

# **Standard Systems Group (SSG) Technology Adoption Planning Workshop**

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Jan Vargas

*April 2004*

SPECIAL REPORT  
CMU/SEI-2004-SR-003





**Carnegie Mellon  
Software Engineering Institute**

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Pittsburgh, PA 15213-3890

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**Acquisition Support Program**

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# Table of Contents

<b>Executive Summary</b> .....	<b>ix</b>
<b>Abstract</b> .....	<b>xi</b>
<b>1 Organization of This Report</b> .....	<b>1</b>
<b>2 Background</b> .....	<b>3</b>
<b>3 Workshop Purpose</b> .....	<b>5</b>
<b>4 Workshop Goals and Desired Outcomes</b> .....	<b>7</b>
<b>5 Participants</b> .....	<b>9</b>
<b>6 Workshop Approach</b> .....	<b>11</b>
<b>7 Agendas</b> .....	<b>13</b>
7.1.1 Rationale for Agenda Changes .....	17
<b>8 Agenda Items for Day 1, October 27, 2003</b> .....	<b>19</b>
8.1 Welcome and why the SEI is here .....	19
8.1.1 Desired Outcomes .....	19
8.1.2 Results.....	19
8.1.3 Discussion .....	19
8.2 Agenda item “Introductions”.....	19
8.2.1 Desired Outcomes .....	19
8.2.2 Results.....	20
8.2.3 Discussion .....	20
8.3 Agenda item “Review/Agree on workshop objectives” Summary .....	20
8.3.1 Desired Outcomes .....	20
8.3.2 Results.....	20
8.3.3 Discussion .....	20
8.4 Gunter to provide review of SSG’s strategic objectives.....	21
8.4.1 Desired Outcomes .....	21
8.4.2 Results Summary.....	21

8.4.3	Discussion.....	21
8.5	Review SEI work plan/connect to SSG objectives.....	21
8.5.1	Desired Outcomes.....	21
8.5.2	Results Summary.....	21
8.5.3	Discussion.....	22
8.6	Create map of SSG's objectives/SEI connections.....	22
8.6.1	Desired Outcomes.....	22
8.6.2	Results Summary.....	22
8.6.3	Discussion.....	22
<b>9</b>	<b>Agenda Items, Day 2, October 28, 2003.....</b>	<b>23</b>
9.1	Review Day 1 work; revise as necessary.....	23
9.1.1	Desired Outcomes.....	23
9.1.2	Results Summary.....	23
9.2	Prioritize SEI work plan tasks.....	23
9.2.1	Desired Outcomes.....	23
9.2.2	Results Summary.....	23
9.3	Perform readiness/fit analysis for top 3 tasks.....	24
9.3.1	Desired Outcomes.....	24
9.3.2	Results Summary.....	24
9.3.3	Discussion.....	24
9.4	Engagement for pilots task planning.....	24
9.4.1	Desired Outcomes.....	24
9.4.2	Results Summary.....	25
9.5	Close up main part of workshop.....	25
9.5.1	Desired Outcomes.....	25
9.5.2	Results Summary.....	25
9.6	Task planning.....	26
9.6.1	Desired Outcomes.....	26
9.6.2	Results.....	26
<b>10</b>	<b>Workshop Report Summary.....</b>	<b>27</b>
10.1	Summary of Next Steps for SEI Tasks.....	27
10.1.1	COTS.....	27
10.1.2	People Capability Maturity Model (P-CMM).....	27
10.1.3	Process Improvement.....	27
<b>Appendix A</b>	<b>Presentation: Col Jevsevar's HQ Standards Systems Group.....</b>	<b>29</b>
<b>Appendix B</b>	<b>Wants and Offers.....</b>	<b>33</b>
<b>Appendix C:</b>	<b>Issues and Comments.....</b>	<b>37</b>

<b>Appendix D: SSG’s Strategic Objectives .....</b>	<b>39</b>
<b>Appendix E: SEI Work Plan.....</b>	<b>51</b>
<b>Appendix F: People Capability Maturity Model (P-CMM) .....</b>	<b>61</b>
<b>Appendix G: Enterprise Architecture .....</b>	<b>69</b>
<b>Appendix H: Software Sustainment and Modernizing Legacy Systems .....</b>	<b>75</b>
<b>Appendix I: Capability Maturity Model – Integrated (CMMI).....</b>	<b>85</b>
<b>Appendix J: COTS-Based Systems.....</b>	<b>98</b>
<b>Appendix K: The Mind Maps .....</b>	<b>107</b>
<b>Appendix L: COTS-Based Systems Enablers and Barriers .....</b>	<b>113</b>
<b>Appendix M: People Capability Maturity Model Enablers and Barriers .....</b>	<b>115</b>
<b>Appendix N: Capability Maturity Model-Integrated Enablers and Barriers .....</b>	<b>117</b>





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# List of Figures

Figure 1: SSG Workshop Approach .....	11
Figure 2: Map of SEI Technologies Against SSG (Cluster Focused on Customer Issues) .....	108
Figure 3: Map of SEI Technologies Against SSG (Cluster Focused on Innovation and Learning Issues).....	109
Figure 4: Map of SEI Technologies Against SSG (Cluster Focused on Internal Operations Issues .....	110
Figure 5: Map of SSG Issues to CMMI Content.....	111
Figure 6: Map of SSG Issues Against P-CMM Content .....	112



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## List of Tables

Table 1:	Standard Systems Group Participants Involved in the Workshop .....	10
Table 2:	Planned Agenda for October 27, 2003 .....	14
Table 3:	Planned Agenda for October 28, 2003 .....	15
Table 4:	Actual Agenda for October 27, 2003.....	16
Table 5:	Actual Agenda for October 28, 2003.....	17
Table 6:	Workshop Report Summary – Pluses and Deltas.....	25



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# Executive Summary

The Software Engineering Institute (SEI) facilitated a two-day Technology Adoption Planning workshop for the SSG Transformation Team (vice director and the directors of the 2-letter organizations) on October 27 and 28, 2003 at the Alabama TechnaCenter in Montgomery, Alabama. The workshop was also attended by SSG personnel who were responsible for partnering with the SEI on the tasks in the FY03-04 SEI/SSG work plan.

The purpose of the workshop was to initiate the planning for phase 2 of the SSG/SEI partnership. (Phase 1, the “Enterprise Assessment,” was conducted in Jan 03 and an out brief was delivered in May 03). The workshop focused on producing a tactical plan for incorporating the recommended SEI technical solutions (based on SSG-expressed needs during Phase 1) into the ongoing SSG transformation activities.

Workshop participants began by reviewing the SSG FY03-08 Strategic Objectives and the Balanced Score Card (BSC) objectives to verify that they were still relevant and supportive of the SSG Strategic Goals. After reviewing the list of 21 objectives, the SSG Transformation Team confirmed that all of the objectives are still relevant, although it was noted that a few of them could be consolidated.

The objectives were grouped into three categories (customer focused, internal operations, and innovation & learning). During the remainder of the workshop, SSG personnel participated in group activities where key technical challenges facing SSG were identified. SEI personnel identified those where SEI could provide expertise/support. A mapping exercise of SSG needs to SEI expertise was conducted. SSG personnel then “dot voted” on the top three areas they thought were the most important for SSG to pursue in the near term. The top three are COTS-Based Systems (CBS) support/integration, People-CMM (P-CMM) support, and Process Improvement support. Interested SSG 2-letter organizations were identified as partners for each task and then individuals from these organizations volunteered to be the primary POC. They are:

- COTS systems support/integration – Steve Wright (EN)
- P-CMM – Lt Col Ingenloff (DP)
- Process Improvement – Tom Speakman (XPJ)

Next step is for the SEI to draft another version of the FY04 work plan with more detailed task descriptions including specific deliverables, a schedule, and a revised cost estimate.



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# Abstract

The Software Engineering Institute (SEI) facilitated a two-day Technology Adoption Planning workshop for the Standard Systems Group (SSG) Transformation Team (Vice Director and the Directors of the 2-letter organizations) on October 27 and 28, 2003 at the Alabama TechnaCenter in Montgomery, Alabama. Other pertinent SSG personnel, with responsibility for partnering with the SEI on the tasks in the FY03-04 SEI/SSG work plan, also were invited and attended.

The purpose of the workshop was to initiate the planning for phase 2 of the SSG/SEI partnership. (Phase 1 was the “Enterprise Assessment” conducted in January 2003 and out briefed in May 03). The workshop was focused on producing a tactical plan for incorporating the recommended SEI technical solutions (based on SSG-expressed needs during Phase 1) into the ongoing SSG transformation activities.





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# 1 Organization of This Report

This report is organized into the following sections:

**Background:** This section provides information as to why the workshop was held and other relevant background information expected to be needed to understand the workshop report.

**Workshop Purpose:** This section elaborates on the purpose of holding the workshop.

**Workshop Goals/Desired Outcomes:** This section elaborates on the deliverables of the workshop and provides details on the goals that supported the purpose of the workshop.

**Participants:** This section describes the SSG and the SEI participants of the workshop.

**Workshop Approach:** This section describes the rationale for the workshop activities and agenda items.

**Nominal Agenda:** This section contains the planned agenda for the workshop as well as the actual agenda that was followed.

**Agenda Items Summary:** This section outlines the desired outcomes, results summary, and discussion of each agenda item.

**Appendices A – N:** The appendices at the end of this report contain the raw data produced in the workshop (such as flip charts and other notes) as well as artifacts from the workshops (such as background information and presentations used during the workshop).



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## 2 Background

In late CY02, the SEI was asked by the new SSG director, Mr. Frank Weber, to perform an “enterprise assessment” of SSG. SSG’s goal is to establish itself as a Center of Excellence (CoE) for Air Force combat support Information technology (IT) systems. Given that goal, SSG asked the SEI to provide initial, objective insights on core SSG processes/organizations that are critical to establishing this CoE, to include:

- Roles/relationships between the Program Offices and Software Factory.
- Skills mix required to support future AF IT environment, to include best balance of blue suit vs. government civilian vs. contractors, considering legacy system requirements, modernization/technology evolution and training requirements/capabilities.
- Core competencies to promote an integrated combat support system domain.
- Basic organizational strategies.

Initial work culminated in a 17 Jan 03 briefing, which addressed areas of Apparent Strength and Areas of Apparent Concern toward the accomplishment of this goal.

Further investigation to include interviews and discussions with various Air Force leaders resulted in a more detailed presentation and a closeout of the “discovery phase” on 8 May 03.

The tasking in this work plan is the direct result of the aforementioned assessment outbriefs and ongoing discussion/direction from SSG leadership and is meant to be consistent with Mr. Weber’s stated goals:

- Make SSG Easy to do business with . . . as deemed by our customers!
- Streamlined organization with agile processes
- Recognized expertise in exploring and exploiting leading IT technologies
- Enterprise-wide perspective

The Technology Adoption Planning workshop was part of the tasking statement of SEI’s Fiscal Year 2003-04 Work Plan for the Standard Systems Group. This workshop was specifically focused on producing a working plan for incorporating technologies in the SEI work plan into the SSG transformation activities. The workshop began by reviewing the objectives and achievement strategies in the SSG FY03-08 Strategic Plan dated August 22,

2002 to validate that they are still relevant in the context of recent organizational changes and priority changes. Working with the SSG leadership team, the SEI collaborated in planning and prioritizing the adoption of the technologies proposed in the FY03-04 work plan. These will be explicitly connected to the SSG strategic objectives in order to provide maximum benefit to SSG in achieving said objectives.

The SEI worked with SSG prior to the workshop to establish the agenda and identify appropriate participants. Attendees at the workshop included the Vice Director of SSG, his direct reports, and staff members who will be responsible for implementing, monitoring, and controlling the transformation effort.

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## 3 Workshop Purpose

The purpose of the SSG Technology Adoption Planning Workshop was to come up with a prioritized list of SSG's strategic objectives tied to specific tasks in the SEI work plan. In addition to creating the prioritized list of tasks, sequencing (i.e., education/training, consulting, etc.) of the subtasks were to be discussed and documented.

A technology adoption workshop approach was considered an appropriate method to come up with the primary list of activities. In addition, the workshop helped to facilitate communication among and between the SSG's departments involved in the two-day event.



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## 4 Workshop Goals and Desired Outcomes

The goals of the workshop included the following:

- Provide a communication forum between SSG and the SEI
- Establish a common understanding between SEI and SSG's objectives/plan
- Establish a common understanding of SEI's portfolio of "SSG appropriate" products
- Create a map of SEI technologies showing explicit connections to various SSG strategic objectives

The desired outcomes (deliverables) from the workshop included the following:

- A prioritized list of SSG's strategic objectives tied to specific tasks in the SEI work plan
- Sequencing of the subtasks discussed and documented
- Set of steps and dates with SEI and SSG resources
- Workshop report (this document)





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## 5 Participants

Participants for this workshop came from the SEI and from SSG. The SEI provided facilitators and subject matter experts for the workshop.

The following list includes SEI staff members and their respective roles in the workshop:

- Grady Campbell, Enterprise Architecture lead
- John Foreman, COTS-Based Systems lead
- Suzanne Garcia, Facilitator
- Kristi Keeler, Capability Maturity Model Integration (CMMI) lead
- Lisa Masciantonio, Business Manager
- Lorraine Nemeth, Facilitator
- Daniel Plakosh, Software Sustainment and Modernizing Legacy Systems leads
- Jan Vargas, SEI tech lead
- Gian Wemyss, People Capability Maturity Model (P-CMM) lead

The following table lists the Standard Systems Group participants involved in the workshop:

<b>Name</b>	<b>Area Represented</b>
Col Dave McKinney	AQ
Stephen Stewart	BI
LtCol Peter Ingenloff	DP/DAG
CMSGT Thomas Kirksey	EDX (DAG)
Willie Miller	DP/CCQ
Kenneth Heitkamp	EA
Eugene Wright	EN
Col Victor Jevsevar	EV
John Lucas	FM
Tommy Pope	
Roger Herndon	FN

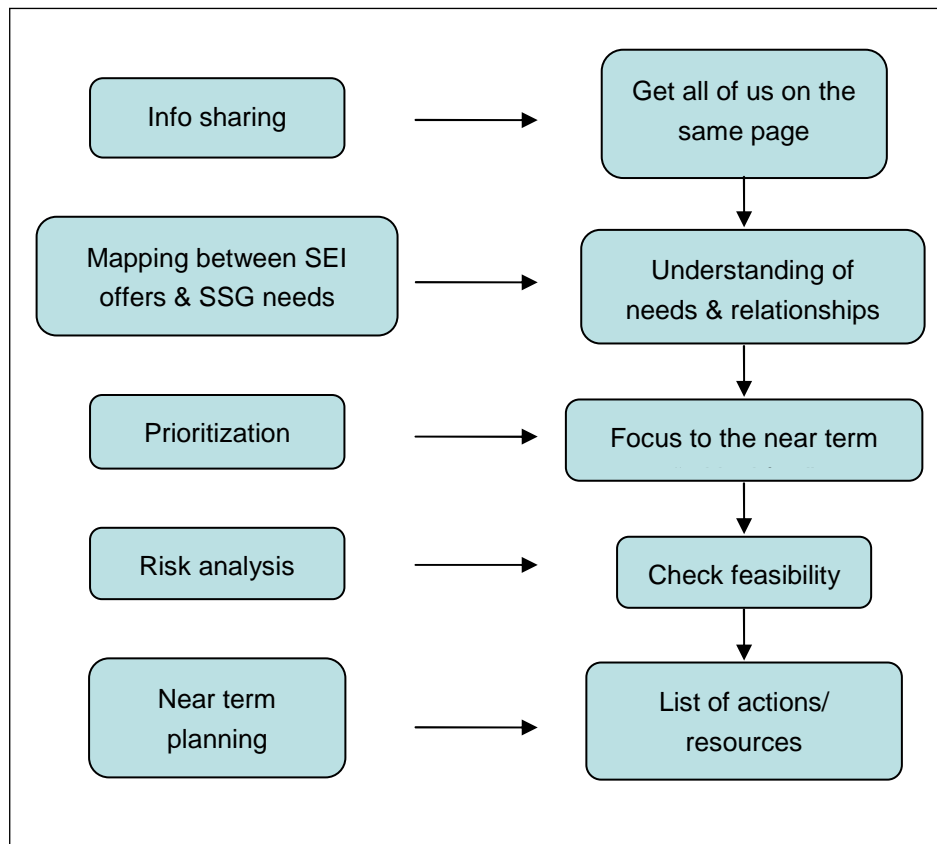
Diane Suchan	ILS
Maj John Hartsell	JA
Maj Pat Reader	MI
Tom Bayless	PI
Trish Meadows	SEPG Lead
David Boulian	ST
Col John Courtney	
Col. Larry Wilson	XO
John Macker	XP
Bloise Stubblefield	XP
Richard Plaskett	XP "Contractor"
Jim Hoffman	XPHC
Harold Speakman	XPJ

*Table 1: Standard Systems Group Participants Involved in the Workshop*

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## 6 Workshop Approach

The facilitators of this workshop utilized agenda items and activities that created a flow of information for shared understanding among all participants, as well as allowing a forum for open communications. The following diagram depicts the flow of the workshop.



*Figure 1: SSG Workshop Approach*



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## 7 Agendas

The planned agendas shown in Table 2 and Table 3 were created and sent to all workshop attendees before the workshop. The actual agendas shown in Table 4 and Table 5 were revised throughout the workshop to meet the changing needs of the workshop and evolved into the “Worked Agendas.”

The actual agendas in Table 4 and Table 5 were created during the workshop on October 27 and 28, 2003. The workshop facilitators worked with the actual agenda and fine-tuned it as each day progressed to meet the needs of the audience.

