Lean Aerospace Initiative
Plenary Workshop

Program Director's Welcome

March 31- April 1, 1998

Presented By:
Earll M. Murman
MIT

Lean Aerospace Initiative

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

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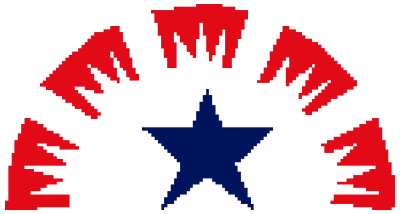
LAI Vision Statement



"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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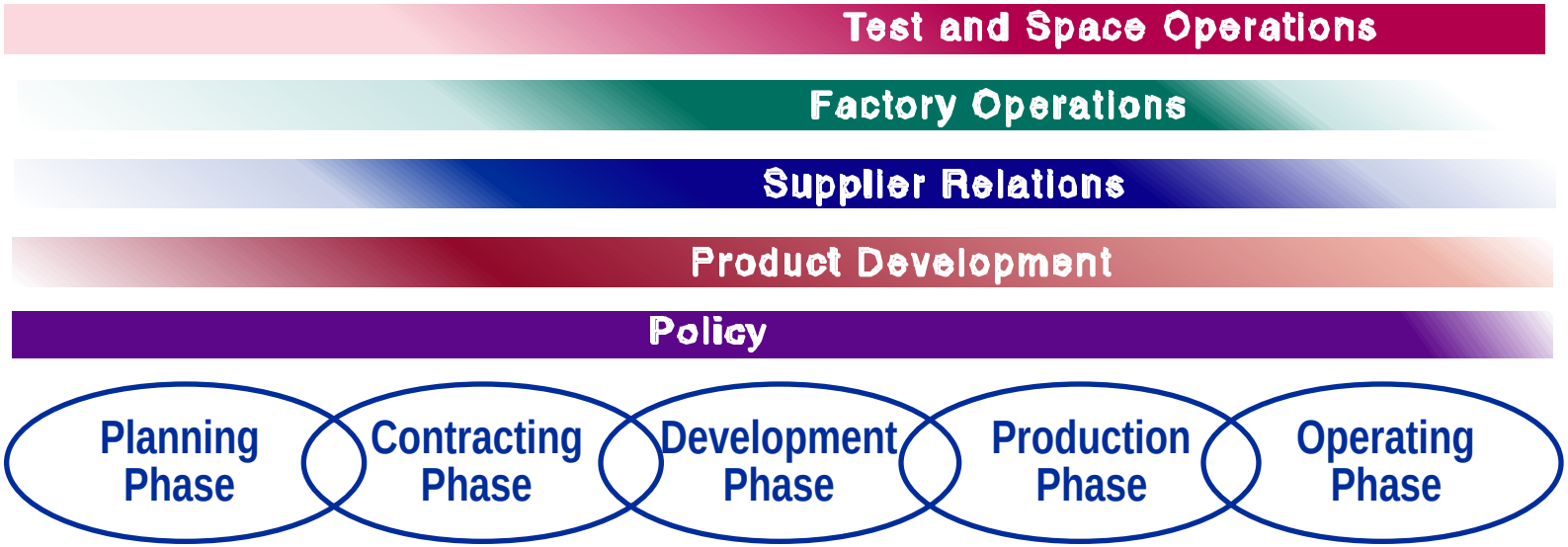
Integrated Supplier Networks and Current LAI Research



- 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

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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

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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

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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.

