

Appendices

Introduction

These appendices provide support materials that organizations using SAM may find helpful in constructing appraisal artifacts and training team members. The appendices can be acquired from the SEI and SPC FTP sites as separate electronic documents for the appraisers.

To access electronic documents from the SPC FTP site

Type *ftp ftp.software.org*

You will be prompted to log in

Type *anonymous*

You will be prompted for a password

Type in your email address in the form *name@site*

[for statistical purposes only]

Type *cd secmm*

Type *cd public*

Type *dir*

Type *binary*

Type *get(space)filename*

Type *quit* to finish

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Appendix A: Template for SAM Opening Briefing

Introduction

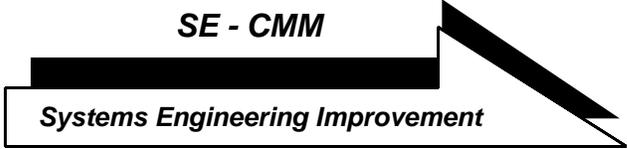
The opening briefing template provides ideas on how to present the basic concepts of SAM and the SE-CMM to the appraisal participants. However, appraisers are welcome to design whatever materials suit their style/needs. The basic purpose of the opening briefing and suggested contents are found in Section 2.2.1.

Also included in this appendix are some of the basic information charts included in the SE-CMM Project Overview briefing. For audiences who are somewhat unfamiliar with the model, these charts or similar ones may be of use as backup charts for the opening briefing to help answer questions about the model itself.

continued on next page

Appendix A: Template for SAM Opening Briefing, Continued

SE - CMM



Systems Engineering Improvement

<company>

SE-CMM Appraisal

<date>

@CMM 1996. This work is a collaborative effort of EPIC: FAA, GTE Gov't. Systems, Electronic Boat Division of General Dynamics, Hughes Corporation, Lockheed-Martin Corp., Loral Corp., NIST, Office of Undersecretary of Defense for Acquisition and Technology, SEI, SPC, and Texas Instruments, Inc.

Process Maturity

- Benefits of process maturity
 - Increased accuracy in predicting results
 - Reduced variability in expected outcome
 - Improved productivity
- Organizational Agility
 - New Technology
 - New Markets
- People and Technology

continued on next page

Appendix A: Template for SAM Opening Briefing, Continued

Process Maturity Models

A maturity model defines the requirements for a process

- Defines “what” NOT “how”
- Does NOT address People & Technology

Framework for describing key elements of an effective process

- Requirements for Process Definition
- Guidance for Process Improvement

Yardstick for judging the maturity of an organization's process

- Contractor Selection
- Process Improvement Metric

Process Maturity Elements

- Process Elements *“What you do”*
 - Process Areas
 - Base Practices
- Maturity Elements *“How well you do it”*
 - Maturity Levels
 - Common Features
 - Generic Practices
- Assessment Process *“How we measure it”*

continued on next page

Appendix A: Template for SAM Opening Briefing, Continued

Process Improvement

"If you don't know where you are, a map won't help."

- Maturity Model *map*
- Assessment Findings *discover where you are*
- Recommendations *decide where you want to be*
- Action Plan *plan how to get there*

Assessment - Data Gathering

- Questionnaire
- SE Lead
 - SE Lead's viewpoint
 - Exploratory Questions
- SE Practitioners
 - Practitioners viewpoint
 - Open discussion

continued on next page

Appendix A: Template for SAM Opening Briefing, Continued

Confidentiality

The assessment depends on your frank & open discussions!

- No project or individual will be identified in the findings
- The team will not discuss your comments outside the assessment
- We expect you not to discuss what you hear during our meetings

Tight schedule - Meetings will start on time!

Assessment - Results

- Products
 - Findings Briefing
 - Level of maturity for each process area
- Next Steps
 - Final Briefing
 - Findings & Recommendations Report
 - Action Plan

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Appendix A: Template for SAM Opening Briefing, Continued

Extra briefing charts

The following set of charts may be useful as backup charts if the audience is not sufficiently familiar with the SE-CMM model itself.