**Table 2: Planned Agenda for October 27, 2003**

<b>October 27, 2003</b>			
<b>Time</b>	<b>Agenda Topic</b>	<b>Lead/Participants</b>	<b>Desired Outcome</b>
8:00 – 8:15 am	Welcome & Why the SEI is here	Jevsevar	Common understanding among all participants.
8:15 – 9:15 am	Introductions	Garcia & Nemeth / All	Each participant has an opportunity to introduce themselves, and state their “wants/offers.”
9:15 – 9:45 am	Review/Agree on Workshop Objectives	Garcia & Nemeth / All	Agreement on agenda and understanding of objectives.
9:45 – 10:00 am	Break	All	Refresh.
10:00 – 11:45 am	Gunter to provide review of SSG’s Strategic Objectives	Rick Plaskett	Common understanding of SSG’s objectives/plan.
11:45 am – 1:00 pm	Lunch	All	
1:00 – 3:00 pm	Review SEI Work Plan/Connect to SSG Objectives	SEI Tech Leads	Common understanding on how SEI’s ideas map to SSG’s objectives.
1:00 – 1:05 pm	Overview of Workplan	Jan Vargas	
1:05 – 1:20 pm	People Capability Maturity Model (P-CMM)	Gian Wemyss	
1:20 – 1:35 pm	Software Sustainment	Dan Plakosh	
1:35 – 1:50 pm	Modernizing Legacy Systems	Dan Plakosh	
1:50 – 2:05 pm	Portfolio Management and Integration	Dan Plakosh	
2:05 – 2: 20 pm	CMMI	Kristi Keeler	
2:20 – 2:35 pm	COTS-Based Systems	John Foreman	
2:35 – 2:50 pm	Enterprise Architecture	Grady Campbell	
2:50 – 3:00 pm	(over run time)		
3:00 – 3:30 pm	Break	All	Refresh.
3:30 – 4:30 pm	Create map of Objectives/SEI connections	Garcia / All	Map of SEI technologies showing explicit connections to various SSG strategic objectives.
4:30 pm	Adjourn		

**Table 3: Planned Agenda for October 28, 2003**

<b>October 28, 2003</b>			
Note: To accommodate the needs of SSG, this agenda was modified based on the results of the October 27 agenda.			
<b>Time</b>	<b>Agenda Topic</b>	<b>Lead/Participants</b>	<b>Desired Outcome</b>
8:00 – 8:30 am	Review Day 1 Work; Revise as Necessary	Garcia & Nemeth / All	Reset on where we are.
8:30 – 10:00 am	Prioritize SEI Work Plan Tasks	Garcia & Nemeth / All	SEI's tasks in prioritized order.
10:00 – 10:15 am	Break	All	Refresh.
10:15 – 11:45 am	Perform Readiness/Fit Analysis for Top 3 Tasks	Garcia & Nemeth / All	Transition risk list related to top three SEI tasks and transition risk profiles.
11:45 am – 1:00 pm	Lunch	All	
1:00 – 3:00 pm	Next Steps	Garcia & Nemeth / All	Set of steps with dates with SEI and SSG resources.
3:00 – 3:30 pm	Evaluate “Want” Satisfaction	Nemeth / All	Understanding of what’s been done and what needs to be done.
3:30 pm	Concluding Remarks and Adjourn	Jevsevar	

**Table 4: Actual Agenda for October 27, 2003**

<b>October 27</b>			
<b>Time</b>	<b>Agenda Topic</b>	<b>Lead/Participants</b>	<b>Desired Outcome</b>
8:00 – 8:15 am	Welcome & Why the SEI is here	Jevsevar	Common understanding among all participants.
8:15 – 8:30 am	Introductions	Garcia & Nemeth / All	Each participant has an opportunity to introduce themselves, and state their “wants/offers.”
8:30 – 8:45 am	Review/Agree on Workshop Objectives	Garcia & Nemeth / All	Agreement on agenda and understanding of objectives.
8:45 – 10:40 am	Gunter to provide review of SSG’s Strategic Objectives	Rick Plaskett	Common understanding of SSG’s objectives/plan.
(9:20 – 9:45)	Break	All	Refresh
10:40 – 10:45 am	Overview of Workplan	Jan Vargas	
10:45 – 11:10	People Capability Maturity Model (P-CMM)	Gian Wemyss	
11:10 – 11:35 am	Enterprise Architecture	Grady Campbell	
(11:35 am–1:00 pm)	Lunch	All	
1:00 – 1:25	Software Sustainment	Dan Plakosh	
1:25 – 2:00 pm	Modernizing Legacy Systems	Dan Plakosh	
2:42 – 3:07 pm	COTS-Based Systems	John Foreman	
(3:07-3:30 pm)	Break	All	
3:30-4:30 pm	Create map of objectives/SEI connections	Garcia/All	Map of SEI technologies showing explicit connections to various SSG strategic objectives.
4:30 pm	Adjourn		



**Table 5: Actual Agenda for October 28, 2003**

<b>October 28, 2003</b>			
Note: To accommodate the needs of SSG, this agenda was modified based on the results of the October 27 agenda.			
<b>Time</b>	<b>Agenda Topic</b>	<b>Lead/Participants</b>	<b>Desired Outcome</b>
8:00 – 8:05 am	Review Day 1 Work; Revise as Necessary	Garcia & Nemeth / All	Reset on where we are
8:05 – 9:00 am	Prioritize SEI Work Plan Tasks	Garcia & Nemeth / All	SEI's tasks in prioritized order
9:00 – 10:30 am	Perform Readiness/Fit Analysis for Top 3 Tasks  +Break	All	Transition risk list related to top three SEI tasks and transition risk profiles  Refresh.
10:30 – 10:50 am	Engagement for pilots task planning	Garcia & Nemeth / All	
10:50 - 11:05 am	Close up main part of workshop  - Evaluate meeting (+ and delta)  - Folks not directly involved in the Pilot Tasks may leave	Garcia & Nemeth / All	Is there anything you liked about this workshop? Is there anything the SEI can improve upon?
11:05 am – 12:30 pm	Lunch	All	
12:30 – 3:00 pm	Task planning	All	

### 7.1.1 Rationale for Agenda Changes

The major changes to the planned agenda and the actual agenda on day one were based on the fact that the workshop members worked through the morning section of the agenda faster than anticipated. The facilitators also allowed an hour and a half for lunch, as participants had a distance to drive to eating establishments. The schedule was shifted slightly during the “Review of SEI Work Plan/Connect to SSG Objectives” to accommodate the time needs of the attendees to discuss in more depth some of the topics covered by the SEI’s subject matter experts.

The major changes to the workshop's agenda during day two included the workshop participants working through the morning's portions more rapidly than predicted. The morning's sections afforded the attendees an opportunity to evaluate the meeting. The facilitators closed up the main part of the workshop so that attendees who were not directly involved in the Pilot Tasks could leave. Lunch was moved up earlier to leave a full two and a half hours to discuss Task Planning.

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## **8 Agenda Items for Day 1, October 27, 2003**

### **8.1 Welcome and why the SEI is here**

The first topic on the agenda for day one was a welcoming message from SEI's facilitators and a welcome and brief talk on why the SEI was there by Col Jevsevar.

#### **8.1.1 Desired Outcomes**

Col Jevsevar wanted all of workshop participants to have a common understanding why the SEI was there and what the SEI was planning to do during the two-day workshop.

#### **8.1.2 Results**

Col Jevsevar presented a slide presentation to outline the purpose and the objectives of the workshop. In addition, he called for full participation from everyone and open communications

#### **8.1.3 Discussion**

See Appendix A for Col Jevsevar's slide presentation.

### **8.2 Agenda item "Introductions"**

The next topic was an introductions section.

#### **8.2.1 Desired Outcomes**

Each workshop participant had an opportunity to introduce themselves and state their "wants/offers."

## **8.2.2 Results**

The facilitators stated the roles and rules of the workshop. Participants introduced their name and their role in SSG or in the SEI. Then, each participant was given two, different colored, large-sized post-it notes. They were instructed to write their wants on one post-it and their offers on the other post-it. When they were done writing, they came to the front of the room and placed their wants on one of the easel pads and their offers on the other easel pad. The facilitators then read through all of the offers and lined them up against the workshop objectives. In general, the wants and offers provided were appropriate for the intended scope of the workshops.

## **8.2.3 Discussion**

See Appendix B for raw data collected from this section.

## **8.3 Agenda item “Review/Agree on workshop objectives” Summary**

Next on the agenda, participants reviewed/agreed upon the workshop’s objectives.

### **8.3.1 Desired Outcomes**

The desired outcome of this agenda topic was for all participants to come to agreement on the agenda and understanding of objectives.

### **8.3.2 Results**

Participants reviewed the workshop objectives and refined the agenda. Key points were captured on a flip chart.

### **8.3.3 Discussion**

The data collected from this agenda item is in Appendix J.

## **8.4 Gunter to provide review of SSG's strategic objectives**

Next, SSG provided a review of their strategic objectives.

### **8.4.1 Desired Outcomes**

All participants were to have a common understanding of SSG's objectives/plans.

### **8.4.2 Results Summary**

Rick Plaskett, from SSG, provided a slide presentation that reviewed all of SSG's strategic objectives. The result of this review and discussion was that the strategic priorities had not changed much since the plan was produced. This provided a stable basis for moving forward.

### **8.4.3 Discussion**

See Appendix C for Rick Plaskett's slide presentation.

## **8.5 Review SEI work plan/connect to SSG objectives**

The next topic on the agenda was a review of the SEI work plan and how it connected to SSG's strategic objectives.

### **8.5.1 Desired Outcomes**

The desired outcome from this section was a common understanding of how SEI's ideas map to SSG's objectives.

### **8.5.2 Results Summary**

Jan Vargas, SEI Tech Lead, gave a brief overview of the SEI work plan. Then, each SEI technology lead talked for 15 minutes on their particular technologies, as outlined below.

- Gian Wemyss: People Capability Maturity Model (P-CMM)
- Grady Campbell: Enterprise Architecture
- Dan Plakosh: Software Sustainment and Modernizing Legacy Systems

- Kristi Keeler: Capability Maturity Model – Integrated (CMMI)
- John Foreman: COTS-Based Systems

### **8.5.3 Discussion**

SEI Work Plan Version 1.40 is in Appendix D, and each SEI technology lead’s slide presentation is located in Appendix E through I.

## **8.6 Create map of SSG’s objectives/SEI connections**

Create map of SSG’s objectives/SEI connections.

### **8.6.1 Desired Outcomes**

Create a map of SEI technologies showing explicit connections to various SSG strategic objectives and the balanced scorecard. There were 21 SSG objectives. These objectives were grouped into three categories: customer focused, internal operations, and innovation and learning.

### **8.6.2 Results Summary**

A mapping exercise of SSG needs to SEI expertise was conducted. First, the SSG issues related to three strategic goal clusters were gathered. The goal clusters were as follows:

- Customer-focused
- Internal operations
- Innovation and learning

Then SEI subject matter experts mapped SEI technologies that could help solve the issue where feasible. The first three maps in Appendix K reflect this perspective. Then the maps were reversed, with SEI technologies at the center and the associated SSG issues highlighted. These maps were used together to support the prioritization activities of day two.

### **8.6.3 Discussion**

The Mind Map that was generated for this exercise can be found in Appendix K.

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## **9 Agenda Items, Day 2, October 28, 2003**

### **9.1 Review Day 1 work; revise as necessary**

The first topic on day two's agenda was a review of day one work.

#### **9.1.1 Desired Outcomes**

Participants were to reset on where we left off the previous day.

#### **9.1.2 Results Summary**

Workshop facilitators "walked the wall," reviewing day one results, and proposed day two's agenda. See Table 5 for the agenda used for day two.

### **9.2 Prioritize SEI work plan tasks**

The next agenda topic on day two was to prioritize SEI work plan tasks.

#### **9.2.1 Desired Outcomes**

The workshop participants put SEI's tasks in prioritized order.

#### **9.2.2 Results Summary**

A mapping exercise of SSG needs to SEI expertise was carried out. SSG attendees "dot voted" on the major three areas they thought were most important for SSG to follow in the near term. The top three tasks that were chosen were COTS systems support/integration, P-CMM, and Process Improvement.

## **9.3 Perform readiness/fit analysis for top 3 tasks**

The next item was to perform a readiness/fit analysis for the top three tasks.

### **9.3.1 Desired Outcomes**

The desired outcome for this item was to develop a risk list related to the top three SEI tasks and create a risk profile for each.

### **9.3.2 Results Summary**

This task was replaced by a task to elicit barriers and enablers for each of the top technologies. Readiness/fit analysis was deemed too detailed an approach for this workshop.

### **9.3.3 Discussion**

The raw data collected from the easel paper is part of the Appendix.

- COTS systems support/integration, Appendix L
- P-CMM, Appendix M
- Process Improvement, Appendix N

## **9.4 Engagement for pilots task planning**

Engagements for pilot task planning.

### **9.4.1 Desired Outcomes**

Interested SSG 2-letter organizations were identified as partners for each task and then individuals from these organizations volunteered to be the primary points of contact.



## 9.4.2 Results Summary

The following individuals are the primary points of contact:

- COTS systems support/integration – Steve Wright (EN)
- P-CMM – Lt Col Ingenloff (DP)
- Process Improvement – Tom Speakman (XPJ)

## 9.5 Close up main part of workshop

### 9.5.1 Desired Outcomes

Participants evaluated the meeting.

### 9.5.2 Results Summary

Facilitators asked the workshop participants if there was anything they liked about the workshop and is there anything that the SEI could improve upon. SSG attendees not directly involved in the pilot tasks could leave the workshop at this time.

In general, the reaction to the workshop was positive. Individual items for improvement were noted and will be incorporated into future technology adoption events as appropriate.

This table outlines what the workshop attendees liked about the workshop and what they would change about the workshop.

*Table 6: Workshop Report Summary – Pluses and Deltas*

<b>Pluses</b>	<b>Deltas (Changes)</b>
Validated issues we see in practice outside in our work	Explain purpose/better preparation ahead of time
In-process artifacts	Strategic vision was 50K, not 500 ft view
Got us thinking about things we need to do	How not to lose other important areas
	Clarify summation/traceability from possible final choices

## **9.6 Task planning**

The final agenda topic was task planning.

### **9.6.1 Desired Outcomes**

The SSG primary points of contact and the SEI technology leads met and discussed how they were going to carry out the top three tasks.

- COTS systems support/integration
- P-CMM
- Process Improvement

### **9.6.2 Results**

Each of the three groups met for approximately two and a half hours to discuss the goals, picture of success, success criteria, tasks for the next three months, and ties to the balanced scorecard clusters: innovation/learning, internal operations, and customer focus.

Section 10 contains the next steps agreed on for each task.

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# 10 Workshop Report Summary

## 10.1 Summary of Next Steps for SEI Tasks

### 10.1.1 COTS

The SEI is an acknowledged expert in the techniques and practices necessary to develop and evolved software systems which are based on/extensively utilize COTS products, as opposed to building systems completely from scratch. Using COTS products requires new or alternate processes and practices throughout the system life cycle, to include but not limited to business case evaluation, requirements definition, vendor and supplier relationships/management, architecture, product evaluation, risk management, and more. Using COTS products also requires ongoing tradeoffs be made among the system context (requirements, cost, schedule, business processes), the system's architecture/design, and the product marketplace.

### 10.1.2 People Capability Maturity Model (P-CMM)

The P-CMM framework helps organizations successfully address their critical people issues. Based on the best current practices in fields such as human resources, knowledge management, and organizational development, the People CMM guides organizations in improving their processes for managing and developing their workforces. As such, the SEI will work with SSG to deliver the following: P-CMM workshop, P-CMM Gap Analysis Findings and Recommendations Report, Action Planning workshop and resulting improvement plan, Improvement Teams workshop, P-CMM coaching and assistance.

### 10.1.3 Process Improvement

The SSG Software Engineering Process (SEP) document contains a well written set of processes that can facilitate the transition from the SW-CMM to the CMMI-SE/SW V1.1. The outcome from the Technology Adoption Planning Workshop indicates that CMMI adoption is an appropriate step for SSG.

The SEI will provide assistance in developing detailed SEP to CMMI-SE/SW V1.1 gap analysis, understanding and interpreting the CMMI reference model and in developing processes that are consistent with the practices contained therein.

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# Appendix A Presentation: *Col Jevsevar's HQ Standards Systems Group*

This appendix contains the presentation “Col Jevsevar’s HQ Standards Systems Group.” These slides, presented on Monday, October 27, 2003, outlined why we were attending the workshop, the purpose of the workshop, and expected outcomes.



## Why We're Here

- Late CY02 – Mr. Weber asked the SEI to perform an “enterprise assessment” of SSG
- SSG goal – Center of Excellence (CoE) for Air Force combat support information technology (IT) systems
- SEI provided SSG (out briefed Mr. Weber and many of you on 8 May 03) with initial, objective insights on core SSG processes/organizations that are critical to establishing the CoE



2

## The Workshop - Purpose

- Review (& validate) objectives & strategies in the SSG FY03-08 Strategic Plan
- Identify technologies that are important to the success of our transformation activities
- Dialogue on how the SEI is positioned to collaborate with us



3

## Expected Outcomes

- Prioritized list of technologies for implementation at SSG
- A risk profile that highlights adoption risks for SSG (top 3 technologies)
- Assignments of SSG implementation team, list of primary stakeholders and initial steps for implementing the technology (top 3 technologies)



4

and Most Importantly...

# Have fun!



5





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## Appendix B Wants and Offers

This appendix contains the list of the workshop “wants” and “offers” from the second item on the Monday, October 27 agenda presented in Table 4.

