishop - Maintenance Jason Ritter - Black Belt Don Wilson - 6S Site Lead(Palmdale) Brent Stenseth - Instrumentation Vern McKim - Data Processing Randy Spink - Avionics Maintenance Julie Dioszegi - Lead Ground Ops (MA) Shawn Darden - Avionics Technician MSgt Wagner - APG Flight Chief MSgt Cross - ACC Pro Super Dwayne Amaral - APG Crew Chief
<p>Customer Requirements:</p> <p>Meet Customer demand by completing aircraft as expeditiously as possible</p>	<p>Process Owner: David Lloyd</p> <p>Coach: Randle Wright – Black Belt</p>
<p>Current Situation & Problems:</p> <p>In order to enhance process capability of the aircraft, we must have a clear understanding of the current process state. The VSA will provide that.</p>	

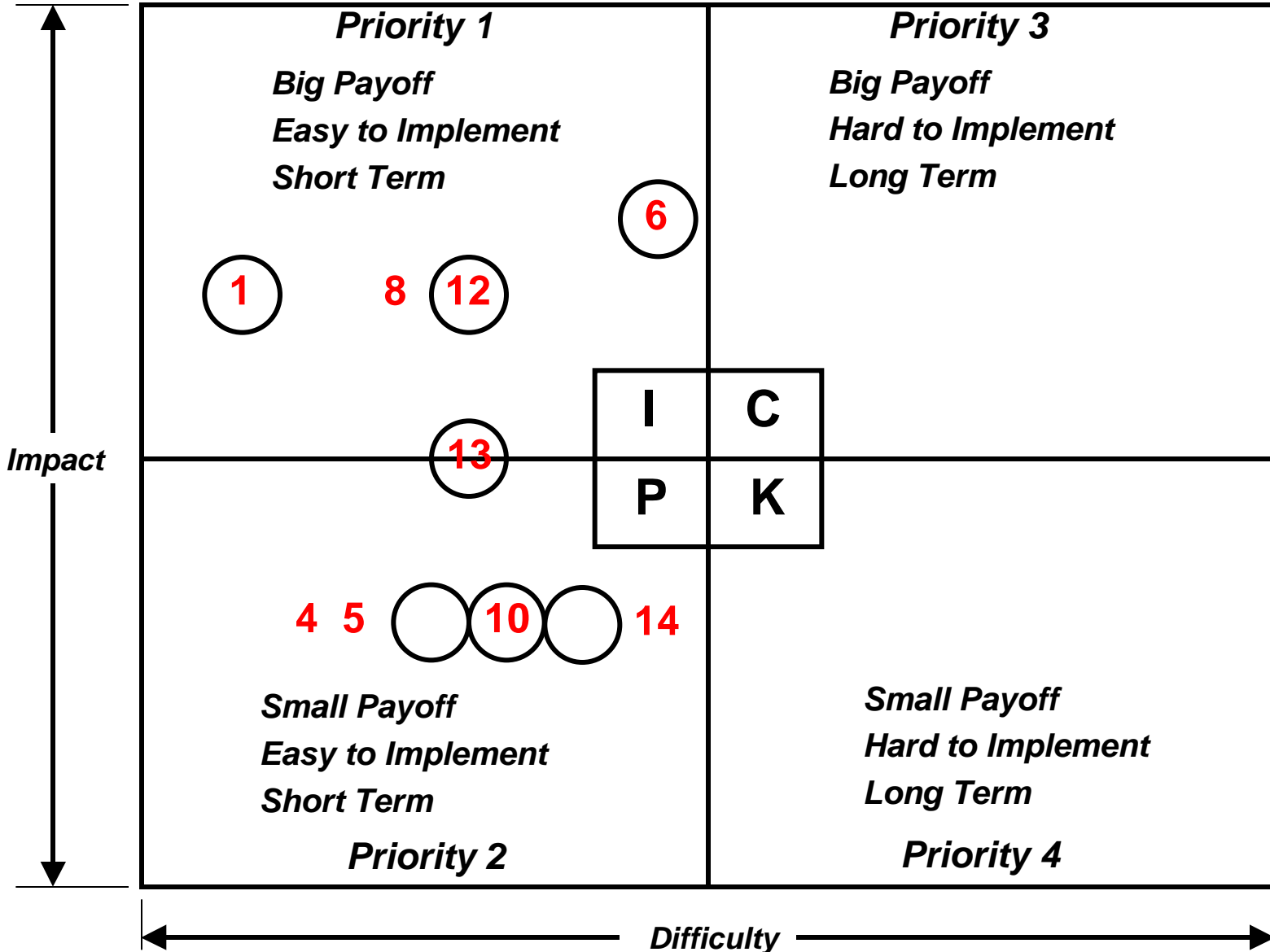


CTF VSM PICK Results

(Possible, Implement, Challenge, Kill)



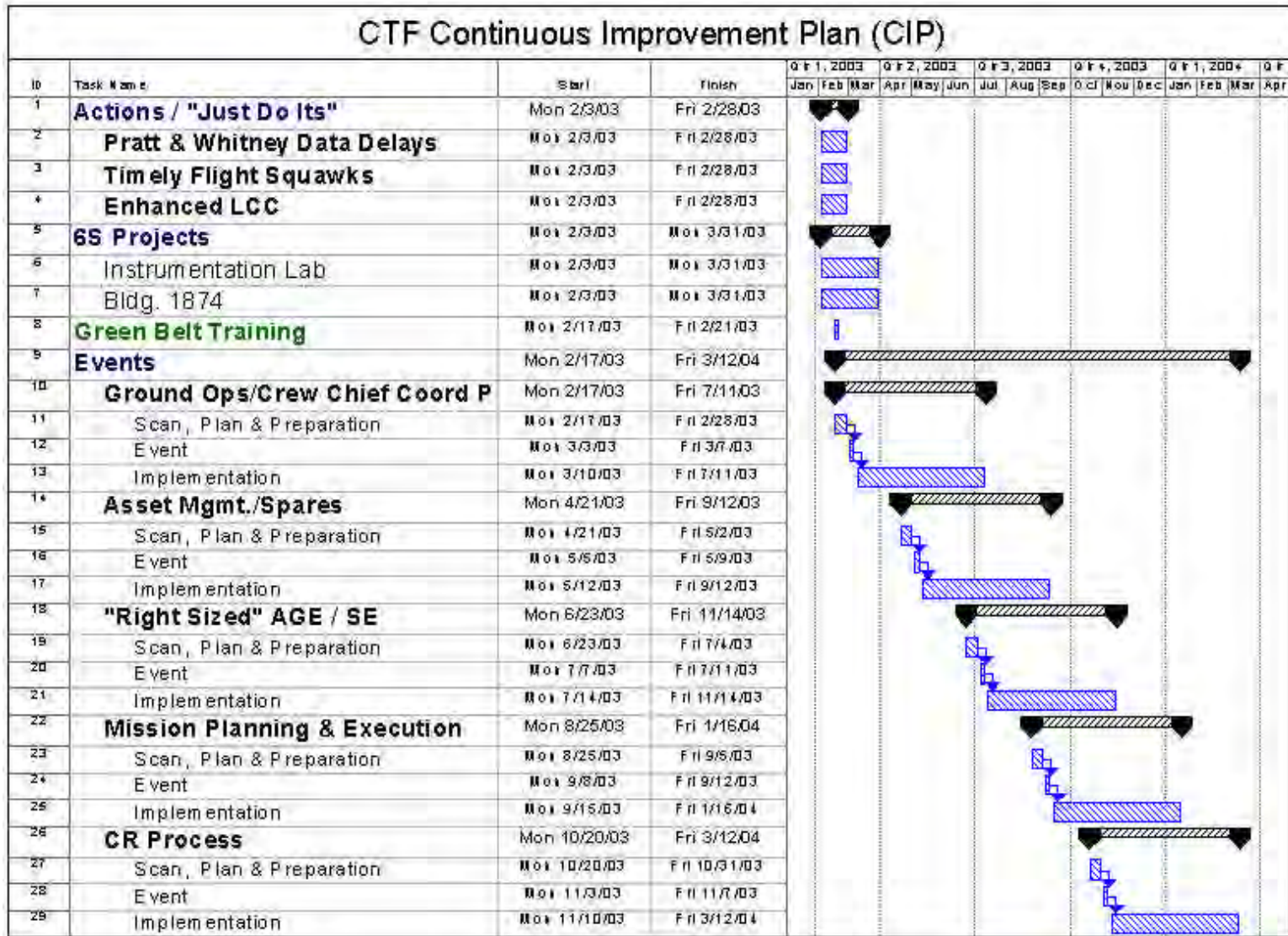
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CTF Continuous Improvement Plan





F/A-22 Enterprise VSM Event Plan Summary



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Event Description: Conduct a value stream analysis on the enterprise value stream for the F/A22 weapon system focusing on the interface processes between the F/A22 Team Members.

Event Dates: February 3-7, 2003
Dayton, OH

Preliminary Objectives :

- Develop a detailed lean improvement plan
- Clear, achievable targets in cost and span reductions
- Data driven decisions on improvement areas
- Milestone-driven schedule of lean events to achieve targets

Co-Leaders: Don Handell (LM F/A-22)
Greg Staley (F/A22 SPO)

Boundaries/Value Proposition: This activity will document the breadth of the F/A22 value stream running from issuing RFP to processes that support the fielded system. The focus will be on the key interfaces between the AF SPO team (SPO, DCMA) and the contractor team (LM, Boeing, & P&W). Interfaces above the AF SPO team (ie, those with AF staff or DoD) as well as interfaces below the contractor team (ie, suppliers) will not be documented and analyzed during this event.

Team Members:

Briggs (LM)	Sackett (F/A -22 SPO)
Baker (LM)	Thurling (F/A-22 SPO)
Alliston (LM)	Anderson (F/A-22 SPO)
Autry (LM)	YFS (SPO)
Pieczonka (LM)	YFF (SPO)
Gall (P&W)	Bryan (LAI)
Young (LM)	Sudderth (DCMA)
Nuttbrock (Boeing)	McDaniel (DCMA)
Smith (Boeing)	Phillips (DCMA)
Wheat (LM)	YFK (SPO)
Tier II IPTs On Call	YFX (SPO)

Process Owner: Ralph Heath (LM) &
Col Thomas Owen

Coach: Tracy Houpt (LAI SME)

Process Information: Value stream mapping has been used as a tool on the F/A-22 Program, primarily in the build team area. Past VSM activity will be used as input for this event where appropriate.

Current Situation and

Problems: A strategic lean implementation plan across the entire F/A -22 weapon system has not been developed. The plan is needed to help prioritize, schedule, and capture savings from future lean events to support F/A -22 Program Goals. This event will define a portion of the overall strategic lean implementation plan.



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Teamwork in Action



**Team Members From Enterprise Stakeholders
F/A-22 SPO, DCMA, LM Aero, Boeing and Pratt & Whitney**

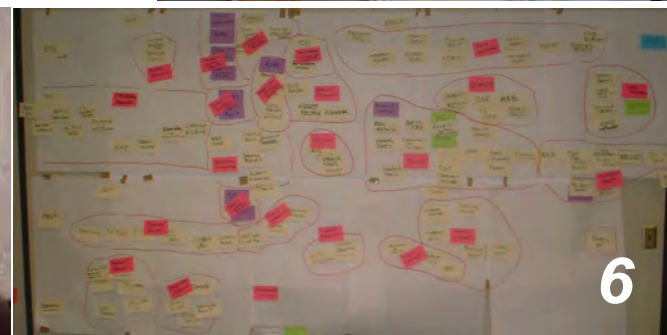
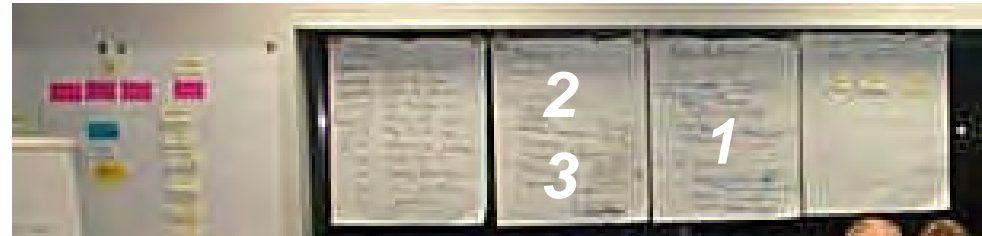


Value Stream Map Process



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- 1) **Define Boundaries**
- 2) **Define the Value**
- 3) **Define the Outcome**
- 4) **Walk/Understand the Flow**
- 5) **Observe and Gather Data**
- 6) **Map the Value Stream**
- 7) **Analyze the Current Condition**
- 8) **Develop Ideal State**
- 9) **Develop Future State Map**
- 10) **Develop Action Plan (Chart 15)**

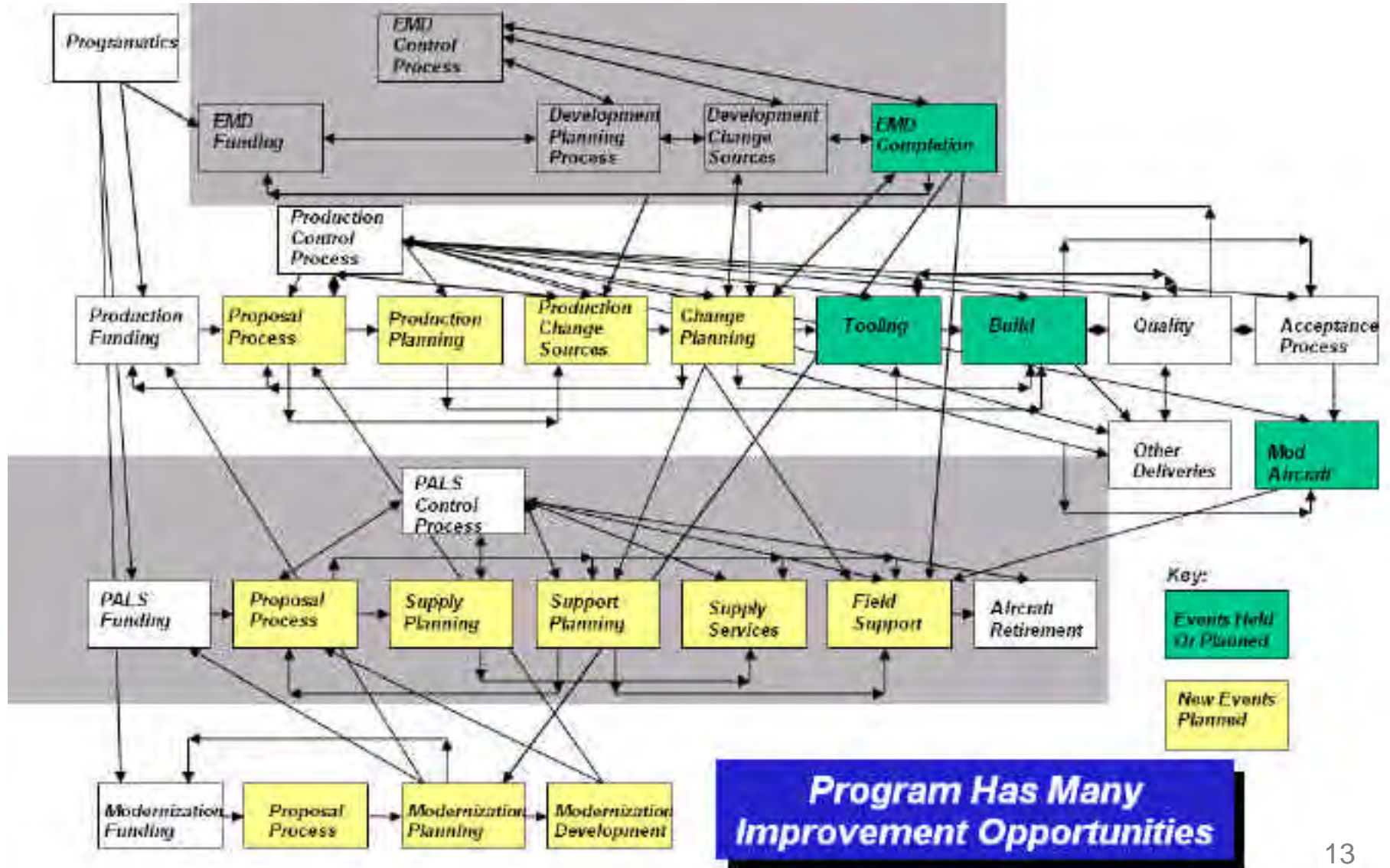




F/A-22 Current State Map



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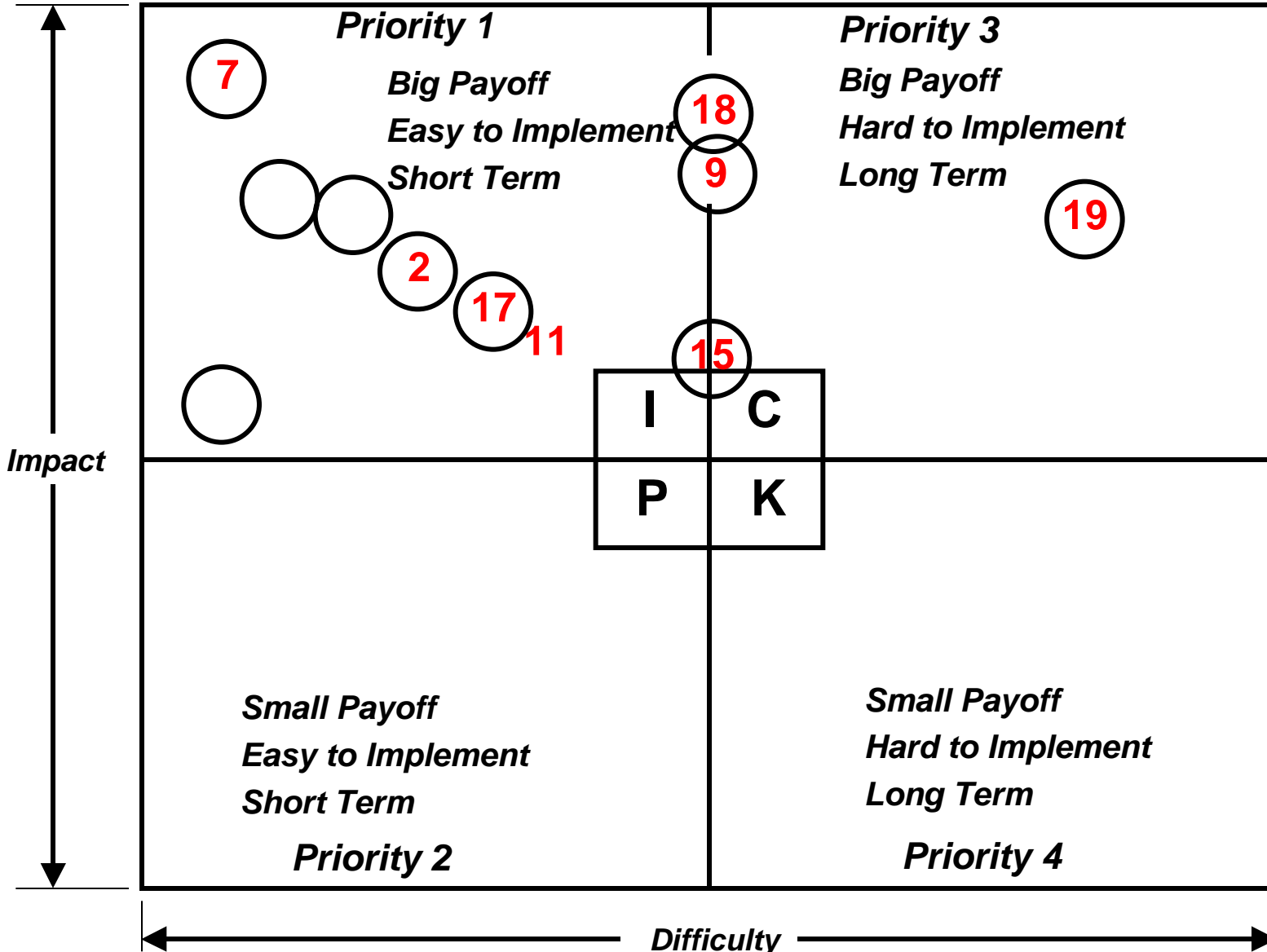


Enterprise VSM PICK Results

(Possible, Implement, Challenge, Kill)



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Top 20 Lean Projects From VSM Event



