The Continuous Representation:
Cultivating Process Improvement from Grassroots Efforts

November 14, 2006

Jennifer Turgeon
Sandia National Laboratories
Agenda

• My Background
• Overcoming Objections to CMMI
• Know the Problems
• Staged vs. Continuous for Small Organizations and Project Teams
• Small Project Teams
• The Plan
• Questions?
My CMMI Background

• Member of SCAMPI B & C Development Team
• Member of Honeywell Aerospace and Corporate IT Appraisal Teams
• Authorized SCAMPI B & C Lead Appraiser
• Candidate Authorized SCAMPI A Lead Appraiser

• Led teams of varying sizes toward some form of CMMI compliance at Honeywell, FM&T; Lockheed Martin, ATARS; and Sandia National Laboratories
CMMI Objections

- CMMI creates endless documentation and useless artifacts
- CMMI is only for large organizations and projects
- CMMI interferes with creativity
- CMMI costs too much
- CMMI is too large and complex

Used inappropriately, ANY process improvement initiative can cause these problems.

The key is to focus on what benefits the team or organization the most.
Overcoming CMMI Objections

• **Listen to and document objections**
  – Understand what the apprehension is
  – Address the issues directly
  – Communicate with and involve management in these discussions

• **Consider process improvement over a “Level”**
  – Discuss the pros and cons with management
  – Realize that the “Level” can always come later
Know the Problems

**Change Resistance**

- What I’m doing works fine, **why change**?
- I don’t have time to learn something new, **what’s in it for me**?
- I don’t trust management’s motivation for change!

**Emotional Responses**

- If I change, that means what I’ve been doing in the past was wrong…
- I don’t want to move out of my comfort zone…
- I have no control over what is changing…
### Staged vs. Continuous

For small organizations and project teams...

<table>
<thead>
<tr>
<th><strong>Staged</strong></th>
<th><strong>Continuous</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Can be costly, especially when Maturity Levels are selected arbitrarily</td>
<td>Cost effective; organizations can prioritize and where they need to improve systematically</td>
</tr>
<tr>
<td>Overwhelming for people new to process improvement</td>
<td>Reduces anxiety by focusing on limited areas</td>
</tr>
<tr>
<td>Can lead to process improvement gone</td>
<td>Supports the need for institutionalization</td>
</tr>
</tbody>
</table>

**BAD**
Presentation Scope

Small organizations and teams

- Team size of 1-5 people
- New to defined or consistent use of process
- Have a general desire to improve the work that they do
- Have some undefined processes in place that are unique to each team member
- Averse to CMMI
The Plan

Let the team build the processes

What will benefit the team?

Take small steps

Bottom up approach

What will benefit the customer?

The Plan

Let the team build the processes

What will benefit the team?

Take small steps

Bottom up approach

What will benefit the customer?
Bottom Up/Grassroots Approach

• Find process improvement grassroots advocates
  – These people believe that their work can be improved and are willing to do something to change
  – They generally do not like “initiatives” because they have seen these come and go
  – They are leaders in their work community

• Let the advocates drive the change
  – Other practitioners trust these advocates
  – They understand how to express the need for change to their peers
Give the Implementation Team Control

• Discuss and identify benefits that can be achieved from change
  – Identify benefits to the team members
  – Identify benefits to the customers
  – Identify benefits to the organization

• Identify areas for improvement
  – Teams identify areas for improvement
  – Teams prioritize the identified areas
  – Teams then schedule the improvement efforts
Small Steps

• **Develop a schedule that works for the implementers**
  – Keep management informed
  – Allow for small increments of change
    • Small steps that elicit great success will allow for bigger steps the next time around
  – Hold people accountable for their work
  – Communicate frequently
Start with Existing Processes

• **Identify existing processes**
  – Provide time for teams to share what they do
  – Include both documented and undocumented processes
  – Take the time to understand the underlying process culture

• **Discuss how existing processes can be improved**
  – Attempt to maintain the culture as processes are improved
Simple Steps to Process Improvement

- Define what you do (may be the draft of a process)
- Identify areas for improvement
- Establish goals
- Develop a process (or refine what you already have)
- Use the process
- Reassess how you are doing after using the new process
- Continuously improve, as needed
Using the Continuous Representation

• Use the continuous representation as a process improvement guide
  – Provides a mechanism for measuring improvement toward goals
  – Allows management to identify readiness for a formalized appraisal
• Avoid “reinventing the wheel”
Continuous Representation

- **Organizational Process Focus**
- **Organizational Process Definition**
- **Organizational Training**
- **Organizational Process Performance**
- **Organizational Innovation and Deployment**

- **Project Planning**
- **Project Monitoring and Control**
- **Supplier Agreement Management**
- **Integrated Project Management**
- **Risk Management**
- **Integrated Teaming**
- **Integrated Supplier Management**
- **Quantitative Project Management**