### Offers

- Technology adoption tools/techniques. Facilitation for workshop. (sg)
- Honesty, integrity, “can do” attitude. Vision for SSG workforce & business goals. (Ingeloff)
- Gap analysis/fit determination with regard to CMMI & other models. (klk)
- Contracting expertise. (wdm)
- Acquisition background. (tb)
- Strategic planning process skills. Understanding of metrics development. (rp)
- Background/skills in strategic planning & program evaluation. (ln)
- 26 years in IT solutions. I have a good understanding of user needs. (dw)
- Insight into how organizations can unify business & technology views of their organizational mission. (ghc)
- Facilitate communication. (jmv)
- An integrated view of SEI technologies & a promise to adapt & tailor as needed. (jtf)
- Offer financial expertise and outcomes obtained and processes reviewed during transformation initiatives. (tcp)
- Knowledge of DoD modernization plans.
- I will guarantee that the SSG needs are met through close internal SEI collaboration. (lm)
- Insight to customer concerns & perceptions about SSG. Insight to the role/concerns of SSG’s enlisted personnel.
- Robust legal advice to enhance mission and achieve SSG vision. (jeh)
- CM experience. (jhh)
- Personal experience with process implementation.
- Experience with P-CMM. Lessons learned from other organizations using PCMM, CMMI. Facilitation skills. (rgw)

- Creative thinking.
- Sense of humor. Acquisition & engineering experience. (vgj)
- Central point for all SSG business processes. (hs)

## Wants

- Workshop results that support a productive relationship w/SSG. (suz)
- True strategic vision – capture essence of what each 2-ltr shall play...all in synch w/SSG's future, corporate goals. (pi)
- Meaningful, short strat plan which can be communicated easily to every person in SSG. Limited metrics. (tb)
- Understanding of what s new technology is so that a roadmap for execution can be built. (wdm)
- A prioritized list of SSG's strategic objectives tied to specific tasks in the SEI workplan (by end of workshop). (ln)
- SSG 2-ltr buy-in of technology priorities. SSG strategic plan. (vgj)
- Result – clear understanding of what the next steps are. (jmv)
- Insight into how SSG can transform itself into a software center of excellence. (jha)
- Everything we say we are going to do has a measurable method of determining success (or not). (rp)
- Co-workers thoughts on how to maximize support to our customers worldwide. (ldw)
- Understand SSG business objectives & alignment/appropriateness fit of models & technology. (klk)
- A productive workshop that helps clarify our strategic objectives. (jhl)
- Enhance SSG's ability to become the IT center of excellence for the war fighter. (jeh)
- Understand SSG status, goals & needs for improvement. (ghc)
- Feedback from other SSG 2-ltrs on objectives/CMM, etc.
- Want to achieve an understanding of measurements we can use to gauge the success of transformation. (tcp)
- Results that helps transformation bring new business process into SEPG. (hs)
- Understand SSG's strategic objectives and the people issues (knowledge, skills, abilities) associated with these objectives. (rgw)
- To see a clear strategic plan that parallels the transformation activities within the organization, as well as meeting the AF's IT needs.

- Agreement on at least one, but ideally three strategic objectives that we will jointly achieve together in 1-2 years.
- To ensure I have a clear understanding of the planned work activities for the SSG customer. (lm)
- Better understanding of how to mix technology advances into legacy sustainment.
- Some ideas about what not to measure as we adopt balanced scorecards. (jc)
- Ideas for ways to assess that SSG is “in the loop” on new technologies. (jc)
- Clearer vision of how to transition ST to better support the SSG strategic goals. (jc)
- Successful workshop in that a “roadmap” for upcoming work is defined & we can proceed to more details & implementation. (jtf)



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## Appendix C: Issues and Comments

These issues and comments were generated during the workshop on Monday, October 27, 2003.

### Spiral acquisition strategies

- Adding increments adds other overhead (e.g. AFCA) that is outside control of SSG

### Develop technical expertise

- Place to add “portal skills” explicitly

### CMMI Level 3

- How do people get refreshed

### GCSS –AF compliance

- Update to include current ESC architecture requirements

### SEP

- Perception of SEP as “obstacle” wider spread than it should be based on results achieved with SEP

### ID right mix of skills

- Remove overhires
- Merge this slide w/other 2 BSC slides related to skills

### Missing?

- Charge back of DP/other staff ?? to 2-letters
  - How/when?
  - Where does it fit?



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## Appendix D: SSG's Strategic Objectives

The following PowerPoint slides, presented by Rick Plaskett on October 27, 2003, outline the objectives for SSG.





## Be Easy To Do Business With

### BSC

- Availability and accessibility
- Reliably consistent with policy and procedures
- Internal and external business processes
  - Simple
  - Relatively quick to complete
- Customers and suppliers get quick answers to their queries



## Create True Partnerships

### BSC

- Customers feel they are clearly understood with respect to requirements
- Industry providers are involved, respected contributors to the mission
- All partners understand the operational environment where products are used
  - Context is vitally important
  - Delivery of capability to increase effect is desired solution





## Better Control Processes

### BSC

- Make SEP a working tool that enables rather than encumbers progress
- Create credible spiral acquisition strategies
  - Program specific
  - Rapidly field capabilities
- Involve both industry and internal workers in the same processes
  - Use ProForma as mapping tool



## Enhance Program Management Skills Base

### BSC

- Match appropriate acquisition skill level with each APDP position
  - Assure each acquisition job is properly coded
  - Assure adequate training and experience for each person filling these jobs
- Create a skills development HR plan
- Target specific skills to mitigate risk, assure completion to user need



## Develop Appropriate Skills

### BSC

- Identify specific skills necessary to perform each job at SSG
- Build a list of prerequisite training, experience, skill levels to match each job
  - Some skills may be acquired OTJ
  - Breadth and depth considered as a function of position
- Have specific human capital plan to execute training to attain skills needed
  - Preplanning a necessity
  - Completion of training just in time to need



## Improve Cost Estimating

### BSC

- Create and maintain a bank of accurate historical PM documentation
  - Scope and complexity estimates
  - Earned value measurements
- Apply any algorithms and formulas that better approximate work under study
- Centralize costing to a shop of experts
- Use industry models for comparisons



## Develop Our Technical Expertise

### BSC

- Grow web-based architecture and integration skills
- Identify current and future needed technical knowledge, skills and abilities
  - Use strategic plan as guide
  - Monitor such agencies as Gartner Group
- Develop a plan to grow, retrain, acquire, or buy the forecast skills needed
- Invest in “smart” organic workers through seminars, additional training, etc.



## Fully Develop Requirements Management Process

### BSC

- Use DOORS as basis for requirements management
- Place rigor in requirements identification through program lifecycle
- Develop specific formalized methods for inserting and tracking requirements
- Institutionalize requirements management across programs



## Improve Customer-focused Culture

### BSC

- Institutionalize customer contact as a part of program management
  - Regular feedback sessions
  - Program reviews
  - Reach-out programs (e.g. Chiefs' visits)
- Train SSG members in customer service
  - Assure any "contact" persons get high priority in customer training
  - Distinguish between users and paying customers



## Align SSG Members to Mission

### BSC

- Grow internal awareness of SSG capabilities and ongoing programs or projects
  - Director's Calls regularly
  - Quarterly newsletters
- Emphasize part each person has to play in adding value to SSG products or services
- Instill and reinforce a sense of Air Force Core Values
  - Republish and discuss SSG Core Values



## Deliver Integrated Solutions

### BSC

- Define and implement integration standards
  - Follow lead of AF-CIO
  - Develop Air Force Enterprise Solutions
- We must deliver the goods
  - On time
  - On cost
  - With full capability as required
- Improve communication to obtain buy-in to integration initiatives and workload



## Institutionalize Knowledge Management

### BSC SP

- Clarify the type of information to be shared throughout the organization
- Inform 2Ltrs and provide them with guidance for making inputs to SSG Knowledge Bank
- Involve the SSG Historian (SSG/HO) as a repository and keeper of resources and data
- Receive inputs from 2Ltrs. Review and post on SSG Knowledge Bank Web Page
- Review other sources of information
- Send reminders about the SSG Knowledge Bank to 2Ltrs every quarter



## Define and Implement Functional and Technical Standards

### BSC

Build the standards into the process, into product for:

- Security
- Integration and Interoperability
- Flexibility to add capability
- Functionality across domains
- Adaptability to platforms, systems, etc.
- Configuration Management across AF



## Achieve GCSS-AF Compliance for SSG Managed Systems

### SP

- Acquire standard architecture tools for migrating onto framework
- Establish common data sets and storage for integrated systems
- Apply XML/SOAP to all applicable managed systems



## Achieve SEI Integrated Capability Maturity Model (CMMI) Level 3

### SP

- Develop systems engineering processes that transform customer needs, expectations, and constraints into product solutions
- Install and institutionalize those processes throughout the organization
- Train organizational personnel on the use of the standard systems engineering processes
- Measure the effectiveness of the organizational standard processes



## Ensure adequacy and modernization of facilities, infrastructure, equipment, and tools

### SP

- Ensure the maintenance, repair, and upkeep of all SSG facility systems in accordance with established standards
- Determine SSG long-range facility maintenance requirements
- Stay abreast of all AF and DoD guidance and instructions pertaining to CE project programming, funding, and implementation
- Track the condition, age, and mission viability of all SSG facilities



## Provide network and communications systems to stay current with technology and organizational requirements

SP

- Acquire/upgrade network backbone hardware
- Expand the SSG LAN Secret Internet Routed Protocol Network (SIPRNET) architecture
- Replace the current 5-year old enterprise network backup system
- Improve of current IPTV system (VBRICK )
- Standardizing PC software throughout SSG
- Acquire an Enterprise Management Document System
- Stand up a 30 terabyte (backup inclusive) Storage Area Network



## Identify the right mix of skills needed at SSG to meet all the requirements of customers and stakeholders

SP

- Annually adjust and resolve skills mix to match any changes in work type or skills forecast for future
- Annually revise the Organizational Training Plan
- Adjust SSG's manpower document(s) to reflect any changes in specialty codes or skill levels
- Coordinate with AFPC to assure requirements are in place
- Hold appropriate Workforce Management Board (WMB) meetings
- Fill our needs using such tools as overhires, superior qualifications, hiring bonuses, etc.





## Provide appropriate training to assure members are technologically current and fully qualified in their positions

SP

- Perform regular audits of 2-letters for Individual Development Plan completion and currency
- Review SSG's Course Catalog for redundancy, overlap, or gaps (by comparing to the SSG Organizational Training Plan (OTP))
- Institute a process such that IDPs drive the content of the OTP
- Manage any changes in requirements by allowing continuous input into workers' IDPs
- Retrain any persons who only possess skills no longer needed at SSG



## Reduce Development Process Cycle Times

SP

- Create efficiencies by combining test functions
- Accomplish sub-processes in parallel rather than serial wherever possible
- Streamline the C4ISP and C&A processes into incremental blocks, performed locally
- Use optimized, standardized automated tools



## Integrate crosscutting improvements and upgrades

SP

- Establish a baseline of current “crosscutting” improvements
- Advocate cross-programmatic resource allocation
- Monitor performance schedules, costs; forecasting new cross-cutting events
- Deliver latest technology in a timely manner and within reasonable costs
- Advocate maximum usage of integrating tools such as XML, Metadata, and common toolsets

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# Appendix E: SEI Work Plan

This work plan was distributed at the workshop on October 27,2003.



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## FISCAL YEAR 2003-04 WORK PLAN

FOR THE

Standard Systems Group (SSG)

PWS 4-198

Version 1.40

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Howard Stubblefield  
Standard Systems Group/XP

---

Date

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Thomas C. Brandt  
Program Integration Directorate  
Software Engineering Institute

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Date

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John Foreman  
Air Force Chief Engineer  
Acquisition Support Program  
Software Engineering Institute

---

Date

# WORK PLAN CHANGE LOG

This section contains a history of changes made to the Work Plan.

Ver #	Description of Change	Date
1.0	Initial draft FY03 work plan	4/15/03
1.1	Incorporated changes from jtf, cpg, rcs, and Ken Heitkamp	5/6/03
1.2	Changed signatory to Howard Stubblefield, revised task 2.2 (Technology Adoption Planning Workshop), revised task 2.8 (COTS-Based Systems), added task 2.9 (Enterprise Architecture), revised the cost estimates to reflect FY04 overhead rates	6/17/03
1.35	<ul style="list-style-type: none"> <li>• Formatting changes in the task table.</li> <li>• Edits to most of the task descriptions.</li> <li>• Rewrote 2.5</li> </ul>	30 July 03
1.38	<ul style="list-style-type: none"> <li>• Changed Tech lead, changed account exec.</li> <li>• Changed Account exec title to "Business Manager".</li> <li>• Added background section (section 2) to explain the project history – all section #s 2 and higher are now 3 and higher</li> </ul>	
1.40	<ul style="list-style-type: none"> <li>• Miscellaneous layout and formatting changes</li> <li>• Added Executive CMMI intro course to the CMMI section</li> <li>• Incorporated results of the Sept 03 TIM w/Gunter people</li> </ul>	Oct 03

**The information listed below must be completed:**

**Name of Organization:** Standard Systems Group

**Point of Contact:** Howard Stubblefield

**Street Address:** 490 E. Moore Drive  
Bldg 892

**City, State, Zip Code:** Maxwell AFB-Gunter Annex,  
AL 36114

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**PWS 4-198**  
**STANDARD SYSTEMS GROUP**  
**WORK PLAN**  
**VERSION 1.40**  
**CDRL A002**

Customer: Standard Systems Group  
Maxwell AFB-Gunter Annex, AL 36114

SEI Business Manager: Lisa Masciantonio

SEI Technical Lead: Jan Vargas

SEI Chief Engineer: John Foreman

Period of Performance: 20 Sep 03 through 30 Sep 04

## **Introduction**

This Work Plan outlines the work that members of the Software Engineering Institute (SEI) will perform under PWS 4-198 for the Standard Systems Group (SSG) during the period 20 Sep 03 through 30 Sep 04.

The intent of the SEI support detailed in this Work Plan is to:

- help SSG understand and use pertinent software engineering technologies and processes;
- assist SSG to improve its software acquisition practices; and
- assist SSG in various transformation efforts.

This Work Plan may be revised to reflect new agreements between the SSG and the SEI. Changes to this Work Plan will require the approval of the authorized persons from the SSG and the SEI and will be documented in the Work Plan Change Log on page 2.

Additional background information can be found in PWS 4-198.

## **Background**

In late CY02, the SEI was asked by the new SSG director, Mr. Frank Weber, to perform an "enterprise assessment" of SSG. SSG's goal is to establish itself as a Center of Excellence (CoE) for Air Force combat support Information technology (IT) systems. Given that goal, SSG asked the SEI to provide initial, objective insights on core SSG processes/organizations that are critical to establishing this CoE, to include:

- roles/relationships between the Program Offices and Software Factory;
- Skills mix required to support future AF IT environment, to include best balance of blue suit vs. government civilian vs. contractors considering legacy system requirements, modernization/technology evolution and training requirements/capabilities;
- Core competencies to promote an integrated combat support system domain; and
- Basic organizational strategies.

Initial work culminated in a 17 Jan 03 briefing, which addressed areas of Apparent Strength and Areas of Apparent Concern toward the accomplishment of this goal.

Further investigation to include interviews and discussions with various Air Force leaders resulted in a more detailed presentation and a closeout of the “discovery phase” on 8 May 03.

The tasking in this work plan is the direct result of the aforementioned assessment out briefs and ongoing discussion/direction from SSG leadership and is meant to be consistent with Mr. Weber’s stated goals:

- Make SSG Easy to do business with . . . as deemed by our customers!
- Streamlined organization with agile processes;
- Recognized expertise in exploring and exploiting leading IT technologies;
- Enterprise-wide perspective.

## **Tasking**

### **Project Management**

The SEI shall coordinate the planning, implementation, and delivery of the support defined in this Work Plan. The SEI will:

- provide on-going customer interface, coordination, planning and support to ensure services and products are satisfactorily delivered;
- provide experienced SEI members of the technical staff to support the SSG;
- present status and progress briefings/reports to both the SEI and the SSG; and
- track deliverables and progress against plans, and track the expenditure of funds against schedules, milestones, and deliverables.

Refer to section 4 of the PWS for project management reporting deliverables.

Sections 3.2 through 3.10 define suggested tasking for this work plan. These tasks address technology adoption planning, workforce management, techniques for improving sustainment of existing systems, modernizing legacy systems, portfolio management, CMMI adoption planning, COTS-based systems, and enterprise architecture.

### **Technology Adoption Planning Workshop**

The workshop is specifically focused on producing a working plan for incorporating technologies in the SEI work plan into the SSG transformation activities. The workshop will begin by reviewing the objectives and achievement strategies in the SSG FY03-08 Strategic Plan (Aug 22, 2002) to validate that they are still relevant in the context of recent organizational changes and priority changes. Working with the SSG leadership team, the SEI will collaborate in planning and prioritizing the adoption of the technologies proposed in this FY03-04 work plan. These will be explicitly connected to the SSG strategic objectives in order to provide maximum benefit to SSG in achieving said objectives.

The SEI will work with SSG prior to the workshop to establish the agenda and identify appropriate participants. Attendees at the workshop should include the Executive Director of SSG, his direct reports, and staff members who will be responsible for implementing, monitoring, and controlling the transformation effort.

Deliverable: An output of the workshop will be a prioritized list of SSG’s strategic objectives tied to specific tasks in this SEI work plan. In addition to creating the prioritized list of tasks, sequencing (i.e., education/training, consulting, etc.) of the subtasks will be discussed and documented.