Title	Owner	Target Date
Data input to IMIS	Ktr	March & June
Develop Parts Shortage Database for Recurrency	Ktr	March
Multiple Part ID	Ktr/SPO	March
Pre-Design Kaizen of Modernization Process		
	Ktr/SPO/ACC	March
Develop Process to Reduce Source Inspection		
	Ktr/Subs	March
Increase Emphasis on Corrective Action on High SR&R		
	Ktr	March
Readily Available Chase Aircraft		
	Ktr/SPO/ACC	March
Readily Available Pilots for Marietta		
	SPO/DCMA	March
Reduce Finishes Rework After Flightline Activities		
	Ktr	April
Program Budget and Requirements Alignment		
	Ktr/SPO/ACC	April
CCB/CRB/AVA Training/Reduce Returns		
	Ktr	April
Baseline Master Schedule to Manage Program		
	Ktr/SPO	April
Redundancy of Contractor and SPO AVA and CCB Boards		
	Ktr/SPO	May
Load MRP with Firm Schedule at LL Authorization		
	Ktr	3rd Qtr. 2003
Optimize Value Stream Map for PALS		
	Ktr/SPO/ACC	3rd Qtr. 2003
Distribution of Budget to EVMS		
	Ktr	3rd Qtr. 2003
Optimize Value Stream for Training System		
	Ktr/SPO	3rd Qtr. 2003
Redundancy of Acceptance Flights		
	Ktr/SPO/DCMA/ACC	4th Qtr. 2003

Top 20 Projects Will Improve Program Execution



F/A-22 Event Timeline

Lean Now Involvement



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Nov **Dec** **Jan** **Feb** **Mar** **Apr** **May** **Jun** **Jul** **Aug**

Lean Now
F/A-22
Kick-Off/
Selection
Nov 6-7

CTF VSM
Edwards AFB
Jan 27-29

Enterprise VSM
Dayton, Ohio
Feb. 3-7

Team Events
April
Team Green
Belt Training
Apr 14-18

CTF OFP
Prep and Load
Event Dec 3-6

Team Green
Belt Training
Feb 17-21

Team Green
Belt Training
Mar 17-21

Team Events
May

LAI Executive
Roundtable
Dec. 12th

CTF Event
Mar 3-7

IMIS Event
Mar 3-7

CTF Event
May 5-9

Team Events
March

CTF Event
Jul 7-11



F/A-22 Lean Implementation Observations



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- **Enterprise Wide Approach To Lean Implementation Is Essential**
 - **Application of LAI LESAT Is Value Added**
 - **Much Potential In Lean Supplier Networks**
- **Leadership Plays Key Role**
 - **Commitment**
 - **Participation**
 - **Resources**
- **Lean Education & Training Is Helpful**
 - **Difficult to Sell Lean Implementation as a Long Term Investment**
 - **Most Effective Is Learning By Doing**

***Lean Now Helped Change the F/A-22 Lean Implementation
Focus From Contractor to Enterprise***



F/A-22 Lean Now Summary

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Completed Spiral 1 Event, 3 - 6 December 2002

F/A-22 OFP Prep and Load Process At CTF

Led to CTF Operations VSM Event, 27- 29 January 2003

Completed Spiral 2 Event, 3 - 7 February 2003

F/A-22 Enterprise Value Stream Mapping Event

Generated 20 Program Improvement Event Ideas

Future Plans

Follow F/A-22 Strategic Lean Implementation Plan

**Communicate Experiences With Other Programs &
Organizations**

Part 3: Lean Now! F/A-22 Briefing 2

Rich See, John Staron: **F/A-22 Raptor – 2003 Lean Initiative Summary**. April 2003. 18 pages



2003 Lean Initiative Summary

***CTF - Edwards AFB
Rich See, F/A – 22
John Staron, Boeing Co, CTF***



The Lean Journey Begins



- **November, 2002**
 - *Test had a lot of issues*
 - *FA-22 Office wanted to know if Lean would help*
 - Joint Government – Contractor Operation
 - Boeing, P&W, LM
 - *Previous resistance to change (we are different)*
- **Lean Team Identified**
 - *6S opportunities*
 - *Material Handling opportunities*
 - *The “Big One”: OFP Loading*



F/A-22 2003 Lean Initiative Summary

Introduction



- Lean Progress at CTF**
- Schedule of CTF Lean Events**
- Event Synopsis**
- Lessons Learned**



F/A-22 2003 Lean Initiative Summary – Lean Progress at CTF



- **Lockheed Martin and Boeing Personnel Completed LM-21 Greenbelt Training – Feb 03**
- **CTF Management Participated In LM Sponsored Lean Leadership Training Event – May 03**
- **CTF is now Self-Sufficient In Conducting Lean Events**





F/A-22 2003 Lean Initiative Summary

Lean Progress at CTF

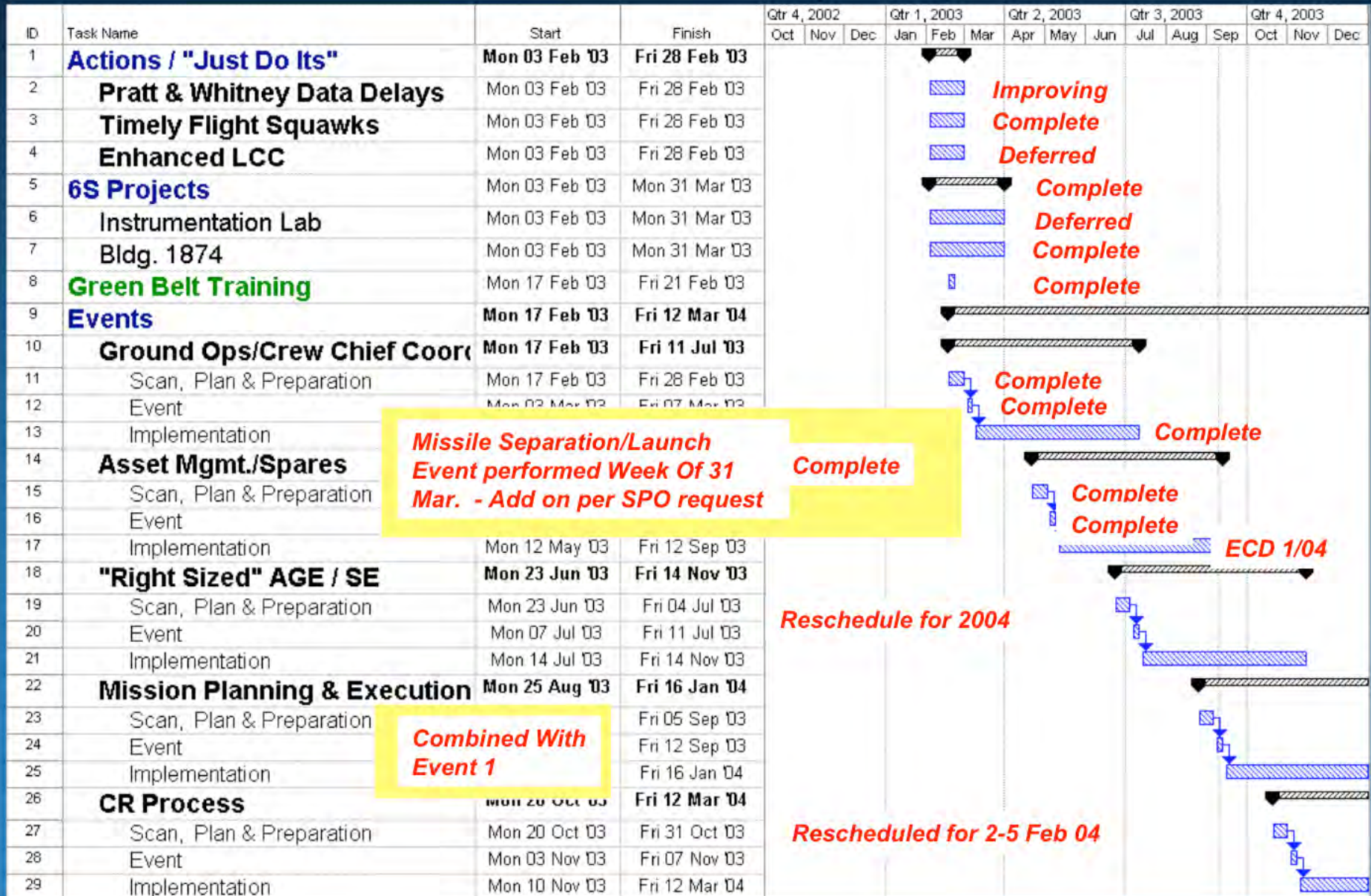


- **U.S. Air Force participation in events becoming more active in each successive event**
- **Becoming increasingly successful in applying lean concepts to flight test environment**
- **6 events completed or in work**





F/A-22 CTF 2003 Lean Continuous Improvement Schedule





F/A-22 2003 Lean Initiative Summary

Lean Event Summary - Schedule



Completed Events

OFP Prep and Load	Dec 02
Maintenance Process Value Stream Analysis	Feb 03
Ground Ops and Crew Chief Communications	Mar 03
Missile Separation	Apr 03
Action Request (AR) Process	Jun 03
Asset Management and Spares	Jul 03



F/A-22 2003 Lean Initiative Summary

Lean Event Summary - Schedule



Upcoming/Pending Events

Right Sized AGE/SE

2004

CR Process

Feb 04

Develop 2004 Continuous Improvement Plan

Feb 04





F/A-22 2003 Lean Initiative Summary

Event Synopsis



OFP Prep and Load

Event Objectives:

- *Validate Aircraft Hardware/Software configurations when loading a new software release*
- *Reduce span time to load software*

Event Results:

- *Touch time reduced by 30%*
- *Span reduced by 52%*
- *Manpower required reduced by 43%*
- *Eliminated rework*
- *Reduced Non-Value Added by 60%*

This Was Our "First" Event - Had a Tremendous Learning Curve



F/A-22 2003 Lean Initiative Summary

Event Synopsis



Maintenance Process Value Stream Analysis

Event Objectives:

- *Conduct a VSA at the CTF (Arrival to departure of an F/A-22)*
- *Map current process state and identify waste*
- *Identify improvements and opportunities*
- *Develop a Strategic Plan that will mitigate risk and expedite aircraft processing*
- *Begin institution of 6S Principles*
- *A key product of the event will be a strategy for a 6-12 month plan to eliminate waste, standardize work and improve process capability and flow at the CTF*



F/A-22 2003 Lean Initiative Summary

Event Synopsis



Maintenance Process Value Stream Analysis (Cont)

• Event Results:

- *Instrumentation Lab 6S Project*
- *Pratt & Whitney Data Delay Resolution*
- *Timely Flight Squawks Resolution*
- *Green Belt Training set for 17 Feb*
- *Established a CTF Continuous Improvement Plan for 2003*



F/A-22 2003 Lean Initiative Summary

Event Synopsis



Ground Ops and Crew Chief Communications

Event Objectives:

- *Reduce time to initiate/conduct troubleshooting on AC*
- *Reduce last minute reconfiguration change notices without canceling a mission*
- *Reduce number of AC reconfigurations per year*
- *Streamline AC crew and MCR readiness timelines*
- *Ensure test resources are available (quantity, location) to support scheduled mission*
- *Streamline data analysis flow to meet mission timelines*

Event Results:

- *Improved Communications with Ground Ops/Maintainers/FTEs*
- *Cross Trained Maintainers to do “Engineering” Duties*
- *Improved engineering coverage across all shifts*
- *Test constraints affecting AC reconfiguration and resource availability identified to CTF Mgmt*



F/A-22 2003 Lean Initiative Summary

Event Synopsis



Action Request (AR) Kaizen Event

•Event Objectives:

- *Improve action request response time to 4 hours or less*
 - (From FSR being informed to IPT remediation information provided to originator)

•Event Results:

- *Touch time reduced by 78%*
- *Span time reduced by 97%*
- *98% of all expedite AR's should meet goal of 4 hours or less*



F/A-22 2003 Lean Initiative Summary

Event Synopsis



Missile Separation

Event Objectives:

- *Decrease span time between missile separation tests*
- *Decrease span time between avionics missile launch/ITV tests*
- *Certify weapons employment envelope for DIOT&E*

Event Results:

- *Reduce span times for separation by 20%*
- *Avionics missile launch span reduced by 26%*
- *Reduced data analysis process time for separation by 21%*
- *Reduced avionics missile launch analysis time by 45%*



F/A-22 2003 Lean Initiative Summary

Event Synopsis



Asset Management/Spares Kaizen Event

**Current Event
with Close
Out Expected
by Jan 2004**

Event Objectives:

- *Decrease part requests without part numbers*
- *Ensure proper purging of repairable parts turned into supply*
- *Minimize time to ready parts for shipping*

Event Results:

- *Will reduced people travel by 95% and product travel by 91%*
- *Will eliminate parts requests without part numbers (new automated form)*
- *Will eliminate number of repairable parts turned in and not properly purged or ready for shipment*
- *Will reduce time between getting new part and removed part ready to vendor by 75%*



F/A-22 2003 Lean Initiative Summary

Lessons Learned



- **Event charter and objectives need to be clearly defined with measurable criteria and agreed to by team prior to beginning event since these will be used to keep team focused during event. Stopping part way through an event to redefine the objectives can cause considerable time to be lost.**
- **To ensure change results from event, team leader needs to be held accountable by upper level management for communicating process improvement status through appropriate metrics**
- **At event start, provide overview and training of lean tools and processes to be used so people know what to expect – many people are not familiar with a specific approach when the team consists of multiple contractors and government personnel.**





F/A-22 2003 Lean Initiative Summary Lessons Learned (Cont)



- **Flight test typically has many “outside” functions that influence its operations and when planning an event it is easy to attempt “solving world hunger”. Successful flight test events have resulted when we have focused on the areas we specifically control.**
- **Waste identification has typically been a hard concept to grasp and much time is spent hashing out definitions. It is important to stress waste identification as a tool to help identify areas to look at more closely in “future state” brainstorming and not get too bogged down in how a particular “current state” is assessed.**
- **Flight test processes being leaned typically require time to verify projected event results. Event team should plan to provide “progress” briefs at future time to show measured results of event change implementation.**



F/A-22 2003 Lean Initiative Summary

Conclusion



- Lean has proven to create Teamwork and to Open Communication Channels
- Events have been Educational to all members
- Savings in time, effort and efficiencies have been found and implemented



Part 4: Lean Now! F-16 Briefing

Bob Weese, Kendra Kershner: F-16 Lean Now! **Prototype – Status Briefing to the LAI Plenary Conference**. March 2003. 17 pages

Headquarters U.S. Air Force

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F-16 Lean Now Prototype

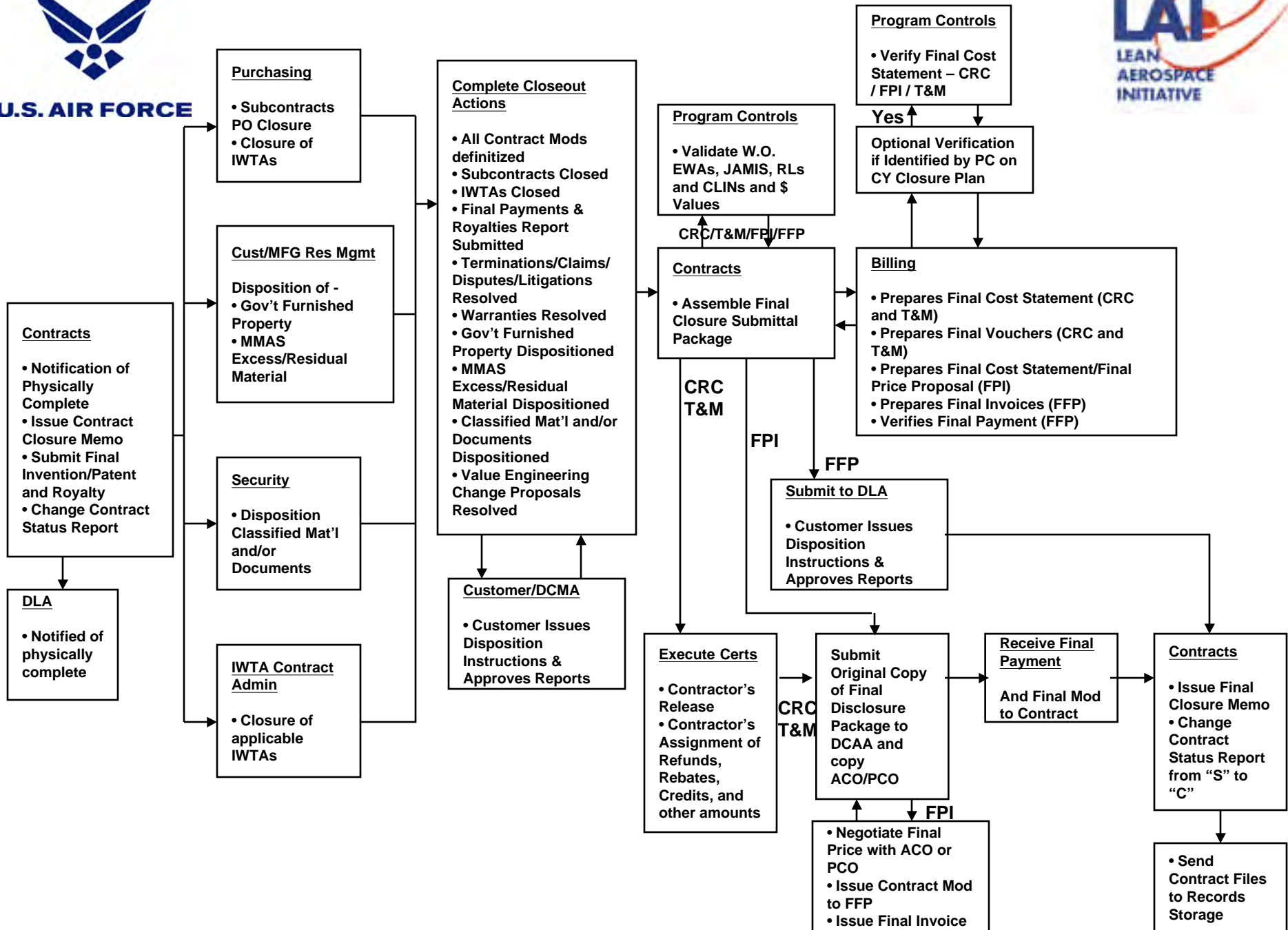
**LAI Plenary Conference
26 Mar 03**



**Bob Weese, LM Aero
Kendra Kershner, F-16 SPO**

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What Is Contract Closeout?





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Why Is Contract Closeout Important?



- Ensures tax payer gets a fair and reasonable price for goods and services procured
- Fulfills legal obligation to both Government and Suppliers
- Ensures funds appropriated have been executed according to policy and regulation
- Removes/returns excess funds to customer
- Decreases Government/Contractor inventory backlog and associated costs
- Contractor receives final payment
- Fewer records to maintain and status by all stakeholders which ultimately consumes fewer resources
 - Better utilization of resources
- Reconciles accounting records

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Why F-16 as a Lean Prototype?



