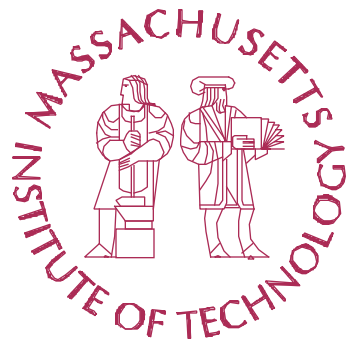
Lean Aerospace Initiative
Plenary Workshop

Welcome and Theme Introduction



October 14, 1998

Presented By:
Earll M. Murman
MIT

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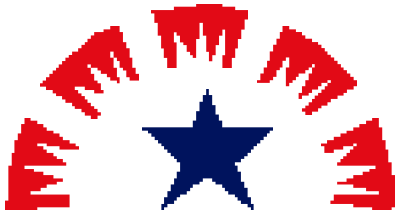
LAI Vision Statement



"To significantly reduce the cost and cycle time for military aerospace products throughout the entire value chain while continuing to improve product performance."

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Today's Introduction

- **Workshop format**
- **Today's theme**
- **Recent events**
- **Progress towards Phase II goals**
- **Workshop notes**

(Team activity reports in binders)

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Plenary Workshop Format

Day One - Oct. 14

A.M. - General Session

***Keynote*: Rebecca Henderson**
Sloan School

The Value Stream
Lean Production Systems

P.M.

Breakout Sessions
- **Four Tracks**
- **Break**
- **Four Tracks**

Reception

Day Two - Oct. 15

A.M. - General Session

***Keynote*: Ed Schein**
Sloan School

Industry Panel
Implementation Activities

P.M.

Focus Team Meetings

Training Module Demo
Reception
Dinner

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Value Stream Analysis

- **Well developed for production applications**
  - **e.g. "Lean Thinking" by Womack and Jones**
- **Not well developed for activities "above the factory floor"**
- **Candidate definition for value stream:**

The network of activities in which there is a continuous addition of product attributes including quality, functionality and usefulness, which directly address customer needs.

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LEM Principles

- **Meta Principles**
  - **Waste Minimization**
  - **Responsiveness to Change**
- **Enterprise Principles**
  - **Right Thing at Right Place, Right Time, and in the Right Quantity**
  - **Effective Relationships within the Value Stream**
  - **Continuous Improvement**
  - **Optimal First Delivered Unit Quality**

OBJECTIVE IS TO ADD VALUE

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This Morning's Plenary Session

Objective: learn more about value streams

- **Introductions to value streams**
  - **Keynote talk**
  - **Introduction to Product Value Stream**
- **Presentations of value stream work in progress**
  - **F-22 Enterprise**
  - **Identifying the Product Development Value Stream**
- **Examples from production operations**
  - **Lean Production System Design**
  - **Implementing Lean Manufacturing at GE Engine Assembly**

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Recent Events

- **5 May Executive Board meeting outcomes**
  - **Initiate planning for Phase III (Sep 99 - Aug 02)**
  - **Approved International Collaborations Policy and collaborations with**
    - **UK Lean Aerospace Initiative**
    - **Swedish Lean Aircraft Research Program**
  - **Consider roadmap for LAI interaction/integration with the Lean Sustainment Initiative**
  - **Approved policy recommendations on Cycle Time Reduction**
- **New LAI Members**
  - **Rockwell Collins**
  - **Aerojet Gencorp**

Recent Events (Con't)

- **Labor Aerospace Research Agenda (LARA) project initiated**
  - **Research objectives**
    - **Quantifying the impacts of instabilities on the workforce**
      - **Changes in program funding**
      - **Changes in organization (merger, restructuring….)**
      - **Changes in technology**
    - **Identifying the diffusion of new work practices within and between organizations**
  - **Participants**
    - **MANTECH funded**
    - **UAW sponsored**
    - **IAM participation**
    - **MIT researchers**

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Phase II: Goals & Recent Progress

- **Develop the LEM and populate it via benchmarking, case studies and research**
  - **21 new data sheets from LAI findings**
  - **38 new data sheets from external sources**
  - **Transition-to-Lean module development started**
- **Integrative research thrusts on cross-cutting topics:**

  Concentrated efforts underway for:
  - **Value stream analysis**
  - **Lean production system design**
  - **Integrated supplier networks**
  - **Requirements definition**
  - **Space operations and testing**

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Phase II Goals & Recent Progress *(Continued)*

- **Telling the LAI story**
  - **LAI Communications Toolkit debut**
- **Facilitating and enabling enterprise wide systemic change**
  - **Regional Supplier Workshops pilots**
  - **Policy recommendations on Cycle Time Reduction sent to OSD/A&T**
  - **Implementation workshop on "Flow Optimization Throughout the Value Stream"**
- **Extending and enhancing the collaborative nature of the project**
  - **Collaborative research projects initiated with UK & Sweden**
  - **Developing ties with Industrial College of the Armed Forces**
  - **Participation of ESC in Plenary Workshop & Executive Board**