### **People Capability Maturity Model (P-CMM) Gap Analysis and Improvement Plan**

One of the findings from the Enterprise Assessment was that in order for SSG to meet its transformation goals, SSG will need to fill certain skills, abilities, and knowledge gaps in their workforce. Assuming that the Technology Adoption Planning Workshop (section 3.2) confirms the aforementioned need as a priority, SEI recommends launching this effort with a P-CMM gap analysis of SSG's people management capability. The P-CMM gap analysis will involve structured interviews by SEI with SSG process owners (from DP, work environment (facilities) management, security, safety, and IT), managers, and representatives of the workforce. At a workshop, the findings from these interviews will be analyzed and synthesized into recommendations for improvement in the form of an improvement plan. The output of the workshop will show how SSG's processes for workforce management are structured to meet the mission (these are opportunities for leverage) and where the gaps are that could be inhibiting factors in the transformation.

Workshop attendees should include leadership from DP, technical staff, and middle management. SEI will work with SSG to identify these individuals. Also, SEI will require the participation of 2-3 SSG personnel and a member of the DP organization for approximately one week, full time, to contribute to the gap analysis activities and the development of the recommendations and improvement plan. SEI will work with SSG to identify appropriate personnel.

Deliverable: P-CMM Gap Analysis findings, Workshop, Improvement plan

## **Software Sustainment - Measured Improvement of Sustainment Processes**

Most systems that are SSG's responsibility are in the sustainment phase. This task will define and apply sustainability measures to sustainment projects at SSG, identify and measure causal factors that can be correlated to sustainability measures, and implement/transition a process of metrics-based continuous sustainment process improvement to SSG.

The SEI is currently developing processes and technical practices that focus on improving the performance of sustainment activities. In order to pilot and transition these techniques, an SEI team will perform two sustainability assessments with SSG observers. The output from these assessments will be a sustainability profile consisting of an annotated set of Excel reports. The SEI will then develop training materials and train up to 10 sustainment assessors on-site at SSG. The SEI will accompany an SSG assessment team during the first SSG-lead sustainability assessment.

Deliverable: Sustainability profile reports, On-site training, Coaching/evaluation during SSG assessment

## **Modernizing Legacy Systems**

A growing need in the emerging Air Force IT environment will be to evolve and modernize legacy systems to incorporate new technologies, function in Web-based environments, achieve horizontal integration and interoperability, and consolidate into Common applications and processes across AF/DoD. The SEI has developed processes and technical practices that focus on system modernization and evolution as well as building new systems using advanced technologies such as commercial components.

This task will enhance and grow SSG's skill sets in modernization, web-based technologies, interoperability, design and architectural alternatives, etc. The SEI will provide training in both Modernizing Legacy Systems and Building Systems from Commercial Components on-site at SSG. The SEI will provide direct support and consultation for design and architecture reviews for two selected programs, which focus on major modernization efforts and new Java-based developments. To transition these techniques to SSG personnel, and stimulate a

culture of continuous growth and improvement, the SEI will assist/coach an SSG team as it performs a design/architecture review for a legacy system modernization.

Deliverable: On-site training, direct support and consultation for design and architecture reviews, coaching during SSG review

## **Portfolio Management and Integration**

Portfolio management refers to a process/activity that establishes measures of technical quality and business value for the set of systems under SSG control and then evaluates the set against the measures. Business value measures the number and criticality of the business goals supported and the degree to which these goals represent core competencies of the business. Technical quality measures vary based upon business requirements but may include sustainability, evolvability, usability, performance, availability, security and other system qualities.

This task will establish criteria for measures of technical quality and business value. Then, beginning with a list of key SSG systems, this task will determine appropriate evolution/migration strategies for each (to include evolution towards the GCSS AF Integration Framework (GCSS-AF IF) and work with SSG management to prioritize and assign appropriate resources to these efforts.

Deliverable: Systems evolution assessment, High-level plan for system evolution

Changes still to be made to 3.6 to more clearly indicate how the measures of technical quality and business value get established. And how are they used to determine appropriate evolution/migration strategies.

## **CMMI Adoption and Implementation Planning**

In 3Q02, an SSG-requested assessment of SSG's Systems Engineering Process (SEP) was conducted. The assessment compared the existing SEP to the CMMI-SE/SW V1.1. The majority of the gaps in coverage that were found resulted from the SEP being Software and SW-CMM oriented. The SEP contains a well written set of processes that can facilitate the transition from the SW-CMM to the CMMI SE/SW V1.1.

If the outcome from Task 3.2 (Technology Adoption Planning Workshop) indicates that CMMI adoption is an appropriate step for SSG, then the SEI can provide assistance in understanding and interpreting the CMMI reference model and in developing processes that are consistent with the practices contained therein. In order to move forward in this area, the SEI will present the Executive CMMI intro course and utilize findings from an Adoption Readiness and Fit Analysis to assess SSG's readiness for adopting and implementing each of the identified CMMI practices and the potential risks associated with each practice. These findings will then be used to build an Improvement Plan, which will lay out specific steps to mitigate high risk areas, and describe steps for implementing the CMMI practices for which SSG is ready.

Deliverable: Executive CMMI intro course, Readiness and Fit Analysis, Improvement Plan for implementing CMMI practices.

## **COTS-Based Systems**

The SEI is an acknowledged expert in the techniques and practices necessary to develop and evolve software systems which are based on/extensively utilize COTS products, as opposed to building systems completely from scratch. Using COTS products requires new or alternate processes and practices throughout the system life cycle, to include but not limited to business case evaluation, requirements definition, vendor and supplier relationships/management, architecture, product evaluation, risk management, and more. Using COTS products also requires ongoing tradeoffs be made among the system context



(requirements, cost, schedule, business processes), the system's architecture/design, and the product marketplace.

The SEI will provide SSG with training and workshops addressing the various key aspects of using COTS products, and transition new risk management, and life cycle management processes. The SEI will also provide consulting in technology insertion and adoption, especially in the context of proper approaches/processes for using Enterprise Resource Planning (ERP) systems.

Deliverable: Training and workshops, Consulting, White paper on ERP.

## **Enterprise Architecture**

The SEI will work with SSG to develop an enterprise architecture that covers business architecture, data architecture, application architecture, and IT architecture to produce a set of guidelines on how to define system architectures. This enterprise architecture will support C4ISP support plan requirements, be implemented using C4ISR architectural views implemented in the Unified Modeling Language (UML), and incorporate the technical constraints of the GCSS AF Integration Framework (GCSS-AF IF). The enterprise architecture will initially be focused on a set or subset of Air Force information systems to be identified by SSG management.

Deliverable: TBD

## **Standard SEI Products and Services**

This task provides SSG with the normal delivery of standard SEI products and services (i.e., courses, workshops, tutorials, publications, and events). This tasking will be used/negotiated if such a need arises during the period of this work plan. Reporting of any activity under this task will be documented in the Annual Summary Report.

## **Technical Assistance and Guidance**

This task provides SSG with technical assistance and guidance related to the SEI initiatives and expertise. This work plan includes the flexibility to accommodate any unforeseen support requirements requested by the customer within the defined scope and in accordance with the SEI mission and initiatives. Tasking, deliverables, cost, and schedule for all involved parties will be mutually agreed upon and documented in advance of task execution. Reporting of supported services will be included in the Annual Summary Report.

## **Knowledge Integration and Transfer**

The SEI will capture knowledge from this engagement, integrate it with lessons learned from other similar work, and help transfer that knowledge for the betterment of the software/systems engineering and acquisition community. This may include but is not limited to, briefings, technical reports, articles, advocacy, and participation in building an acquisition community of practice.

Deliverable: Lessons learned report

# Task Summary

<b>TASK SUMMARY</b> <b>SSG - PWS 4 - 198</b> <b>20 SEP 03 THROUGH 30 SEP 04</b>				
<b>TASK No.</b>	<b>TASK DESCRIPTION</b>	<b>DELIVERABLE(S)</b>	<b>ESTIMATED DELIVERY DATE(S)</b>	<b>ESTIMATED COST</b>
3.1	Project Management	Management and Technical Reports	Various per PWS #4-198	\$78,100
3.2	Technology Adoption Planning Workshop	Technology adoption plan	Anytime after the work plan is signed (& depending on availability of key SSG personnel)	\$58,400
3.3	P-CMM Gap Analysis and Improvement Plan	Gap analysis findings Workshop Improvement plan	TBD	\$48,700
3.4	Software Sustainment	Sustainability profile reports  On-site training  Coaching/evaluation during SSG assessment	TBD (1 month and 3 months after task start date )  TBD (5 months after task start date)  TBD (6 months after task start date)	\$67,000
3.5	Modernizing Legacy Systems	On-site training  Techniques, guidance in and direct support for architecture and design reviews  Coaching/evaluation during SSG review	TBD (3 months after task start date)  As needed  TBD	\$75,000
3.6	Portfolio Management and Integration	Systems evolution assessment  High-level plan for system evolution	As needed  As needed	\$15,500
3.7	CMMI Adoption Planning	Executive CMMI intro course Readiness and Fit findings Improvement plan	TBD	\$38,600
3.8	COTS-Based Systems	Training and workshops	TBD	\$75,000

<b>TASK SUMMARY</b> <b>SSG-PWS 4-198</b> <b>20 SEP 03 THROUGH 30 SEP 04</b>				
TASK No.	TASK DESCRIPTION	DELIVERABLE(S)	ESTIMATED DELIVERY DATE(S)	ESTIMATED COST
		Consulting	TBD	
		White paper on ERP	TBD	
3.9	Enterprise Architecture (EA)	EA description to include: <ul style="list-style-type: none"> <li>• briefings</li> <li>• technical report</li> <li>• UML Models</li> </ul>	TBD	\$100,000
3.10	Standard SEI Products and Services	TBD	TBD	TBD
3.11	Technical Assistance and Guidance	TBD	TBD	TBD
3.12	Knowledge Integration and Transfer	Lessons learned report	TBD	\$25,000
			<b>Total Estimated Cost</b>	<b>\$581,300</b>
			<b>Funding provided (end Sept 03)</b>	<b>\$350,000</b>
			<b>Remaining</b>	<b>\$183,400</b>

**Note:** Estimated costs listed above include staff and travel costs. Costs are estimates only. The actual cost will depend on the actual staff resources that are used and travel that is completed. Only actual resources expended, plus actual travel costs will be charged. The estimated delivery dates listed above assume the availability of the needed participants from SSG and a Work Plan start date of no later than 20 Sep 03. Adjustments may be required, based on actual start date and mutual availability of SSG and SEI staff.



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# Appendix F: People Capability Maturity Model (P-CMM)

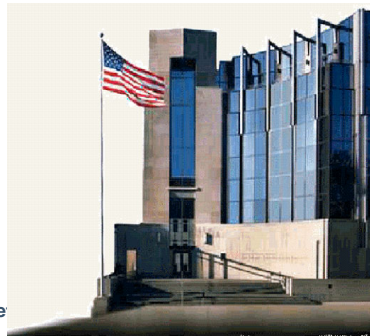
Gian Wemyss gave the following PowerPoint presentation at the workshop on October 27, 2003.



## People Capability Maturity Model<sup>®</sup> (People CMM<sup>®</sup>) version 2

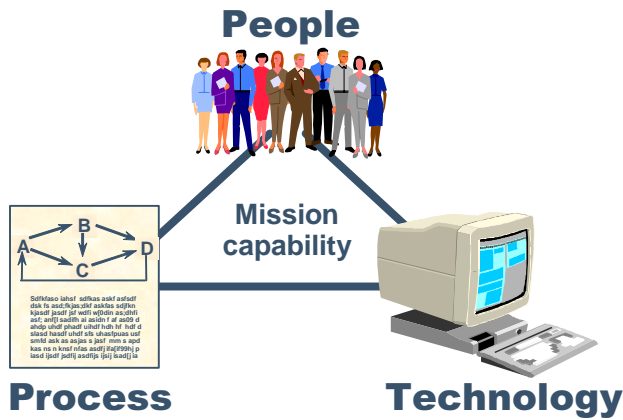
**Gian Wemyss**  
Senior Member of the  
Technical Staff  
Capability Maturity Model Team

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page 1

## Improving Organizations



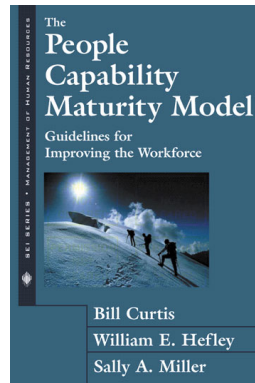
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page 2

## What Is the People CMM ?

An organizational change roadmap based on state-of-the-art workforce practices to help organizations:

- Develop the workforce required to execute organization strategy
- Characterize maturity of workforce practices
- Set priorities for improving workforce capability
- Integrate improvements in process and workforce
- originally developed with support from the U.S. Army and the Office of the Secretary of Defense



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Curtis, Hefley, & Miller (2001)

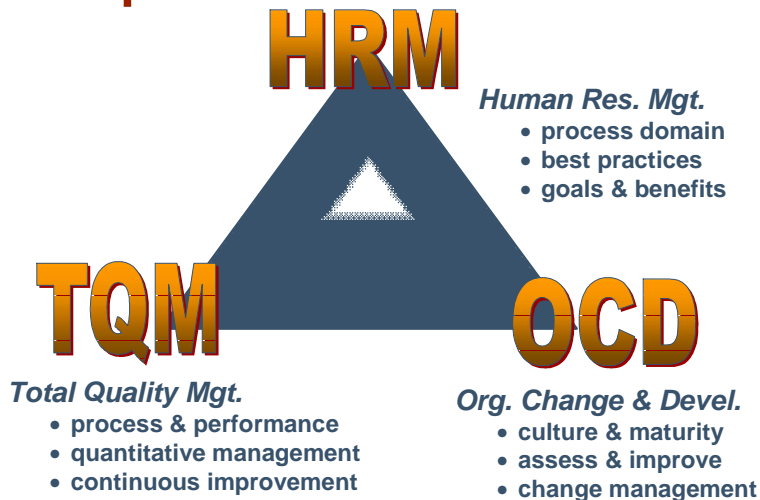
page 3

## Founding Advisory Board

Miriam Browning  
Ed Cotter  
Barry Frew  
Paul Garber  
Paul Gehrman  
Glenn Gienko  
Marlene Griffin-Bunnell  
Watts Humphrey  
James Jackson  
Cindy Kendall  
Belkis Loeng-Hong  
Sally Mathews  
Jeff McHenry  
Ron Radice  
Roger Sobkowiak  
Ed Thompson

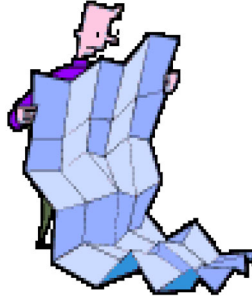
U.S. Army  
Digital Equipment Corporation  
Naval Postgraduate School  
Citicorp  
International Business Machines  
Motorola  
Eli Lilly & Co.  
Software Engineering Institute  
Texas Instruments  
Office of the Secretary of Defense  
Defense Information Systems Agency  
General Services Administration  
Microsoft  
Software Technology Transition  
Software People Concepts  
Advanced Research Projects Agency

## People CMM Foundations



## People CMM-Based Improvement

- Improvement in Workforce Capability
- The model helps us understand “what” to do.
- “How” is up to the organization.
- The model is a roadmap.



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page 6

## Why Adopt People CMM?

- 1) Become ‘Employer of Choice’
- 2) Enhance organization performance
- 3) Manage:
  - intellectual assets
  - knowledge capital
- 4) Measure HR’s contribution to the business
  - provides common measurement framework
  - allows benchmarking against best practices

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page 7



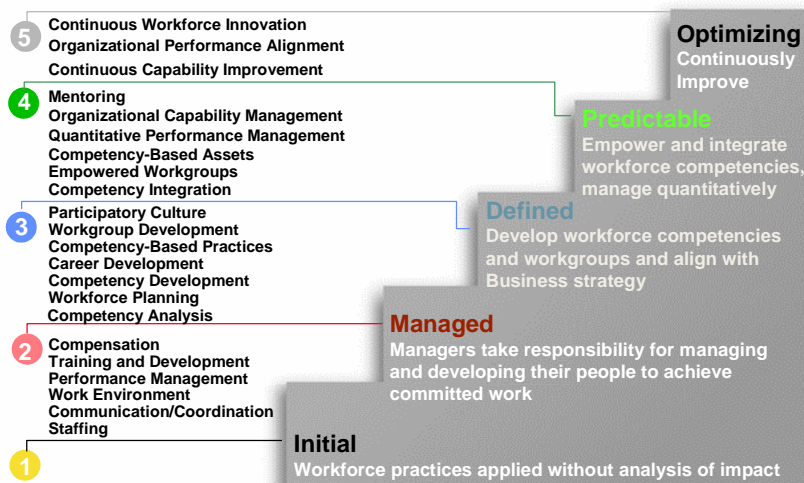
## Why People CMM for SSG?

- Enhance Project Management Skills Base.
- Develop Your Technical Expertise.
- Communication and Coordination of the SSG strategic plan.
- Mitigate the loss of institutional knowledge (employees eligible for retirement, opportunities from other organizations, outplacement).
- Understand what investment to make in “smart” organic workers.
- Establish a Culture of Human Capital Management.