- **History of YP Initiative:**
 - **F-16 selected due to historical internal closeout initiative successes**
 - **DRID 53 MOCAS accounting system conversion was driving need to reconcile and closeout contracts – conversion now on hold**
 - **F-16 program is mature and has some of the most complex and aged contracts in USAF**
- **Need for Contract Closeout prototype because:**
 - **Contract Closeout is difficult/slow – High variation in inputs/non-capable process**
 - **Manpower intensive as is a “forensic science” – “CSI Fort Worth”**

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F-16 Historical Contract Closeout Successes



- **Streamlined closeout process** – F-16 SPO, DCMA, DCAA, and LM Aero reconcile contract using detailed contractor records; Final contract mod incorporates a reconciliation of entire contract – DFAS directed to correct obligation and payment posting errors; Used to close 5 major F-16 contracts valued at \$9B (\$129M ULOs)
- **Cumulative Allowable Contractor Worksheet (CACWS)** – implemented in CY 2002. Reduces audits/manpower for review and disposition using sampling vs individual audits – utilized on small dollar value delivery order contracts
- **Electronic Contracting System** – Identify and monitor closeout tasks improving tracking and reconciliation; Contract funding will be tracked by ACRN and reconciled with DFAS; Automatic cross-check of vendor and DFAS accounting data – errors flagged and reconciliation initiated
- **Property accountability contract** – accounts for all contract property eliminating property transfer to follow-on contracts
- **Overhead (corporate allocations)** – complete to schedule (March 03) to support overhead rates for contract closeout

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Desired Outcomes of F-16 Lean Now Prototype



- Eliminate F-16 contract closeout backlog
- Reduce contract closeout cycle time
- Return excess funds to USG and Foreign Military Sales (FMS) customers
- Increase efficiency of human resources and closeout process



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F-16 Contract Closeout Prototype Approach



- **4 Nov 02 F-16 Contract Closeout prototype initiated**
- **13 Nov 02 Kaizen Event – Down-select**
- **Data gathering**
- **12 Dec 02 LAI Executive Board presentation**
- **Jan 03 Workshop:**
 - **Contract closeout process mapped**
 - **Selected work order closeout process**
 - **Determined redirection needed – apply other Lean tools and expand focus**
 - **Implement Just-Do-It's (JDIs)**
- **Feb 03 Status to Maj Gen Mushala**
- **Regrouped core team**
 - **10-13 Mar 03 Performed barrier root cause analysis and developed potential solutions**
- **17-20 Mar 03 Senior management/core team workshop**
 - **Implement JDIs and further refine action plans for items to be elevated**

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F-16 Jan 03 Workshop

“Just-Do-It” Actions



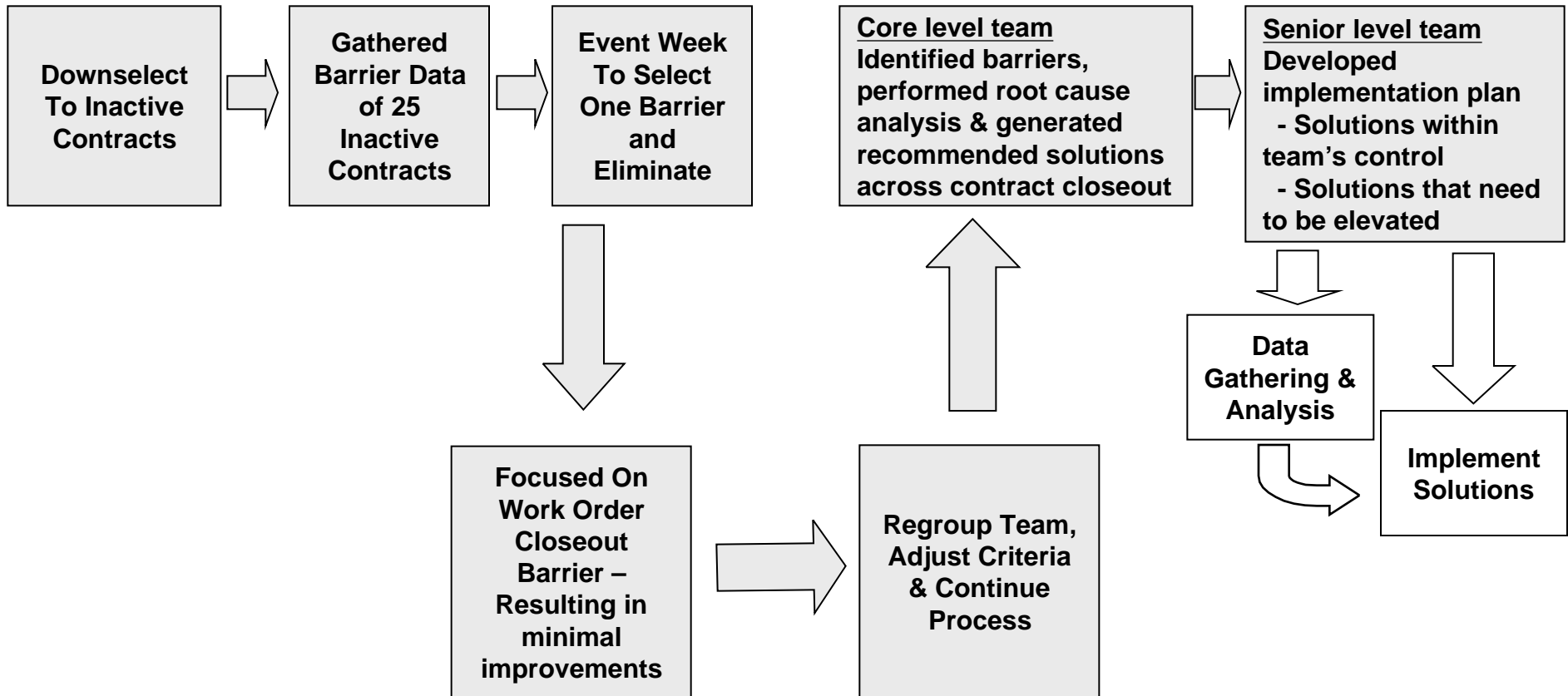
- **Run CACWS (Cumulative Allowable Contractor Worksheet) multiple times a year versus current practice of once a year**
 - **Reflects all contracts with closed work orders and no outstanding material issues ready for DCAA audit**
 - **Ensures audits go to DCAA in a more timely manner allowing for quicker closeouts**
- **LM Aero new software effort to clean up MRP “loans and borrows” issues**
- **Emphasis on “up front” reconciliation versus waiting until contract closure**
 - **Obtain contract invoice and obligation histories now**
 - **SPO/ACO resolve any differences**

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F-16 Contract Closeout Prototype Flow Mar 20, 2003



Principle Root Cause

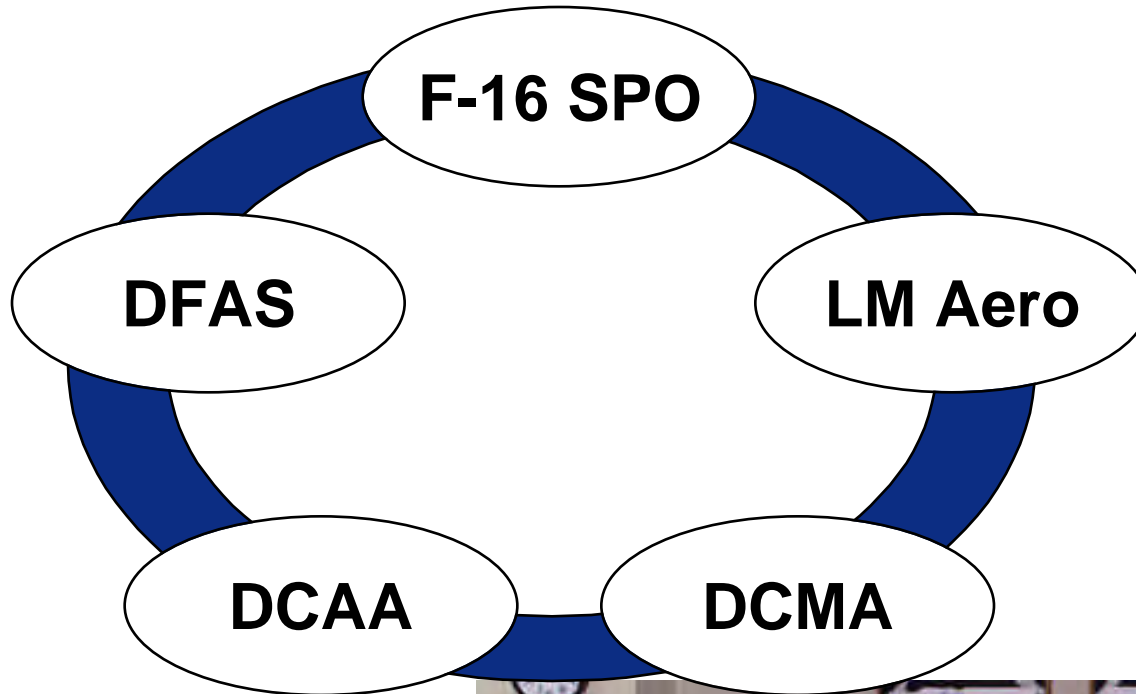
Selection criteria too restrictive – Focused worker-level team on working areas that only they could affect

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F-16 Contract Closeout Spiral II Team



Opened new lines of communication and increased options and decision envelope



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F-16 Lean Now Prototype Contract Closeout

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Event Description:

Lean Now Senior Enterprise Team Analysis of F-16 Contract Closeout

Event Dates: 17-20 March 2003

Champions: Chuck Jackson, SPO and John Larson, LM Aero

Background:

- Second of two phases performed by Senior Enterprise team.
- Evaluated barriers and solutions outside the control of the core team.
- Also identified the next steps and implementation plans.

Process Owners: Mark Perehoduk, LM; Col Michael Hubert, DCMA; Larry Syrus, DCAA; Tom Frye, SPO Financial Management; Col Deborah Gable, SPO Contracts

Team Co-Leaders: Mark Perehoduk, LM and Kendra Kershner, SPO

Objectives:

- Define implementation plan to eliminate those barriers that are within the team's control
- Identify and elevate barriers and recommended solutions
- Integrate effort into DFAS/DCMA/DCAA initiatives

Team Members:

Linda Carpenter, DCAA	Dan St. John, DCAA
Mark Jordan, SPO	Bob Weese, LM
Dan Rosner, SPO	Don Wheat, LM
Bob Larsen, SPO	Vince Blankenship, LM
Linda McLaughlin, SPO	Tony Viotto, LM
Dwight Early, AF ACE	Paul Mahar, LM
Nayda Katzaman, DCMA	Pattie Boyd, LM
Jeff Gardiner, DCMA	David Glidewell, LM
Karen Scarberry, DCMA	Randy McCasland, LM
Denise Eldridge, DCMA	LTC Bruce Johnson, DFAS
Susan Carter, DFAS	

Coaches: Mark Lambert, LM Aero, Terry Bryan, LAI & Tracy Houpt, LAI

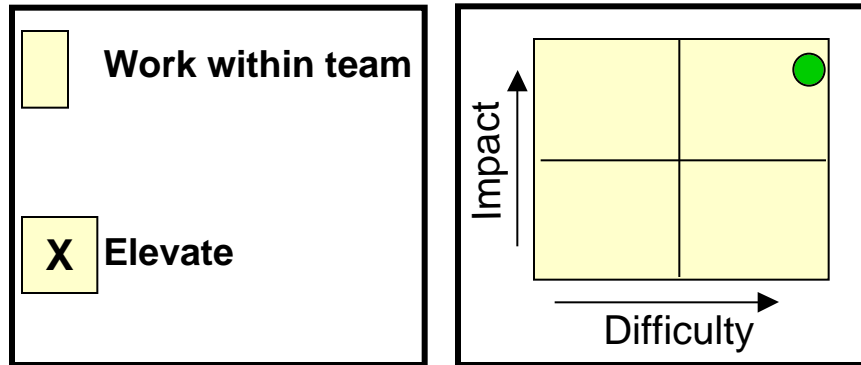
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F-16 Contract Closeout Solution Matrix

Proposed Solution Matrix		
	Notes	Resources
<u>Within Team's Control</u>		
Current-for-Cancelled Status Feedback	(1) 1 Apr - 30 Apr 03; (2) As required for status	SPO - Lt LaTonya Kelly*, YPF, YPK, Tom Carney, Pattie Boyd, Bob Larsen
Human Resources Allocation	(1) NLT 15 Apr 03; (2-8) Dates TBD from Event	(1) Mark Perehoduk*, Chuck Jackson, Jeff Gardiner; Tom Frye, Larry Syrus, David Glidewell, Bill Wilson (LM SME), Tracy Houpt
Establish guidelines for closure via negotiated settlements -- subcontracts	(1) 30 Apr - 15 May 03; (2) 1 Jul - 30 Aug 03; (3) NLT 30 Sep 03	(1,2) Viola Dean *, Karen Scarberry, Linda Carpenter, Dan StJohn, Don Wheat; (3) Management team
<u>"Just-Do-It's" Within Team's Control</u>		
Establish vehicle to change data purchase order accountability	24 Mar - 30 Apr 03	Tony Viotto*, Marilyn D, Vince B, John L
Post Award Audit - Schedule & Manage Tasks	24 Mar - 15 May 03	Bob Weese*, ASC/PK
Timely PO Closure	24 Mar - 30 Jun 03	Marilyn Decusati*, Don Wheat, Paul Mahar, Ralph Beaugez, Nancy Bell (IS&T)
Eliminate False Loan-Borrow Signals	24 Mar - 30 Jun 03	David Glidewell, IS&T
Settlement versus ACRN-Level Reconciliation #1	24 Mar - 7 Apr 03	Mark Jordan*, Tom Frye, Susan Carter
<u>Elevate</u>		
Expand DCMA Q-Final Authority One DFAS POC for F-16 Contracts	(1) 1 Apr - 31 May 03; (2) 1 Jun - 30 Jun 03 24 Mar - 30 Jun 03	Nayda Katzaman*, Karen S, AF acc't, Simone M Lt Col Bruce Johnson*
More cost effective approach for small value cost-type contracts	(1) 21 Mar 03; (2) Report Out; (3) 30 Jun 03 JMC	(1) Chuck Jackson*; (2) Nayda Katzaman/Denise Eldridge*; (3) Mark Perehoduk*
Settlement versus ACRN-Level Reconciliation #2	15 Apr - Release of IG Audit Report	Mark Jordan*, Nayda Katzaman, Denise Eldridge, Tom Frye, Chuck Ingram, ASC/FM, ASC/PK, Dan Rosner, ASC/ACE, OSD, DFAS - Susan Carter
<u>"Parking Lot"</u>		
Address Unintentional Consequences of M Account Removal	Scope & bring back	Karen S, Pattie B, Kendra K, Dan R, DCMA, DCAA, DFAS
Consider Settlement Write-Off	Start 1-3 months	LM Aero, SPO DCMA
Waivers		
<u>Eliminate</u>		
MOA to Close Low Dollar Contracts (funding)	Start 1-3 months	DCMA, LM Aero DCAA
Move Existing Tasks	Start 2-4 months	F-16 SPO, DCMA, LM Aero, DCAA
Relief on 1% Limit on Current for Cancelled Funding		

F-16 Contract Closeout Lean Event - Mar 17-20, 2003

More Cost Effective Approach for Small Value Cost-Type and Time & Material (T&M) Contracts



Description: Perception that administrative cost to closeout small-value (under \$10K) cost-type contracts exceeds \$10K. Taxpayer interest would be best served to avoid cost to close based on proven contractor system performance and random sampling to ensure continued compliance with accounting standards. Few audit exceptions have occurred at LM Aero over the past three years, therefore risk is low.

Reason for Activity: Skilled resources are constrained and tax payer interests are not being served. Desire more effective, cost efficient use of contract closeout resources Focuses government to function more like a business as desired by SecDef.

Estimated Start Date: (1) 21 Mar 03 –Develop and submit to DoD Ad Hoc Working Group proposal for closeout process using “de minimis” approach. (2) DoD Ad Hoc working group reports out. Develop implementation plan if proposal accepted (3) 30 Jun 03 - Develop SPI concept paper.

Other Actions:

(4) 20 Mar 03 -- HQ DCMA provided T&M quick closure procedures;
 (5) Apr 04 -- Apply DAU study results (risk management approach to contract closeout);

Process Owner: Chuck Jackson, SPO

Potential Team Leaders & Members:

SPO – Chuck Jackson; DCMA – Nayda Katzaman, Denise Eldridge, Karen Scarberry; LM Aero – Mark Perehoduk, David Glidewell; DCAA - Linda Carpenter

Implementation Costs: TBD

Impact: 20% of F-16 contracts potentially affected: estimated 100 manhours saved per contract => \$10K minimally cost avoided per contract;
 $\$10K/\text{contract} * (20\% \text{ of } 1200 \text{ contracts}) = \$2.4M \text{ immediate F-16 cost avoidance} + \text{all future contracts}$



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F-16 Contract Closeout Implementation Schedule



ID	Task Name	Duration	Start	Finish	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec				
1	F-16 Lean Now Prototype Action Plan	346 days	24 Mar '03	19 Jul '04	[Gantt bar from Mar '03 to Jul '04]											
2	Actions Within the Team's Control	137 days	24 Mar '03	30 Sep '03	[Gantt bar from Mar '03 to Sep '03]											
3	Current-for-Cancelled Status Feedback	22 days	01 Apr '03	30 Apr '03	[Gantt bar from Apr '03 to Apr '03]											
4	Develop Tracking Spreadsheet	22 days	01 Apr '03	30 Apr '03	[Gantt bar from Apr '03 to Apr '03]											
5	Human Resource Allocation	137 days	24 Mar '03	30 Sep '03	[Gantt bar from Mar '03 to Sep '03]											
6	Identify Choke Points and Process to Eliminate	17 days	24 Mar '03	15 Apr '03	[Gantt bar from Mar '03 to Apr '03]											
7	Use Existing Techniques to Reallocate Resources as Required	22 days	16 Apr '03	15 May '03	[Gantt bar from Apr '03 to May '03]											
8	Identify and Provide Any Training to Enhance Efficiency and Effectvness in Cl	137 days	24 Mar '03	30 Sep '03	[Gantt bar from Mar '03 to Sep '03]											
9	Establish Guidelines for Closure Via Negotiated Settlements for Subcont	110 days	30 Apr '03	30 Sep '03	[Gantt bar from Apr '03 to Sep '03]											
10	Team Determine What Requires Audits on Cost-Type Contracts	12 days	30 Apr '03	15 May '03	[Gantt bar from Apr '03 to May '03]											
11	Team Determine Conditions for Assist Audits	44 days	01 Jul '03	29 Aug '03	[Gantt bar from Jul '03 to Aug '03]											
12	Present Info to Management to Determine Whether or Not to Pursue Solution	21 days	02 Sep '03	30 Sep '03	[Gantt bar from Sep '03 to Sep '03]											
13	"Just-Do-Its" Actions Within the Team's Control	71 days	24 Mar '03	30 Jun '03	[Gantt bar from Mar '03 to Jun '03]											
14	Establish Vehicle to Change Data Purchase Order Accountability	28 days	24 Mar '03	30 Apr '03	[Gantt bar from Mar '03 to Apr '03]											
15	Post-Award Audit -- Schedule and Manage Tasks	39 days	24 Mar '03	15 May '03	[Gantt bar from Mar '03 to May '03]											
16	Timely Purchase Order (PO) Closure	71 days	24 Mar '03	30 Jun '03	[Gantt bar from Mar '03 to Jun '03]											
17	Realign and Track Subcontractor Closure Schedules to Match Prime Contractor	71 days	24 Mar '03	30 Jun '03	[Gantt bar from Mar '03 to Jun '03]											
18	Investigate Interface with Material Purchasing Management System Module and	71 days	24 Mar '03	30 Jun '03	[Gantt bar from Mar '03 to Jun '03]											
19	Eliminate False Loan-Borrow Signals	71 days	24 Mar '03	30 Jun '03	[Gantt bar from Mar '03 to Jun '03]											
20	LM Accounting to Provide LM Contract Closeout with List of Work Orders	5 days	24 Mar '03	28 Mar '03	[Gantt bar from Mar '03 to Mar '03]											
21	Investigate Problem and Develop Action Plan to Resolve Issue	71 days	24 Mar '03	30 Jun '03	[Gantt bar from Mar '03 to Jun '03]											
22	Settlement versus ACRN-Level Reconciliation #1	10 days	24 Mar '03	04 Apr '03	[Gantt bar from Mar '03 to Apr '03]											
23	SPO/LM provide DFAS (Susan Carter) with List of Contracts Held Up in DFAS	10 days	24 Mar '03	04 Apr '03	[Gantt bar from Mar '03 to Apr '03]											
24	Determine Why Contract 2038 Final Mod Has Not Been Processed	1 day	24 Mar '03	24 Mar '03	[Gantt bar from Mar '03 to Mar '03]											
25	Elevate Actions	346 days	24 Mar '03	19 Jul '04	[Gantt bar from Mar '03 to Jul '04]											
26	Expand DCMA Q-Final Authority	137 days	24 Mar '03	30 Sep '03	[Gantt bar from Mar '03 to Sep '03]											
27	HQ DCMA and Ft Worth DCMA Review FFP Contract Examples to Determine A	50 days	24 Mar '03	30 May '03	[Gantt bar from Mar '03 to May '03]											
28	DCMA Work with DFAS to Determine if Authority Can Be Expanded	21 days	02 Jun '03	30 Jun '03	[Gantt bar from Jun '03 to Jun '03]											
29	Develop Policy/Procedure to Expand DCMA Q-Final Authority	66 days	01 Jul '03	30 Sep '03	[Gantt bar from Jul '03 to Sep '03]											
30	Assign One DFAS POC for F-16 Contracts	71 days	24 Mar '03	30 Jun '03	[Gantt bar from Mar '03 to Jun '03]											
31	Develop a More Cost-Effective Closeout Approach for Small Value Cost-T	346 days	24 Mar '03	19 Jul '04	[Gantt bar from Mar '03 to Jul '04]											
32	Interject Proposed Solution to HQ DCMA Working Group White Paper	1 day	24 Mar '03	24 Mar '03	[Gantt bar from Mar '03 to Mar '03]											
33	HQ DCMA Working Group Reports Out - Date Estimated - Event Driven	1 day	30 Jun '03	30 Jun '03	[Gantt bar from Jun '03 to Jun '03]											
34	Evaluate Idea for Single Process Initiative (SPI)	71 days	24 Mar '03	30 Jun '03	[Gantt bar from Mar '03 to Jun '03]											
35	HQ DCMA Provide Team With T&M Quick Closeout Procedures	1 day	24 Mar '03	24 Mar '03	[Gantt bar from Mar '03 to Mar '03]											
36	DAU Study Results Published	1 day	16 Apr '04	16 Apr '04	[Gantt bar from Apr '04 to Apr '04]											
37	Apply DAU Study Results -- Risk Management Approach to Contract Closeout	66 days	19 Apr '04	19 Jul '04	[Gantt bar from Apr '04 to Jul '04]											
38	Settlement versus ACRN-Level Reconciliation #2	23 days	15 Apr '03	15 May '03	[Gantt bar from Apr '03 to May '03]											
39	Release of IG Audit Report Regarding Contract Closeout Settlement Procedure	1 day	15 Apr '03	15 Apr '03	[Gantt bar from Apr '03 to Apr '03]											
40	Determine if Additional Action by Team is Required	22 days	16 Apr '03	15 May '03	[Gantt bar from Apr '03 to May '03]											

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F-16 Contract Closeout Closure Plan



Solutions Within Team's Control...

