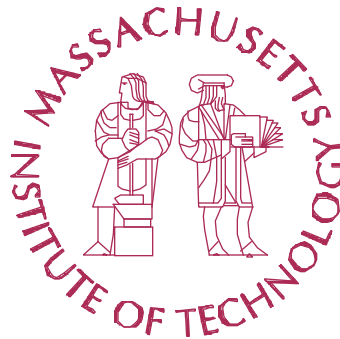


Lean Aerospace Initiative Plenary Workshop

Cycle Time Reduction through Integrated Supplier Networks: Overview and Introduction



March 31- April 1, 1998

**Presented By:
Kirk Bozdogan
MIT**

Research Sponsored By LAI

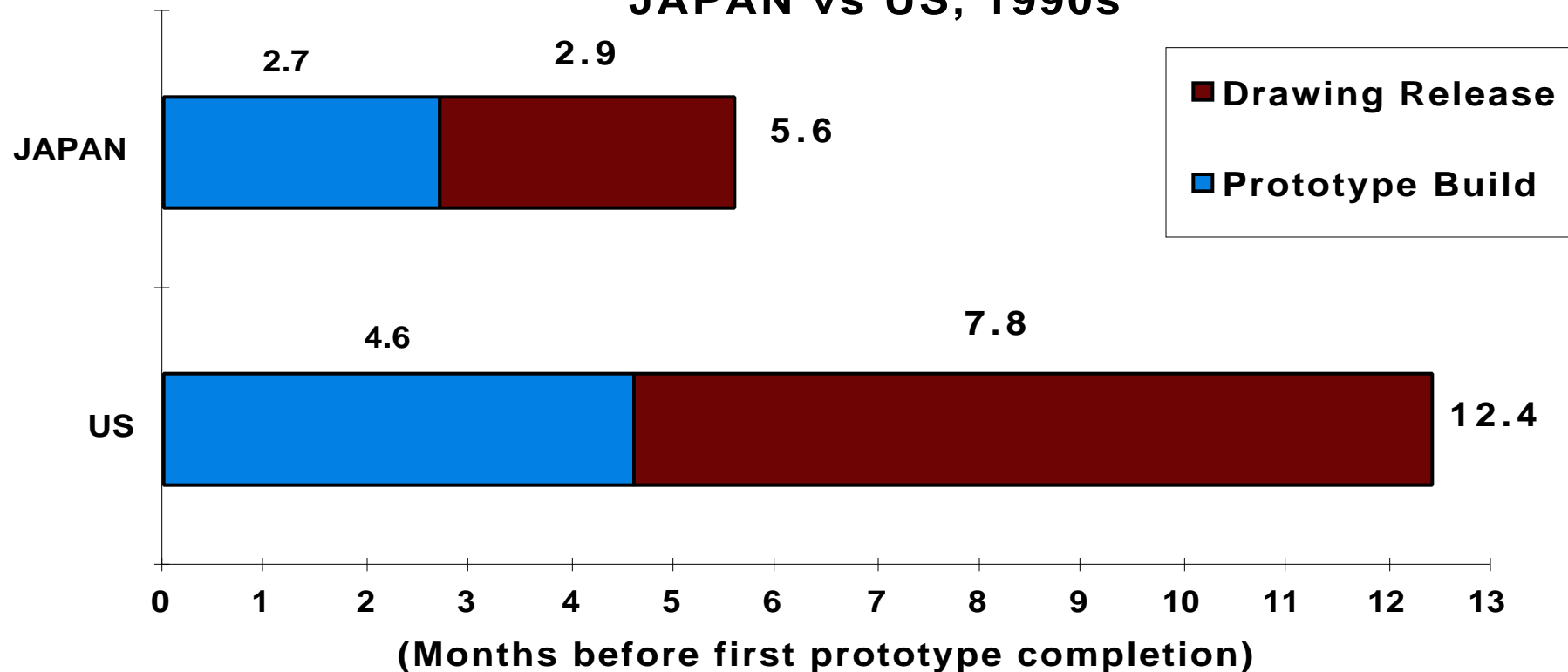
- **Kick-off today's theme: *Cycle time reduction through integrated supplier networks***
- **Introduce today's briefings**