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page 8

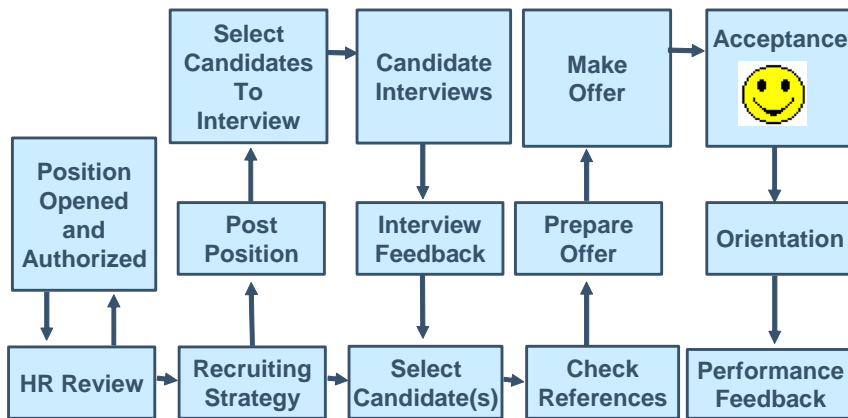
## People CMM<sup>®</sup> Architecture



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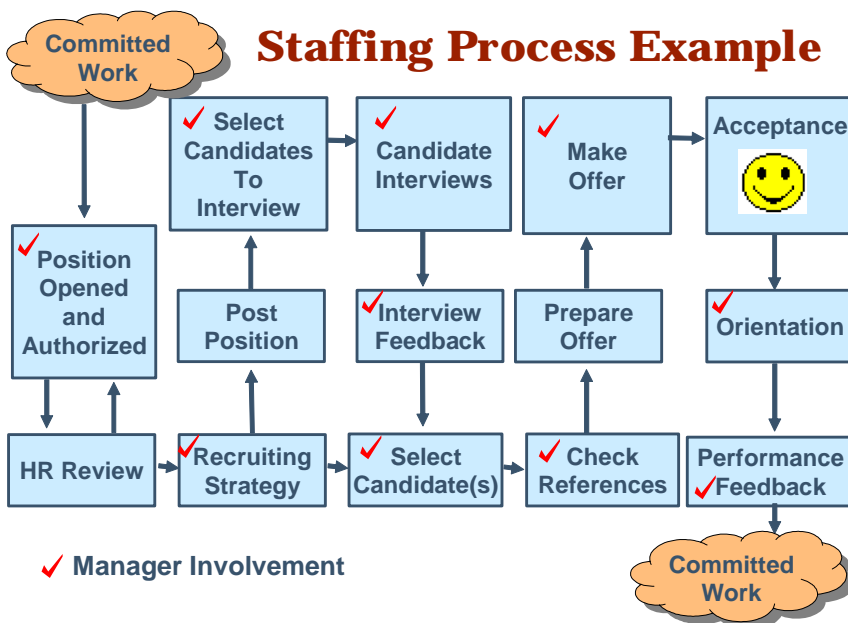
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## Staffing Process Example



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page 10



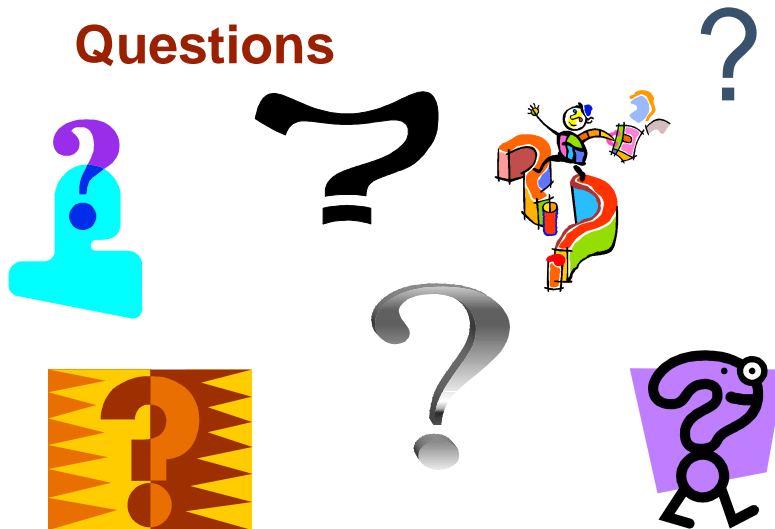
## All the solutions have to fit



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page 12

## Questions



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page 13



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# Appendix G: Enterprise Architecture

Grady Campbell gave the following PowerPoint presentation on October 27, 2003.



## Enterprise Architecture

Grady Campbell  
(Robert Seacord)

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page 1

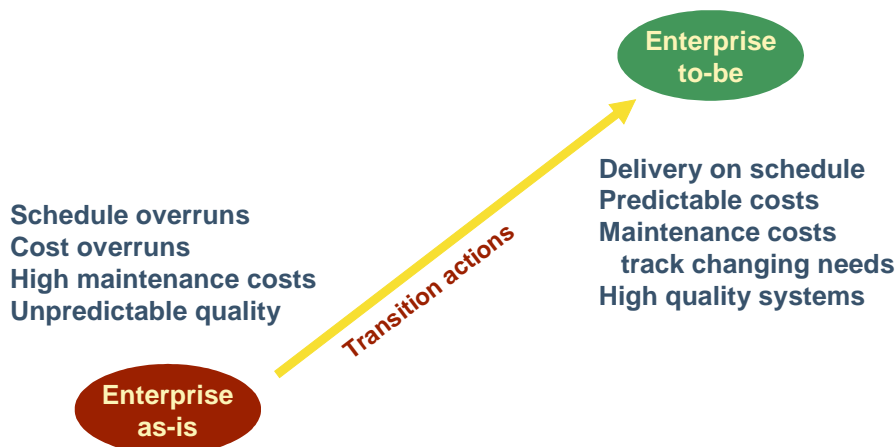
## Enterprise Architecture

A coherent view of the mission and capabilities of an enterprise and an integrated business/technology strategy for achieving the organization's goals

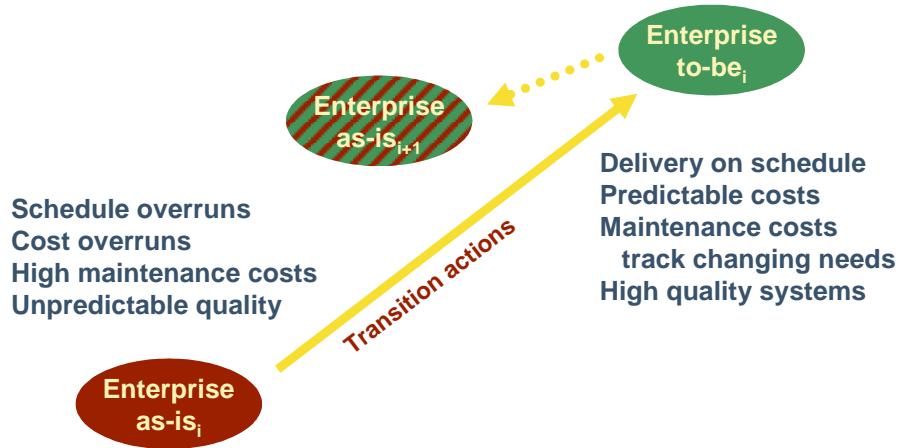
The set of rules that guide all system development, modernization, and system integration efforts, aligned with enterprise strategic business goals.

- Description of supported business processes
- Description of common services
- Description of legacy migration path
- Prescribed technologies and usage guidelines
- Guidelines for development of system architectures
- Patterns (blueprints) for implementation of applications that use the common services and prescribed technologies

## A Simplified Model of Enterprise Architecture



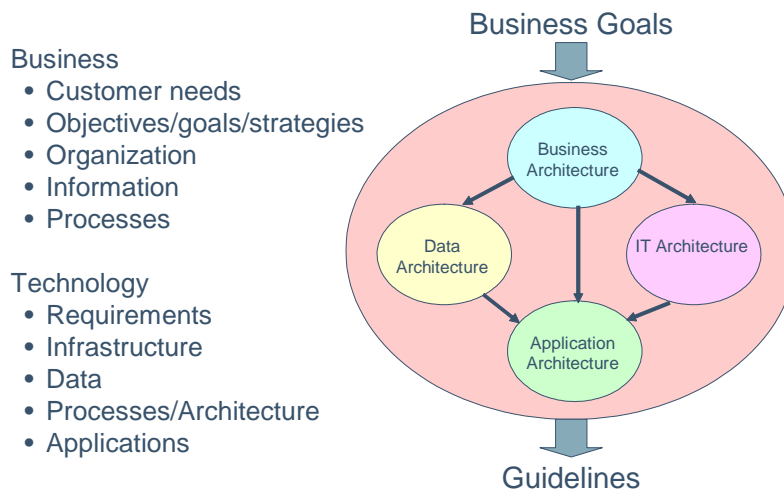
## Realistic Model for Enterprise Architecture



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## Enterprise Architecture Elements



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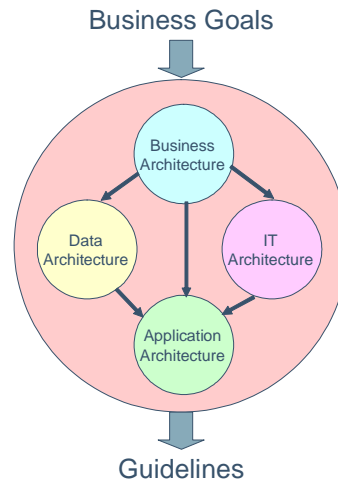
page 5

## Business Architecture

Business goals and core competencies

Business processes

Organizational structure



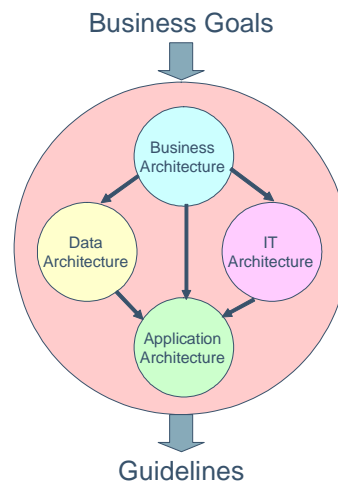
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## Data Architecture

Enterprise business information/data needs, supported by:

- Database distribution
- Data mining
- Data protocols for integration and exchange
- Data integrity and security
- Data usage
- Data migration (optional)



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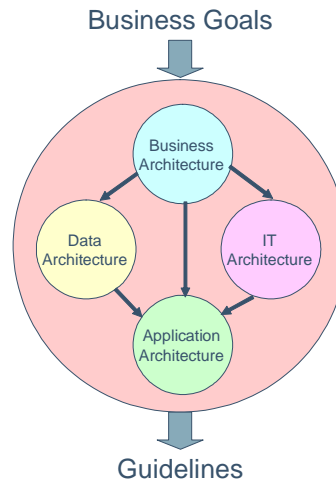
page 7



## Information Technology Architecture

Hardware and software, the technological base for the enterprise (e.g., GCSS-AF)

- Server configurations
- Client configurations
- Network configuration
- Middleware
- Devices (storage, printing, etc.)
- Development environments

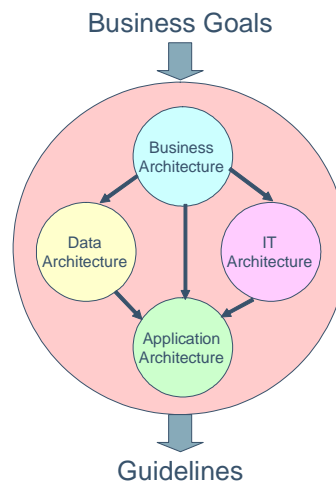


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page 8

## Application Architecture

Blueprints for the construction of applications, based on the IT technologies and business data to support business processes.



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page 9



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# Appendix H: Software Sustainment and Modernizing Legacy Systems

Dan Plakosh gave the following PowerPoint presentation on October 27, 2003.



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Pittsburgh, PA 15213-3890

## Software Sustainment

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page 1

## Software Sustainment\*

*There will always be old software*

The term “software sustainment” is not well-defined. It has some use within DoD and limited use in academia and industry.

### JAC/SEI Definition (from Challenge Problems)<sup>1</sup>

“implies integrated logistic support, which includes all aspects of acquisition **after initial system delivery** including, e.g., maintenance, evolution, upgrades, warranties, and depot management”

### DoD definition<sup>2</sup>

“involves a full spectrum of support, ranging from acquisition and outsourcing, to in-house development and modification (with little maintenance) of software”

\*Generally refers to activities and techniques used to **maintain** software after it has been developed

<sup>1</sup> Software Engineering Thrusts and Challenge Problems

<sup>2</sup> Lt. Col. Joe Jarzombek, U.S. Air Force ESIP Director, Realities of Software Sustainment vs. Maintenance CrossTalk, May 1997

## Top DoD Software Sustainment Issues<sup>1</sup>

Staffing: **Software engineering staff instability or shortages**

Computer Resources and System / Software Engineering Environment (S/SEE) Capability: **Obsolete and/or saturated computer hardware; adequacy and long-term viability of the support / test environment, programming language, etc.**

Training: **Lack of appropriate and timely training**

Documentation: **Inadequate or outdated system/software documentation**

Guidance: **Lack of policy, guidance, and methods for SIWS acquisition and support**

<sup>1</sup>AF CIO directed study “Weapon System Software Sustainment Study”, Apr 2001

## Software Evolution and Maintenance Why is this important?

### Software Lifetime and Maintenance Cost

- Average lifetime of software is about 10 years<sup>1</sup>
- Most of the lifecycle costs for software occur after initial system delivery<sup>2</sup>
  - Maintenance now represents over 70% of the total cost

<sup>1</sup>T. Tamai and Y. Torimitsu, "Software Lifetime and its Evolution Process over Generations", Proceedings of 1992 Conference on Software Maintenance, Nov. 1992.

<sup>2</sup>R. Grady, *Software Metrics: Establishing a Company-Wide Program*, Prentice-Hall, 1987.

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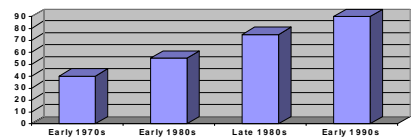
page 4

## Software Maintenance Statistics<sup>1</sup>

It is estimated that US Corporations spend over \$30 billion annually on software maintenance, and in the 1990's, 95% of lifecycle cost would go to maintenance.<sup>1</sup>

Survey	Year	Maintenance (%)
Canning	1972	60
Boehm	1973	40-80
deRose/Nyman	1976	60-70
Mills	1976	75
Zeikowitz	1979	67
Cashman and Holt	1979	60-80

Maintenance Costs as a % of Total Software Lifecycle Costs<sup>2</sup>



The Percentage of Software lifecycle costs devoted to maintenance<sup>3</sup>

<sup>1</sup>Gartner Group

<sup>2</sup>Arthur, L. J. *Software Evolution: The Software Maintenance Challenge*. John Wiley & Sons, New York, 1988.

<sup>3</sup>Moad J. *Maintaining The Competitive Edge*. DATAMATION 61-6, 1990

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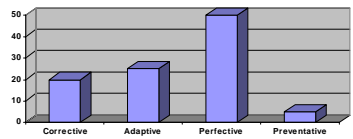
page 5

## Software Maintenance Statistics<sub>2</sub>

Over 75% of maintenance costs are for providing enhancements in the form of adaptive and perfective maintenance.

Maintenance Category	Lientz & Swanson 1980	Ball 1987	Deklava 1990	Abran 1990
Corrective	22%	17%	16%	21%
Non-Corrective	78%	83%	84%	79%

<sup>1</sup> % effort spent on Corrective and Non-Corrective maintenance



<sup>2</sup> Distribution of maintenance by categories

<sup>1</sup>Lientz & Swanson 1980 Lientz B. P. & Swanson E. B. Software Maintenance Management. Addison-Wesley Publishing Company. Reading, Massachusetts. 1980

<sup>2</sup>Martin J. and McClure C. Software Maintenance: The Problems and Its Solutions. Englewood Cliff, NJ: Prentice Hall

## Software Maintenance Statistics<sub>3</sub>

Software maintenance consumes the biggest part of the budget devoted to software

	Avg.	Information system	Real time software
Development	n	n	n
Maintenance	5 X n	3 X n	7 X n
Corrective Maintenance	7,5 X n	5 X n	12 X n
Adaptive Maintenance	5 X n	2 X n	5 X n
Perfective Maintenance	4 X n	3 X n	5 X n
Evolute Maintenance	3 X n	2 X n	7 X n

Cost of developing vs. maintaining

## Some Reasons for Software Decay

Brittle architectures

Requirements changes

Inadequate documentation

Loss of staff

Technological change

- operating system
- language
- changes in supporting software
- methods and paradigms (e.g., structured to object oriented)
- tools

## Building Software for Sustainment

General guidelines (that everybody knows, but few practice):

- Build it right the first time
- Move to the left
- Develop a robust architecture
- Design for change
- Have strong separation of concerns
- Document the knowledge and rationale for design and changes
- Have a disciplined process, methods, and tools

## Software Sustainment - How can we help ?

Area	Activity
Pre Software Development - Acquisition Phase	Provide RFP language (sections L&M) and evaluation criteria that can help increase the sustainability of the software to be developed
Software Development Phase - Prior to transition to sustainment	Develop policies and processes that will help increase the sustainability of the software once it is transitioned.
During Sustainment	<ul style="list-style-type: none"><li>• Develop policies and processes that will help keep the system sustainable through out its lifecycle.</li><li>• Apply some of our research work in sustainment and transition, if suitable</li></ul>

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page 10

## Modernizing Legacy Systems



## Modernizing Legacy Systems,

A Legacy System can be defined as “any system that significantly resists modification and evolution.” [Brodie 95]

They can cause several problems

- Usually run on obsolete hardware that is slow and expensive to maintain.
- Software maintenance can also be expensive, because documentation and understanding of system details is often lacking and tracing faults is costly and time consuming.
- A lack of clean interfaces makes integrating with other systems difficult.
- Often are difficult, if not impossible, to extend.