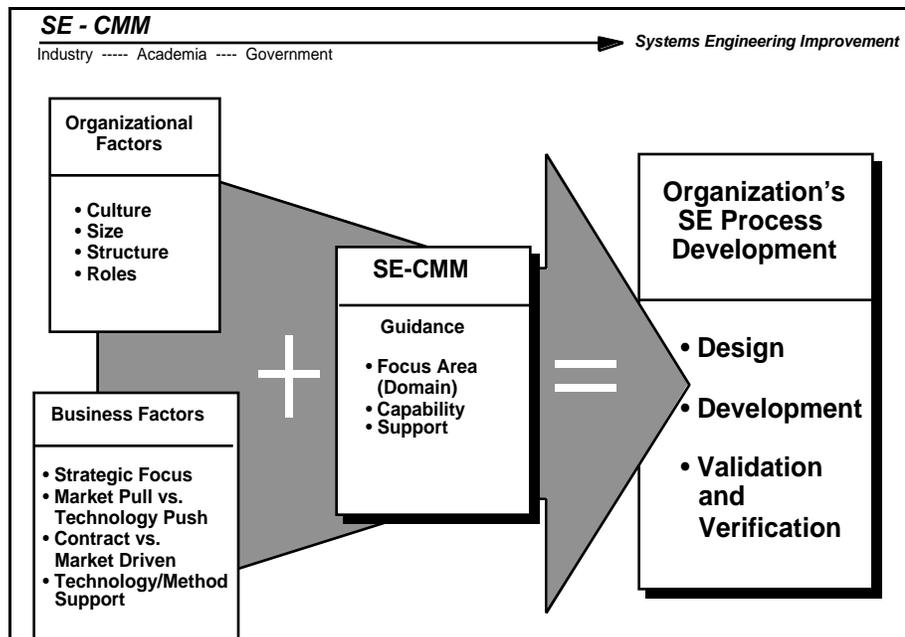
SE - CMM Systems Engineering Improvement
Industry ----- Academia ----- Government

What is Systems Engineering?

(Many definitions of systems engineering have been published. The authors chose to use the definition of systems engineering from AFM 770-78:)

Systems Engineering is defined as the selective application of scientific and engineering efforts to:

1. **Transform** an operational need into a description of a system configuration which best satisfies the operational need according to the measures of effectiveness;
2. **Integrate** related **technical parameters** and ensure compatibility of all physical, functional, and technical program interfaces in a manner which optimizes the total system definition and design;
3. **Integrate** the efforts of **all engineering disciplines** and specialities into the total engineering effort.



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Appendix A: Template for SAM Opening Briefing, Continued

SE - CMM

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► Systems Engineering Improvement

The SE-CMM models....

The **Characteristics of good systems engineering practice**

It does NOT model "The SE Process"

SE-CMM focuses on:

- **Domain** (e.g., systems engineering) **specific characteristics** indicative of a successful SE implementation
- **Characteristics** pertaining to **institutionalizing process focus** within a project or organization
- **Characteristics** of processes related to **quantitative process management** principles

SE - CMM

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► Systems Engineering Improvement

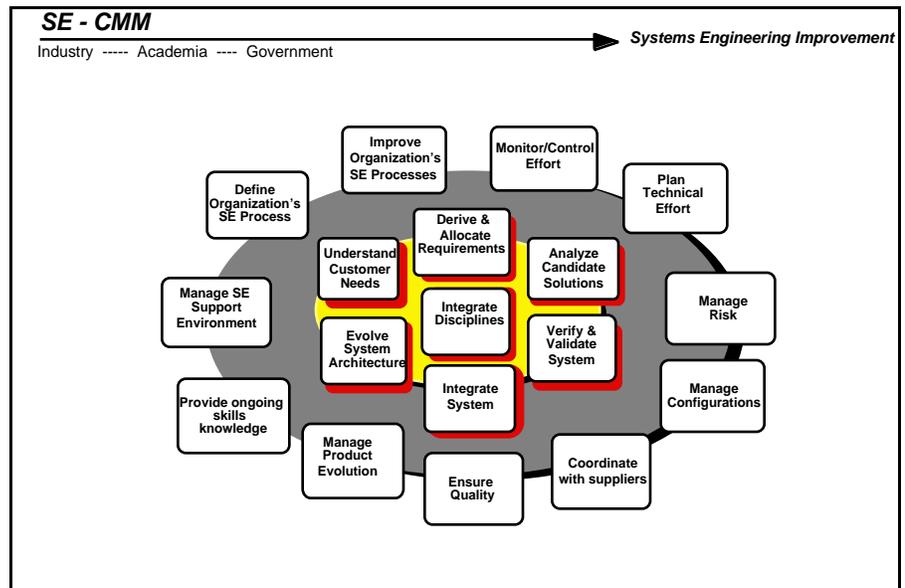
How is the model organized?

Into two prime focus areas:

- **Process areas** - which concentrate activities typically associated with the **successful practice** of Systems Engineering, plus other activities which critically impact effective execution of SE tasks
- **Capability levels** - with Common Features which reflect the characteristics one expects to see at **increasing levels of sophistication** in process management

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Appendix A: Template for SAM Opening Briefing, Continued



SE - CMM
Industry ----- Academia ----- Government → Systems Engineering Improvement

Process Area List

Engineering	Project	Organization
Understand customer needs and expectations	Manage configurations	Define organization's systems engineering process
Derive and allocate requirements	Plan technical effort	Manage systems engineering support environment
Analyze candidate solutions	Monitor and control technical effort	Provide ongoing skills and knowledge
Evolve system architecture	Manage risk	Manage product line evolution
Integrate system	Ensure quality	Improve organization's systems engineering processes
Verify & validate system		Coordinate with suppliers
Integrate disciplines		