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Space Sector

- 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

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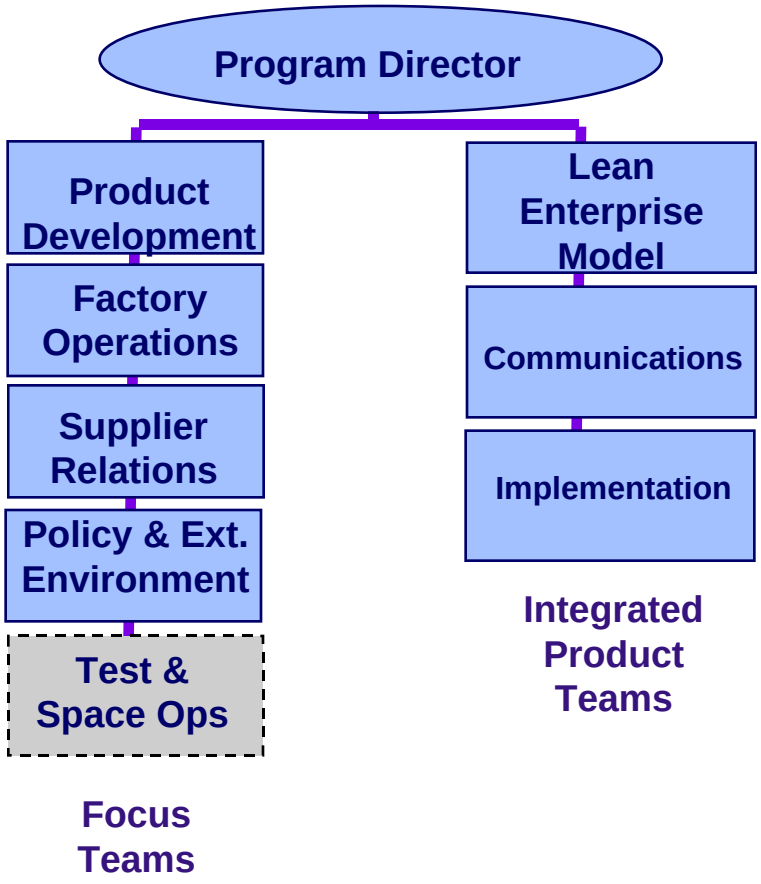
Integration of Space Sector into Focus & Product Teams

- 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



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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**

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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