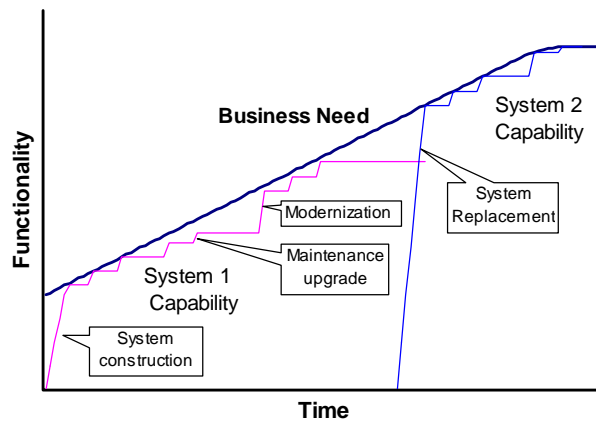
## Modernizing Legacy Systems<sub>2</sub>

Modernization involves extensive changes, but conserves a significant portion of the existing system.

For  
example:

Modernize From	To
Batch sequential architecture	B2B/component-based architecture
Hierarchical/network structure database	Relational structure
Mainframe platform	J2EE-based platform
COBOL/Fortran	Java

## Software Evolution



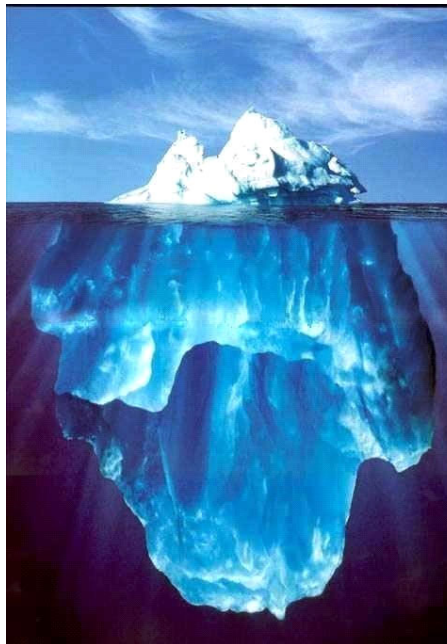
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page 14

## Legacy Crisis 1

The amount of legacy code is immense and growing.

- 250 billion lines of source code being maintained [Sommerville 00].



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## Legacy Crisis 2

Information systems expand with time

- The average Fortune 100 company [Müller 94]
  - maintains 35 million lines of code
  - adds 10% per year in updates, enhancements, and other maintenance.
  - code doubles in size every seven years

Cumulative code changes over many years often lead to less maintainable code.

Increased complexity means that the system becomes increasingly brittle.

## Modernization Challenges

Legacy system size and complexity

Conflicting stakeholder priorities

Software technology and engineering processes

Achieving business objectives

## Modernizing Legacy Systems – How can we help ?

- Provide training and coaching with respect to modernizing legacy systems
  - Address the Legacy Modernization Challenges
  - Establish good modernization strategies
- Direct support and consultation
  - Design and architecture reviews
  - Determine technical quality and business value of candidate software
  - Development and execution of tailored modernization strategies

---

# Appendix I: Capability Maturity Model – Integrated (CMMI)

Kristi Keeler gave the following PowerPoint presentation on October 27, 2003.



**Carnegie Mellon  
Software Engineering Institute**  
Pittsburgh, PA 15213-3890  
Arlington, VA. 22203



## CMMI® – The Next Step in Process Improvement

**SSG Presentation 10-27-2003**

**Kristi Keeler**

SM SCAMPI, SCAMPI Lead Appraiser, and SEI are service marks of Carnegie Mellon University.  
© CMMI, Capability Maturity Model, and CMM are registered in the U.S. Patent and Trademark Office by Carnegie Mellon University.

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page 1



## This Presentation

Provides an overview of CMMI

**The Past**—where we've been and what has influenced us

**The Present**—where we are

**The Future**—where we are going and how you can help



## The Past *era of “manufacturing in quality”*

The premise of “manufacturing in quality”

- Implies a focus on processes as well as on products
- Is a long-established premise in manufacturing
- Is based on Total Quality Management principles as taught by Shewhart, Juran, Deming, and Humphrey

**“It costs a lot of money to build bad products.”**

Augustine's 12<sup>th</sup> Law

**“The quality of a system is highly influenced by the quality of the process used to acquire, develop, and maintain it.”**

Phillip Crosby “Quality is Free: The Art of Making Quality Certain”

## Quality Management Maturity Grid

Management Categories	Stage 1: Uncertainty	Stage 2: Awakening	Stage 3: Enlightenment	Stage 4: Wisdom	Stage 5: Certainty
Cost of quality as % of sales	Reported: unknown Actual: 20%	Reported: 5% Actual: 18%	Reported: 8% Actual: 12%	Reported: 6.5% Actual: 8%	Reported: 2.5% Actual: 2.5%
Summation of company quality posture	"We don't know why we have quality problems."	"Must we always have quality problems?"	"We are identifying and resolving our quality problems."	"We routinely prevent defects from occurring."	"We know why we don't have quality problems."

Crosby, P. *Quality is Free: The Art of Making Quality Certain*. New York: McGraw-Hill, 1979.

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page 4

## The Present *era of "engineering in quality"*

CMMs® focus on

- Process and product quality
- Business results
- Engineering in quality

CMMs continue to be adopted and used

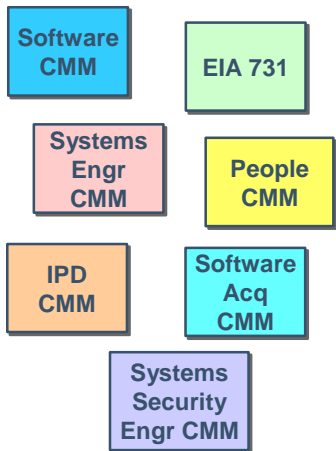
Companies in key markets are adopting CMMs

- Defense
- Aerospace
- Automotive
- Entertainment
- Telecommunications
- Finance

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page 5

## Multiple Process Models



Success of the Software CMM® caused development of other CMMs, but they

- Have different structures, formats, terms, ways of measuring maturity
- Cause confusion, especially when more than one are used
- Are difficult to integrate into a combined improvement program
- Are difficult to use in supplier selection

## Sunseting of SW-CMM

Introduction to SW-CMM training course

- Last public offering from SEI<sup>SM</sup> is December 2003
- Continued availability from transition partners

CBA-IPI Assessments and SCE Evaluations

- Last Lead Assessor (LA) training is December 2003
- Last Lead Evaluator (LE) training is October 2003

- LA and LE authorizations expire December 31, 2005; Las and Les must upgrade to SCAMPI<sup>SM</sup> to continue providing SEI-Authorized appraisal services

For more information, see the Sunset FAQ at

<http://www.sei.cmu.edu/cmmi/adoption/sunset-faq.html>



## The Future *era of “innovating in quality”*

We face unprecedented engineering challenges.  
Customer demand quality products faster and cheaper.  
Management expects higher productivity.  
Engineering fields continually evolve and merge.  
Organizations are dynamic; there is much more partnering.  
Our knowledge and experience must be shared.

The future is now!  
CMMI is our knowledge infrastructure

## CMMI Is Integration and Improvement

CMMI supports process integration and product improvement.

CMMI integrates multiple disciplines into one process-improvement framework that eliminates inconsistencies and reduces duplication.

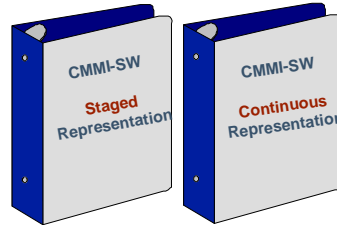
CMMI provides a framework for introducing new disciplines as needs arise and therefore reduces the cost of implementing model-based improvement.

CMMI is designed to minimize the impact on legacy process improvement efforts and investment.

## CMMI Models

### Source Models

- Capability Maturity Model® for Software V2, draft C (SW-CMM V2C)
- EIA 731, System Engineering Capability Model (SECM)
- Integrated Product Development Capability Maturity Model, draft V0.98 (IPD-CMM)



### CMMI

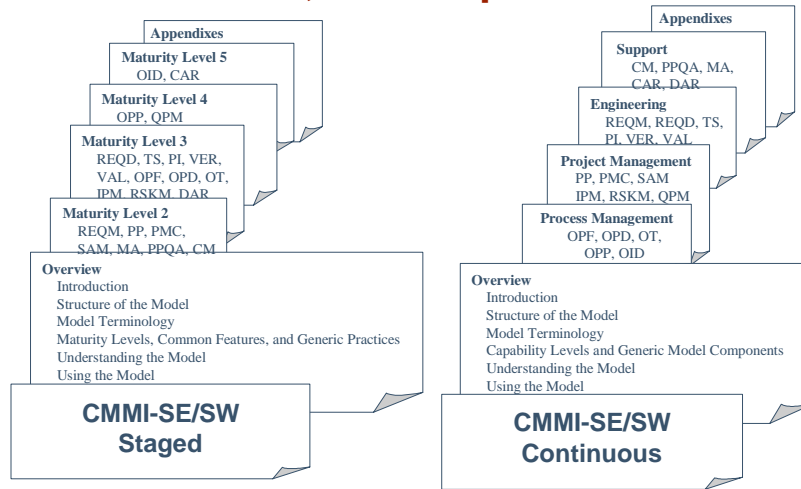
- Meets the needs of software organizations
- Is an upgrade of SW-CMM
- Benefits from best practices contributed from all three source models

## Improving on the Software CMM

CMMI Models improve on SW-CMM Version 2.0 Draft C:

- Incorporate additional years of learning
- More explicitly link best practices to **business objectives**
- Expand the scope of and visibility into the product life cycle and engineering activities
- Add more best practices, (e.g., measurement, risk management, product integration, decision analysis and resolution, and supplier management)
- Capture more robust high-maturity practices
- Address additional generic practices needed for institutionalization
- More fully comply with relevant ISO standards

## One Model, Two Representations



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page 12

## Understanding CMMI Representations

A representation allows an organization to pursue different improvement objectives and presents model components differently. The content is **nearly identical** in both representations.

### So why both?

- The representation of each source model was different
  - Software CMM—Staged
  - SE-CMM, SECM—Continuous
- Ease adoption by legacy communities.
- Both representations provide inherent benefits.

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page 13

## Advantages of Each Representation

Continuous Representation	Staged Representation
Provides maximum flexibility for order of process improvement	Predefined and proven path with case study and ROI data
High visibility of improvement within process areas	Focuses on organizational improvement
Easy upgrade from EIA 731	Easy upgrade from SW-CMM
Easy comparison to ISO 15504	Provides familiar benchmarking capability
Improvement of process areas can occur at different rates	Overall results summarized in a maturity level

## CMMI in a Nutshell

A CMMI model provides a structured view of process improvement across an organization.

CMMI can help

- set process improvement goals and priorities
- provide guidance for quality processes
- provide a yardstick for appraising current practices

## CMMI Today

Stable Version 1.1 CMMI Product Suite was released  
January 2002

CMMI models will not change until 2005 at earliest (per  
CMMI Steering Group direction)

Many defense, aerospace, and commercial organizations  
are upgrading to CMMI

One appraisal method, SCAMPI, covers

- internal process improvement
- supplier source selection
- contract process monitoring

## Early Adopters

Currently there are 30+ early  
adopters.

Are you an early adopter?

Send email to [cmml-  
comments@sei.cmu.edu](mailto:cmml-comments@sei.cmu.edu) to be  
listed.

See Early Adopter list at  
[http://www.sei.cmu.edu/cmml/a  
doption/early-adopters.html](http://www.sei.cmu.edu/cmml/aoption/early-adopters.html)



The screenshot shows a web browser window displaying the 'CMMI Early Adopters' page. The page header includes the Carnegie Mellon Software Engineering Institute logo and navigation links: Home, Search, Contact Us, Site Map, What's New. A sidebar on the left lists navigation options: ABOUT THE SEI, CMMI Main Page, General Information, News and Communications, Publications and Transition Materials, Product Suite, Project Groups, Organization Documents, and External Web Pages. The main content area is titled 'CMMI Early Adopters' and contains a paragraph explaining that the listed organizations were the first to implement CMMI-based process improvement initiatives. Below this, there are three entries for early adopters: 'The Boeing Company' (contact: Al Brown, World Wide Web: <http://www.boeing.com>), 'Harris Corporation' (contact: Gary Nahlik, Senior Principal Engineer, Email: [gnahlik@harris.com](mailto:gnahlik@harris.com), World Wide Web: <http://www.harris.com>), and 'Jacobs Sverdrup Technology Inc., Advanced Systems Group Engineering Performance Improvement Center (EPIC)' (contact: Jeffrey L. Dutton, Technical Director, Email: [jdutton@sverdrup.com](mailto:jdutton@sverdrup.com)). At the bottom, there is an entry for 'U.S. Army TACOM ARDEC Software Enterprise' (contact: S. Wayne Sherer, Senior Technical Associate for Corporate Process Improvement, E-mail: [wscherer@csa.army.mil](mailto:wscherer@csa.army.mil)). A footer note states: 'If you have questions or comments, send email to: [webmaster@sei.cmu.edu](mailto:webmaster@sei.cmu.edu)'.



## Discoveries in Use

Ease of upgrade to CMMI reported by:

- Multiple SW-CMM level 5 organizations that upgraded and maintained their maturity level
- Multiple organizations that upgraded from EIA 731 systems engineering assessments
- Numerous European companies in group discussion of CMMI adoption at recent SEI-Europe quarterly meeting

Appraisal times reflect excellent learning curves

- Australian group reported 40% reduction in appraisal time as learning occurred over five appraisals

Mappings and gap analyses confirm evolutionary expansion from predecessor models

- Government and contractors agree on CMMI's improved engineering coverage in contract monitoring
- ISO/CMMI compatibility appears favorable



## Where We're Going

Adoption activities

- Transition Partner data
- Workshops, technical notes, and book publication
- Interpretive Guidance project

Appraisal enhancement activities

- SCAMPI appraisal data
- CMMI appraisals conducted worldwide
- SCAMPI enhancements

Training activities

- CMMI training data
- Training course upgrades

## Adoption—What’s Happening Now

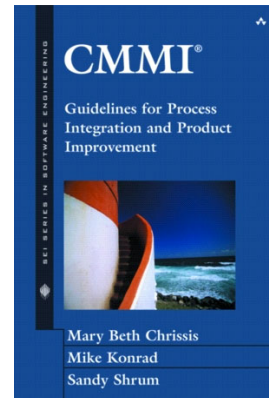
Events related to CMMI adoption:

- Quarterly transition workshops
  - Annual NDIA/SEI CMMI User Workshop
- Interpretive Guidance project

Technical notes and special reports:

- CMMI and Product Line Practices
- CMMI and Earned Value Management
- Interpreting CMMI for Operational Organizations
- Interpreting CMMI for Service Organizations (in progress)
- CMMI Mappings
- Specific interests (e.g., safety, security)

Publication of SEI Series Book with Addison-Wesley



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page 20

## In Summary

In today’s fast-paced, competitive business environment, approaches used in the past such as “manufacturing in quality” and present, “engineering in quality” are not enough. The future is innovation. CMMI helps organizations to ...

- **Improve** delivery of performance, cost, and schedule
- **Integrate** stakeholders into project activities
- Provide **competitive** world-class products and services
- Implement an **integrated** enterprise business and engineering perspective
- Use common, **integrated**, and **improving processes** for systems and software

**Upgrade to CMMI now... and lead the way to the future of process improvement.**

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page 21



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## For More Information...

For more information about CMMI, see  
<http://www.sei.cmu.edu/cmmi/>

You can find more presentations like this on the SEI Web  
site at <http://jo.sei.cmu.edu/pub/english.cgi/0/323123>.

Or, contact

**SEI Customer Relations**

Phone: 412 / 268-5800

Email: [customer-relations@sei.cmu.edu](mailto:customer-relations@sei.cmu.edu)





# Appendix J: COTS-Based Systems

John Foreman gave the following PowerPoint presentation on October 27, 2003.



