Lean Aircraft Initiative
Plenary Workshop

Product Development Focus Group

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DSM background at Boeing

- Early focus---reduce preliminary design cycle time
  - Process reengineering
  - Design data management
  - Improved design and analysis tools

- Data-driven paradigm in preliminary design
  - Imposes rigor in process definition
  - Uses DSM for process execution control
Program Planning Using DSM

DSM for design process management
Hierarchical Program Planning Paradigm

- Decision Gates
- Key Milestones
- Design Activity
- Design and Analysis Tasks

Plan Top-Down
Schedule Bottom-Up
Hierarchical Process Construction

Level 1

Level 2

Integration

Level 1 Breakdowns
Design process decomposition difficulties

- Gap exists between what and how
- Must be oriented to data not tasks
- Backlash to rigorous process definition
- Requires hierarchical data collection
True Test of Integration in Program Plan

Schedule Without Iteration
Recognized (Inconsistent Data)

Schedule With Iteration
Recognized (Consistent Data)
Program Planning Using DSM

- Program management impact
  - Organization structure implications

Align organization with process decomposition

Secure Authorization for Conditional Of
Assess Audit Configuration
Assess Cost/Price/Marketing
Assess Noise
Assess Propulsion System
Complete Mini-Audit
Determine Initial Structure
Estimate Aero Performance
Estimate High Lift Aeronautics
Estimate High Speed Aerodynamics
Estimate Operating Performance
Estimate Weight and Balance
Generate Wing-7 Loft
Review Audit Configuration

Leadership Team
Configuration Definition Team
Sales and Marketing
Noise Engineering
Propulsion Integration Team
Configuration Definition Team
Wing Integration Team / Structural
AeroPerformance
Wing Integration Team / Low-Speed
Wing Integration Team / High-Speed
Marketing / Aerodynamics
Weights Engineering
Aerodynamics
Leadership Team
Program Planning Using DSM

- Program management impact: lessons learned
  - Significant reduction in flow time
    - Typically on the order of 50%
    - Milestones met with consistent information
  - Visibility to adverse effects of program decisions
    - Schedule penalty from out-of-sequence activity
    - Example: 7 month extension moving single milestone
    - Or design inconsistency propagated downstream
  - Logical flaws in process definition
    - What is desired is not feasible
    - Guides necessary conditions to make it feasible
Program management impact: lessons learned

- Managing resource allocation is more critical to process reengineering
  
  • Reengineering full benefit lost without improved resource management
  
  • Prediction of task durations need to be based on realistic (level loaded) rather than ideal staff availability
Perspective on DSM at Boeing

- Adds value for understanding processes
- Eliminates out-of-sequence rework
- Identifies opportunities for concurrency (parallelism)
- Identifies “tent poles” in design cycle

Some perceive DSM as:

- Too complicated
- Taking too much time
- Requiring too much detail