Event Summaries

F-16 Inactive Contracts Lean Event (Phase II) - Mar 17-20, 2003 #

[insert title] #

Work within team
 Elevate

Difficulty

Estimated Start Date: #

Process Owner: #

Potential Team Leaders & Members: #

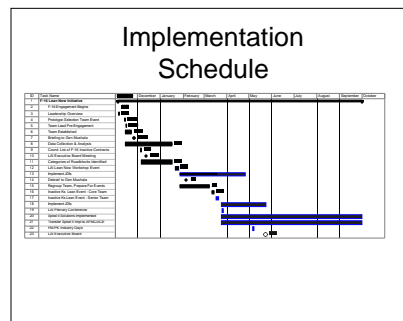
Implementation Costs: #

Impact: #

Description:

Reason for Activity:

Schedule



Statusing

PERSON(S) Responsible	Due Date	CRITICAL TO Next Load?	% Complete	NOTES
McPeak, Jules	8-Dec-02	Y		Larry McPeak reported that currently the team used production paper forms. The goal is to display OFF prep and load information on IMS.
Walter	Closed on 12/19/2002	Y	25	
Walter	Closed on 12/19/2002	Y	25	
Walter	Closed on 12/19/2002	Y	25	
Schandavel, Mack	Closed on 1/7/2003	Y	25	Issued CCB Directive

JMC
Bi-Monthly



LM Aero/F-16 SPO
(Action Officers)
Bi-Weekly

Solutions That Are Elevated...

Event Summaries

F-16 Inactive Contracts Lean Event (Phase II) - Mar 17-20, 2003 #

[insert title] #

Work within team
 Elevate

Difficulty

Estimated Start Date: #

Process Owner: #

Potential Team Leaders & Members: #

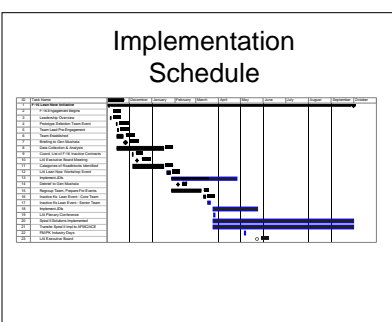
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Executive Stakeholders
Bi-Monthly



ACE Office
(Action Officers)
Bi-Weekly

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Upcoming Activity



- **Knowledge Management:**
 - **25-26 Mar 03 Plenary Conference**
 - **6 May 03 ASC FM/PK Industry Day**
- **Implement JDIs**
- **Fully develop and coordinate implementation plans for “elevate” initiatives**
- **21-22 May 03 LAI Executive Board**

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Summary



- **Spiral II stakeholders inclusion tremendously beneficial**
- **Substantive barriers identified, root cause analysis performed, and solutions generated**
- **Down-selected from 18 proposed solutions, eliminated three, “parked” three, and developed 12 preliminary implementation plans**
 - **Solutions fall into two categories: (1) Eight within the control of this team; and (2) Four to be elevated**
 - **Projected minimum cost avoidance of \$2.4M**
 - **Project cycle time reduction of 3-7 years**
- **Elevated proposal to Defense Acquisition Regulation Ad Hoc Committee on Contract Closeout for implementation of business analysis cost effectivity approach to contract closeout of small-value cost-type and T&M contracts**

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Part 5: Lean Now! Global Hawk Briefing 1

David Riel: **Global Hawk Lean Now! Initiative – Briefing to the LAI Plenary Conference. March 2003.** 24 pages



GLOBAL HAWK
Lean Now Initiative

The section header features a silhouette of a Global Hawk aircraft in flight, centered above a horizontal line. Below the line, the words "GLOBAL HAWK" are written in a large, bold, black, sans-serif font. Underneath that, "Lean Now Initiative" is written in a bold, blue, sans-serif font.

LAI Plenary Conference
Lt. Col. David Riel





Lean Now Global Hawk Program



U.S. AIR FORCE

- **Agenda**

- **Overview**

- **Project Status**

- **Results**

- **Summary**





Lean Now Global Hawk Program



- **Lean Now Goal**
 - **Operate With More Capable, Affordable Enterprise-Wide Processes Responsive to the War Fighter Mission Needs**
 - **A total enterprise environment that allows quick response to new challenges and uncertain circumstances**

- **Approach**

1. **Apply Lean Principles to Government-Industry Critical**

**Lean Now has a Government “Pull”
...the LAI is Providing Enabling Support**

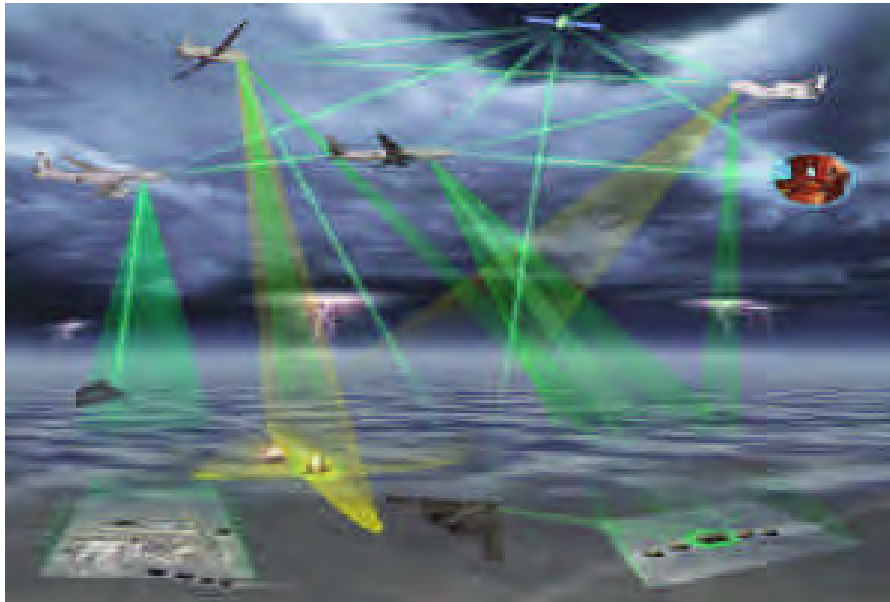
2. **Pursue Spiral Prototyping**



USAF Global Hawk – ISR Mission



U.S. AIR FORCE

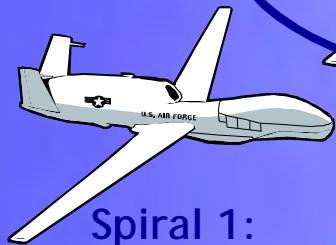


- **Capability – Provide Multi-INT Persistent Surveillance**
- **EO/IR/SAR and SIGINT**
- **Platform-to-Platform Cross-cueing via Network Centric Ops**
- **Integrated with Manned, Unmanned and Overhead Systems**
- **Range Half Way Around the World**
- **On Station for Extended Periods**
- **Advanced Technology Sensor for Dominant Information Awareness**
- **51 USAF Global Hawks**
 - 18 PAA for 6 each 24/7 Wartime Orbits
 - Peacetime attrition
 - 23 Multi-INT
 - 12 RTIP

Global Hawk Capabilities By Spiral

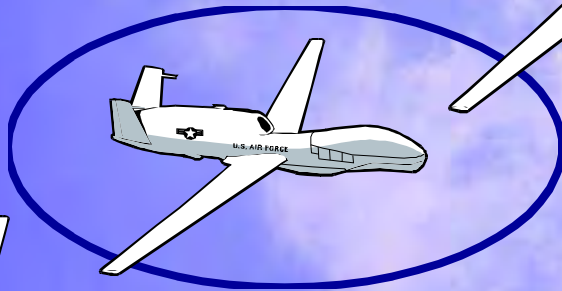
Advanced Concept Technology Demonstration (ACTD) provided strong foundation of capabilities:

- Autonomous flight control system
- Long-range, long endurance airframe
- Hi-resolution, precision multi-sensor payload
- Limited ground moving target indication
- Manual RF cueing to radar emitters



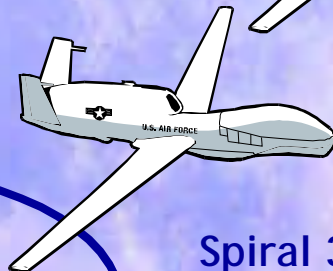
Spiral 1: Operationalize Existing System

- World-wide operating capability
- Sustainable support system



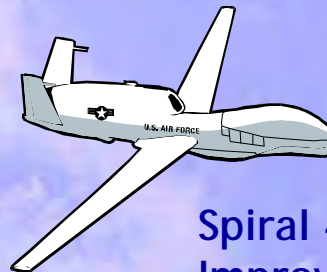
Spiral 2: Core "Truck"/Open Architecture

- Expanded IMINT, initial SIGINT
- Near horizon standoff range
- Baseline NAVY variant



Spiral 3: Full-spectrum SIGINT

- Signals Intelligence to support mid-scale engagements
- Machine level horizontal integration capable
- Defensive threat awareness
- Open System Architecture



Spiral 4: Improved Radar

- Improved range and resolution
- Track quality ground moving target identification
- Airborne surveillance capability
- Enhanced airspace operations and survivability
- Potential Navy variant



Spiral 5-6: Full-spectrum operations

- Full horizontal integration
- Expanded communications
- Extreme environment / NBC ops



Lean Now Global Hawk Program



U.S. AIR FORCE

- **Agenda**

- Overview

- **Project Status**

- Results

- Summary





The Challenge: Promulgating Change



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- Intent for Each Prototype**
(facilitated by LAI SMEs)
- Determine "current reality"
 - Compare to LEM practices
 - ID Gaps & Set Req'd Outcomes
 - Gap Closure Plan
 - Implement
 - Show Results

We Need Action Plan to Get Here

We Are Here



Global Hawk Team

Lean Now Coordination Network

- Global Hawk:**
- Lead LAI SME - N-G
 - LAI SME Coaching Team
 - Raytheon
 - AF SME



Lean Now Global Hawk Event Timeline



U.S. AIR FORCE

Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----





Lean Now Global Hawk Program



- **Agenda**

- Overview
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Lean Now ISS Event at Raytheon



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- **\$2M Per ISS Saving Realized by Transition-to-Production & Implementation of Automated STE -- \$29M investment**
 - Additional Potential Savings in Initial Spares and O&S Not Included
 - Total STE and Transition to Production Break Even Point at ~ P18
 - Increased production capacity from 3 per year to 6 per year
- **Plan Provides for Sensors on Empty UAVs**
 - Results from increased production rates
- **Established Collaborative Team Which Developed a Common Understanding of the ISS Value Stream**
- **Lean Principles, Methods and Tools Have Proven Effective in Improving the Total Value Stream**



Value Stream Mapping

***Collaborative Teaming
Achieving Results***

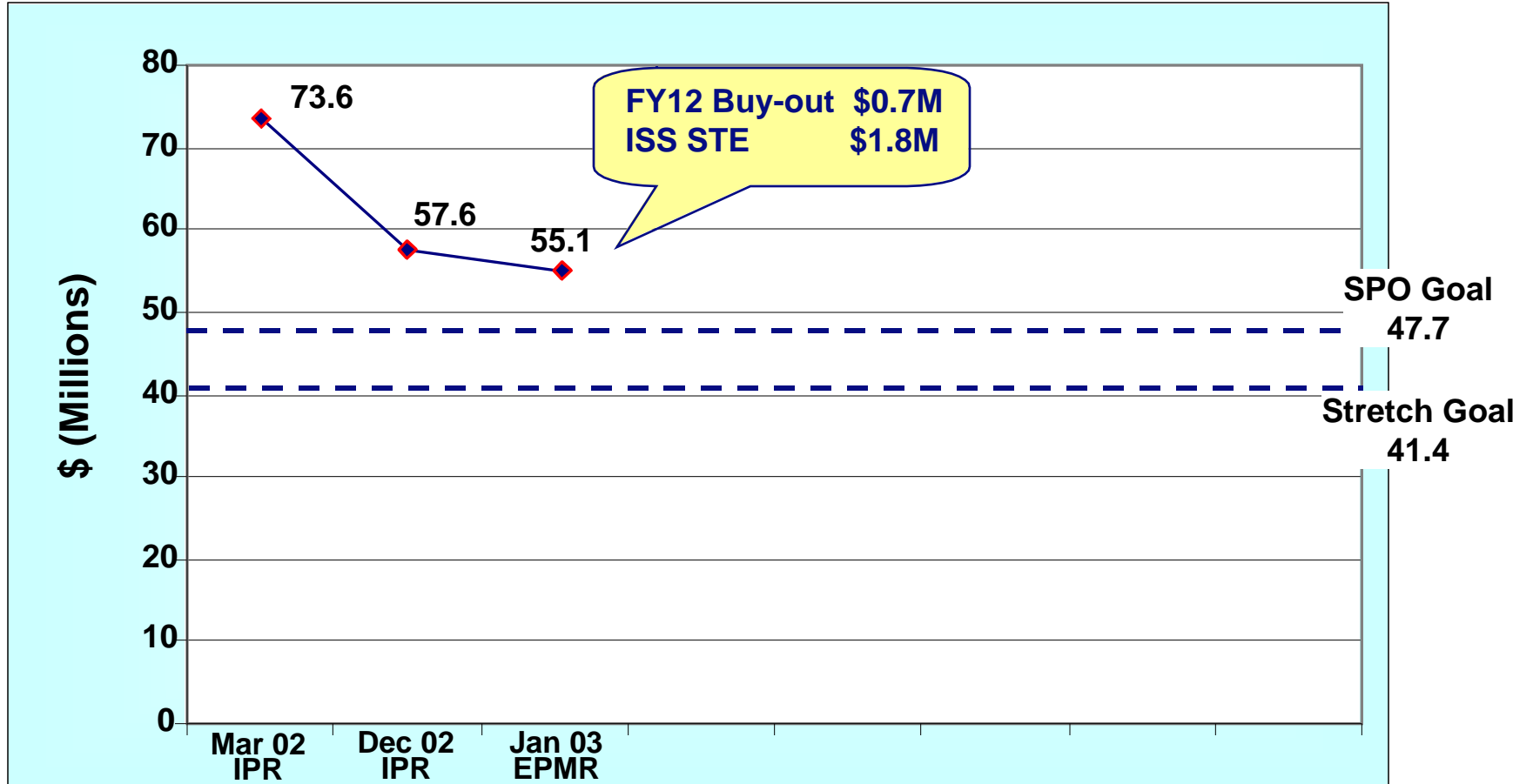




Lean Now Results You Can See



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SPO Chart in the Exec PMR Affordability Review



Lean Now Workshop Training Day



- **A full day interactive session for the Global Hawk enterprise team bringing Government and Industry together**



- **Topics covered Lean enterprise, transformation, tools and concepts, and exercises to promote teaming networks**



Lean Now ICS Event at L-3 Comm.



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- **Assessed Rationale and Justification for Special Test Equipment**
 - 2-3 month reductions in lead times
 - ROI of 2.5 with \$2.8M investment -- eliminated \$3.6M of requested STE
- **Design Process Improvements using Common Module Sets**
 - Investigating open system architecture solution for airborne suite – potential \$0.5M decrease for each MP-CDL equipped aircraft
 - ROI of 4 with \$1.8M investment -- eliminated poor candidate
 - Significant life cycle cost savings through use of common modules
- **Established Collaborative Team Which Developed a Common Understanding of the ICS Value Stream**



Value Stream Mapping

***Collaborative Teaming
Achieving Results***





Global Hawk Enterprise VSM



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Event Description:

Conduct an enterprise level value stream analysis for the Global Hawk program focusing on the key interface processes between major stakeholders of the Global Hawk enterprise level team members.

Preliminary Objectives:

Enterprise Level Value Stream Mapping of Global Hawk

- Map Key Process Interfaces Within Program
- Identify Agreed Upon Improvement Areas
- Establish Targets and Metrics for Cost / Cycle Time Reductions
- Determine Schedules / Milestones for Follow-on Events

Value Proposition :

This activity will enable the Global Hawk program to implement continuous process improvement initiatives by utilizing the enterprise level value stream map as a meaningful model (roadmap) for applying lean principles throughout the Global Hawk enterprise.

Process Information:

Value Stream Mapping is being used as a primary lean tool within the Global Hawk program to identify key areas of waste by documenting "current state" conditions and providing clear visibility to prioritize and implement improvement initiatives.

Event Dates: February 3-7, 2003 NG Fairborn, Ohio

Co- Leaders: Lt. Col. David Riel, USAF
Chris Cool, Northrop Grumman

Team Members:

Tim Miley (GH)	Candy Henderson (USAF)
Joe Sanfilippo (GH)	Tony Braswell (ASC/RAV)
Joy Trott (GH)	Bill Goetz (GH SPO)
Dave Corbeil (GH)	Jim Crouch (GH SPO)
Bill Eddins (GH)	Nancy Byrge (USAF)
Eric LaMoure (GH)	Dean Porter (ASC/RAV)
Jerry Owen (GH)	Randy Carpenter (ASC/RAV)
Chris Paulsen (GH)	Jon Specht (USAF)
Pete Sterling (GH)	Vic Mehta (GH DCMA)
Tom Moss (USAF)	Ken Fehr (USAF)

Process Owners: Col. Scott Coale & Carl Johnson

Coaches: Robert Goetz (NG / LAI SME)
Terry Bryan (LAI / MIT SME)
Nancy Fleischer (Raytheon/LAISME)
Renee Linehan (Raytheon/ LAI SME)

Current Plan For Action:

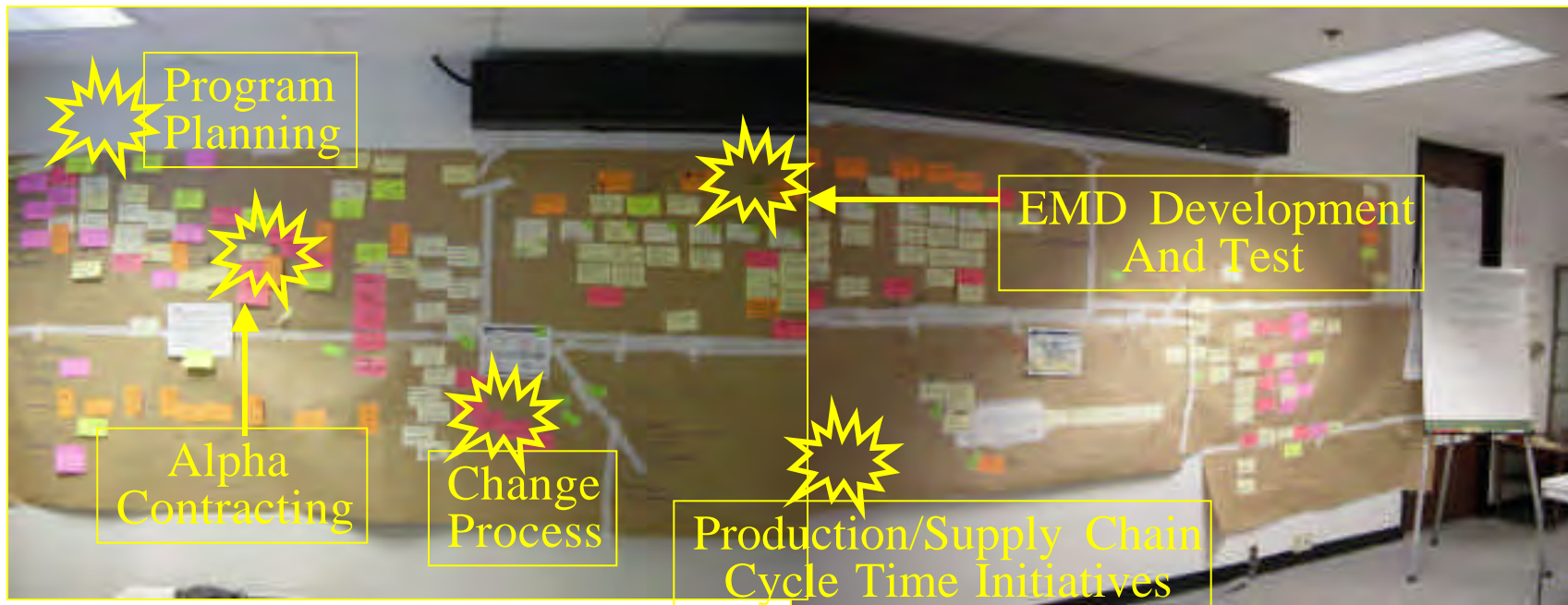
Global Hawk Lean Now Initiative Plans Include:
Supplier Focused Events – ISS Event Raytheon El Segundo
ICS Event L-3 Communications
Lean Now Workshop Training – Rancho Bernardo
Enterprise Level VSM – Wright Patterson AFB
Alpha Contracting Event – Rancho Bernardo
VSM Follow-on Kaizen Events & LESAT Assessment