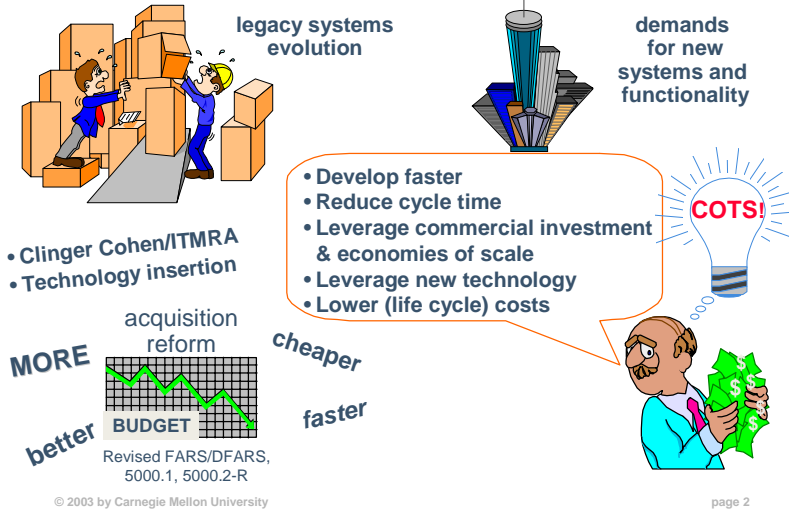
## COTS-Based Systems

Sponsored by the U.S. Department of Defense  
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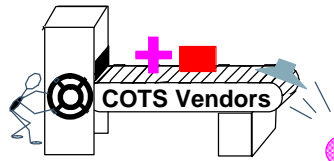
page 1



## COTS: Attraction and Motivation

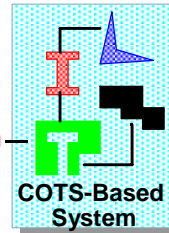


## COTS Challenges



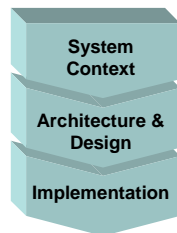
- Limited visibility into product quality and behavior
- Varying architectural paradigms
- Dependencies between products
- Built-in models of use
- New “business” issues (licenses, data rights, warranties)

- Products driven by market, **not** your system context
  - Frequent product and marketplace changes
  - Limited control of content or frequency of releases
- Vendor differentiation

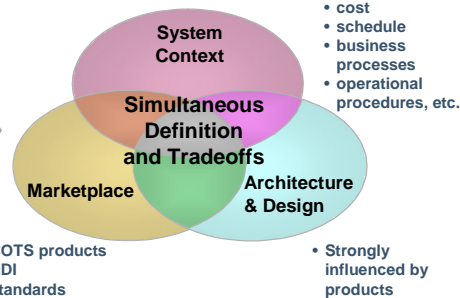


## Fundamental Change

Traditional Approach  
(Waterfall Development)



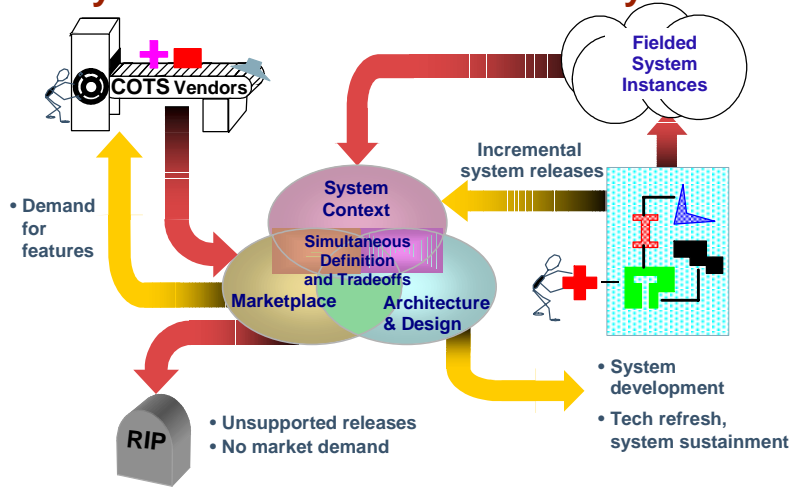
Required COTS Approach



*Build from Scratch*

*Buy, Integrate, Continuously Refresh*

## Cyclic Nature of COTS-Based Systems



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page 5

## CBS are Radically Different

### Mil Spec

- Requirements driven
- Spec Focus
- Rigid requirements
- Unique architecture
- Owner controls evolution
- Stable design
- Ignore evolution
- Cost emphasis
- Make custom hardware
- Develop software
- Obsolescence
- Waterfall-style development

### COTS

- Market driven
- Business plan focus
- Flexible requirements
- Open system architecture
- Market controls evolution
- Constant changes
- Design for evolution (tech refresh)
- TOC emphasis
- Buy from catalog
- License software
- Earlier obsolescence
- Spiral development



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page 6

## CBS Implications for You

New requirements processes – more flexible

New concerns over existing end-user processes – Acquisition and development processes as well as Business/end user processes must yield to the realities of commercial practice

More use of spiral/iterative/incremental approaches

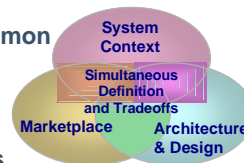
Different view of system sustainment/CM

New questions about COTS products and reliability/safety, performance/real-time security/survivability

New skill sets required

## CBS Capabilities and Products

- **COTS Product Evaluation Techniques**
  - Determining the right product in the right context
- **Design and Engineering Practices**
  - Techniques for analysis of alternatives, design, integration, and sustainment
- **COTS Based Process Framework**
  - Develop / Institutionalize new management and development processes to build, field, and support CBS
- **Risk Identification and Mitigation**
  - Identify and propose mitigations for common CBS risks and known failure modes
  - COTS Usage Risk Evaluation (CURE)
- **Information Dissemination**
  - Technical publications, Courses/tutorials



## Why is COTS Product Evaluation Hard?

COTS product evaluation is the examination of individual COTS products for the purpose of determining the products' fitness for use in a particular context.



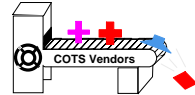
Less than perfect system understanding



Black box products and vendors



Conflicting interests



Rapid rate of change of COTS products

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page 9

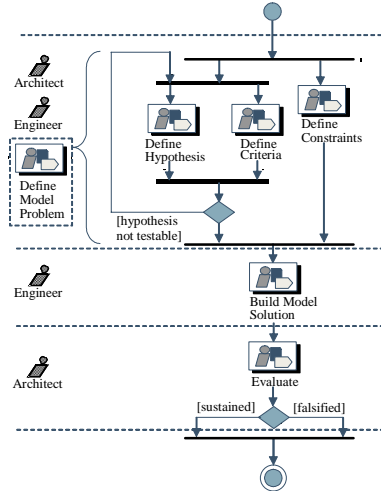
## Design and Engineering Practices

Techniques that facilitate analysis of alternatives, design, integration, sustainment, and evolution of COTS Based Systems:

- Developing “just-in-time” competency
- Component ensemble evaluation that focus on project risk rather than product features
- Capturing, representing and sharing component integration knowledge
- Legacy system modernization

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page 10



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page 11

## Model Problems

What: Model Problems are prototypes where the consumer is the designer.

Why:

- Spot technical risks
- Quickly develop know-how on how to resolve risks

## Evolutionary Process for Integrating COTS-Based Systems (EPIC)

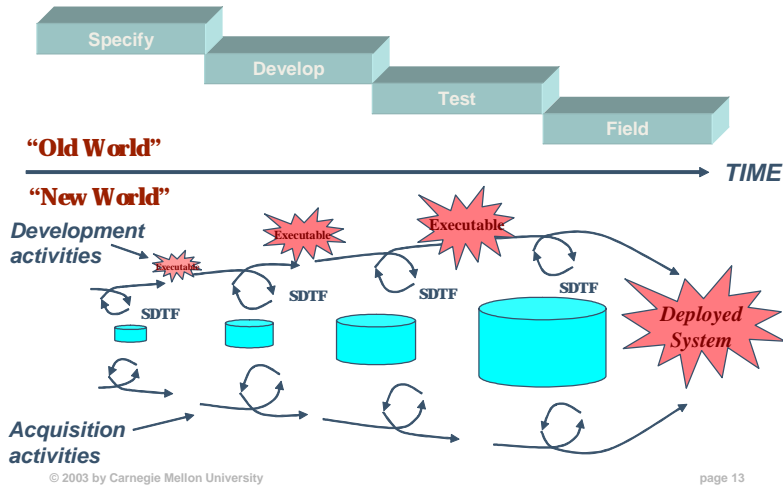
EPIC operationalizes software engineering best practice and COTS lessons learned to build, field, and support COTS-based systems

- Negotiation-driven, disciplined, spiral approach
- Objectives, activities, and artifacts at a sufficient level of detail to facilitate needed culture change (using RUP for basic management and engineering processes and artifacts)

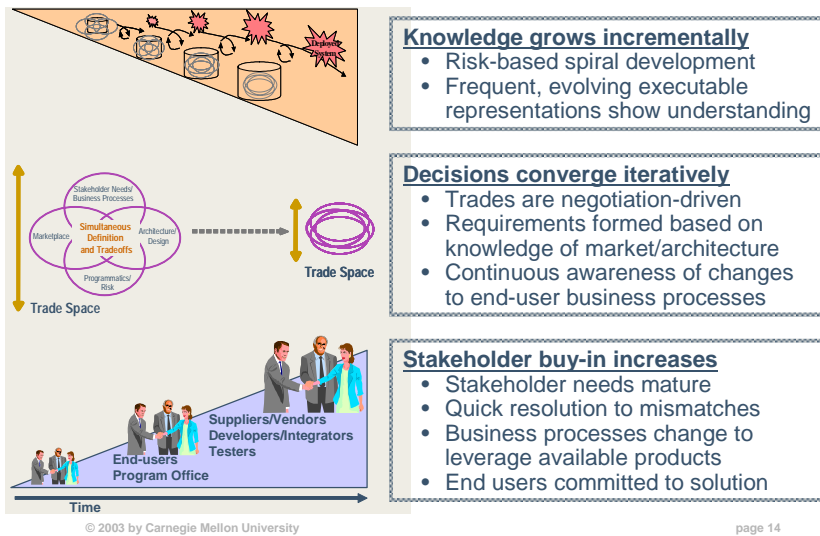
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page 12

## COTS Based Process Framework

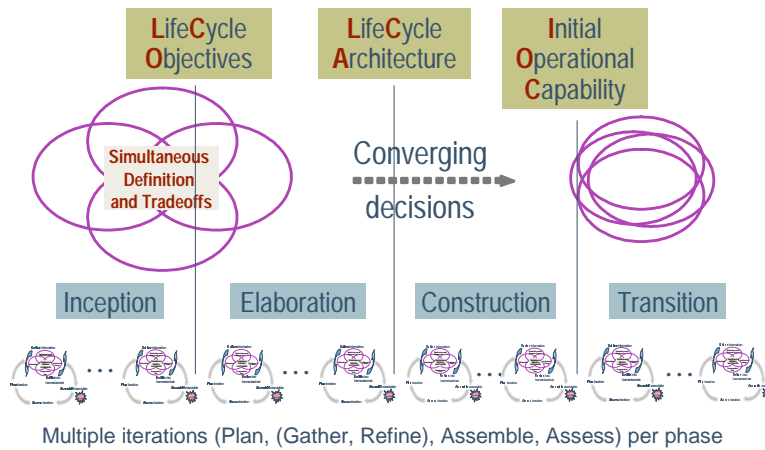


## EPIC Concepts





## Phases Bounded by Anchor Points



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page 15

## COTS Usage Risk Evaluation (CURE)


- **What:** Early identification of COTS-based risks within a program to raise management awareness
- **Who:** Focus is comprehensive:
  - integrators and developers
  - acquirers and managers
- **Result:** Report on risks and mitigations
  - Preferred: out-brief delivered to program management
  - Optional: written report



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page 16

## COTS-Based Systems Courses

Audience	Offerings
<ul style="list-style-type: none"> <li>• Executives (govt and industry)</li> <li>• OSD policy makers</li> <li>• PEOs, DACs, CIOs, CFOs</li> </ul>	<ul style="list-style-type: none"> <li>• COTS-Based Systems (CBS) for Executives (2.5 hrs)</li> <li>• Open Systems for Executives (4.5 hrs)</li> </ul>
<ul style="list-style-type: none"> <li>• Program managers (PMs)</li> <li>• Functional managers</li> <li>• Financial/budget personnel ...</li> </ul>	<ul style="list-style-type: none"> <li>• CBS for PMs (4-5 hrs)</li> <li>• CBS for PMs - on CDROM</li> <li>• CBS for PMs w/ extended discussion (8 hrs)</li> <li>• CBS Workshop for PMs (8 hrs)</li> </ul> 
<ul style="list-style-type: none"> <li>• Technical staff – engineers, system integrators, proposal evaluators, contracts personnel</li> </ul>	<ul style="list-style-type: none"> <li>• COTS Product Evaluation (abridged – 3 hours, full - 2 days)</li> <li>• Building Systems from Commercial Components (abridged - 4 hrs, 2 Days)</li> <li>• Modernizing Legacy Systems (8 hrs)</li> <li>• CBS for Practitioners – 2 Days</li> </ul>

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## Appendix K: The Mind Maps

The mind maps in this appendix were created on October 27, 2003 as outputs from mapping SEI technologies to various SSG strategic objectives.

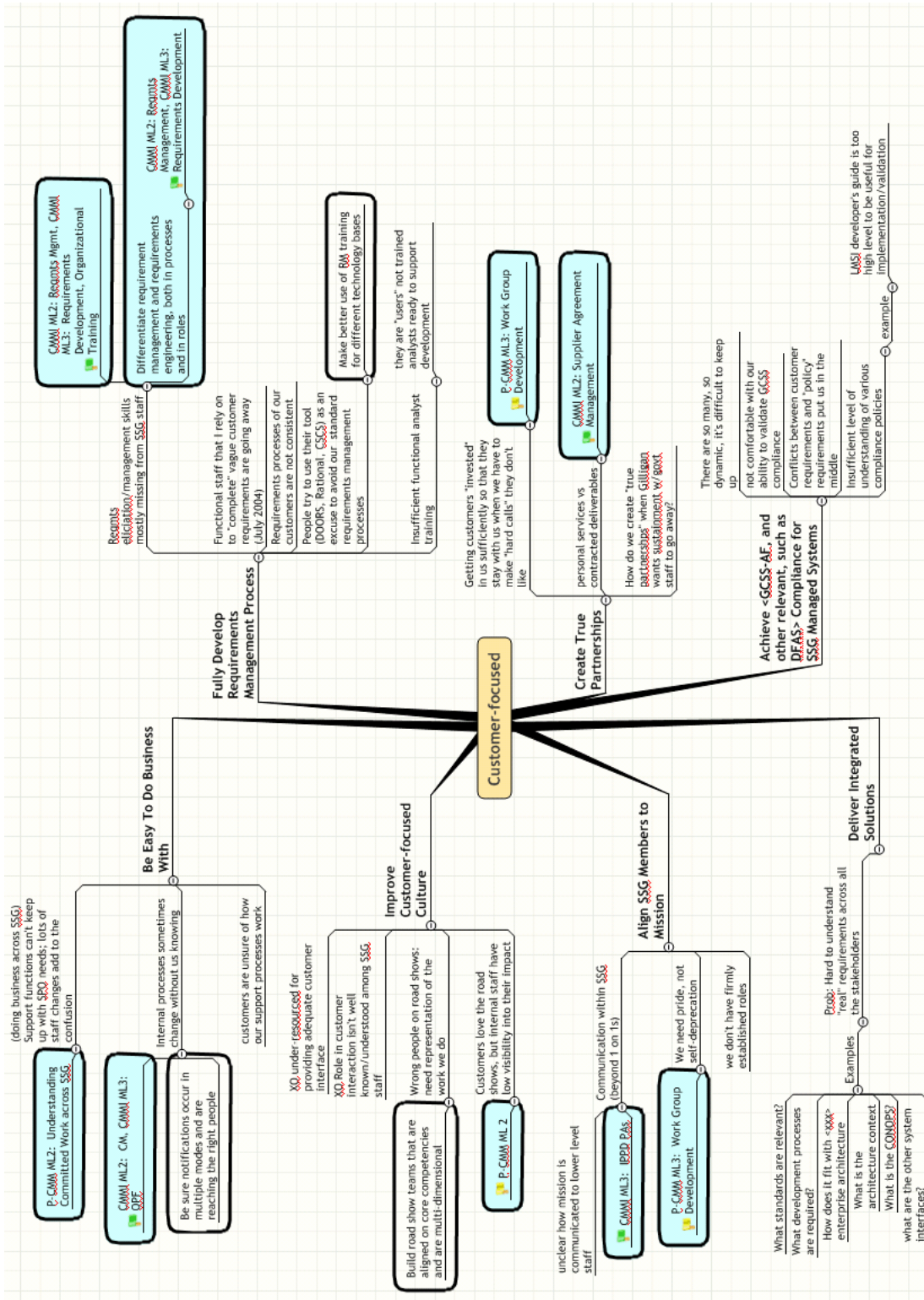


Figure 2: Map of SEI Technologies Against SSG (Cluster Focused on Customer Issues)

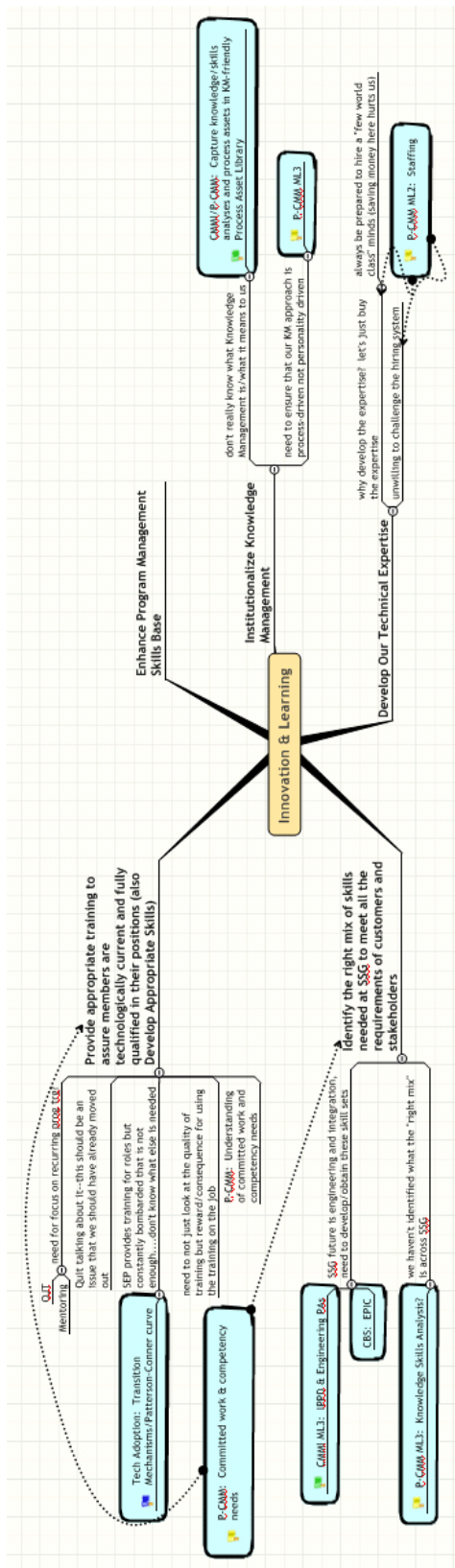


Figure 3: Map of SEI Technologies Against SSG (Cluster Focused on Innovation and Learning Issues)

