Lean Aircraft Initiative
Plenary Workshop

Supplier Relations Focus Team Report

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Presented By:
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Outline

- Baseline Phase I research progress
- Describe on-going research
- Provide overview of Phase II research plan
- Highlight new areas of near-term research emphasis
- Summarize focus team thrust and benefits
Lean Aircraft Initiative

Phase I Research Progress

**TECHNOLOGY SUPPLY CHAINS -- PHASE II**

- Defined strategies for early supplier integration

**DESIGN INTEGRATION**

- Defined strategic long-term partnering relationships

**PARTNERSHIPS**

- Identified enablers for establishing predictable and controllable supplier processes

**QUALITY**

- Documented supply base restructuring and streamlining strategies

**RATIONALIZATION**

- Baselined current practices, major changes, and emerging lean practices

**SURVEY**

- Developed framework for lean supply chain management practices and metrics

**FRAMEWORK**

PROCESS: Survey research, case studies, site-visits, workshops
PRODUCT: Briefings, customized survey feedback, reports, theses, inputs to LEM
IMPACT: Research findings being implemented by consortium members

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Phase I “Top Level” Findings (1)

RATIONALIZATION: Rapid and fundamental restructuring, consolidation and streamlining of supplier base over last five years

- Direct production supplier base reduced over 50%
- Integration of internal supply chain management functions across business units
- Centralized/leveraged purchasing
- Fundamental re-evaluation of make-buy
- New roles and responsibilities; key suppliers given greater role (production, testing, inspection)
- Evidence of “tiering” in supplier structure

CONTRIBUTION: Documented significant efficiency gains in entire value stream and key practices
QUALITY: Growing emphasis on continuous supplier quality improvement
- Widespread adoption of formal supplier rating, certification and selection systems
- Certification key to ensuring quality of critical suppliers
- Emphasis on supplier training and assistance
- Synchronization of prime-supplier processes

CONTRIBUTION: Identified enablers and metrics for building inspection-lean customer-supplier networks and defined benefits of establishing predictable/controllable supplier processes
PARTNERSHIPS: Emergence of partnerships with major suppliers represents a central development in recent years

- Development-focused: Strategic alliances for new product, process & technology development; supplier integration into design
- Production-focused: Long-term agreements fostering mutual performance improvement
- Key features: Closer communications; long-term commitments; cooperative relationships; risk and benefit sharing

CONTRIBUTION: Defined substantial mutual benefits (cycle time, cost, quality), critical enablers and metrics
On-Going Research Activities

- Early supplier integration into product development (with PD)*
- Make-buy and strategic outsourcing*
- System dynamics modeling for evaluating IPT effectiveness over the supplier network (with PD)**

* Continuing from Phase I; also part of Phase II research plan.
** Initiated as part of Phase II research plan.
Early Supplier Integration
Fosters Architectural Innovation

“Old” Approach
Prime
Subcontractor
Vendor

Rigid vertical FFF interfaces and control

“Current” Lean
Prime
Subcontractor
Vendor

Collaborative with rigid organizational interfaces

“Emerging” Lean
Prime
Subcontractor
Vendor

Virtual Team w/o boundaries enabling architectural innovation

ARCHITECTURAL INNOVATION over the supplier network: Major modification of how components in a product/system are linked together (changes in form/structure, functional interface, system configuration) through full integration of suppliers into extended enterprise

LAI CONTRIBUTION: Introduction and validation of new concept and lean practice with significant benefits for entire value stream
Preliminary Findings Confirm Early Supplier Integration Fostering Architectural Innovation

- Early case study inputs provide evidence of architectural innovation over supplier network
- Case studies have documented major drivers for early supplier integration, key practices and processes, government-prime-supplier relationships, and major benefits
- Early findings: Architectural innovation yields significant benefits for entire value stream
  - Lower unit cost (A: 40%-60%; B: 5-fold cost reduction)
  - Shorter cycle time (A: 30% less time)
  - Substantial risk reduction
Emerging Enablers Fostering Architectural Innovation

- Pre-sourcing; long-term commitments
- Early supplier integration into IPTs; IPPD; co-location; joint design & configuration control
- Retaining flexibility in defining system configuration
- Open communications; informal links; knowledge-sharing
- Leveraging technology base of suppliers (key suppliers; tooling suppliers; subtiers)
- Target costing
- Supplier-capability-enhancing investments
- Incentive mechanisms (not to compete agreements; long-term warranty); maintaining trade secrets
- Government part of the team; relief from military standards and specifications
Architectural Innovation: Current Focus and Next Steps

- **Key Questions**
  - Under what conditions does architectural innovation offer major payoff?
  - What are key metrics, best practices, enablers, barriers, mitigation strategies and benefits?
  - What are major policy/incentive mechanisms?

- **Research steps**
  - Refine earlier case study findings
  - Develop and validate key metrics
  - Expand research base through additional case studies
  - Expected completion and report by November 1997
  - Follow-on research: Information infrastructure support
Make-Buy and Strategic Outsourcing: Principal Questions

- What are key considerations and factors shaping make-buy decisions?

- What are major impacts of make-buy decisions on prime-supplier relationships?

- What are chief differences between defense vs. commercial industry practices?
Focus on two vertical supply chains
(prime-key supplier-subtier)
- Defense
- Commercial

Initial case studies and structured field interviews conducted vertically at each level in both chains

Next steps:
- Incorporate feedback from focus team
- Refine and expand earlier findings

Expected completion and report by May/June 1997
## Phase II Focus Team Guidance

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<th>Phase II needs and requirements jointly identified by Product Development and Supplier Relations Focus Teams</th>
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- Provide tools for self-assessment in supply chain management
- Define lean supply chain management strategies
- Help evaluate implications of systemic change affecting industry
- Evaluate impact of less government R&D funding
- Define requirements establishment & flowdown
- Examine data definition with suppliers, information exchange and data security
- Identify new government oversight practices
- Consider downstream issues
- Address contracting flexibility
Phase II Research Plan and New Areas of Near-Term Emphasis

- Technology management over supplier network
  - Early supplier integration into product development and information infrastructure support*
  - System dynamics modeling for evaluating IPT effectiveness over supplier network*
  - Technology supply chain management*
  - Assembly-oriented design methods and vertical design/process integration

- Supply chain integration and management
  - Make-buy and strategic outsourcing
  - Managing transition to performance-based environment
  - Target costing and flexible contracting
  - Systems analysis and modeling approaches

NOTES: *With Product Development Focus Team
ITALICS: On-going research
BOXES: New areas of emphasis over next year
Phase II Thrust and Expected Benefits

- **Thrust:** Define strategies, practices, methods and change processes for supply chain optimization in both near-term and longer-term

- **Expected benefits:** Significant network-wide (“value stream”) efficiency gains, lead time reduction, flexibility and quality improvement in the defense aircraft industry

Create synergistic links with other focus teams within LAI and with other research programs (within and outside MIT) to maximize benefits to LAI sponsors