Lean Aircraft Initiative
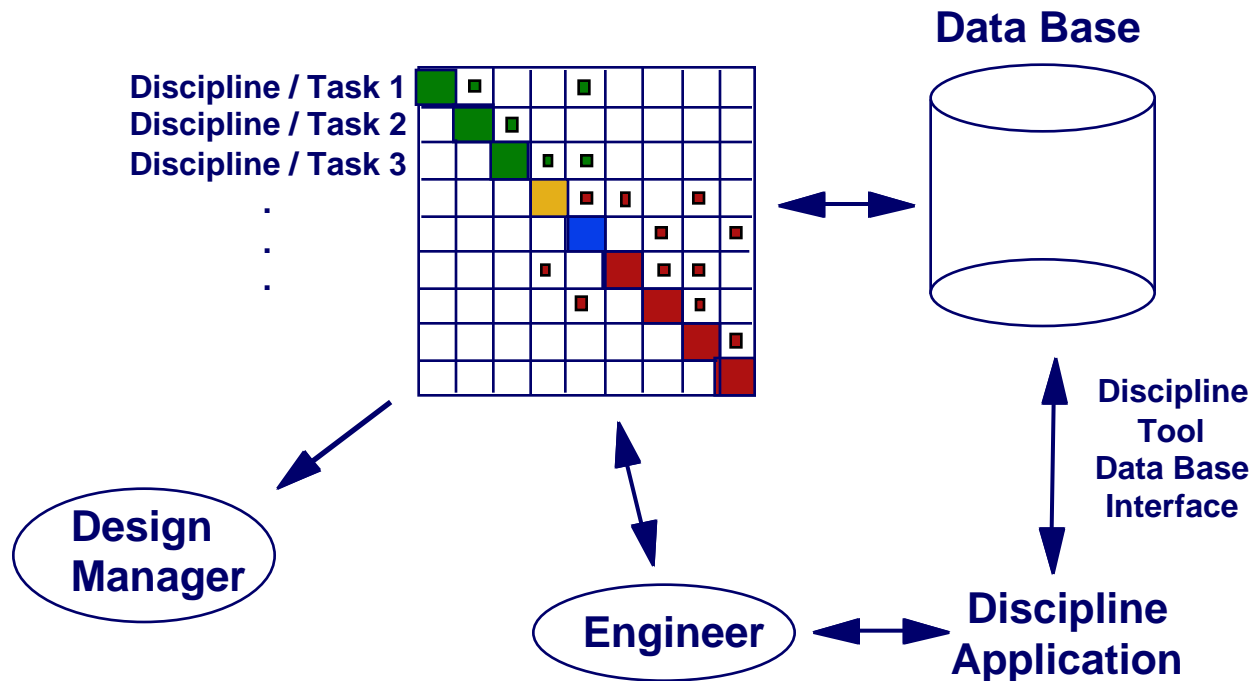# Plenary Workshop

