CMMI\textsuperscript{sm} Technology Conference and User Group
November 2002

Business Value and Customer Benefits
Derived from High Maturity

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• **Purpose:**
  – Communicate business value and customer benefits derived from an application of “high maturity” system/software engineering processes, and
  – How an integrated process framework helps

• **Discussion Agenda**
  – Business Value/Customer Benefits & Process Highlights
    – Quality and Process Goals
    – Quality and Process Performance
    – Process Highlights
  – Integrated Process Improvement (CMMI)

• **Limit – 40 minutes including questions**
DES Business Objectives

1. DES management selects quality and process goals & measurements

Projects select related goals & measurements for each life cycle phase.

2. Projects track process performance over time.

3. Projects check performance against project goals and business objectives.


5. DES management checks org and project data against DES goals (process capability baseline).

6. DES management selects quality and process goals & measurements
# DES Process and Quality Measures

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Measurement</th>
<th>Process</th>
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<tr>
<td>CPIm</td>
<td>Cost Performance Index monthly</td>
<td>Earned Value System</td>
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<tr>
<td>SPIm</td>
<td>Schedule Performance Index monthly</td>
<td>Earned Value System</td>
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<tr>
<td>EPVPm</td>
<td>ETC Performance Variance Percentage monthly</td>
<td>Earned Value System or other financial process</td>
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<td>DDrt</td>
<td>Defect Density from Peer Review</td>
<td>Peer Review (all Life Cycle Stages)</td>
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<tr>
<td>DDt</td>
<td>Defect Density from Test &amp; Operations</td>
<td>Test</td>
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## DES Business Objectives

<table>
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<tr>
<th>Annual Operating Plan</th>
<th>DES Process &amp; Quality Performance Goals Collective across participating projects</th>
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| Achieve revenue and margin objectives | 1. Achieve Cost Perf. Index = 1 ± 5%  
2. Achieve Schedule Perf. Index = 1 ± 5%  
3. Achieve Est-To-Complete-Var = 0 ± 5%.  
4. Achieve 5% improvement in Defect Density for each life cycle phase. |
| Improve customer satisfaction rating | 1. Achieve Cost Perf. Index = 1 ± 5%.  
2. Achieve Schedule Perf. Index = 1 ± 5%.  
3. Achieve Est-To-Complete-Var = 0 ± 5%.  
4. Achieve 5% improvement in Defect Density for each life cycle phase. |
Optimizing Process Strategy Overview

Before Defect Categories
Root Cause Analysis
Pareto Analysis

Test PR or Peer Review PR

Defect Data → Defect Analysis
Common Causes
Defect Categories

Project Tailored Process
Organization Defined Process
Technology Innovations

Process Change
Remove Root Causes From Process to Prevent Defects

Remove Root Causes From Process to Prevent Defects

Root Cause Analysis
SATS/SIGS Program and QM Indicators

**Technical**
- Goal: 20 +/- 5 defects/KLoC
- Actual: 22.9 defects/KLoC
- Action: Implementing DDt
- Technical Highlights: Only 2% of all defects are found in the fielded system

**Financial**
- Goal: 1.0 +/- 0.1
- Actual: 0.98
- Action: DP cycle for SCoV in April; Countermeasures – improve estimation; change EV tracking
- Technical Highlights: CPI is still on target
**M Schedule**

- **Goal:** 1.0 +/- 0.1
- **Actual:** 0.975
- **Action:** Watching closely, DP cycle for SCoV in April; Countermeasures – improve estimation; change EV tracking
- **Technical Highlights:** will be Satisfactory by 7/02

**E Customer Satisfaction**

- **Goal:** >= 95%
- **Actual:** 98.8%
- **Action:** Continue to deliver
- **Technical Highlights:** Customer is very flexible due to track record
Statistical process control identifies build issues that can impact the development schedule.
Predicting Quality - Example

AWIPS Rel 4.2 DRs

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Rayleigh Model
Controlling Process Performance

- Cost and schedule can be managed with statistical process control
- Improves predictions of future performance
- Results:
  - Build 4, 2% underrun
  - R5.0, 4% underrun
  - R5.1, 5% underrun
  - Build 5 variance in last 12 months, 10%

Statistical process control improves cost & schedule performance.
JEDMICS Defect Density & Customer Satisfaction Survey

Quality Improvement Realized

Mean Defect Density by Phase

Defects/Page KSLOC vs. LifeCycle Phase

- Analysis
- PDesign
- CDesign
- Code
- Test
- Ops

PRC 9909
PRC 9912
A
B
D

.05 defects/KSLOC

Good
Process Implementation Support – Best Practice

- Process Implementation Support – Best Practice
- Output Work Products
- Roles & Responsibilities
- Process Integration
- Checklists
- Support
- Tailoring Guidance
- Requirements
- Training
- Tools
- Metrics
- Policies & Verifications
- Process & Product
- Process Champion
- Internal Consultant
- Subject Matter Experts
- One Per Domain
- Shows Variations in each Process/Asset
- Expert Knowledge
- Per Process, Asset
- SWCMM
- SECMM
- ISO
- Customer Stds
- Corporate
- OJT
- COTS & “Glue” Support
- Compatible Formats

- Templates
- Samples
- Policy Statements
- Quality Assurance
- Audits
- Links to other KPAs/PAs
- Links to SIM
- Links to other processes
- Proposals
- Pilot Projects
- Startups
- Ongoing Projects
- Corporate
- Customer
- Internal
- Corporate
- Customer
- Internal
Information Technology Products & Services in Constant Change

IT Consulting
Sys Arch, Engin & Delivery
Enterprise Integration
Data Center Operation
IT Infrastructure Management
Applications Management
SETA
Functional Process Outsourcing
Context: Acquisition/Development Space

- **Mismatch**
  - Mature buyer must mentor low maturity developer
  - Outcome not predictable

- **Matched Team**
  - Match of maturity
  - Team risk approach
  - Execution to Plan
  - Measurable performance
  - Predictable results

- **Disaster**
  - No discipline
  - No process
  - Adhoc
  - Crisis Management
  - Outcome not predictable

- **Mismatch**
  - “Customer is always right”
  - Customer encourages “shorts cuts”
Why the CMMI fit’s

Mission Area Planning  | Budgeting Priority  | Requirements Definition
Decision Analysis and Resolution  | Requirements Development
Contracting  | Activity Planning
Supplier Agreement Management  | Project Planning
Integrated Project Management  | Product Control
Risk Management  | Requirements Management
Project Monitoring and Control  | Configuration Management
Program Management  | Quality Assurance
Mission Shortfalls  | Causal Analysis and Resolution
Deficiencies  | Directives, Constraints
Concurrent Front-End Activities

Assessment & Certification
Product Verification  | Measurement and Analysis  | Validation
Organizational Process Management
Process Focus  | Process Definition  | Innovation and Deployment  | Training  | Process Performance  | Quantitative Mgmt
Process Maturation

System Product Deliveries

Courtesy: Mitre/Mike Bloom