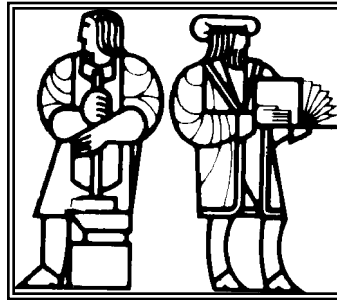


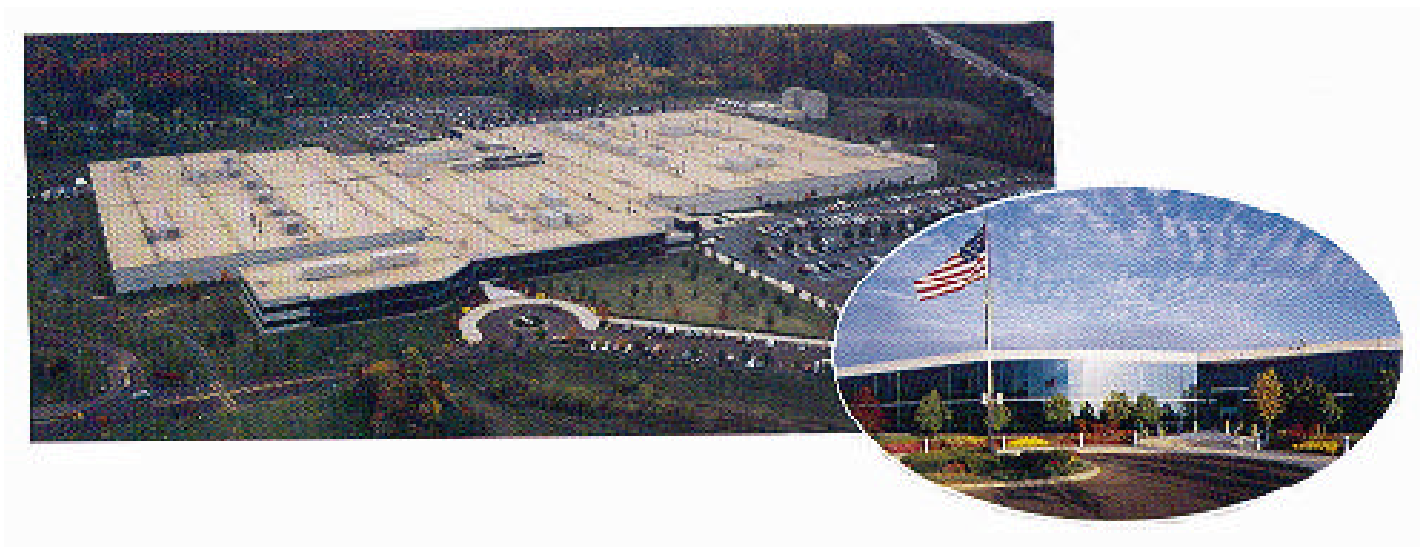
**Lean Aircraft Initiative
Plenary Workshop
Factory Operations
Ford Electronics Benchmark**



October 16, 1996

**Presented by:
Jim Everett
TRW**

Ford Electronics North Penn Facility



- ▶ **Surveyed May 17, 1996**

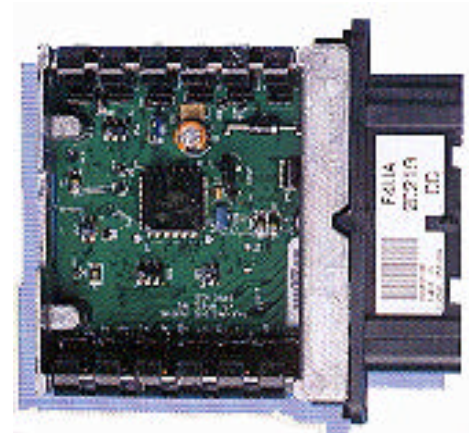
- ▶ **The team —**
 - **George Alexander, Lockheed Martin**
 - **Fred Bolling, University of Michigan-D**
 - **Mike Chapman, Boeing**
 - **Gene Danser, Texas Instruments**
 - **Jim Everett, TRW**
 - **Joe Hill, Hughes**

Ford Electronics Facility Background

- ▶ **Part of Automotive Components Group**
 - North Penn facility, formerly Philco (1961)
 - New 705 k sq. ft. plant opened 1990
- ▶ **Employees**
 - 2500 (390 Salaried, 400 Skilled Trade)
 - Union Shop (UAW)
- ▶ **Products**
 - 10 product lines
 - 100,000 units shipped per day
 - 9,000,000 components consumed per day