Product Development Focus Group

October 8, 1997

Presented By:
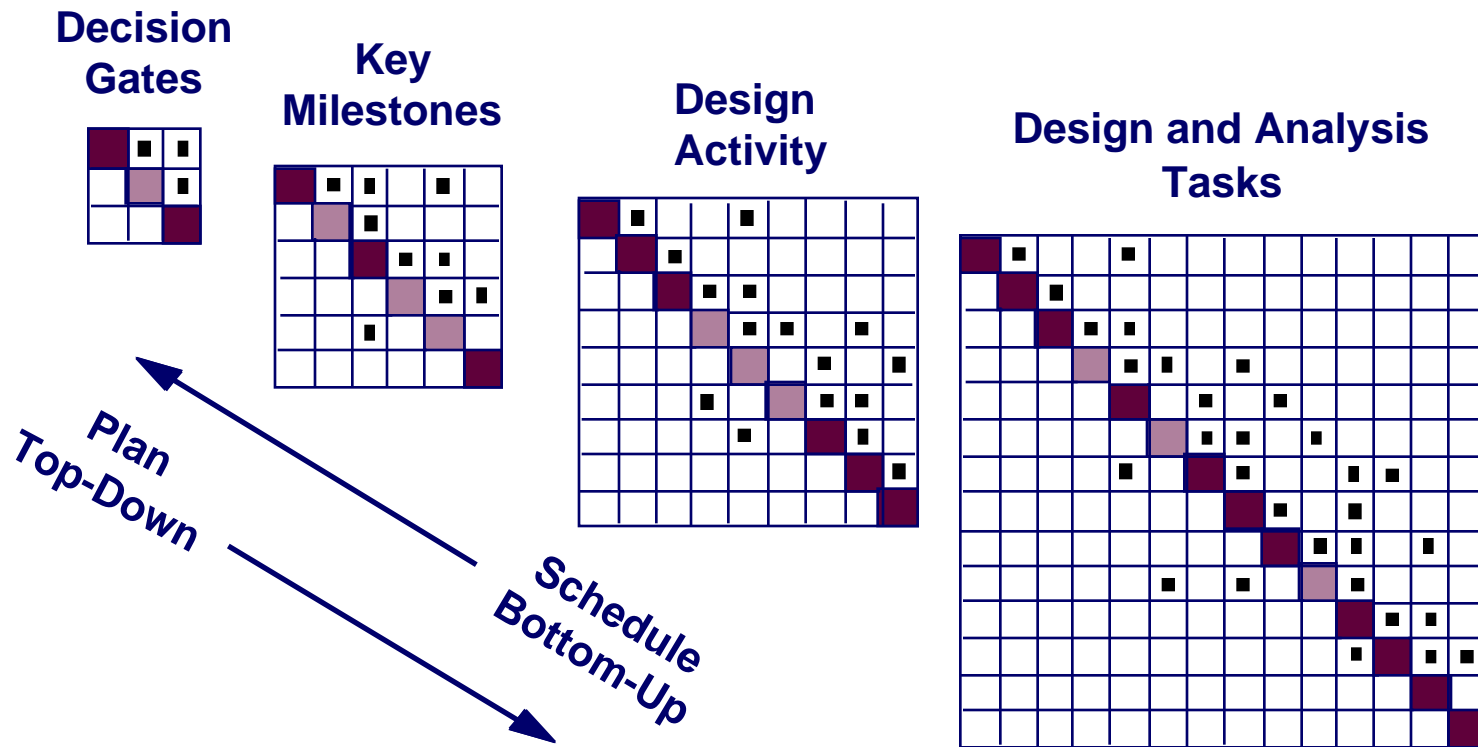David L. Grose
The Boeing Company

Program Planning Using DSM

- **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**

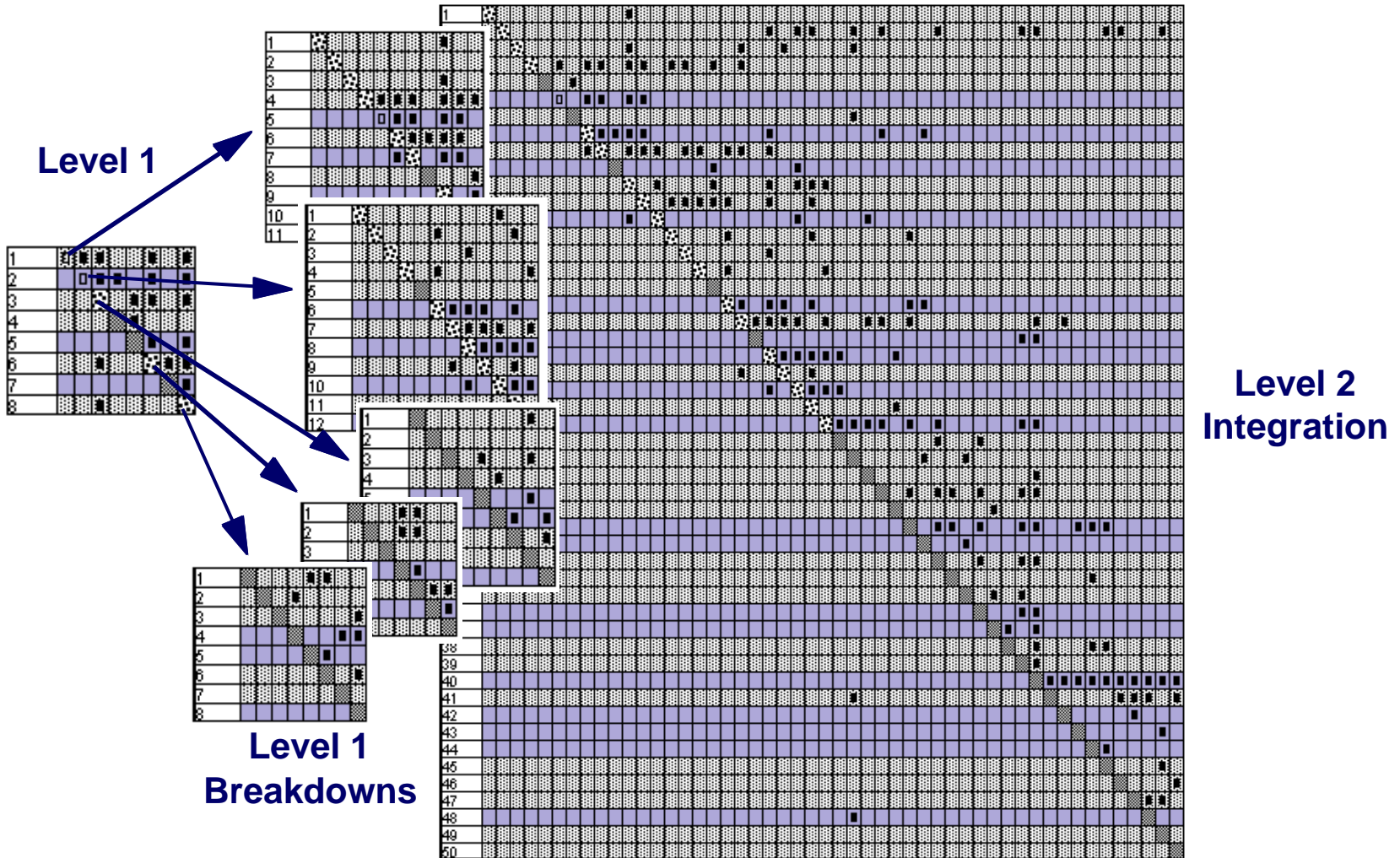   - **Uses DSM for process execution control**