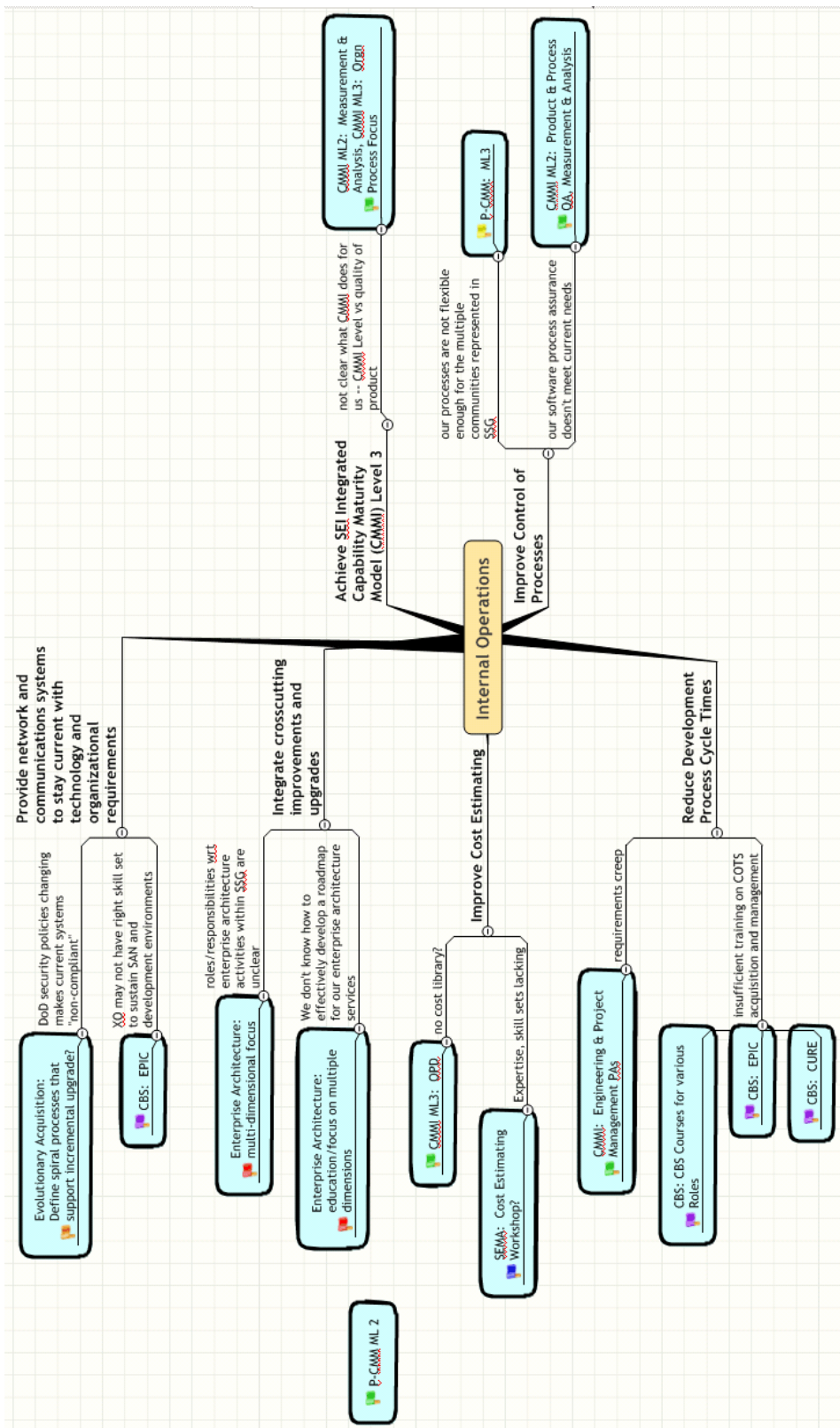


Figure 4: Map of SEI Technologies Against SSG (Cluster Focused on Internal Operations Issues)

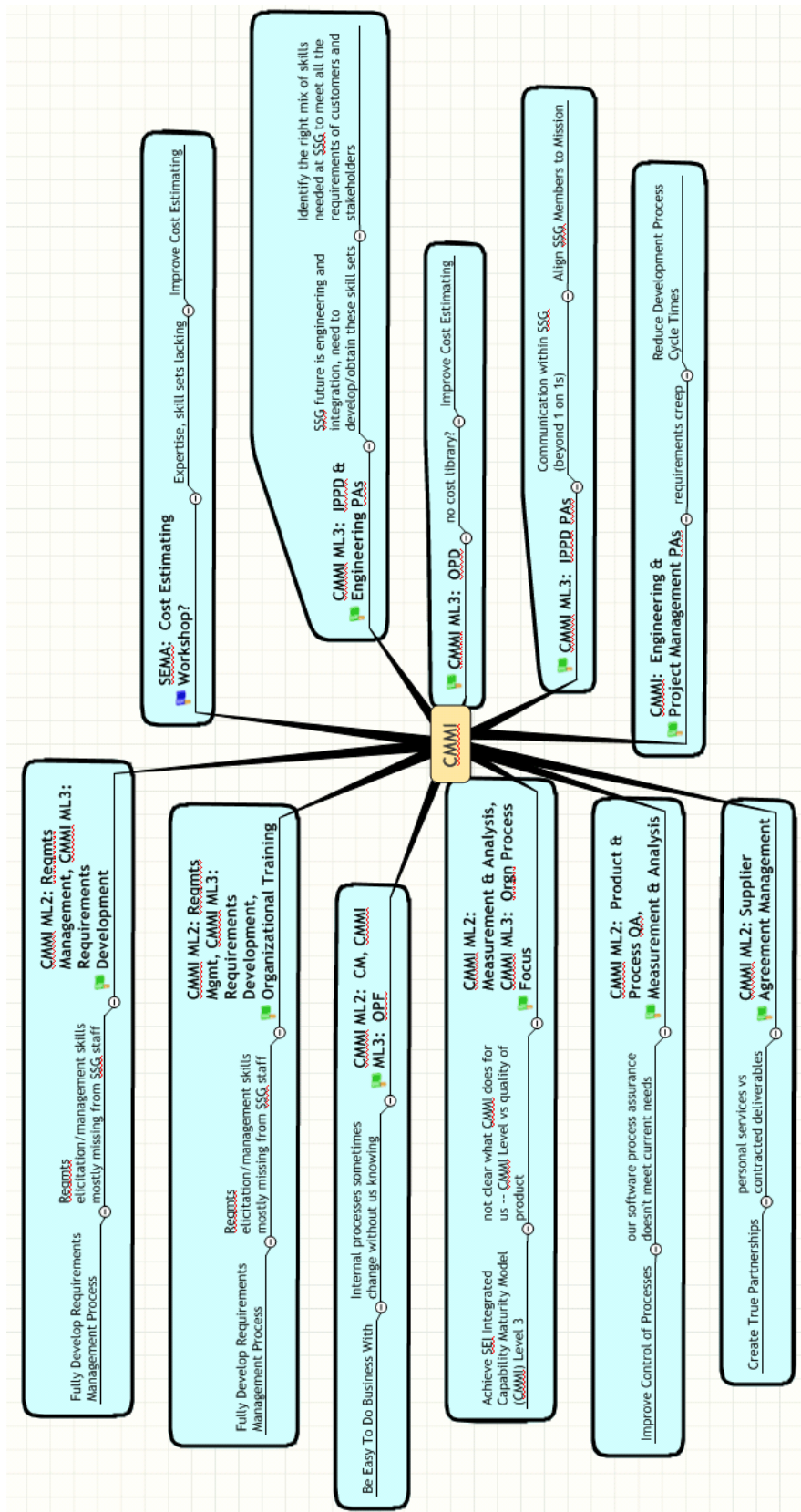


Figure 5: Map of SSG Issues to CMMI Content

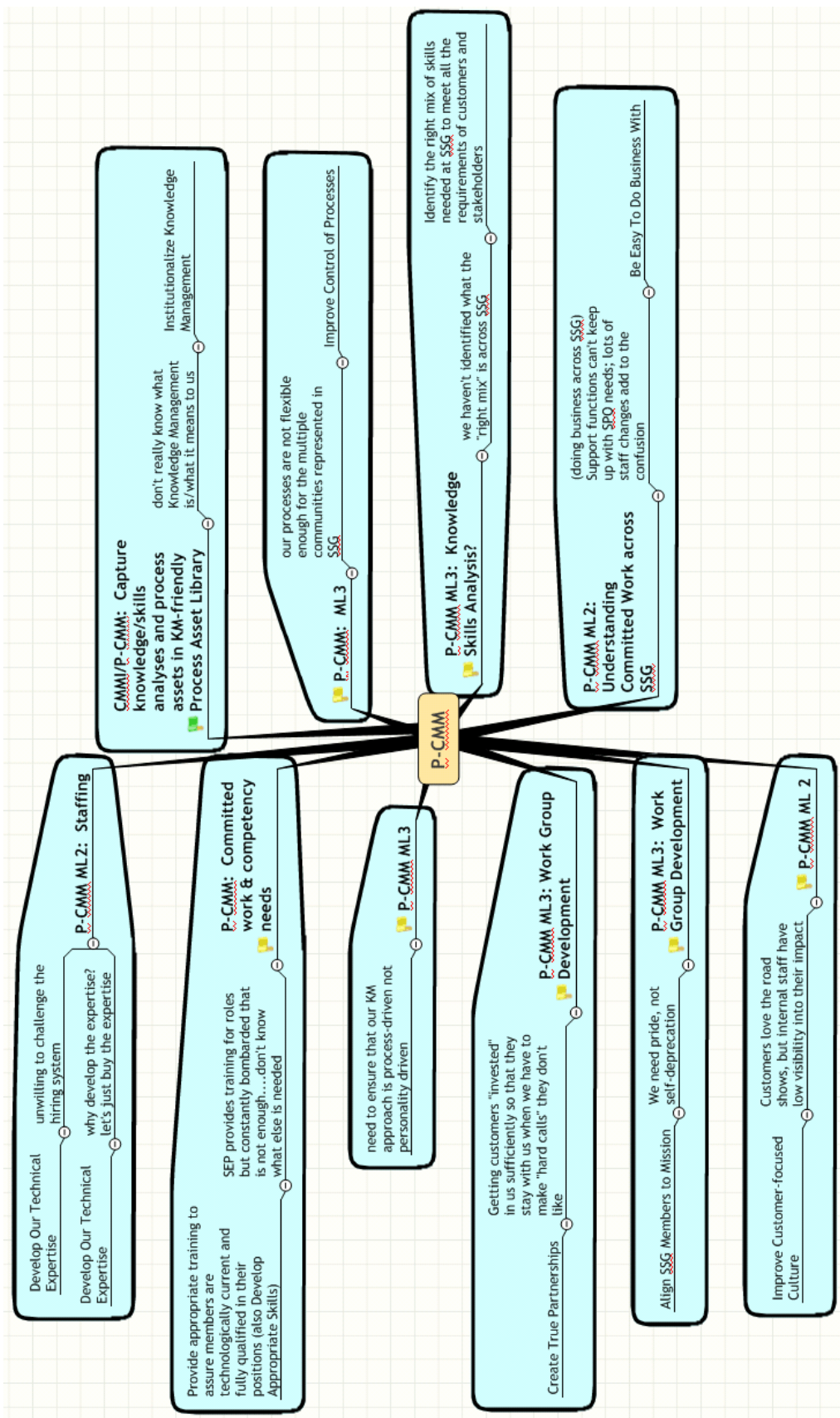


Figure 6: Map of SSG Issues Against P-CMM Content



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# Appendix L: COTS-Based Systems Enablers and Barriers

The list of COTS-Based Systems Enablers and Barriers was created as workshop output on Tuesday, October 28, 2003.

## CBS Barriers & Enablers - Engineering & Integration

### CBS Barriers

1. Individual skills/skill sets  
Erosion of talent when we can't "offload" benched team members
2. Lack of palpable experience, success with integration
3. Current processes/procedures are "engrained" in workforce / unwillingness to change
4. Competing org (MSG) appears to be "better positioned" to do this.  
(Not necessarily better equipped.)
5. Undefined, detailed standard configurations for AF.  
No one accountable to adopt standards  
Insufficient motivation to comply
6. Customers are "finding" and dictating "solutions"

### CBS Enablers

#### SEI can train/mentor on CBS intelligence

1. Change in AF personnel system  
Training and workforce reshaping  
Shift focus to external sources
2. Partnering with proven winners in industry  
Locally fielded solutions  
Do "pilot" programs small scale
3. OSD "enterprise integration toolkit"  
"First fielding" of 20% EPIC solution pilots  
Decision-makers must control at least some resources

4. (+1) Use current resident expertise to explore new possibilities and look forward  
Improve working relationship with HQ AFMC  
Hire an ERP advisor to SSG/ED
5. Define what “standards” are – many kinds  
Focus on results and capability of STDs

#### Gap Analysis

- Gap Analysis: what you have, what is available, what you need
- Staffing
- Communication/coordination
- Work environment
- \* Performance management: implementation by managers & DAG/DP, Pilot = MI
- \* Training/development: mapping training to needs (#'s)
- Compensation

---

# Appendix M: People Capability Maturity Model Enablers and Barriers

This outline of enablers and barriers was output of the P-CMM pilot planning session (part of the workshop held on Tuesday, October 28, 2003).

1. Goal:
  - processes & practices for Level 2
  - process areas piloted and ready for organizational implementation by 12/04
2. Picture of success:
  - SSG workforce mgmt practices support transformation objectives and speed transformation of organization to be Center of Excellence for AF combat support IT
3. Success Criteria:
  - Practices implemented by 75% of 2-ltr orgs. at SSG
  - Customers recognize increased/new capabilities of SSG and select SSG for work
4. Tasks (Next 3 months):
  - Gap analysis of SSG workforce practices against P-CMM
  - Recommendations for improvement
  - Coordination points for Booz-Allen human capital plan
  - Implementation plan for P-CMM improvement
5. Tie to Balanced Scorecard:
  - Innovation/learning
    - a. Maintain/add technologically current skills
    - b. Enhance PM skills base
    - c. Develop technological expertise
    - d. ID right mix of skills needed @ SSG

- e. Knowledge mgmt
- Internal ops
  - a. Communication & coordination
  - b. Adequacy & modernization of infrastructure
- Customer focus
  - a. Align SSG members to mission
  - b. Be easy to do business with

---

# Appendix N: Capability Maturity Model-Integrated Enablers and Barriers

This outline of enablers and barriers to the success of Configuration Maturity Model-Integrated was output of the workshop held on Tuesday, October 28, 2003.

## **CMMI Barriers to Success**

1. Lack of knowledge in writing clear, firm requirements.
2. Responsibility for training? Who 'owns' this?
3. Need independent determination of requirements quality (clear, complete, etc.) prior to design.
4. Lack of commitment to process, contract. Tool does not replace process and training.
5. Unrealistic expectations from customer.
6. No customer or funding for enterprise architecture and integration requirements.
7. Willing to perform at risk and accept unrealistic requirements.
8. Inadequate capture of baseline and senior management tracking of changes (impact of changes on program success).
9. Government and contractor disagreement or misunderstanding of roles and responsibilities.

## **Enablers of Success**

1. SEP
2. DOORS (and its integration with Mercury Test Director), Rational, Performa.
3. EN for non-functional requirements (e.g.: GCSS, DFAS, sizing, etc.)
4. Staff responsiveness.
5. Combined Test Force (CTF) and the move of testing to requirements phase.

## Pilot Ideas

1. Develop requirements facilitation function with domain knowledge, contract understanding, and experience. This should be an SSG level, corporate shared resource. (AQ, ST)
2. Identify lead projects and teams from each SPO. (not to exceed 6 months, 3 to 4 projects/teams) .=> Revised REQM process. (IL, FN, ST, AQ)
3. Implement/improve Earned Value Management processes with senior management level tracking of significant deviations (5%), => SEMA. (XP)
4. Restart recurring program review for senior staff that includes functional staff. (XP)

## CMMI Pilot Planning Session

1. Pilot Goal:
  - Establish and charter a requirements facilitation team and supporting processes.
  - Document requirements management and requirements engineering processes beginning with customer view, covering complete life cycle of requirements. Introduce tools and processes to customer.
  - Develop a shared view of the requirements (an educated customer).
2. Deliverables:
  - Customer education process.
  - Requirements communication plan.
  - Requirements management documentation.
  - Requirements engineering documentation.
  - Capture pilot lessons.
3. Picture of success:
  - “Better” requirements documentation and customer has a better understanding of requirements.
  - Requirements are “right.”

- Definition of “better” requirements, “right” (According to Customer, According to SSG)
4. Success Criteria:
- No DRs tied to requirements (based upon root cause analysis of the DR).
  - Positive CSAR (Customer Satisfaction Assessment Report).
5. Next 3 months:
- Gap analysis discussion.
  - Form IPT (SSG, Customer, SEI).
  - Develop charter template.
6. Tie to Balance Scorecard:
- Customer Focus: Easy to do business with (customer satisfaction).
  - Center of choice (cheaper).
7. LOE Estimate for next 3 months, each member of IPT:
- 25 FTE for pilot project, gap analysis.

Notes:

IPT Members:

- Contracting/AQ
- FM
- FN (program manager) – system view of requirements
- SEPG
- EN (non functional requirements)
- ST (software requirements)/IL (COTS)

- Customer/functional representation (DFAS)
- XP (tools)
- SEI

The process must be iterative, tied to spiral development and release processes.

Leverage the current SEP, tools, meetings, historical data.