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

- **Configuration Management**
- **Process and Product Quality Assurance**
- **Measurement and Analysis**
- **Decision Analysis and Resolution**
- **Organizational Environment for Integration**
- **Causal Analysis and Resolution**
## Continuous Generic Goals

<table>
<thead>
<tr>
<th>Generic Goals</th>
<th>Generic Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GG1: Achieve Specific Goals</strong></td>
<td>GP 1.1: Perform Base Practices</td>
</tr>
</tbody>
</table>
| **GG2: Institutionalize a Managed Process**       | GP 2.1: Establish an Organizational Policy  
GP 2.2: Plan the Process  
GP 2.3: Provide Resources  
GP 2.4: Assign Responsibility  
GP 2.5: Train People  
GP 2.6: Manage Configurations  
GP 2.7: Identify and Involve Relevant Stakeholders  
GP 2.8: Monitor and Control the Process  
GP 2.9: Objectively Evaluate Adherence  
GP 2.10: Review Status with Higher Level Management |
| **GG3: Institutionalize a Defined Process**        | GP 3.1: Establish a Defined Process  
GP 3.2: Collect Improvement Information |
| **GG4: Institutionalize a Quantitatively Managed Process** | GP 4.1: Establish Quantitative Objectives for the Process  
GP 4.2: Stabilize Subprocess Performance |
| **GG5: Institutionalize an Optimizing Process**    | GP 5.1: Ensure Continuous Process Improvement  
GP 5.2: Correct Root Causes of Problems |
Simple Steps to Process Improvement

- Define what you do (may be the draft of a process)
- Identify areas for improvement
- Establish goals
- Develop a process (or refine what you already have)
- Use the process
- Reassess how you are doing after using the new process
- Continuously improve, as needed
Define What you Do

Process Management
- Organizational Process Focus
- Organizational Process Definition
- Organizational Training
- Organizational Process Performance
- Organizational Innovation and Deployment

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

Product Management
- Project Planning
- Project Monitoring and Control
- Supplier Agreement Management
- Integrated Project Management
- Risk Management
- Integrated Teaming
- Integrated Supplier Management
- Quantitative Project Management

Support
- Configuration Management
- Process and Product Quality Assurance
- Measurement and Analysis
- Decision Analysis and Resolution
- Organizational Environment for Integration
- Causal Analysis and Resolution
Simple Steps to Process Improvement

• Define what you do (may be the draft of a process)
• Identify areas for improvement
• Establish goals
• Develop a process (or refine what you already have)
• Use the process
• Reassess how you are doing after using the new process
• Continuously improve, as needed
Identify Areas for Improvement

Process Management
- Organizational Process Focus
- Organizational Process Definition
- Organizational Training
- Organizational Process Performance
- Organizational Innovation and Deployment

Product Management
- Project Planning
- Project Monitoring and Control
- Supplier Agreement Management
- Integrated Project Management
- Risk Management
- Integrated Teaming
- Integrated Supplier Management
- Quantitative Project Management

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

Support
- Configuration Management
- Process and Product Quality Assurance
- Measurement and Analysis
- Decision Analysis and Resolution
- Organizational Environment for Integration
- Causal Analysis and Resolution

[Image: Sandia National Laboratories]
### Prioritize Improvement Areas

<table>
<thead>
<tr>
<th>Process Management</th>
<th>Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Organizational Process Focus</td>
<td></td>
</tr>
<tr>
<td>• Organizational Process Definition</td>
<td></td>
</tr>
<tr>
<td>• Organizational Training</td>
<td></td>
</tr>
<tr>
<td>• Organizational Process Performance</td>
<td></td>
</tr>
<tr>
<td>• Organizational Innovation and Deployment</td>
<td></td>
</tr>
<tr>
<td>• Requirements Management</td>
<td></td>
</tr>
<tr>
<td>• Requirements Development</td>
<td></td>
</tr>
<tr>
<td>• Technical Solution</td>
<td></td>
</tr>
<tr>
<td>• Product Integration</td>
<td></td>
</tr>
<tr>
<td>• Verification</td>
<td></td>
</tr>
<tr>
<td>• Validation</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product Management</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Project Planning</td>
<td></td>
</tr>
<tr>
<td>• Project Monitoring and Control</td>
<td></td>
</tr>
<tr>
<td>• Supplier Agreement Management</td>
<td></td>
</tr>
<tr>
<td>• Integrated Project Management</td>
<td></td>
</tr>
<tr>
<td>• Risk Management</td>
<td></td>
</tr>
<tr>
<td>• Integrated Teaming</td>
<td></td>
</tr>
<tr>
<td>• Integrated Supplier Management</td>
<td></td>
</tr>
<tr>
<td>• Quantitative Project Management</td>
<td></td>
</tr>
<tr>
<td>• Configuration Management</td>
<td></td>
</tr>
<tr>
<td>• Process and Product Quality Assurance</td>
<td></td>
</tr>
<tr>
<td>• Measurement and Analysis</td>
<td></td>
</tr>
<tr>
<td>• Decision Analysis and Resolution</td>
<td></td>
</tr>
<tr>
<td>• Organizational Environment for Integration</td>
<td></td>
</tr>
<tr>
<td>• Causal Analysis and Resolution</td>
<td></td>
</tr>
</tbody>
</table>
Simple Steps to Process Improvement