Cycle Time Key to Competitive Advantage

Focus on auto industry benchmarking results covering 1990s

MONTHS TO FIRST ENGINEERING PROTOTYPE, JAPAN vs US, 1990s



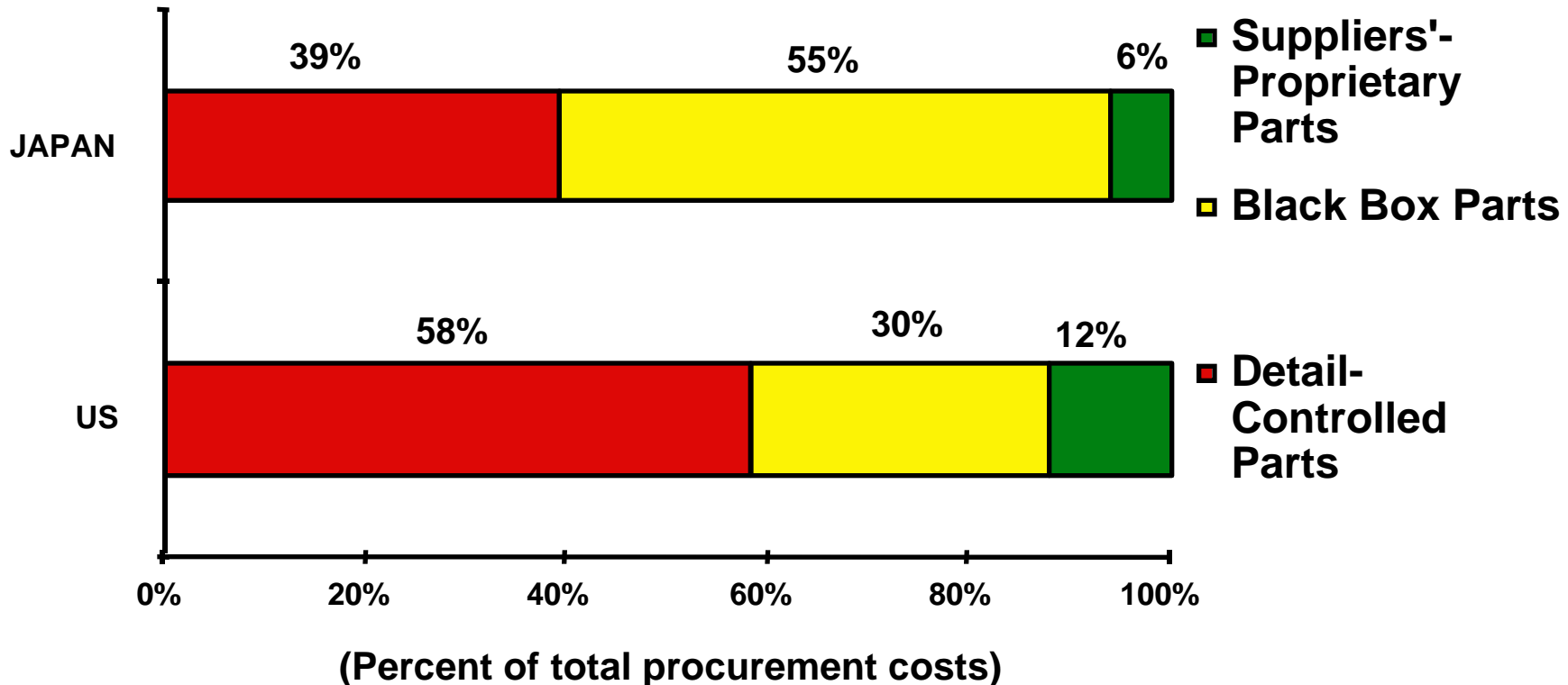
SOURCE: Clark, Ellison, Fujimoto and Hyun (1995)



Integrated Supplier Networks Critical to Cycle Time Reduction

**Japanese auto suppliers delegated greater design responsibility
("Black Box" components)**

SUPPLIER ROLE, JAPAN vs US, 1990s



SOURCE: Clark, Ellison, Fujimoto and Hyun(1995)



