

# "The Role of CMMI® in Facilitating Program Performance in Large Scale Systems"

Dev Banerjee Director – Systems Engineering Integrated Defense Systems The Boeing Company St. Louis, MO CMMI® Technology Conference and User Group November 13-16, 2006 Hyatt Regency Tech Center Denver, CO



# People working together as a global enterprise for aerospace leadership

### Strategies

Run healthy core businesses Leverage strengths into new products and services Open new frontiers

### **Core competencies**

Detailed customer knowledge and focus Large-scale systems integration Lean enterprise

### Values

Leadership Integrity Quality Customer satisfaction People working together A diverse and involved team Good corporate citizenship Enhancing shareholder value











# Topics

### Boeing Progress on CMMI

- 11 sites at Maturity Level 5
- Continuing effort to deploy CMMI across all programs
- Moving to "common"

### Current Limitations of CMMI

- Industry Issues
- Program Issues

### Boeing Approach and Initiatives

- Corporate Initiatives
- Key Focus Areas Integrated Defense Systems
- Program Management Best Practices
- Strengthen Systems Engineering

### Summary

### **Boeing is Committed to CMMI**

Programs at 11 major Boeing sites supporting all Business Units have been appraised at Maturity Level 5



**Boeing Sites Appraised at ML5** 

Major Programs Appraised:

- B-1B
- C-17
- F/A-18 E/F
- F-22
- V-22
- Satellite Systems
- Mission Planning
- International Space Station
- Delta
- GPS

All Major Boeing Sites at Maturity Level 5

# Continue to Deploy CMMI Across All Businesses and Programs

- Business Units and Sites continue to expand deployment of CMMI-based processes
- Goals include:
  - Increase the number of programs and projects
  - Increase the penetration into the Engineering population
- Expand use of CMMI processes from main business programs into supporting Engineering activities and functions:
  - Modeling and Simulation
  - Engineering Laboratories
  - Ground Support Equipment

### Move to Common Processes Consistent With CMMI Process Areas



### **Industry Issues**

#### **Industry Issues:**

Top 5 System Engineering Issues

Top 5 SE Issues - 2006 Key systems engineering practices known to be effective are no consistently applied across all phases of the program life cycle. Insufficient systems engineering is applied early in the program cycle, compromising the foundation for initial requirements and architecture development.	t
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<ul> <li>Insufficient systems engineering is applied early in the program cycle, compromising the foundation for initial requirements and architecture development</li> </ul>	
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Requirements are not always well-managed, including the effect translation from capabilities statements into executable requirements to achieve successful acquisition programs.	ive
<ul> <li>The quantity and quality of systems engineering expertise is insufficient to meet the demands of the government and the defe industry.</li> </ul>	nse
Collaborative environments, including SE tools, are inadequate effectively execute SE at the joint capability, system of systems (SoS), and system levels.	to

Top Software Engineering Issues



#### **Typical Program Issues:\***

- Requirements instability
- Weak baseline management
- Weak risk management
- Weak supplier management
- Inadequate specifications
- Poor project management
- Management change control
- \* Issues developed during joint Government/Boeing Systems Engineering Interchange meeting and from list of top reasons projects fail from the Project Management Institute

**Boeing Recognizes the Limitations of CMMI-based Process Implementation** 

### **Approach to Integration of Broad-based Initiatives**

### Boeing Corporate – Growth and Productivity Initiatives

- Internal Services Productivity
- Lean+
- Global Sourcing
- Development Product Excellence

### Boeing Integrated Defense Systems – Key Focus Areas

- Supplier Management and Quality
- Program Management Best Practices
- Strengthen Systems Engineering
- Cost Reduction

Strong/Robust SE Support of Program Management Best Practices (PMBP) Required for Successful Program Performance

#### **SE Activities Supporting PMBP**



### **Process to Strengthen Systems Engineering**



**Program Assessment and Measurement** 

- SE Independent Assessments of "Focus Programs"
- SE Function Review/Support to Proposal/ Program Start-ups
- Progress Measurement/Metrics
- Rollup Reporting to Leadership

A. Management Commitment

Establish policy/procedure for

- Goals
- Program Lead SE
- SE Skills for Program Leadership
- Program SEMP

C. Implementation/ Execution

**Program Execution (Scorecard)** 

- Lead SE on PM Staff
- SEMP
- Resources/Structure for SEMP Implementation
- SE Reviews and Metrics
- Key Supplier SE Environment
- Program Self Assessments

#### B. Infrastructure

#### **Establish and Deploy**

- SEMP Guide
- SE Leading Indicators/Metrics Guide
- SE Assessment Template
- Proposal/Program Start-up Checklist
- SE Leadership Training
- "SE Certificate" Program
- SE Processes, Tools, Training, SMEs
- Assessment and Infrastructure for Supplier SE

**Structural Changes** Operational Changes

#### Closed Loop Process to Strengthen SE at Boeing

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### Summary

# **Vision 2016**

Supplier Management and Quality

Program Management Best Practices

Strengthen Systems Engineering Lean +

### **Global Sourcing**

- Project Planning
- Project Monitoring & Control
- Supplier Agreement
   Management
- Integrated Project Management + IPPD
- Risk Management
- Quantitative Project
   Management

- Requirements
   Management
- Requirements
   Development
- Technical Solution
- Product Integration
- Verification
- Validation

- Configuration
   Management
- Process & Product Quality Assurance
- Measurement & Analysis
- Decision Analysis & Resolution
- Causal Analysis & Resolution

# Excellence

**Development Process** 

- Organizational Process
   Focus
- Organizational Process
   Definition
- Organizational Training
- Organizational Process
   Performance
- Organizational Innovation & Deployment

#### **CMMI** Supports the Boeing Vision