• Define what you do (may be the draft of a process)
• Identify areas for improvement
• Establish goals
• Develop a process (or refine what you already have)
• Use the process
• Reassess how you are doing after using the new process
• Continuously improve, as needed
Establish Goals - 1

**Process and Product Quality Assurance Process Area**

- **SG 1 Objectively Evaluate Processes and Work Products**
  - SP 1.1-1 Objectively Evaluate Processes
  - SP 1.2-1 Objectively Evaluate Work Products and Services

- **SG 2 Provide Objective Insight**
  - SP 2.1-1 Communicate and Ensure Resolution of Noncompliance Issues
  - SP 2.2-1 Establish Records
Establish Goals - 2

• Goals may be all or some of the specific practices
• Be careful with the jargon
  – “We are working toward improving our functional testing” versus
  – “We are implementing SPs 1.1 – 1.3 in order to improve the way that we prepare for functional testing
• It is important to pace achievement towards goals to ensure success
## Establish Goals - 3

<table>
<thead>
<tr>
<th>Generic Goals</th>
<th>Generic Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG1: Achieve Specific Goals</td>
<td>GP 1.1: Perform Base Practices</td>
</tr>
<tr>
<td>GG2: Institutionalize a Managed Process</td>
<td>GP 2.1: Establish an Organizational Policy</td>
</tr>
<tr>
<td></td>
<td>GP 2.2: Plan the Process</td>
</tr>
<tr>
<td></td>
<td>GP 2.3: Provide Resources</td>
</tr>
<tr>
<td></td>
<td>GP 2.4: Assign Responsibility</td>
</tr>
<tr>
<td></td>
<td>GP 2.5: Train People</td>
</tr>
<tr>
<td></td>
<td>GP 2.6: Manage Configurations</td>
</tr>
<tr>
<td></td>
<td>GP 2.7: Identify and Involve Relevant Stakeholders</td>
</tr>
<tr>
<td></td>
<td>GP 2.8: Monitor and Control the Process</td>
</tr>
<tr>
<td></td>
<td>GP 2.9: Objectively Evaluate Adherence</td>
</tr>
<tr>
<td></td>
<td>GP 2.10: Review Status with Higher Level Management</td>
</tr>
<tr>
<td>GG3: Institutionalize a Defined Process</td>
<td>GP 3.1: Establish a Defined Process</td>
</tr>
<tr>
<td></td>
<td>GP 3.2: Collect Improvement Information</td>
</tr>
<tr>
<td>GG4: Institutionalize a Quantitatively Managed Process</td>
<td>GP 4.1: Establish Quantitative Objectives for the Process</td>
</tr>
<tr>
<td></td>
<td>GP 4.2: Stabilize Subprocess Performance</td>
</tr>
<tr>
<td>GG5: Institutionalize an Optimizing Process</td>
<td>GP 5.1: Ensure Continuous Process Improvement</td>
</tr>
<tr>
<td></td>
<td>GP 5.2: Correct Root Causes of Problems</td>
</tr>
</tbody>
</table>
• Generic practices start to take care of themselves as processes improve
  – Monitoring generic practices should be a project management activity reported to management
• Don’t talk CMMI until practitioners are ready
  – Gradually introduce the fact that the process improvement efforts align well with CMMI implementation
Simple Steps to Process Improvement

- Define what you do (may be the draft of a process)
- Identify areas for improvement
- Establish goals
- **Develop a process** (or refine what you already have)
- Use the process
- Reassess how you are doing after using the new process
- Continuously improve, as needed
Develop a Process

• Relevant practitioners need to write, or at least edit, the process
• Keep the process simple, even if it is not complete
• Don’t shoot for a perfect process the first time
• Get team consensus
Simple Steps to Process Improvement

- Define what you do (may be the draft of a process)
- Identify areas for improvement
- Establish goals
- Develop a process (or refine what you already have)
- **Use the process**
- Reassess how you are doing after using the new process
- Continuously improve, as needed
Use the Process

- Use the process for an extended period of time
- Collect issues related to the process as they arise
- Reassess how you are doing after using the new process
- Continuously improve, **as needed**
Contact Information

Jennifer Turgeon
jlturge@sandia.gov
505-284-3630
Questions?