Lean Now Tier 1 VSM After



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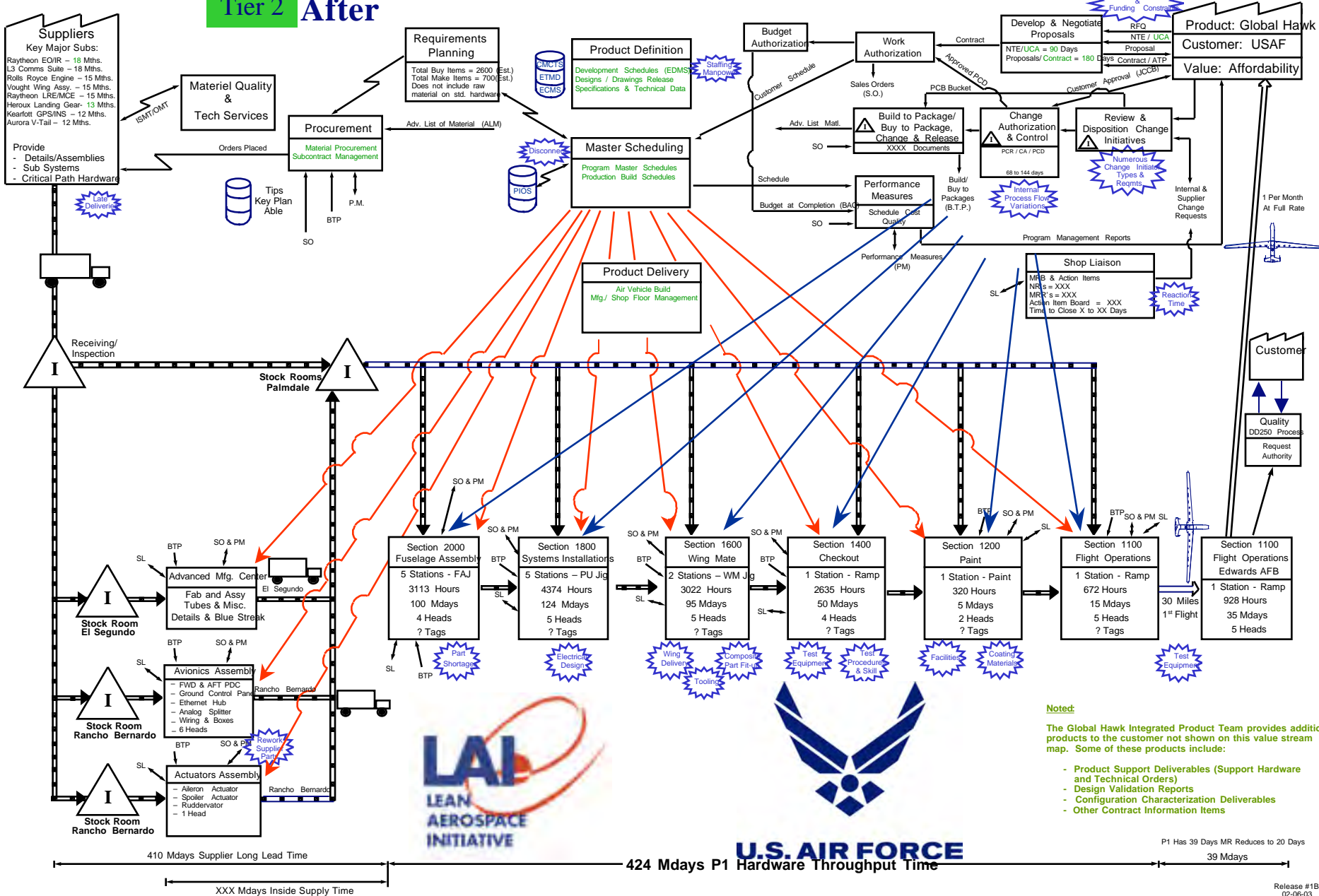
Two Day Event to Map Tier 1 Enterprise & Complete Objectives

Current State

As Of February 2003

Value Stream Map View Global Hawk Program

Tier 2 After



Notes:
 The Global Hawk Integrated Product Team provides additional products to the customer not shown on this value stream map. Some of these products include:

- Product Support Deliverables (Support Hardware and Technical Orders)
- Design Validation Reports
- Configuration Characterization Deliverables
- Other Contract Information Items

P1 Has 39 Days MIR Reduces to 20 Days



Lean Now Enterprise VSM Event Ohio



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- **Created Global Hawk Enterprise Value Stream Map**
 - **Developed Tier 1 & Tier 2 “Current State” Global Hawk Program VSM’s**
 - **Selected 5 Key Processes for Follow-on “Kaizen” Events**
 - **AF Requirements Development and Program Planning**
 - **Alpha Contracting**
 - **EMD Development and Test**
 - **Production / Supply Chain**
 - **Change Process**
- **Events Planned to Focus on Agile Processes, Cycle Time Reduction, Improved Quality and Cost Affordability in Support of Spiral Concepts**



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Alpha Contracting

Event Description:

Conduct a collaborative event involving Government, Northrop Grumman, and key suppliers, to address and correct current state disruptions within the Alpha Contracting process.

Preliminary Objectives:

Institutionalize the Alpha Contracting Process

- Focus on ACT Phases I, II, & III and 15 Step Process
- Identify Root Cause Current State Process Perturbations
- Establish Proposal Boundaries, Size & Complexity
- Reduce Process Cycle Time and Sustain Gains
- Improve Quality of Proposals, 1st Time Yield

Value Proposition :

This activity will enable the Global Hawk enterprise team to jointly develop a mutually agreed to contract document with the intent to shorten acquisition lead-time. The value is to enable a highly efficient process, focused on producing quality contracts that fit within available funding.

Process Information:

Proposal prep, schedules and joint review. Issuance of RFP & RFQ with pricing instructions. BOE's and supplier inputs. Review boards. Submit proposal / contracts. Multiple review cycles, (SPO &NG), signatures, and contract award.

Event Dates: February 18-20, 2003 NG UMS

Co- Leaders: Lt. Col. David Riel, USAF
Tim Miley, Northrop Grumman

Team Members:

Linda Benardo (GH)	Tony Braswell (ASC/RAV)
Pat O'Connor (GH)	Cecelia Benford
David Corbeil (GH)	Betty Gillespie
Garth Savage (GH)	Dave Rehorst
Rick Hallahan (GH)	Charlie Garland
Pete Sterling (GH)	Dave Solomon
John Hom (GH)	Bill Goetz
Dennis Will (GH)	Linda Kerstens
Mark Thompson (GH)	Dave Corbeil (GH)
Cort Mongrain (Raytheon)	Mark Brian (L-3 Comm.)
Jay Robertson (Raytheon)	Larry Montgomery (L-3)

Process Owners: Col. Scott Coale & Carl Johnson

Coaches: Robert Goetz (NG / LAI SME)
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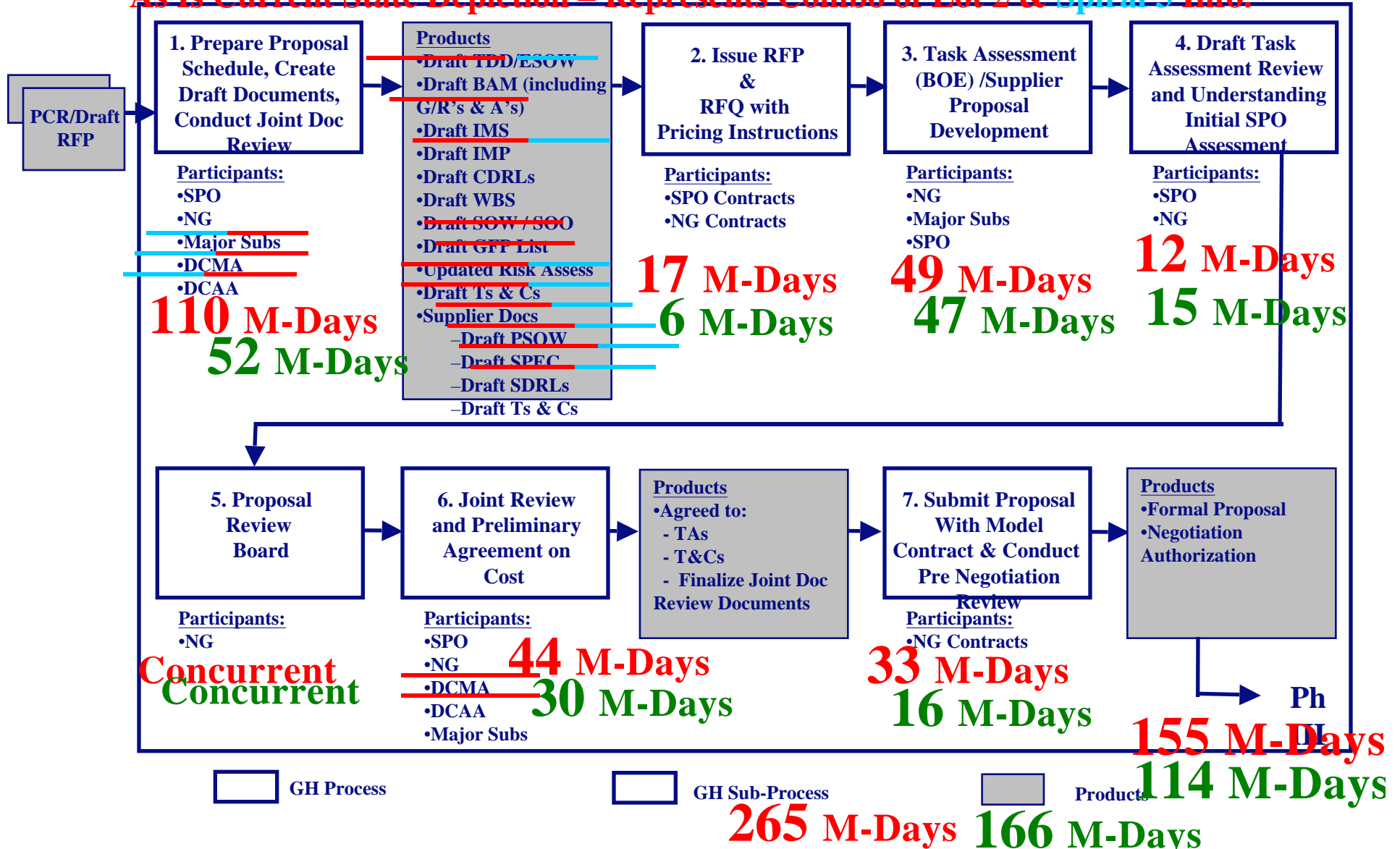
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Lean Now Workshop Training – Rancho Bernardo
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Alpha Contracting Event – Rancho Bernardo
VSM Follow-on Kaizen Events & LESAT Assessment



Global Hawk Proposal Development and Contracting Phases I & II

As Is Current State Depiction – Represents Combo of Lot 2 & Spiral 3 Info.





Global Hawk Proposal Development and Contracting Phases I & II





Lean Now Alpha Contracting Event



- **The Alpha Contracting Team Identified Major Process Improvements for Implementation**
 - **SPO/NG/Supplier Involvement Upfront and Throughout the Process**
 - **Identified 53% Cycle Time Reduction for Phase I and 26% for Phase II – total of 5 months**
 - **Created a Process Scheduling Template**
 - **Defined the Entrance/Exit Criteria and Documents**



Lean Now Global Hawk Events



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Lean Now Approach Delivering Value to the Total Aerospace Enterprise

22 - LAI Plenary Conference Briefing 26 Mar 03



Lean Now Global Hawk Program



- **Agenda**

- Overview
- Project Status
- Results
- **Summary**





Lean Now Global Hawk Summary



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- **Delivering on Promise to Accelerate the Lean Transformation of Government and Industry**
- **Collaborative Teams are Engaged to Define Value Streams and Implement Process Interface Improvements**
- **Documented Results Demonstrating Value Across the Total Enterprise to all Stakeholders**
- **Lean Principles, Methods and Tools Have Proven Effective in Improving the Total Value Stream**

Part 6: Lean Now! Global Hawk Briefing 2

Ron Jobo: **Global Hawk – Continuing the Lean Journey – Briefing to the LAI Plenary Conference.** March 2003. 23 pages.



Continuing the Lean Journey

Major Ron Jobo, USAF

Affordability and Lean IPT Lead

**Global Hawk System Program Office
Wright-Patterson AFB, OH**

ronald.jobo@wpafb.af.mil



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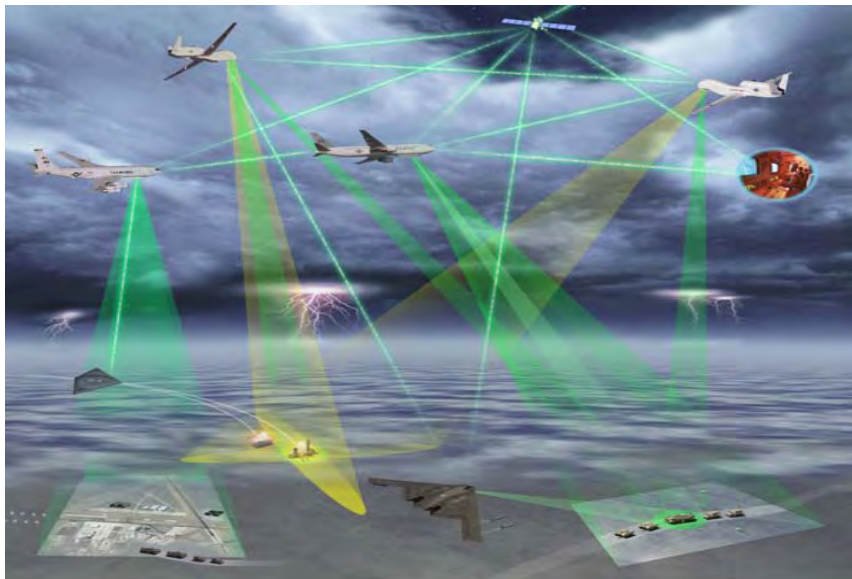
Presentation Outline

- **Introduction to the Global Hawk program**
- **Global Hawk participation in “Lean Now”**
- **Continuing the lean movement and promoting lean within the AF System Program Office**
- **Pitfalls and Misconceptions of lean**



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USAF Global Hawk – ISR Mission



- **Capability – Provide Multi-INT Persistent Surveillance**
- **EO/IR/SAR and SIGINT**
- **Platform-to-Platform Cross-cueing via Network Centric Ops**
- **Integrated with Manned, Unmanned and Overhead Systems**
- **Range Half Way Around the World**
- **On Station for Extended Periods**
- **Advanced Technology Sensor for Dominant Information Awareness**

Global Hawk Capabilities By Spiral

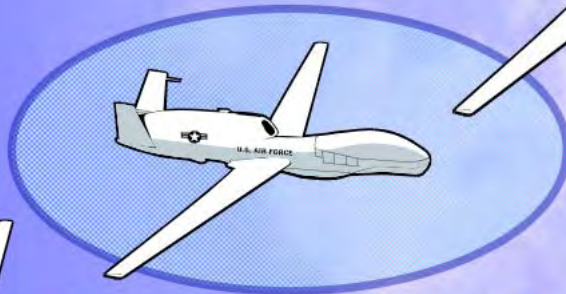
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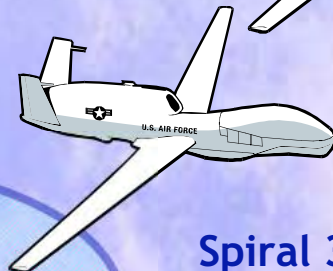
Spiral 1: Operationalize Existing System

- World-wide operating capability
- Sustainable support system



Spiral 2: Core "Truck"/Open Architecture

- Expanded IMINT, initial SIGINT
- Near horizon standoff range
- Baseline NAVY variant



Spiral 3: Full-spectrum SIGINT

- Signals Intelligence to support mid-scale engagements
- Machine level horizontal integration capable
- Defensive threat awareness
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Spiral 4: Improved Radar

- Improved range and resolution
- Track quality ground moving target identification
- Airborne surveillance capability
- Enhanced airspace operations and survivability
- Potential Navy variant



Spiral 5-6: Full-spectrum operations

- Full horizontal integration
- Expanded communications
- Extreme environment / NBC ops



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Global Hawk Major Stakeholders

NORTHROP GRUMMAN
Integrated Systems



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Raytheon



communications

Aurora
FLIGHT SCIENCES

Vought
Aircraft Industries, Inc.



U.S. AIR FORCE

Global Hawk “Lean Now” Initiative

- **Global Hawk was chosen as one of three AF “Lean Now” prototype programs – Oct/Nov 2002**
 - **“Lean Now” initiative focused on “interfaces” between the government and its industry partners**
 - **Concept of lean was new to the SPO**
 - **Northrop Grumman (NG) had a lean infrastructure in place but focused internally**
 - **“Lean Now” opened the dialogue between government and industry**
-



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Global Hawk Lean So Far...

-
- **CY2003 Year End Event Summary (18) Major Initiatives**
 - ISS Event Raytheon – Lean Now – December 2002
 - LAI Lean Now Workshop Training – January 2003
 - ICS Event L-3 Communications – Lean Now – January 2003
 - Enterprise VSM – Lean Now – February 2003
 - Alpha Contracting – Lean Now – February 2003
 - Engineering Scheduling – Global Hawk – March 2003
 - Aurora Aft Fuselage VSM – Lean Now – May 2003
 - Supplier NCTP Process – Global Hawk – May 2003
 - Production VSM – Lean Now – May 2003
 - Employee Processing – Global Hawk – June 2003
 - Change Process – Global Hawk – June 2003
 - EAFB Flight Test 5 S – Global Hawk – July 2003
 - LESAT Process Overview Kickoff – Lean Now – August 2003
 - Eng. Development VSM – Global Hawk – August 2003
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 - UCA Baselineing – Global Hawk – October 2003
 - Purchase Requisition – Global Hawk – November 2003
 - Begin SPO IPT Process Reviews – December 2003
-



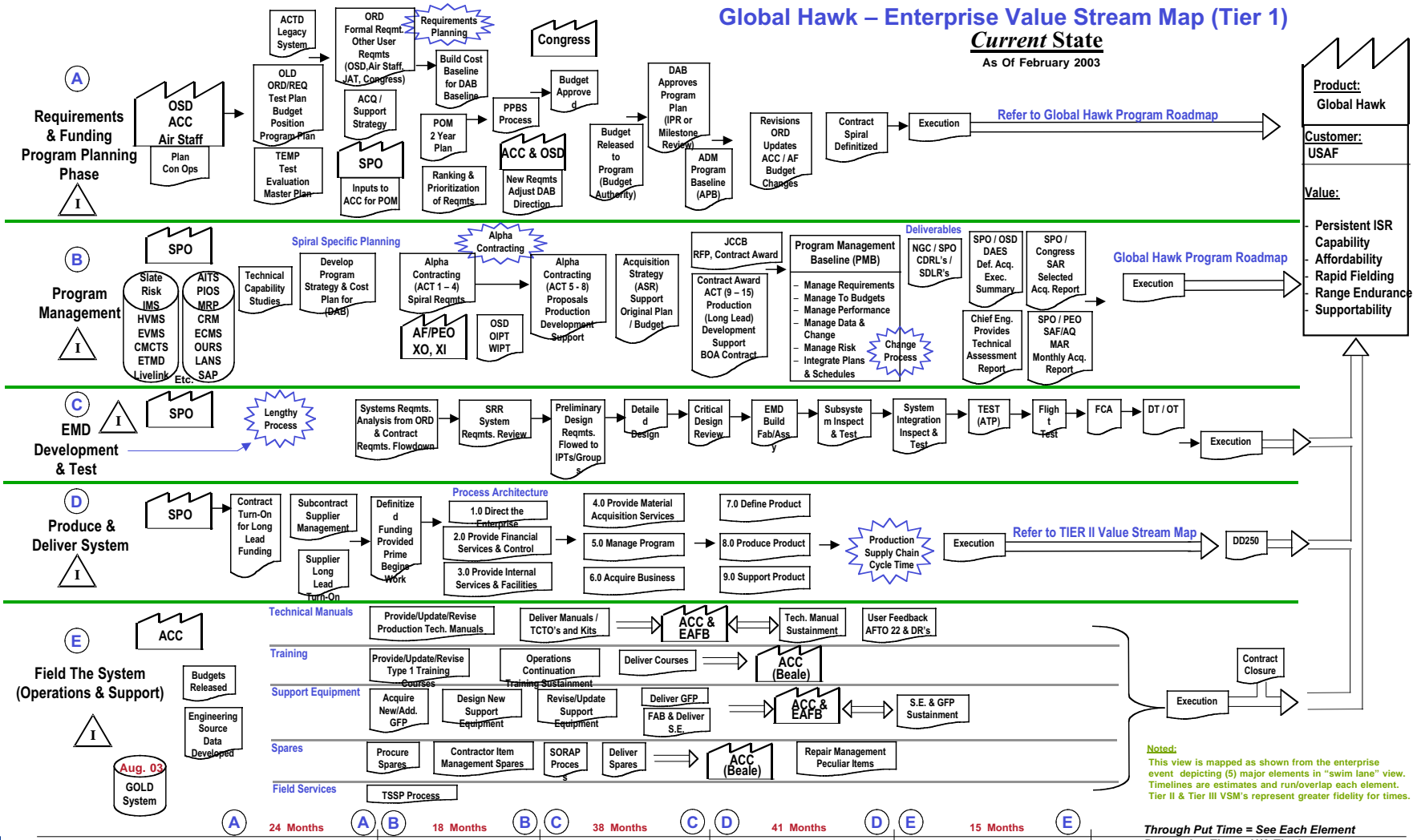
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Global Hawk Enterprise Value Stream Map