Major Lessons from Auto Industry

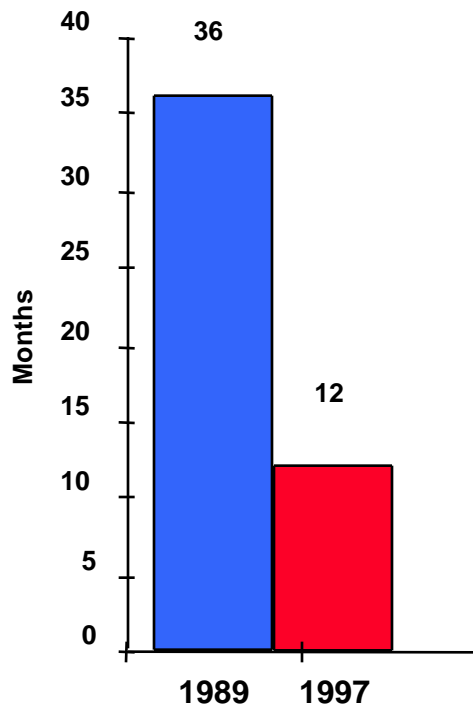
- **Early supplier integration critical to sustained competitive advantage**
 - Shorter cycle time
 - Faster introduction of new technology
 - Continuous improvement
 - More rapid market response
- **Key success factors**
 - Fewer first-tier suppliers
 - Strategic supplier partnerships
 - Major supplier role in design (“black-box” parts)
 - Up-front design/process integration
 - Close communications with suppliers
 - Target costing; supplier development



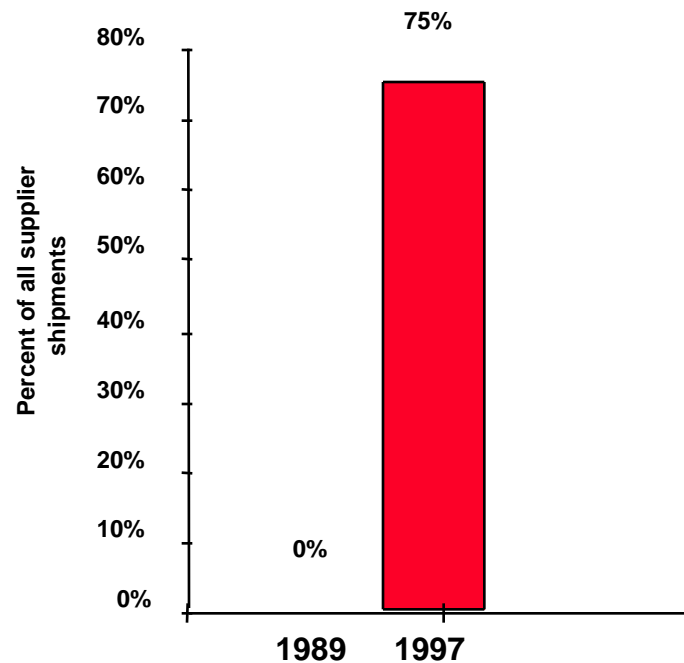
Aerospace Industry Learning Lean Lessons

Major producer of complex airframe structures achieved significant performance improvements by using lean principles

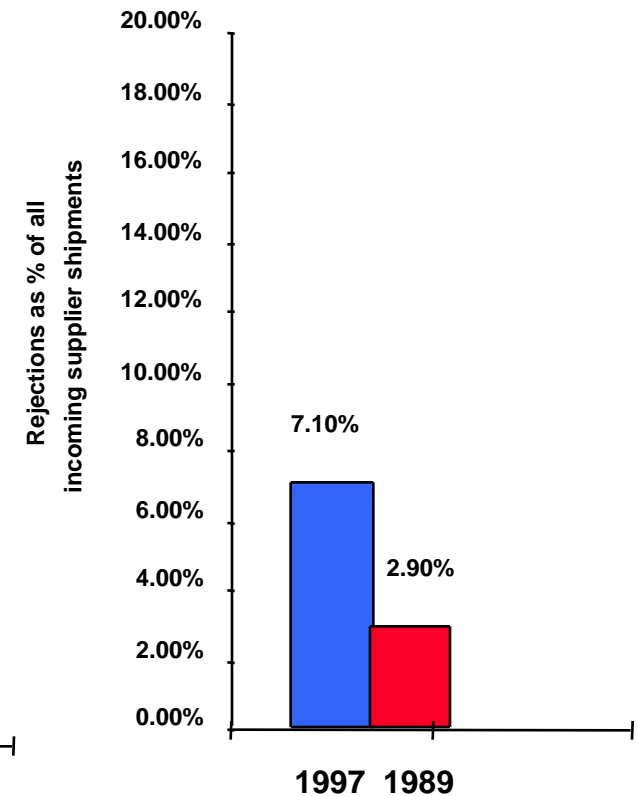
REDUCED CYCLE TIME
(Order-to-Shipment, months)



IMPROVED SUPPLIER DELIVERY
(Dock-to-Stock)



REDUCED SUPPLIER DEFECTS





Key Practices

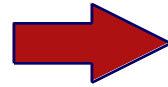
Integrated suppliernetwork linked to corporate strategic thrust