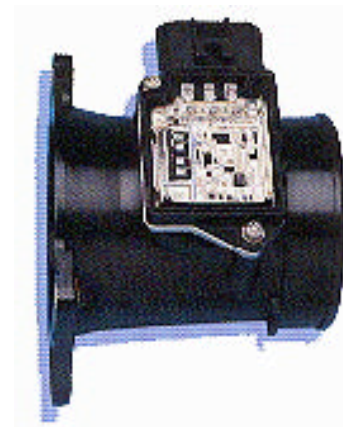
▶ SMT Assemblies

- Engine Controllers
 - 4 Million/year
- Antilock Brakes
 - 2.5 Million/year

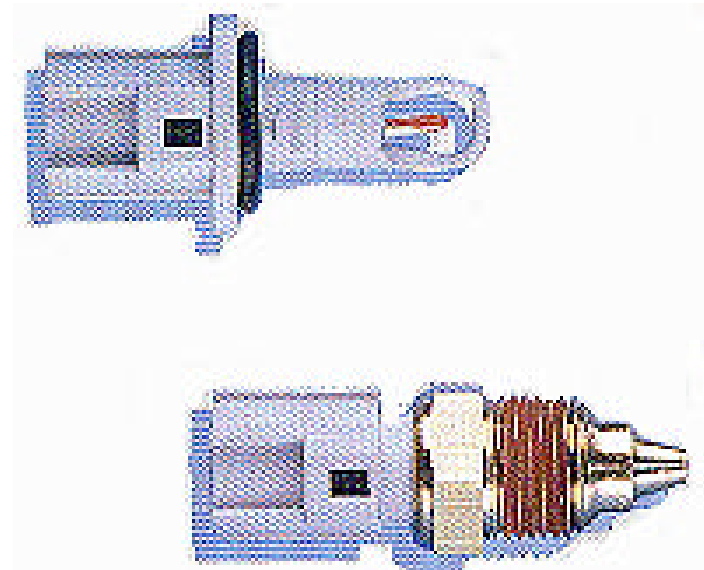


▶ Hybrid Assemblies

- Speed Control Amps
 - 4 Million/year
- Mass Air Flow
 - 4 Million/year



- ▶ **Sensors**
 - Air Charge Temp
 - 8.5 Million/year
 - Engine Coolant Temp
 - 8.5 Million/year



Facility Achievements

- ▶ **Internal Awards**
 - Q1; TQE; Customer Driven Quality
 - World Wide Quality Achievement
- ▶ **External Awards**
 - Industry Week 10 Best Plants in America '93
 - Auto Alliance Quality 1993 & 1994
 - Shingo Prize for Excellence in Manufacturing
- ▶ **ISO9001 Certification**

- ▶ **Baseline 1991**
 - **Cycle time — down from 7.8 to 1.7 days**
 - **WIP turn — 148 times/year**
 - **1st pass yield — 92.8%**
 - **Lead time, order to ship —**
 - **SMT 2 days, Hybrid 4 days**
 - **Customer reject rate — 121ppm**
 - **Cost reduction — 38%**

Lean The Ford Way

- ▶ **Drive to stay alive**
- ▶ **Paying attention to the people**
- ▶ **Thoroughly understand processes**
- ▶ **Well planned new part introduction**
- ▶ **Stable products**
- ▶ **Continuous Process Improvement**
- ▶ **Rigorous self-assessment**
- ▶ **Everyone focused on common objective**

Drive to Stay Alive

- ▶ **Everyone has an “at risk” mentality**
- ▶ **“Agile” is the watchword**
- ▶ **Each customer has a single POC**
- ▶ **Code Blue production response**
 - 20 minutes to call for help
 - 60 minutes to call plant manager
- ▶ **RAPID**
 - Structured, focused, facilitated, problem solving method
- ▶ **A sense of urgency**

Paying Attention to People

- ▶ **100 self-directed work teams**
- ▶ **Training Management System (TMS)**
 - Training automatically scheduled
- ▶ **Comprehensive training program**
 - Basic skills; all employees as required
 - Occupational training
 - **539 modules developed**
- ▶ **Regular peer group meetings**
- ▶ **Formal team recognition program**
 - Non financial

Understanding Processes

- ▶ **All processes are documented**
 - On-line with flow-chart and procedures
 - Measured with SPC or other metric

- ▶ **Understanding of maintenance issues**
 - as primary importance — uptime & quality
 - as impediment to process
 - Total Preventative Maintenance Program

Planned New Part Introduction

- ▶ **Rigorous transition to production rules**
 - Manufacturing involved in design
 - Onsite rapid prototype proveout
 - Design engineering representative on site
 - Must run in paperless factory
- ▶ **Suppliers are part of introduction team**
 - Aided by supplier management teams

- ▶ **3 1/2 year life**
- ▶ **Product quality is a “given”**
- ▶ **Minimal engineering changes**
- ▶ **Minimal production engineering**

- ▶ **Continuous Improvement Recognition System — CIRIS**

- ▶ **Financial and non-financial metrics**
 - All facets of business driven by metrics
 - Teams, products, objectives, equipment, etc.

- ▶ **All teams required to have CPI projects**

- ▶ **Self assessment is continuous**
 - Rigorous process
 - Expected of all work teams

- ▶ **Repeated evaluation by outside parties**
 - Internal assessment by Ford entities
 - Independent auditors & consultants
 - Ongoing application for industry awards

Focus on Common Objective



Customer Delight

Rule #1

**“If we don’t take care of the
customer, someone else will.”**

Lean at Ford: Key Facilitators

- ★ **Integrated Database**
 - Financial
 - Personnel/Training
 - Production/Assembly/Test
 - Engineering

- ★ **Constant-assessment**
 - Aggressive pursuit of opportunities
 - Internal and external

**Total Quality and Productivity
Management Culture and Infrastructure**