Global Hawk – Enterprise Value Stream Map (Tier 1)

Current State

As Of February 2003



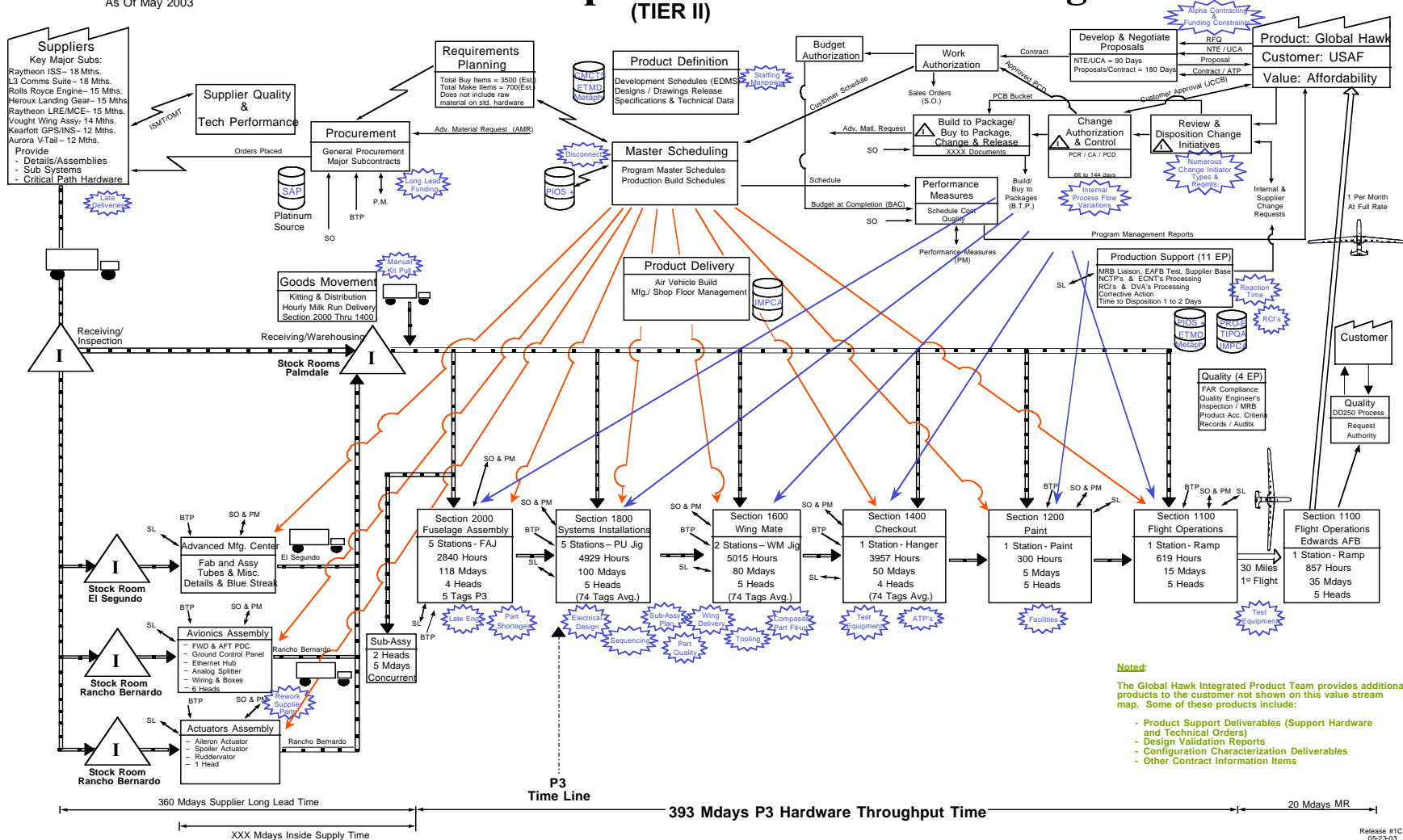
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Global Hawk Production Value Stream Map

Current State Value Stream Map View Global Hawk Program (TIER II)

As Of May 2003



Notes:
 The Global Hawk Integrated Product Team provides additional products to the customer not shown on this value stream map. Some of these products include:

- Product Support Deliverables (Support Hardware and Technical Orders)
- Design Validation Reports
- Configuration Characterization Deliverables
- Other Contract Information Items



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**
 - 37% Initial Reduction of 5 Months
- **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



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“Lean Now” Post Mortem

- **“Lean Now” showed what is possible when government and industry work together**
- **Successful “Lean Now” initiative doesn’t mean we’re lean**
- **A lean enterprise implies lean stakeholders**
 - NG already on the journey to lean
 - GH SPO needs to address the others steps of the TTL Roadmap
- **Primary focus of “Lean Now” was on the “Implement Lean Initiatives” phase of the Transition to Lean (TTL) Roadmap**
 - Need to add further focus on other areas of the TTL Roadmap



Transition-To-Lean (TTL) Roadmap

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Entry/Re-entry Cycle

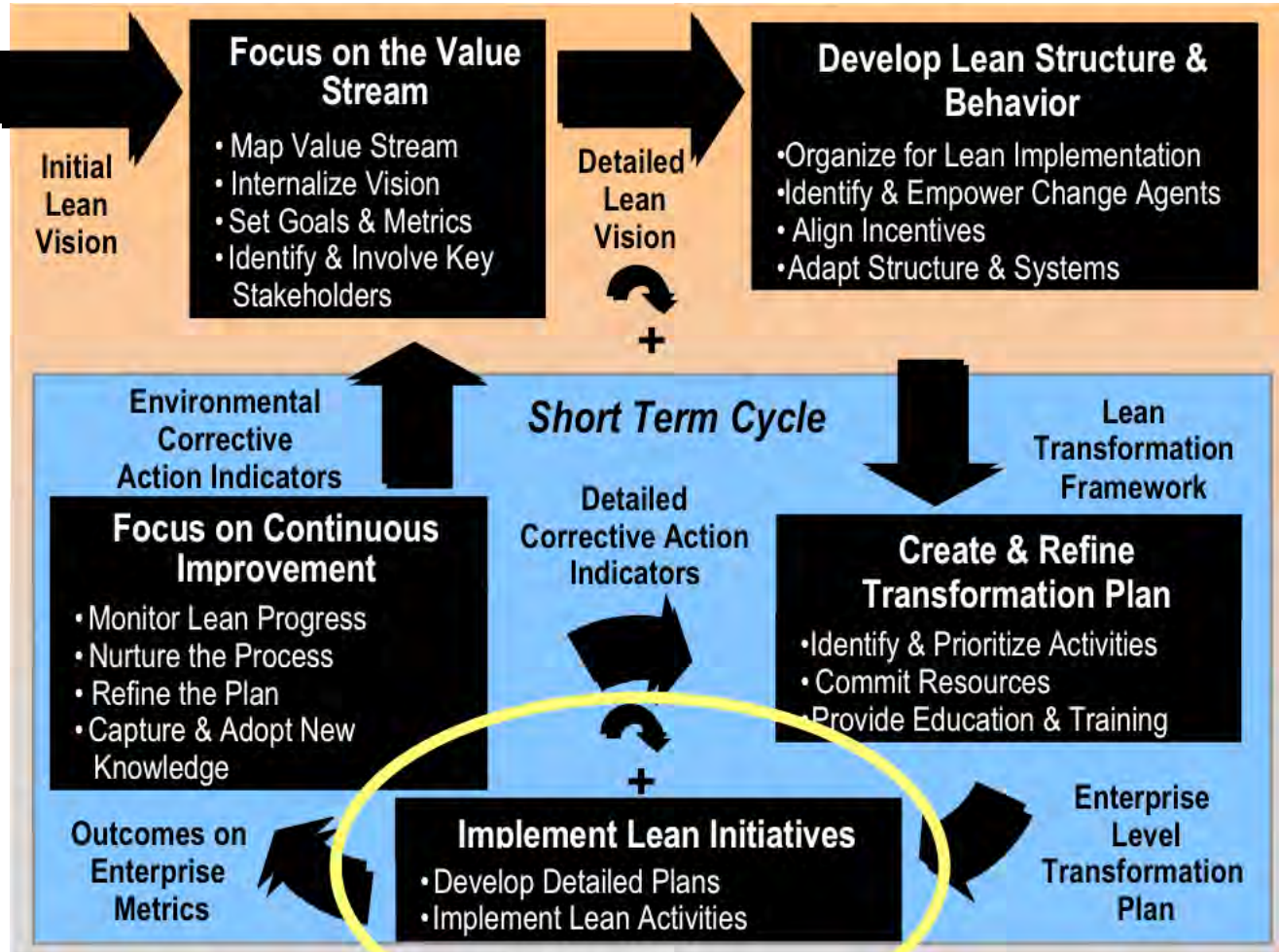
Adopt Lean Paradigm

- Build Vision
- Convey Urgency
- Foster Lean Learning
- Make the Commitment
- Obtain Senior Mgmt. Buy-in

Decision to Pursue Enterprise Transformation

Enterprise Strategic Planning

Long Term Cycle





What is the SPO approach to meet the Long Term Objectives?

- **Continue to promote the lean enterprise**
 - Continue to encourage NG lean initiative
 - Encourage NG to have lean subcontractors
 - Focus on interfaces and enterprise-wide processes
 - Build relationships between stakeholders
 - Establish a Lean Community of Practice
 - Develop joint tactical and strategic lean roadmap
- **Apply lean within the SPO**
 - Identify a lean lead for the SPO
 - Examine internal organization and processes
 - Continuous learning through lessons learned and training



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Global Hawk Enterprise 2004 Objectives

- **Value Stream Mapping: Update VSM's / Create New**
 - Support Program Strategies for Continuous Improvement
- **Key Processes: Alpha Contracting**
 - Achieve 50% Throughput Cycle Time Reduction
- **Supplier Focus: Implement Strategic Engagement**
 - Improve Quality, Affordability, Deliveries, Lean Training Development, & Establish SME Community for Supply Chain
- **Establish Flow on Global Hawk: AOP Tactic Goal**
 - Implement Production Flow to meet Customer Takt Time
- **Develop 5 Year Lean Roadmap: LEAN Framework**
 - Increase Enterprise Operational Efficiencies, and Value

NORTHROP GRUMMAN
Integrated Systems



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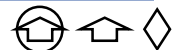
Global Hawk Enterprise 2004 Project Roadmap

Activity	2004											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1. Value Stream Mapping - Update VSM - Create New - 5 Year Roadmap	Perform Value Stream Mapping / Update Existing Maps + Future State / Create New VSM's / 5 Yr. Roadmap											
		Enterprise VSM		Development VSM		Production VSM						
	Ground Segment VSM			Key Suppliers				Logistics / Beale AFB			Roadmap Approval	
2. Key Processes Alpha Contracting Eng. Development Change Process	ETP Phase II Event Plan											
			ACT Kaizen Events / Targeted 50% Key Process Cycle Time Reduction Goal									
3. Key Suppliers	Aurora Raytheon											
								Develop SME Community	Conduct 3 Key Supplier Events			
4. Kaizen Events - Annual LESAT	5-S Uniformity Team											
		Work LESAT Gap Analysis Plans							LESAT			



Status Date: 1/28/04

Monitor Milestones





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Global Hawk SPO Lean Objectives

- **Lean has been incorporated into the umbrella of the Affordability Program**
 - **Use lean to find the best value for all stakeholders**

 - **Reduce Life Cycle Costs through efficiencies and process improvements**

 - **Increase communication effectiveness and relationships between SPO, contractors, and ACC**

 - **Enhance SPO effectiveness**
 - **Review SPO process/structure**
 - **Fine tune IPT processes and interactions**
 - **Increase cross-talk between IPTs and personnel**
-



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Global Hawk Process Improvement Way Ahead

- **Assigned a SPO lean lead**
 - Promote lean internally and externally
 - Lead lean events and initiatives
 - **Use Government LESAT results to identify focus areas**
 - **Refine internal SPO processes**
 - Government LESAT used to identified opportunities
 - Reduce confusion – improve communications
 - Identify Roles and Responsibilities
 - Examine existing processes
 - Document processes
 - **Continuous education**
 - Promote “thinking out of the box”
 - Educate workforce on principles of change
-



Global Hawk Process Improvement Way Ahead (con't)

- **Capture Lessons Learned**
 - Promote the use of Lessons Learned to learn from past activities
- **Established SPO Database Library**
 - Use of database to promote SPO knowledge sharing
 - Responsibility matrix
- **Continue to promote Enterprise-wide Thinking**
 - Continue SPO/Contractor lean events
 - Establish a “Lean Council” between SPO/NGC/Subs
 - Strategic view of Lean (5-year Plan)
 - Revised GH Team Norms



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Global Hawk Team Norms - 3-3-04

- **Establish Trust Through Building Relationships**
 - **Be a Contributor not a Critic**
 - **Always Develop Win Win Solutions**
 - **Take Joint Ownership and Accountability in Products and Issues**
 - **Seek First To Understand, Then Be Understood (Listen)**
 - **Open and Timely Sharing and Responsible Use of Information**
 - **Relentless Commitment To Excellence**
 - **Take Time to Plan, Innovate, and Improve
(Become a Learning Organization)**
 - **Continuously Provide Two Way Feedback**
 - **Provide Recommendations When Presenting Problems**
 - **Help Others to Excel**
-



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Recent, On-going, and Planned Activities

- **Aurora Lean Training (16 Feb 2004)**
 - **Ground Segment Lean Event (Feb-Mar 2004)**
 - **SPO IPT Reviews (On-going)**
 - **Alpha Contracting (April 2004)**
 - **Logistics Lean Event (Spring 2004)**
 - **GH Library Database Development (On-going)**
 - **Closing out and follow-through of past lean events (On-going)**
 - **GH Lean Community of Practice -- SPO, NGC, and subs**
 - **Lean Training Module for New Comers Briefing**
 - **Combining NG and SPO LESAT results (TBD)**
-



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Pitfalls and Misconceptions...

- **Thinking of lean as a tool rather than a commitment to continuous improvement**
 - Results in inconsistencies and suboptimization
 - **“We can’t do that because...”**
 - Improvement means taking risks and challenging the status quo
 - **“Lean should be free”**
 - Lean requires resources and sometimes requires substantial investment
 - **“Personality driven”**
 - Infrastructure is required to endure leadership changes
 - **“All talk and no action”**
 - Too much analysis and planning and not enough action
-



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Pitfalls and Misconceptions (con't)

- **“The Spanish Inquisition”**
 - Using lean events as a threat
 - Lean becomes an activity rather than a philosophy
- **Lack of patience**
 - Change doesn't happen over night
- **Overuse of the word “lean”**
 - Lean becomes a buzzword
 - Little understanding of what lean is
- **Reinventing the Wheel**
 - No capture and/or use of lessons learned



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Conclusions

- **“Lean Now” provided enthusiasm and publicity for the possibilities of lean**
- **Success of “Lean Now” is no indicator of a successful paradigm shift**
- **Self-sustaining lean requires a proactive and dedicated approach and a solid foundation – “an infrastructure for change”**

Part 7: Lean Now! Global Hawk Briefing 3

Summary Briefing: **Global Hawk Lean Program – After the Lean Now! Initiative – Briefing to the LAI Executive Board**. May 2004. 7 pages



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Global Hawk Lean Program—After “Lean Now”

- **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
 - Builds relationships and trust between government and industry
 - Transforms traditional process to meet demands of spiral acquisition
 - Lean is a keystone of meeting affordability targets
 - **Lean has taken hold and is spreading across the total Global Hawk Enterprise**
 - Lean being applied to internal process at SPO, NG, and subs
 - Both SPO and NG have full-time lean change agents
 - Full-time Lean change agents have been identified at the major subcontractors and the Global Hawk Lean Community of Practice was formed
-



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CY2003 Lean Activities

-
- **18 Major Initiatives**
 - ISS Event Raytheon – Lean Now – December 2002
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-



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CY2004 Lean Activities to Date

- **CY2004 Activity to date**
 - **NG 5S Factory Uniformity – January 04**
 - **Key Supplier Development, Lean Training at Aurora – February 04**
 - **Ground Segment VSM Part I at Raytheon – Lean Now – February 04**
 - **Ground Segment VSM Part II at UMS – Lean Now – March 04**
 - **NG Prime Contract Flowdown Process – March 04**
 - **NG EVMS (MPM) User Implementation – April 04**
 - **Tier I Enterprise VSM Update – Lean Now – April 04**
 - **Ground Segment VSM Part III at L-3 – Lean Now – April 04**
 - **SPO Training at WPAFB – April 04**
 - **Alpha Contracting II at WPAFB – Lean Now – May 04**
-



Global Hawk "Lean Now" Major Accomplishments

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 - Increased Units from 3 to 6 per Year
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Enterprise Value Stream Mapping

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Cycle Time Reductions

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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
-



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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





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Global Hawk Major Stakeholders



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communications



Part 8: Lean Now! Turbine Engine Development Briefing

Ed Kraft: **Lean Now! Wave 2 – Turbine Engine Development and Sustainment.** 13 pages

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***Lean Now – Wave 2
Turbine Engine
Development and
Sustainment***

Dr. Ed Kraft

Technical Advisor

AEDC



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Outline



- **Project Description**
- **Initial Activities**
- **Challenges**
- **Taking Stock**
- **Roadmap**
- **Some Early Success**
- **Summary**

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Turbine Engine Development & Sustainment Prototype (Test and Evaluation Support Focus)



<p>Prototype Description:</p> <ul style="list-style-type: none"> • Use an Propulsion Testing Enterprise Team (Air Force, Army, Navy, and Industry) to create value and eliminate waste in the engine development and sustainment process 	<p>Start Date: 10 June 2003</p>
<p>Preliminary Objectives:</p> <ul style="list-style-type: none"> • Significant reductions in cycle time and cost for the testing process supporting the engine development and sustainment process 	<p>Team Leader: Dr. Edward Kraft, AEDC Co-Leader: Pete Chenard, P&W; Tim Hillstrom, RR; Jim Wilson, GE</p>
<p>Value:</p> <ul style="list-style-type: none"> • Enhance support to multiple weapon systems by (1) leveraging multi-center and industry sharing of best practices, common language, tool sets; and, (2) attacking key cycle times & drivers 	<p>Team Members: See Attachment</p>
<p>Process Information:</p> <ul style="list-style-type: none"> • Focus upon test cost & cycle time reductions for engine RDT&E, DT&E, OT&E, & sustainment • Access applicability of commercial engine test approaches, as well as revised DOD acquisition models 	<p>Process Owner: Mr. Tim Dues, PPGM, OC-ALC</p>
<p>Process Information:</p> <ul style="list-style-type: none"> • Focus upon test cost & cycle time reductions for engine RDT&E, DT&E, OT&E, & sustainment • Access applicability of commercial engine test approaches, as well as revised DOD acquisition models 	<p>LAI Lean Experts: Ida Gall, P&W Doug Hottman, R-R Wes Switzer, Boeing Terry Bryan, LAI Tracy Hought, LM</p>
<p>Process Information:</p> <ul style="list-style-type: none"> • Focus upon test cost & cycle time reductions for engine RDT&E, DT&E, OT&E, & sustainment • Access applicability of commercial engine test approaches, as well as revised DOD acquisition models 	<p>Case for Action:</p> <ul style="list-style-type: none"> • The time and cost for development testing on today's advanced engines are of the order of 10 yrs and \$2.5B • The propulsion testing enterprise has not been examined from a lean perspective • Application of LAI principles should lead to significant reductions in time and cost