DSM for design process management

Data Base

Discipline / Task 1
Discipline / Task 2
Discipline / Task 3

Design Manager

Engineer

Discipline Tool Data Base Interface

Discipline Application

Program Planning Using DSM

Hierarchical Program Planning Paradigm

Decision Gates

Key Milestones

Design Activity

Design and Analysis Tasks

Plan Top-Down

Schedule Bottom-Up

Program Planning Using DSM

Hierarchical Process Construction

Level 1

Level 1
Breakdowns

Level 2
Integration

- **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**

Program Planning Using DSM

True Test of Integration in Program Plan

ion	1
on Geometry	2
cs Model	3
odel	4
operties	5
State Airloads	6
y Airloads	7
Breakdown	8
roelastic Analysis	9
Analysis	10
nalysis and Optimization	11

Schedule With Iteration
Recognized (Consistent Data)
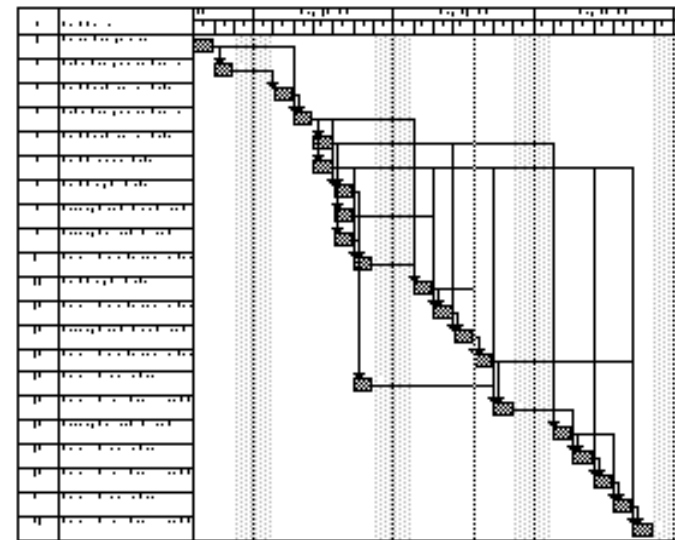
Schedule Without Iteration
Recognized (Inconsistent Data)

Program Planning Using DSM
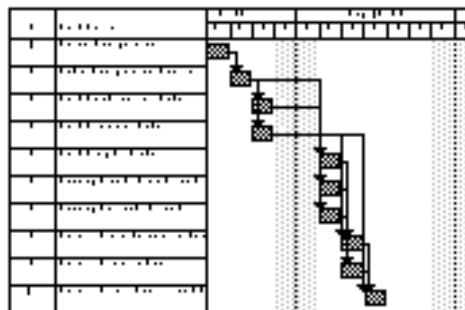
- **Program management impact**

  – **Organization structure implications**

Align organization with process decomposition

Secure Authorization for Conditional Of	Leadership Team
Assess Audit Configuration	Configuration Definition Team
Assess Cost/Price/Mar	Sales and Marketing
Assess Noise	Noise Engineering
Assess Propulsion Sys	Propulsion Integration Team
Complete Mini-Audit	Configuration Definition Team
Determine Initial Struct	Wing Integration Team / Struc
Estimate Aero Perform	AeroPerformance
Estimate High Lift Aero	Wing Integration Team / Lo-Sp
Estimate High Speed A	Wing Integration Team / Hi-Sp
Estimate Operating Per	Marketing / Aerodynamics
Estimate Weight and B	Weights Engineering
Generate Wing-7 Loft	Aerodynamics
Review Audit Configura	Leadership Team

- **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 <u>more</u> 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**

Program Planning Using DSM

- **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**