	Before (1989)	After (1997)
● Redefined business mix		
– Commercial sales as % of total sales	48%	92%
● Reduced supplier base		
– Number of direct production suppliers	542	162
● Improved procurement efficiency		
– Procurement personnel as % of total employment	4.90%	1.90%
– Subcontracting cycle time (days)	13	7
● Improved supplier quality and schedule		
– Procurement (dollars) from certified suppliers	0%	75%
– Supplier on-time performance (% of all shipments)	76.4%*	83.0%
● Established strategic supplier partnerships		
– Procurement (dollars) under long-term agreements	0%	95%

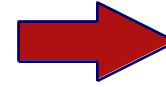
NOTE: *Refers to 1991

Early Supplier Integration: Results from Other Case Studies

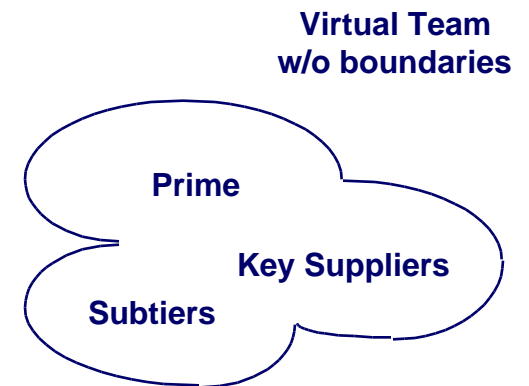
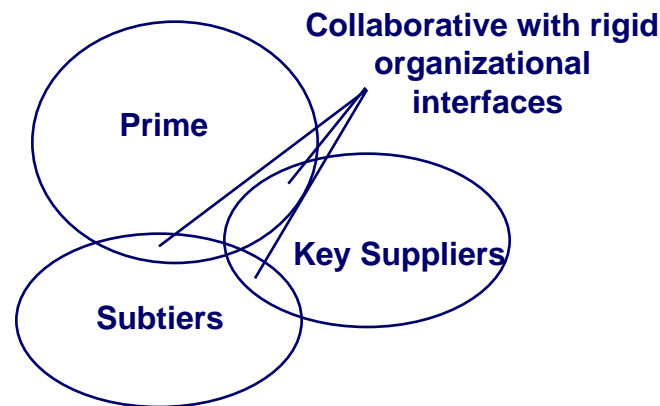
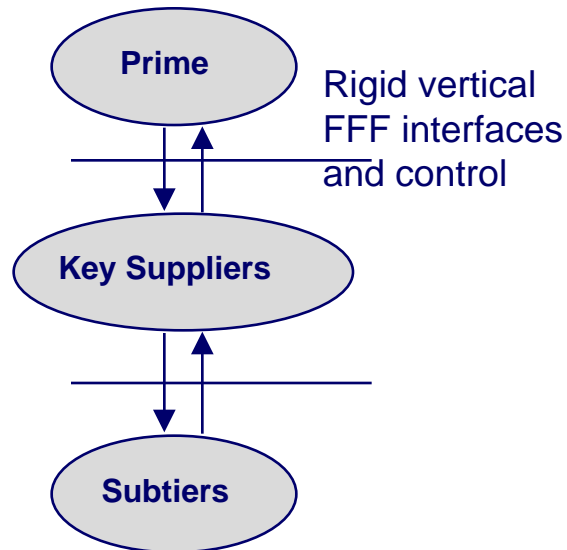
“Old” Approach



“Current” Lean



“Emerging” Lean



Arm's length; interfaces totally
defined and controlled

Collaborative; but constrained by
prior workshare arrangements

Collaborative and seamlessly
integrated, enabling architectural
innovation

- Case studies demonstrate significant benefits: more than 30% cycle time reduction; 40%-60% cost reduction; significant quality improvements
- Major benefits stem from architectural innovation in product development



Introduction to Today's Briefings

- **Chrysler: Rethinking the Supply Chain**
 - Prof. Jeff Dyer, Wharton School, U of Pennsylvania
- **Cycle Time Reduction with Part Synchronization**
 - Tom Shields, LAI
- **Three Dimensional Concurrent Engineerings**
 - Prof. Charlie Fine, LAI (Sloan School)
- **Key Characteristics Maturity Model**
 - Basak Ertan, LAI
- **“Customer and Supplier Integration Across the Supply Chain”- Summary of Implementation IPT Workshop Results (February 12-13, 1998)**
 - Prof. Joel Cutcher-Gershenfeld, LAI (Sloan School)



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