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The Case for Action



		<u>DEV.</u> <u>TIME =MOS</u>	<u># DEV.</u> <u>ENGS</u>	<u>DEV.</u> <u>HRS</u>	<u>FY96</u> <u>COST</u>	<u>LIFE</u>
F100		54	23	9,628	\$1.41B	150 HRS
F404		98	14	15,000	\$1.05B	4000 HRS
F414		72	14	10,000	\$941M	4000/8000 TAC's
ORIG. F119		108	11	9,683	\$1.47B	4000/8000 TAC's
ACTUAL F119		156	9	8,677	\$2.465B	4000/8000 TAC's

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Getting Started The Challenges



Groundbreaking initiative:

- **Total Enterprise approach - not program specific**
- **Numerous organizational interfaces**
 - **Government-Industry**
 - **Industry - Industry**
 - **Tri-Service: Army, Navy, and Air Force**
 - **Cross Functional: S&T, Ground Test, Flight Test, Program Office, Depot Maintenance, Logistics, OEM Design and Manufacture**
- **Scoping the Enterprise to the doable**
- **Learning and creating lean processes on the fly**

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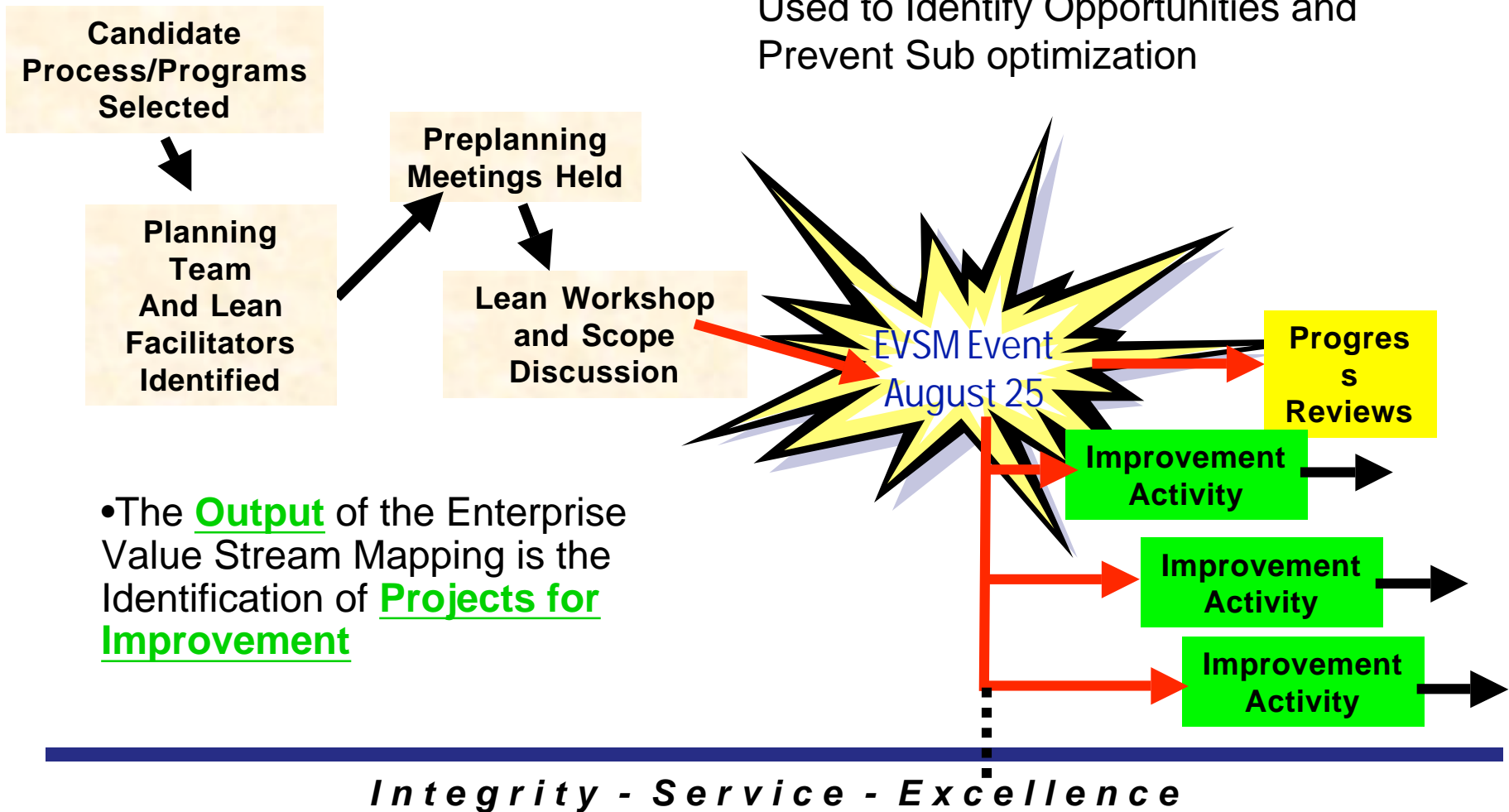


Initial Lean Now Activity

Turbine Engine Development Sustainment Prototype



- Enterprise Value Stream Mapping is Used to Identify Opportunities and Prevent Sub optimization

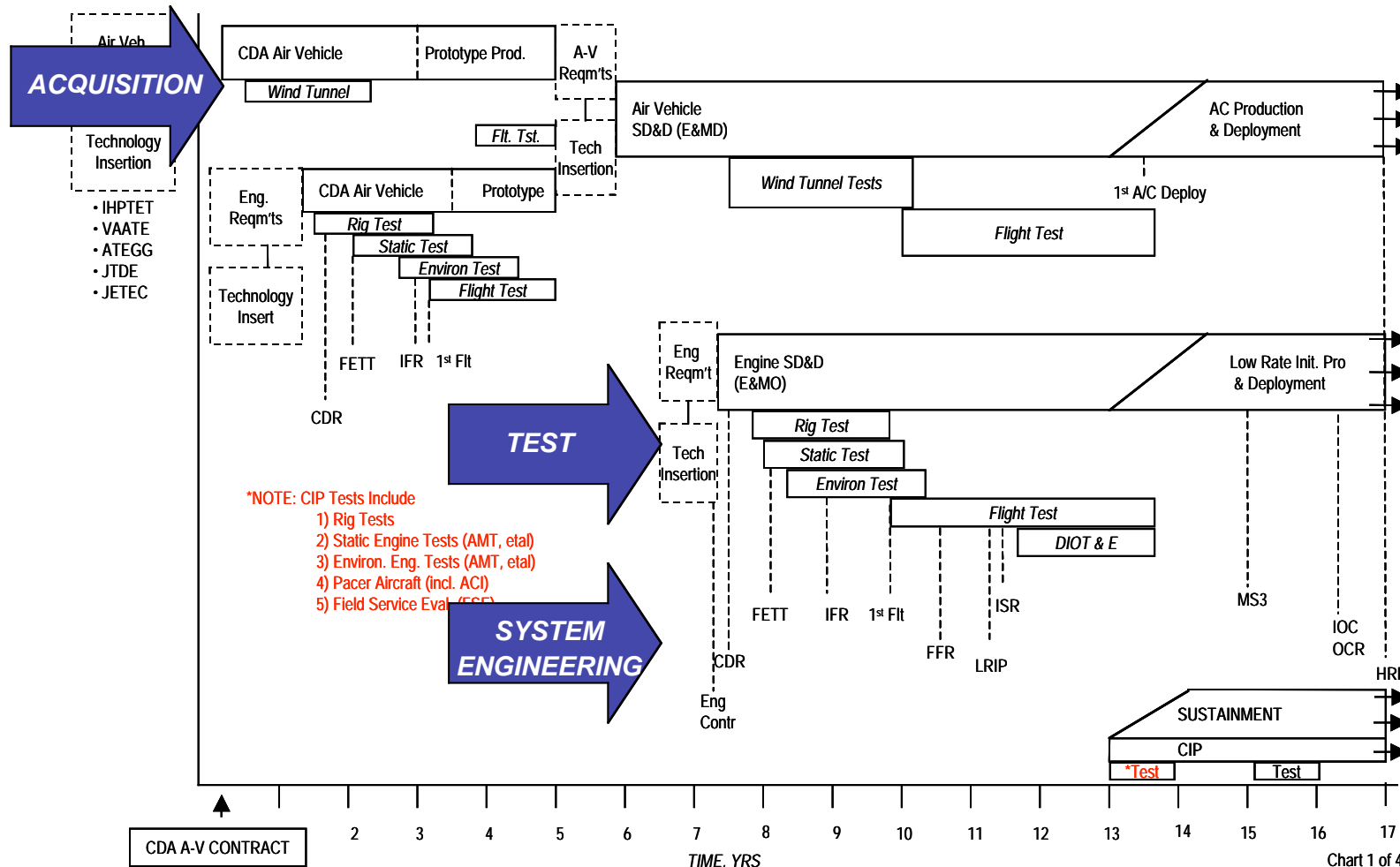


•The **Output** of the Enterprise Value Stream Mapping is the Identification of **Projects for Improvement**



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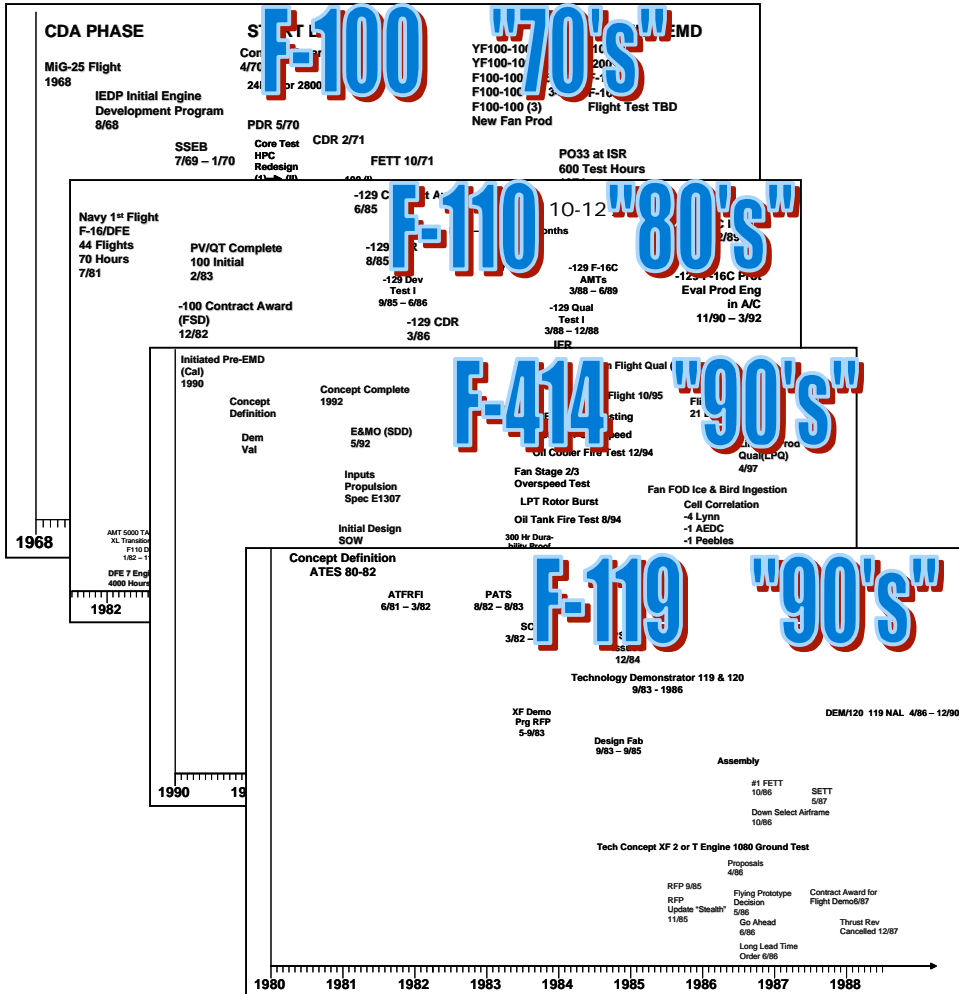
Turbine Engine Development Enterprise Viewpoint



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Creating a "Shop Floor" Developing a Baseline Value Stream



- Using data archives, reports, "rat pack" data, and "grey beards" reconstructed timelines and events for four major engine development programs
- Invaluable information for framing a value stream for engine development and sustainment

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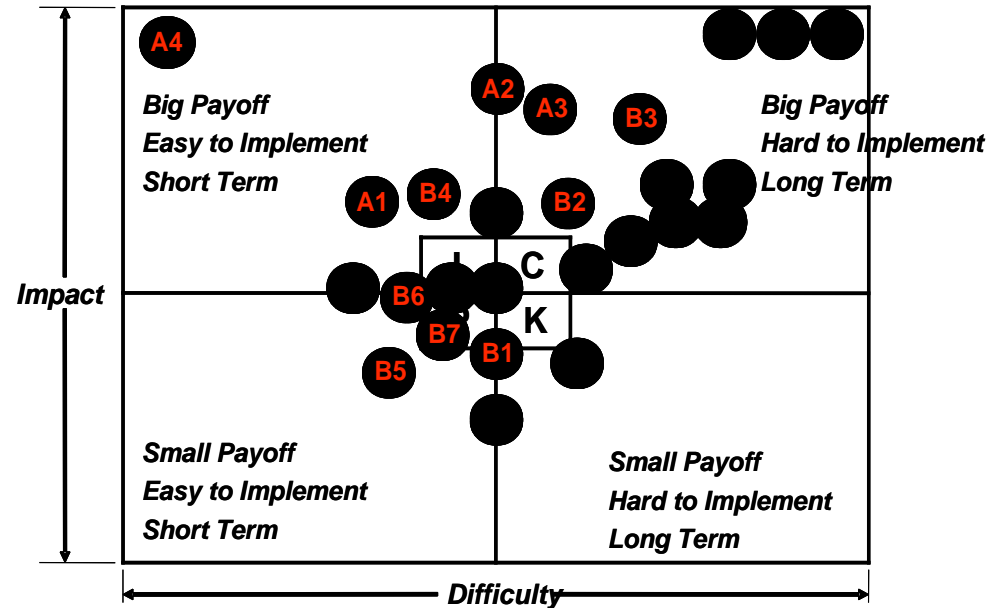


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Outcome of the Initial Value Stream Mapping



- **A1: Improve Ground Test Throughput**
Reduce cycle time and cost in ground testing
- **A2: CIP Test Cost Growth**
Identify sources of cost growth in CIP Programs
- **A3: SDD Internal Defect Elimination**
Determine root cause of design, fabrication, assembly and test defects during the engine development process
- **A4: First Engine to Test / CDR Relationship**
Explore impact of FETT/CDR relationship on potential design iterations



Enterprise VSM PICK Results
(Possible, Implement, Challenge, Kill)

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Taking Stock Calibrating Efforts With Reality



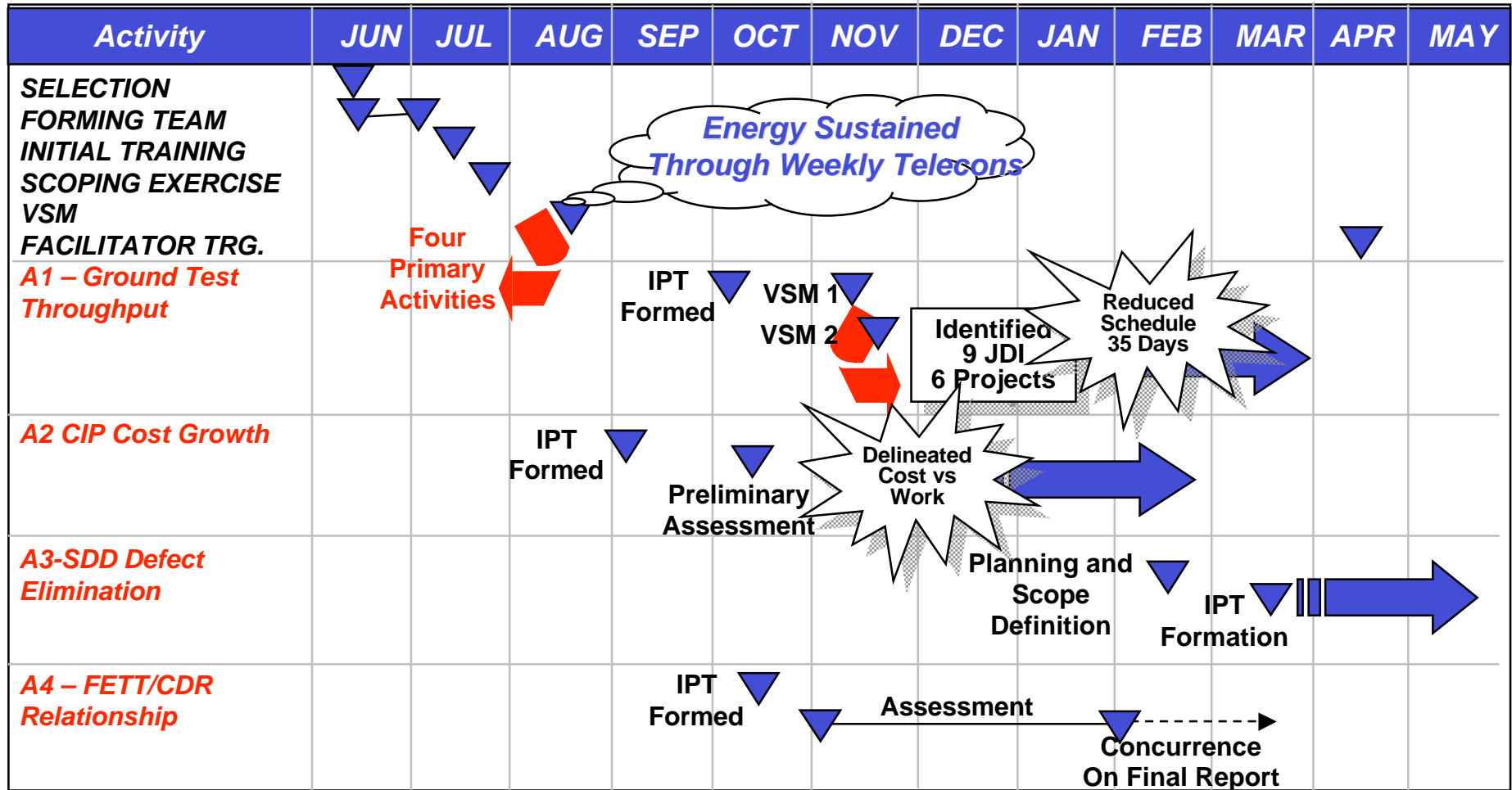
- **Overenthusiastic about schedule coming out of August VSM Exercise**
- **Finite set of already busy people; same names show up on multiple exercises**
- **Resources (man hours, travel) had to be identified and acquired – not fair to expect industry to take out of overhead**
- **Potentially contentious issue about collecting data on defect discovery requiring careful scoping and protection of proprietary information**

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Roadmap



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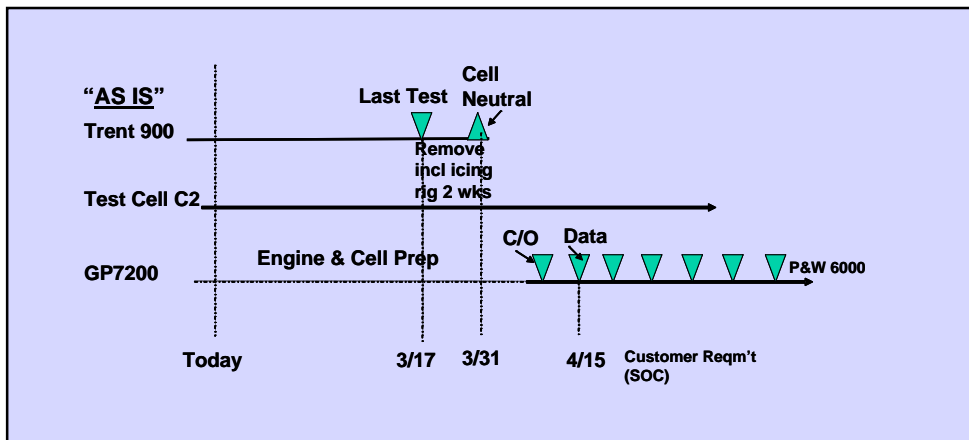
Test Cell Scheduling



Case for Action

- Cell Capacity Conflict for two engines striving to meet same program milestones
- Tried hard to solve problem with traditional tools – “can’t expect new results from doing the same things!”
- Employed Value Stream Mapping

- **Identified potential 35 days of schedule savings through:**
 - Parallel operations
 - Eliminate non-value added steps
 - Craft work scheduling
 - Enhanced vendor management
 - Early cell modification
- Multiple culture gains:
 - Integrated IPT (AEDC/ATA/P&W)
 - Eliminating old paradigms re. work scheduling
 - Capture “voice of the customer”
 - Move from “engineered-to-order” to “standard-with-options”



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Lessons Learned



- **Buy-in by senior management is crucial – aligned senior managers prior to starting Lean Now initiative**
- **Need to identify data needs early**
- **For an enterprise approach that is not aligned with a specific program need to identify required resources and the source**
- **Need to plan ahead to capture and manage knowledge generated when there is no single organization responsible**

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Part 9: Lean Now! Purchase Request Process Briefing

Geoff Bentley: **Purchase Request Process – OO-ALC at Hill Air Force Base. Lean Now! Project Status Briefing.** January 2004. 18 pages



Purchase Request (PR) Process OO-ALC at Hill Air Force Base



Lean Now Project Status Briefing



January 28th 2004

Presented by Geoff Bentley (Bob Blair & Nick Montalbine)

Lean Now PR Project—Jan 2004 1



Status:
12-04-03

OO-ALC Purchase Request Lean Now Prototype



Description

What: Lean transformation of the Purchase Request Process

Why: To reduce contract cycle time, model future State process for all ALC contracting function

Who: OO-ALC LG, Finance, Contracts, Raytheon, Textron, Boeing

Enterprise Leaders: Tom Girz, Rob Vogt, Sherm Bjerregaard, Steve Wall

- Prototype**
- Validation**
- Widely Deployed**

LAI SMEs

- G. Bentley
- B. Blair
- N. Montalbine



OO-ALC Team – VSM Workshop

Objectives

- Cut current contract cycle time in half
- Conduct pilot of future state contracting that will be the model for deployment of the new process across Ogden and the other ALCs
- Use data to prioritize continuous change

Activity

- **Past 30 Days**
 - Project teams working projects-using project templates
 - Established Project Team tracking and project report cards
 - Plan for design blitz for PR Central Pilot
 - Individual project teams-work in progress
- **Next 90 Days-**
 - Conduct design blitz for PR Central Pilot
 - Initiate pilot for PR Central process
 - Arrange workshop with other ALCs to share learning/status?

