

***Lean
Aerospace
Initiative***



***Enterprise Value:
The New Lean Horizon***

**Lean Effects on Aerospace Programs
Raytheon AMRAAM Case Study
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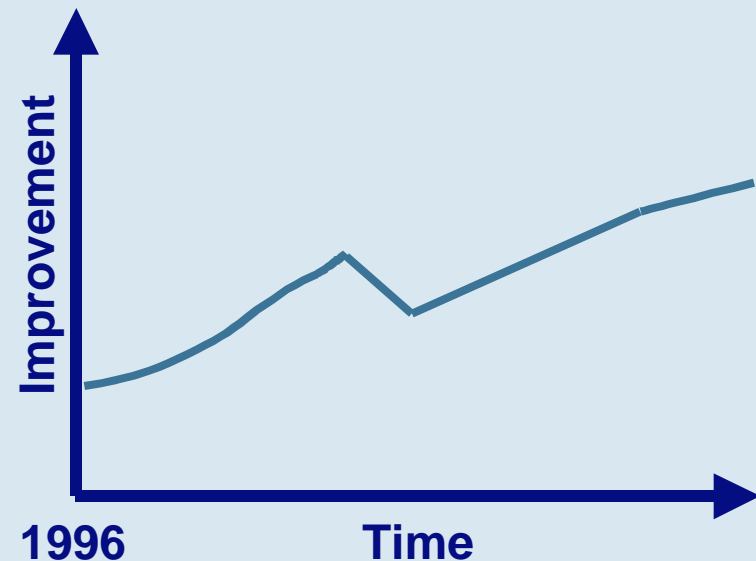
- **Advanced Medium-Range Air-to-Air Missile**
- **Production and repair both at Raytheon Company in Tucson, Arizona**
- **Flown by air forces of 20 nations**
- **Deployed September 1991**
- **Volumes per year**
 - **Produce 450-600**
 - **Repair 100-150**



High dependability, low cost of ownership

Lean Transformation Journey

- Formerly produced at both Raytheon & Hughes
- Hughes Agile program in 1997
- Raytheon & Hughes consolidated in Tucson
- Raytheon Six Sigma
 - Extensive use of IPTs
 - Engaging suppliers
 - IPPD in action
 - Common parts, processes, practices



Raytheon Six Sigma/lean tools institutionalized

- **1999 Industry Week (Miller)**
 - Cost from \$1M to \$250,000 in 7 years
 - Doubled deliveries in 12 months
 - Improved reliability to three times what RMS contracted for
- **Highlights from LEAP study**
 - Manufacturing flow time decreased 71%
 - Defects dropped 48%
 - 100% of workers participate in empowered teams

Highlights of Raytheon Missile Systems Awards

- 2000 “Lightning Bolt Award” for AMRAAM Engineering Support
- 1999 Industry Week America’s Best Plants Award
- 1998 Navy COE Best Manufacturing Practices
- 1997 Arizona Governor’s Award for Quality

Unit cost reduced significantly

- **Leadership**
 - **Strong, involved enterprise leadership**
 - **Great leadership at all levels**
 - **Provide motivation & support for change**
 - **Key to overcoming consolidation**
- **People**
 - **Extreme pride and enthusiasm for AMRAAM**
 - **Empowered at all levels**
 - **Extensive use of IPTs**

Leadership and people are key enablers



Government Relationship as a Key Enabler

- **Once contractor costs reduced, government costs drove missile cost**
- **Task Destination streamlined AMRAAM processes**
- **Government support office personnel reduced from 300 to 60**
- **Total System Performance Responsibility (TSPR) contract**
- **Strong government team relationship**

More cooperation = greater level of lean

- **Improvements using lean enabled improved government relationship**
- **Cooperative government relationship enables an even greater level of lean**
- **Initial Agile experience helped with consolidation challenges**
- **Strong leadership at all levels drive continued change**

Lean efforts pay off in many ways

- **Future challenges**
 - **Government leadership transition**
 - **Completely integrate repair and build sections**
 - **Reduce Lot 16-21 AMRAAM pricing**
- **Key elements in the AMRAAM success story**
 - **Strong leadership**
 - **Emphasis on people**
 - **Lean transformation and continuation**
 - **Strong government team relationship**

AMRAAM is a benchmark of what is possible