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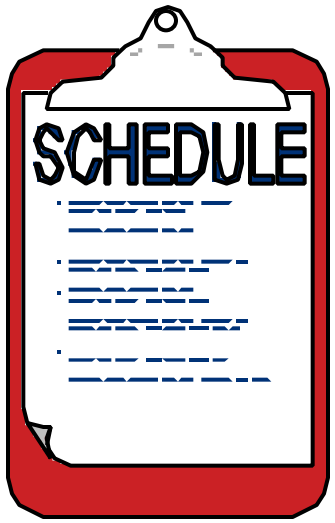
Workshop Notes



- Presentations available in the take-home notebook; and on our web site on or about Oct. 23, 1998
- A workshop evaluation included with materials
- On-site business services available – see registration area for details
- Team agendas for tomorrow can also be located in the registration area
- A list of scheduled meetings and room assignments is included in welcome packet
- Two scheduled breaks - central refreshment area outside this ballroom
- Reception with cash bar starting at 5:30
- LEM IPT dinner meeting at 6:30
- Finally, the bus back to the Cambridge Inn will depart at 6:40p.m. this evening - gather in lobby. It will leave from the Cambridge Inn tomorrow at 7:00a.m

Team Activity Reports

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Product Development Focus Team

Activities

- Establishing Software Requirements from System Requirements
- Using Modeling and Simulation in Requirements Generation
- Technology Insertion and the Product Development Process
- Strategic Technology Investment Decisions
- J- SR: Engineering Changes, Technology Supply, Info. Infrastructure

Products

- Finishing: Complex System PD Risks, Best Practices in Systems Engineering, Design Methods: Set-Based Practices
- Workshop + whitepaper: Product Development Value Stream

Plans

- Effective Use of Process Capability Databases for Design
- J- SR: Implementing Technology Throughout a Supplier Network

MIT	Industry	Government
Earll Murman	Ray Summers	Bob Deem
Hugh McManus		

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Factory Operations Focus Team

Activities

- June Focus team meeting on the Lean Production System Design
- Development of a maturity matrix for lean production system design
- Airframe sector wing assembly study
- Schedule control policy experiment started

Products

- Lean production system design decomposition to focus team
- Maturity matrix for lean production system design
- Additional 10 LEM data sheets

Plans

- Conclude airframe sector research
- Expanded transition to production study
- Continue schedule control policy experiment

MIT	Industry	Government
Tim Gutowski	Fred Stahl	Bill Humphrey
Tom Shields		

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Supplier Relations Focus Team

Activities

- Information systems for supplier integration (w/PD team & w/LARP)
- Make-buy and strategic outsourcing (w/LARP)
- Supplier coordination mechanisms
- Implementing world-class technology throughout supplier network
- Regional supplier workshops (w/USAF ManTech)

Products

- Innovation in product architecture through supplier integration
- LEM data sheets

Plans

- Comparative international benchmarking survey (w/UK LAI & LARP)
- Best practices in flowing down lean concepts throughout supplier stream
- Early supply chain design for robust transition to production

MIT	Industry	Government
Kirk Bozdogan	George Reynolds	Hamid Akhbari
Charlie Fine		

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Policy and External Environment Focus Team

Activities

- Simulation model of cycle time cost and schedule control
- Lean user (needs and requirements definition) research (joint w/PD)
- Managing subsystem commonality research
- Developing research ties to the Center for Innovation in Product Development (CIPD) at MIT and the Industrial College of the Armed Forces (ICAF)

Products

- Master's thesis on economic incentives in procurement
- Policy recommendations to DoD for cycle time reduction

Plans

- Continue research as indicated while exploring new opportunities with affiliated groups

MIT	Industry	Government
Wes Harris	Brad Gale	
Eric Rebentisch		

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Test & Space Operations Focus Team

Activities

- Identifying and evaluating satellite integrated system test anomaly data
- Applying lean principles and value stream to spacecraft test
- Collection of launch failure data and looking at the implications of verification and validation approaches

Research products

- Evaluation of effectiveness of satellite integration system integration testing.
- LEM data sheets

Research plans

- Effectiveness of satellite system testing
- Launch operations evaluation
- Command and control approaches

MIT	Industry	Government
Joyce Warmkessel	Frank Goodell	Art Temmesfeld
Ed Greitzer		

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Lean Enterprise Model IPT

- **Research Activities**
  - **Additional data sheets added to Web LEM 2.0**
    - **21 LAI Research, 38 External**
  - **Transition-to-Lean (TTL) Module development underway**
  - **Pilot inclusion of external benchmarking and best practice data**
- **Research plans**
  - **TTL precedence diagrams, descriptions and linkage to LEM for enterprise and factory operations**
  - **Enhancement of LEM architecture**
  - **Updates to LEM from LAI research & external sources**

MIT	Industry	Government
Debbie Nightingale	Ed Harmon	John Cantrell

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Communications IPT

Activities

- May 98 Meeting and Site Visit w/ Aviation Week present
  - LMTAS, Ft. Worth, Raytheon Systems Co. Lewisville
- August 98 Meeting and Site Visit w/ Aviation Week Interviews
  - Raytheon Aircraft Co., Wichita KS

Products

- LAI Toolkit debut
- Constructed Exhibit Booth (as seen outside)
- Local communication products developed by team members

Plans

- Trade Shows and Expos - DMC Dec. 1998
- Second wave of products for Toolkit - success vignettes
- Team growth - space sector interests

MIT	Industry	Government
Deneen Silviano	Don Cook Bob Such	Bob Reifenberg