Results

- Trained 25 facilitators-40 hour LAI class.
- Created PR Process VSM and collected available data
- Created Project Plans 23 plans, prioritized and staffed
- Results Expected by 1st Qtr 2004
 - Pilot process designed and in place
 - 50+% Cycle time reduction in end to end process
 - Planning to extend pilot to other product areas

Issues/Corrective Actions

<u>Issue</u>	<u>CR</u>	<u>Resp.</u>	<u>Date</u>
1. Lack of metrics on the process	-Use pilot/traveler to gather metrics	Vogt	12/ 03
2. Project tracking mechanism	-Weekly calls	Vogt/Wall	Weekly
3. Scope of continued LAI support	-To be defined 30 Oct with Commander	Bryan	10/03

Lean Now PR Project—Jan 2004 2



Background & Goals



- Ogden's SMAG (Supply Management Activity Group) processes thousands of PRs funding billions of dollars of Spares and Repairs annually
- 'Average' Flow Time per PR is 7-8 months
- PR Process Goals
 - Reduce Flow Time by one-half
 - Avoid negative metric of MICAPs (Mission Impaired Capability Awaiting Parts)
 - Serve as model for others



Organization



- LAI Team
 - Bob Blair (Raytheon-Lead)
 - Geoff Bentley (Textron) and Nick Montalbine (Textron)
- Ogden Management and Line Operations
 - Senior Steering Team
 - Integration Team
 - Tom Girz (Lead)
 - Sponsor
 - Rob Vogt (Product Integrity)
 - Team Leads for various IPTs
- Ogden Lean Transformation Office
 - Col. Macquet



Upfront Summary



Current PR Process

VSM → Projects → IPTs



PR Central Design & Plan of Action

Streamlining Current System
Fundamental change in how processing is done



PR Central Pilot

Design & Test
Concept Validation
Extend (generalize) test results



Production

Handoff after Pilot results



Major Milestones— Aug-Sept 2003



- August
 - Kick-off meeting with OO-ALC Leadership
 - Agreed to focus on 'Purchase Request' Process
 - Established points of contact and schedule
 - Planned/scheduled facilitator training
- September
 - Conducted week-long Facilitator Training for 25 ALC staff
 - Conducted one-day Lean Training event and initiated planning for Value Stream Mapping event



Major Milestones— October 2003



- Completed week-long VSM of PR Process
 - From Requirements Identification to Contract Award (see exhibit)
 - Hundreds of processes (inputs/outputs/handoffs)
- Prioritized potential projects
- Initiated plans for 23 projects (each with an IPT)
- Facilitated Reporting and Coordination mechanism for IPTs/projects
 - Dedicated Ogden web-site for project materials
 - Discussions on team reporting and feedback
- Each IPT/Project has Team Leader and a Facilitator
 - Product Integrity organization ~100+ persons
 - IPTs ~ 50+ persons



Major Milestones— November 2003



- Conducted coaching on data collection and analysis— “telling the story with data” (see next chart and data booklet)
- Facilitated two-day IPO workshop on the ‘761’ Requirements Screening process with the 761 Project IPT
 - 3 follow-up actions
 - 3 JDI actions
- Project Status Reviews
 - Established Project Gate Reviews using LAI template (see next chart)
 - Coaching on the process and tools
- 23 projects condensed to 15 projects and teams



PR Process Data Collection & Analysis

Average FTs for *SMAGs only* (~25% of total PRs)



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166 days

Requirements

Strongly f(Product Line & Mgt. Prerogatives)

Limited data

11 days

Coordination

f(serial vs. parallel cycles)

54 days

Contracting

Wide variation

f(Kind of Contract, Contract Type, Product Line)

- Spares add 14 days wrt Repairs
- Non-competitive >\$100K adds 50 days wrt average
- Commodities Product Line adds 16 days wrt to average

Multiple Drivers
 2 Kinds of Contract (Spares, Repairs)
 11 Contract Types
 7 Product Lines
 Priority Special Handling Options





Project Gate Reviews Per Project

Bi-Weekly Meetings—Team Members plus Integration Team



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OBJECTIVES	Dates, Handoffs & Checkoffs
<p><u>Step 1: Project Visualize & Commitment Phase</u></p> <p>A) Identify expected benefits, goals, objectives & scope (pg 1 & 4)</p> <p>B) Identify affected organizations, process owners, team and project resources (pg 2)</p> <p>C) Identify related process improvement projects (pg 3)</p> <p>D) Develop Project Plan, Milestones, Estimated Completion Date (pg 2)</p> <p>E) Gate Review</p>	<p><i>Visualize & Commit</i></p>
<p><u>Step 2: Project Prioritize & Characterize Phase</u></p> <p>A) Define "As Is" using Spaghetti Diagram: takt time, lead time, route & method of travel (pg 4)</p> <p>B) Identify & Prioritize Root Causes (pg 4)</p> <p>C) List Alternative Solutions (pg 4)</p> <p>D) Define To-Be or Future State using process mapping (pg 4)</p> <p>E) Identify method of measurement (As-Is vs. To-Be) (pg 5)</p> <p>F) Gate Review</p>	<p><i>Prioritize & Characterize</i></p>
<p><u>Step 3: Project Improve & Achieve Phase</u></p> <p>A) Identify Resource Requirements for Future State (pg 4)</p> <p>B) Prepare Cost Benefit Analysis (pg 6-7)</p> <p>C) Document success, share knowledge, recognize & reward (pg 7)</p> <p>D) Gate Review</p>	<p><i>Improve & Achieve</i></p>



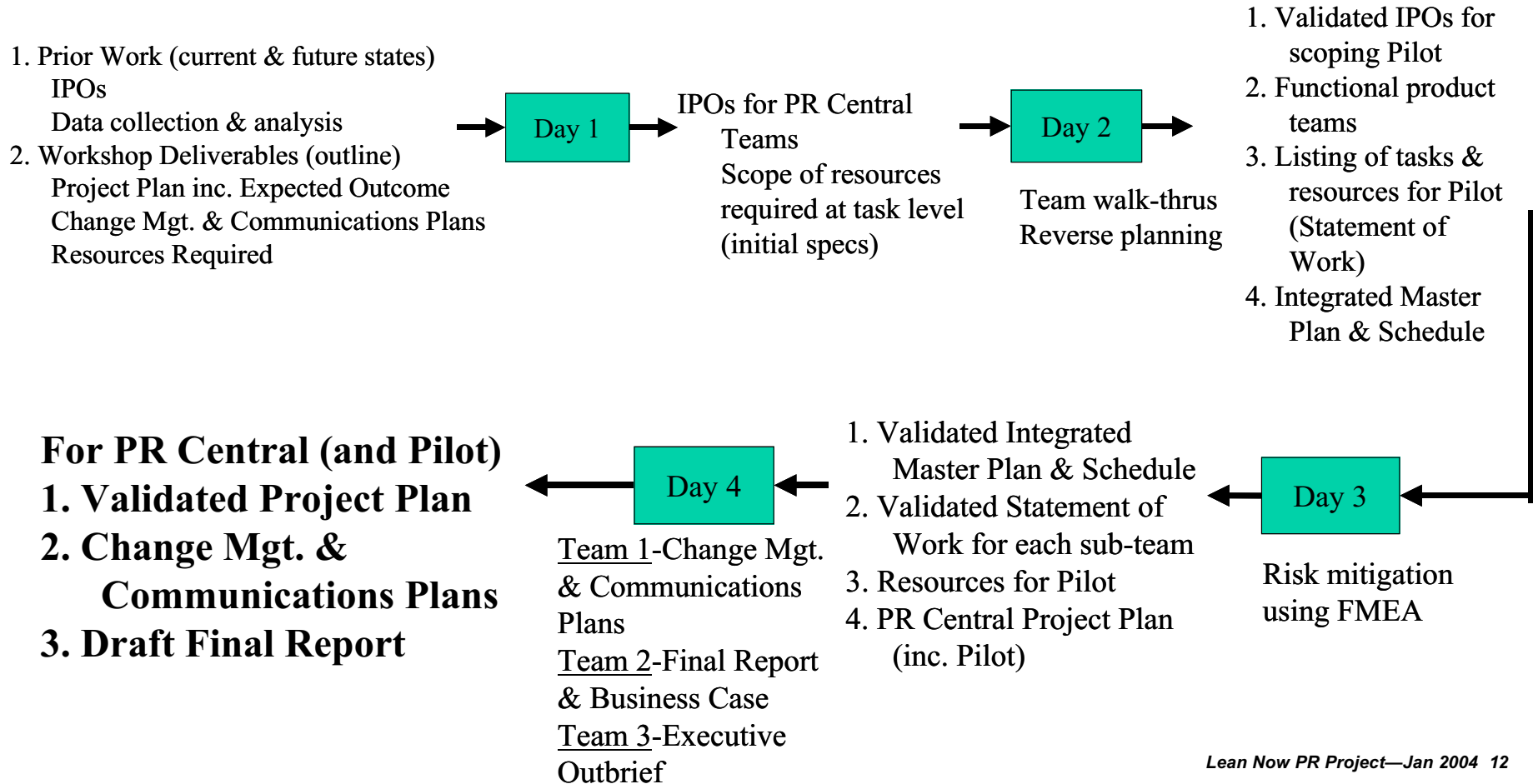
Major Milestones— December 2003



- Major focus shift
- PR Central elevated to priority status
 - Embodies much of Requirements, through Coordination and Contracting to contract award
- Planning for PR Central design blitz in January
 - Solution Shop workshop scheduled for week of 19 January (see next chart)
 - Output Goal
 - Validated plan to conduct a PR Central Pilot Project



PR Central Workshop Solution Shop Roadmap for PR Pilot (subject to some modification)





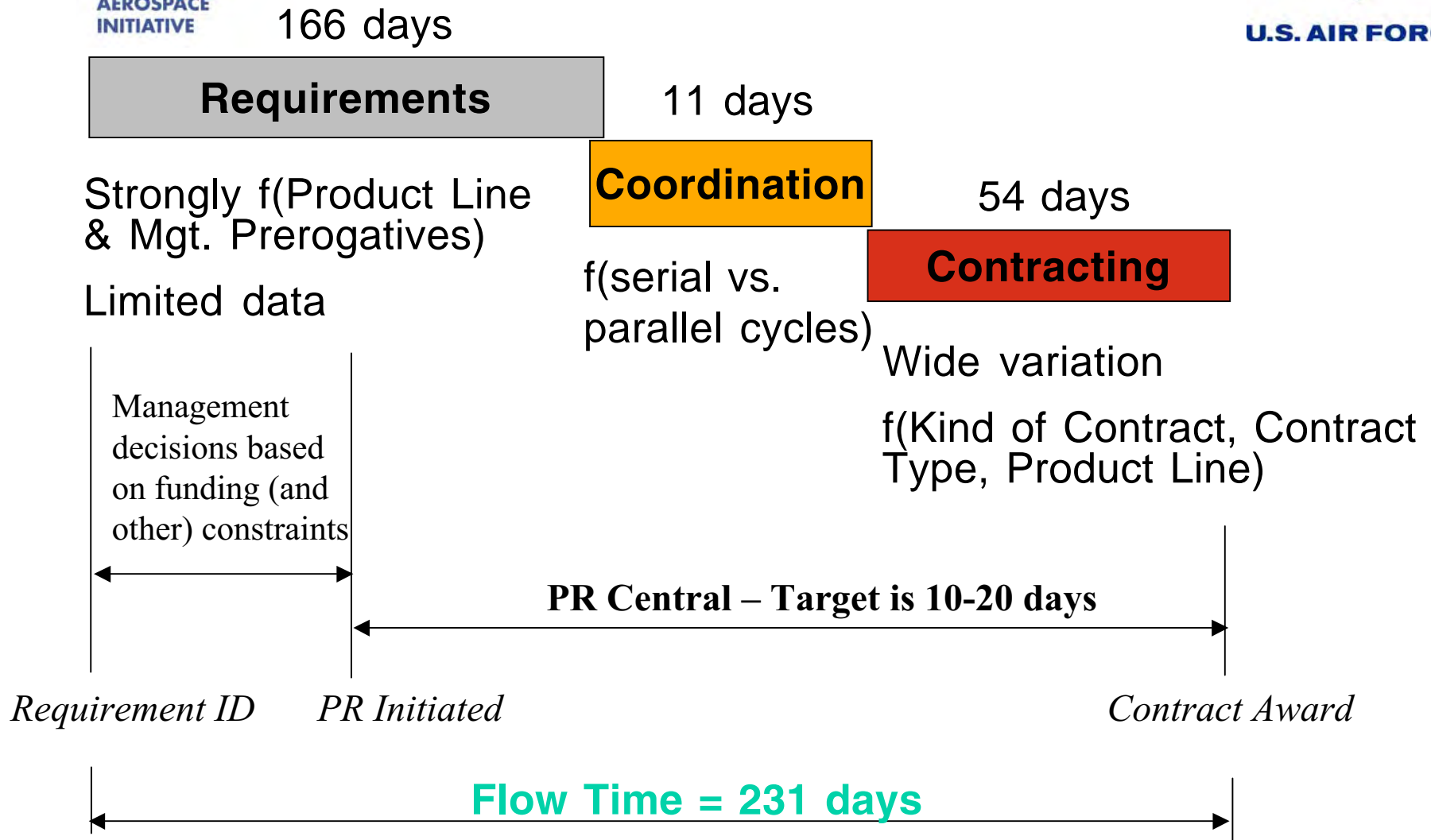
Methodology--PR Central Workshop Plan



- Designate Players
 - Leader (Karen), Core Team Members (Sandra, Rich, Kathy, Product Line member plus Karen & Rob)
- Facilitate Agreement on Scope of PR Central
 - Core Team
- Decide Product Line for Pilot
 - Brainstorm Criteria
 - Data
 - Prioritize and look at pluses & deltas
- Define Pilot with Leadership Team
 - Leads
 - Facilitators
 - Participants (Support Team members)

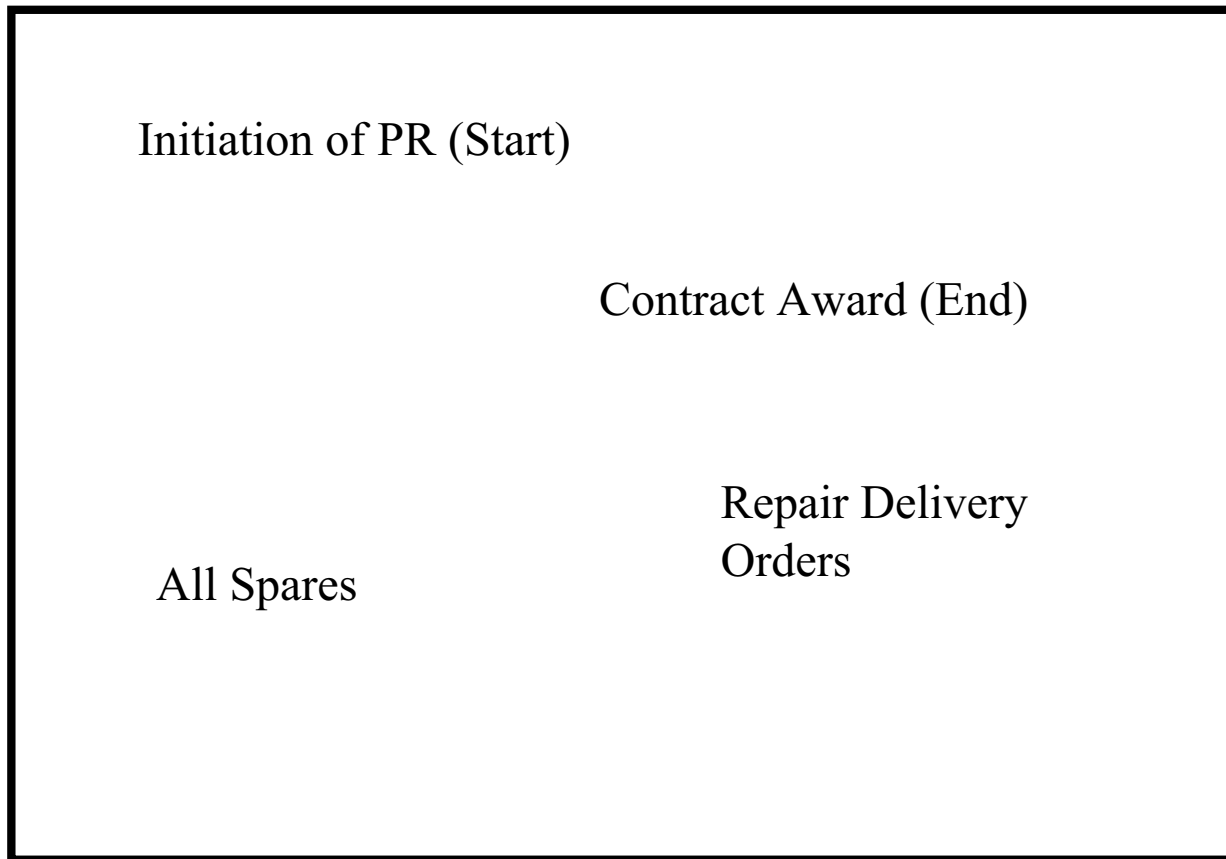


Scope of PR Central (Average Flow Times)





PR Central Scope— What's In, What's Out (major elements only)



Funding

Master File



Support Team Characteristics



- Support Team Members must have:
 - Big Picture Knowledge
 - Detailed Process Knowledge
 - Time Commitment from Supervisor
 - Motivated, Interested, Willing to Participate
 - Skills needed to understand some Lean concepts
 - Project Planning Skills
 - Data Gathering Capability
 - Opinions/Open to Others
 - Decision-making capability for his/her function



Pilot Criteria



- Test must equal reality
 - Representative sample of PRs
 - Implementation requirements such as skill base, training & operating instructions may be drivers
- MSD Funds must be available
 - SMAG only
- Phased approach with Product Line
- Strong Leadership support from Product Line



Milestone Schedule



Milestone	Est Comp Date	Resources
Data Gathering	Ongoing	Geoff Bentley Rich Ballard Sandra Berger
PR Central Planning	6-Feb	LAI Rob Vogt Core Team
PR Central Workshop	9-13 Feb	LAI Core Team Workshop Participants
Complete Pilot Design	20-Feb	Core Team Workshop Participants LAI
Deliver Pilot	20-Mar	Core Team Pilot Team LAI
Complete Business Case & Implementation/Transition Plan (All Product Lines)	3-Apr	Core Team LAI
Upgrade Pilot Design (Phased Implementation Starts)	10-Apr	Core Team LAI
Transition to Ogden Complete	10-Apr	Core Team