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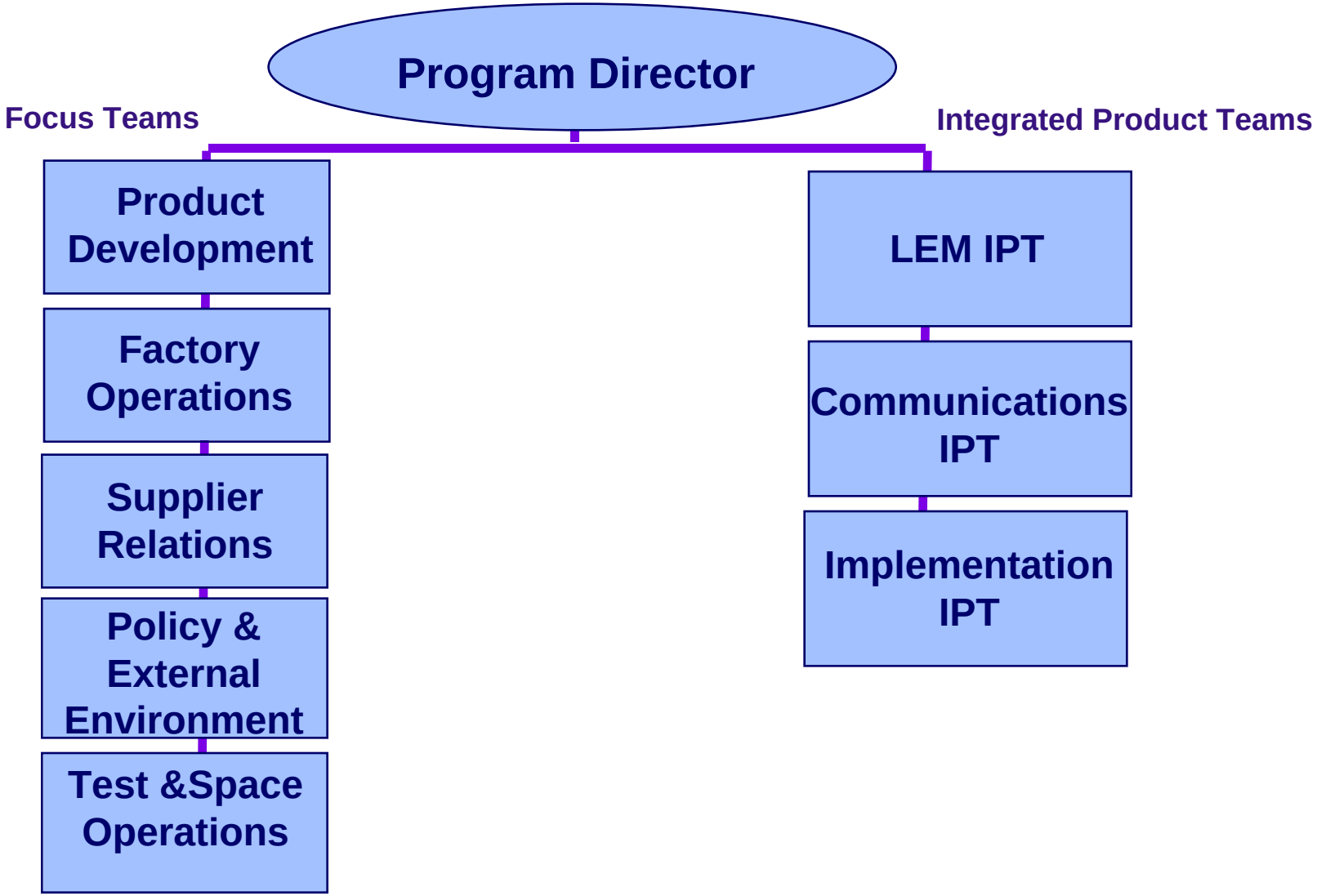
LAI Organization



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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

MIT	Industry	Government
Earll Murman	Ray Summers	Bob Deem
Hugh McManus		

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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

MIT	Industry	Government
Tim Gutowski	Fred Stahl	Bill Humphrey
Tom Shields		

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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)

MIT	Industry	Government
Kirk Bozdogan Charlie Fine	George Reynolds	TBD

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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

MIT	Industry	Government
Wes Harris	Brad Gale	Col. Bob Kayuha
Eric Rebentisch		

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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

MIT	Industry	Government
Joyce Warmkessel	Frank Goodell	TBD

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Lean Enterprise Model IPT

- **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

MIT	Industry	Government
Deborah Nightingale	Ed Harmon	John Cantrell

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Implementation IPT

- **Activities**
  - Feb 98 Implementation workshop "Supplier and Customer Integration Across the Supply Chain"
- **Products**
  - Aug 97 Workshop Report on "Integrated Product and Process Development"
  - LEM Datasheets
- **Plans**
  - Aug 98 Implementation Workshop tentatively focused on "Flow Manufacturing"

MIT	Industry	Government
Joel Cutcher-Gershenfeld	Mike Packer	John Cantrell

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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"

MIT	Industry	Government
Deneen Silviano	Carol Federspill	Bob Reifenberg

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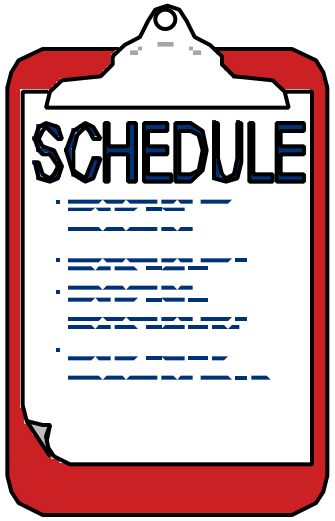
Workshop Notes



- 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

