Lean Aerospace Initiative
Plenary Workshop

Program Director’s Welcome

March 31- April 1, 1998

Presented By:
Earll M. Murman
MIT
Today’s Introduction

- LAI Vision and Today’s Theme
- Recent Events
- Space Sector & New Focus Team
- International Collaborations
- Added MIT Resources For Phase II
- Current LAI Research and Products
- Workshop Notes
“To significantly reduce the cost and cycle time for military aerospace products throughout the entire value chain while continuing to improve product performance.”
Integrated Supplier Networks and Current LAI Research

- Chrysler: Rethinking the Supply Chain
- “3D” Concurrent Engineering
- Key Characteristics Maturity Model
- Cycle Time Reduction with Parts Synchronization
- Supplier & Customer Integration Across the Supply Chain
Recent Events

- 13 November Executive Board Meeting
  - Name changed to Lean Aerospace Initiative
  - Requested policy & proposals on international collaborations
- Briefing to Defense Science Board
- Briefings to DSAC & its Sub Task Force On Cycle-Time Reduction
- Invited talk at DoD Cost Analysis Symposium
- 13-14 Jan Space Sector Kickoff Meeting in Los Angeles
- Formation of New “Test and Space Operations” Focus Team
Recent Events - Continued

- Participation in MANTECH display at Rayburn Office Building
- 6 “Evidence of Lean” Site Visits
- Release of Web Lean Enterprise Model
- US Coast Guard withdrew from LAI
- IAM withdrew from LAI participation
- Introductory meetings with UK LAI and Swedish Lean Aerospace Research Program
- 16 March Los Angeles Times feature article on LAI
The Lean Enterprise Model

- The LEM is an organized compilation of LAI research findings
- Available on-line on the LAI web site
- For all consortium members to use as:
  - A reference tool to self-assess an organization’s state of leanness.
  - A guide to set future goals and leverage organizational change – you decide how, when, where to implement lean practices.
13-14 January Space Sector Kickoff hosted by Lt. Gen DeKok, Commander of Space and Missiles Center
- 19 industry and 49 gov’t representatives attended
- Space Sector research interests captured
- High degree of overlap with existing LAI research

Formation of “Test and Space Operations” Focus Team

11 March briefing to Space Command

New LAI Space Sector Participants:

Industry Members
- TRW Inc.
- Lockheed Martin Space & Strategic Missiles
- Pratt and Whitney Space Propulsion
- Hughes Space and Comm
- The Boeing Company

Government Members
- Space & Missiles Center
- NRO

Government Participants
- USAF Space Command
- BMDO
Integration of Space Sector into Focus & Product Teams

- Existing LAI Focus Teams and IPTs expanded to include space related issues as appropriate

- Test & Space Operations Focus Team added for new research topics suggested by Space Sector stakeholders

- Research related to aircraft testing to be included within new focus team charter

- Integration of space sector into LAI teams is this afternoon’s breakout topic
International Collaborations

- **Policy paper drafted recommending:**
  - Retain current policy limiting memberships in LAI to US organizations in US government aerospace programs.
  - A limited number of collaborations for mutual benefits between MIT & international LAI-like research programs.

- **MOUs drafted for two European programs:**
  - **UK Lean Aerospace Initiative**
    - Warwick Univ., Univ of Bath, Cranfield and Nottingham
    - 25+ British Aerospace Companies & Government
    - Research focus on LEM overarching practices
  - **Swedish Lean Aerospace Research Program**
    - Linkopings Universitet
    - Saab AB, Volvo Aero Corp, Ericksson Saab Avionics
    - Research focus on Supplier Relations and Product Development

- **Above to be submitted to the Working Group & EB**
**Lean Aerospace Initiative**

**Added MIT Resources for Phase II and last 6 months**

### Core Faculty and Staff

- Tom Allen - Sloan
- Charlie Fine - Sloan
- Joel Cutcher-Gershenfeld - Sloan
- Ed Greitzer (9/98) - Aero-Astro
- Tim Gutowski - Mech Eng’g
- Hugh McManus - Aero-Astro
- Debbie Nightingale - Aero-Astro
- Deneen Silviano - CTPID
- Joyce Warmkessel - Aero-Astro
- Sheila Widnall - Aero-Astro

### Affiliated Faculty and Staff

- David Cochran - Mech Eng’g
- Steve Eppinger - Sloan
- Dan Frey - Aero-Astro/SDM
- Stan Gershwin - Mech Eng’g
- Sandy Jap - Sloan
- Duncan Simester - Sloan
- Anna Thornton - Mech Eng’g

### Graduate Students

Presently have 21 LAI

Research Assistants
Product Development Focus Team

- **Research activities**
  - Methods in Risk Reduction for Complex Systems Development
  - Organizational Structures for Technology Transition
  - Key Characteristics: Methods and Tools
  - Evidence of Set-Based Design Methods in the Aerospace Industry
  - Engineering Changes over the Supplier Network (joint with SR)

- **Research products**
  - Briefings to DSAC - Role of Schedule Development on Product Cycle Time
  - LEM Data Sheets

- **Research plans**
  - Best Practices for Establishing Software Requirements
  - Impact of Modeling & Simulation on Establishing Requirements
  - Technology Insertion & the Product Development Process

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<td>Earll Murman</td>
<td>Ray Summers</td>
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Factory Operations Focus Team

- **Research activities**
  - Complex Manufacturing System Research finished on engine sector and started on airframe sector (wing assemblies)
  - Transition to production study started

- **Research products**
  - Hypothesized lean implementation model report completed
  - Lean production system design decomposition to focus team
  - LEM data sheets

- **Research plans**
  - Continue airframe sector research
  - Continue transition to production study

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Supplier Relations Focus Team

- **Research activities**
  - Information Infrastructure (w/PD team)
  - Technology supply chain management (w/PD team)
  - Engineering changes over the supplier network (w/PD team)
  - Transition to commercial practices

- **Research products**
  - Dual-use supplier management and strategic international sourcing
  - Collaborative learning in a manufacturing network
  - LEM data sheets

- **Research plans**
  - Supplier network coordination mechanisms
  - Sharing the benefits of R&D collaboration in the supply chain (w/PE team)
  - Managing product complexity over the supplier network (w/PD team)

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Policy and External Environment Focus Team

- **Research activities**
  - Economic incentives research in engine sector, supplier survey
  - Simulation model of cycle time cost and schedule control
  - Lean user (needs and requirements definition) research (joint w/PD)
  - Impact of aerospace offsets on supplier base (joint w/SR)

- **Research products**
  - Economic incentives working paper
  - C-17 economic incentives case study
  - 2 articles in *Program Manager* magazine on commercial practices
  - LEM data sheets

- **Research plans**
  - “High pass” study of program portfolio management research
  - Follow-on research agenda TBD by focus team

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<td>Wes Harris</td>
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Test and Space Operations

- **Research Topics**
  - Satellite testing best practices (started)
  - Aircraft system testing
  - Lean approaches to space operations
  - Specific cases to be determined

- **Research Activities**
  - Initial research agenda to be finalized at this Plenary
  - Initial survey of satellite test practices to be completed summer 1998
  - Other activities to be determined

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**Activities**
- New module plan formulated
- LEM data collection expanded to non LAI data bases

**Products**
- Web LEM

**Plans**
- Continual update of Web LEM
- New module development
- Formulation of LEM 2.0

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<td>Ed Harmon</td>
<td>John Cantrell</td>
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Activities
- Feb 98 Implementation workshop “Supplier and Customer Integration Across the Supply Chain”

Products
- LEMDatasheets

Plans
- Aug 98 Implementation Workshop tentatively focused on “Flow Manufacturing”

MIT
Joel Cutcher-Gershenfeld

Industry
Mike Packer

Government
John Cantrell
Communications IPT

- **Activities**
  - Feb 98 IPT Meeting; 3 new members (Boeing, Lockheed TAS, Raytheon Aircraft)
  - Media relations and referrals
  - Electronic linkages

- **Products**
  - Revised comm plan
  - Local and national placement of lean/LAI articles
  - Two page executive level summary
  - Standardized communication products (Toolkit)

- **Plans**
  - Electronic and hard copy delivery of Toolkit to POCs mid - late April
  - Proactive collection of “success stories”

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Workshop Notes

- Presentations are available in the take-home workshop notebook; also on our web site on or about April 8, 1998
- A Workshop Evaluation is also included in your binder
- No on-site business services available – limited assistance at LAI registration desk
- Two scheduled breaks - please keep program running smoothly by adhering to times
- Interactive workshop - small group discussions and problem-solving
- Refer to welcome package for complete list of scheduled meetings and room assignments
- Reception with cash bar starting at 5:30
- LEM IPT and IT dinner meetings at 6:30