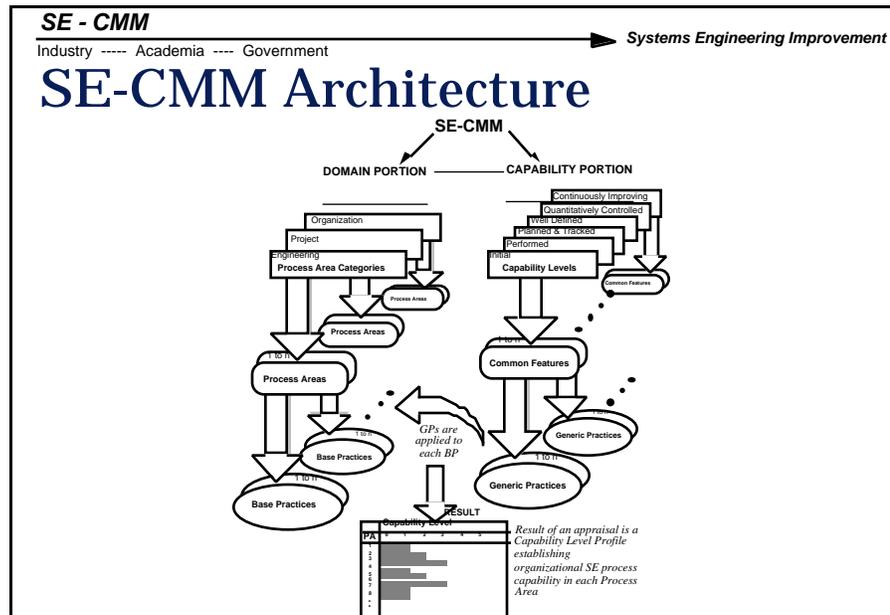
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Appendix A: Template for SAM Opening Briefing, Continued

SE - CMM ➔ Systems Engineering Improvement
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Capability Levels - Common Features

Initial	<ul style="list-style-type: none"> • None
Performed Informally	<ul style="list-style-type: none"> • Base practices performed
Planned & Tracked	<ul style="list-style-type: none"> • Committing to perform • Planning performance • Disciplined performance • Tracking and verifying performance
Well Defined	<ul style="list-style-type: none"> • Defining a standard process • Tailoring the standard process • Using data • Performing the defined process
Quantitatively Controlled	<ul style="list-style-type: none"> • Establishing measurable quality goals • Determining process capability to achieve goals • Objectively managing performance
Continuously Improving	<ul style="list-style-type: none"> • Establishing quantitative process effectiveness goals • Improving process effectiveness



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Appendix A: Template for SAM Opening Briefing, Continued

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“Typical” Process Area

PA 05: Integrate System

- The purpose of Integrate System is to ensure that system elements will function as a whole. This primarily involves identifying, defining, and controlling interfaces, as well as verifying system functions that require multiple system elements.

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“Typical Generic Practice”

Generic Practices

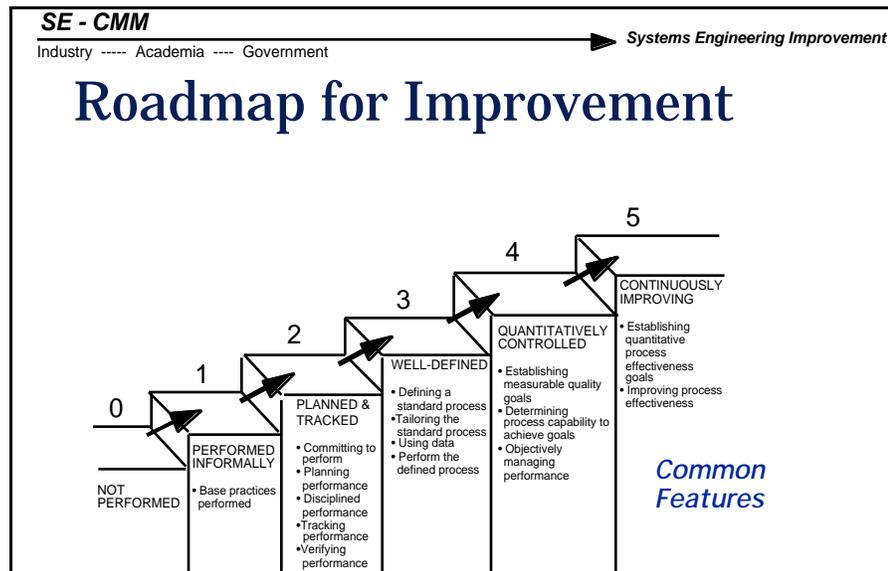
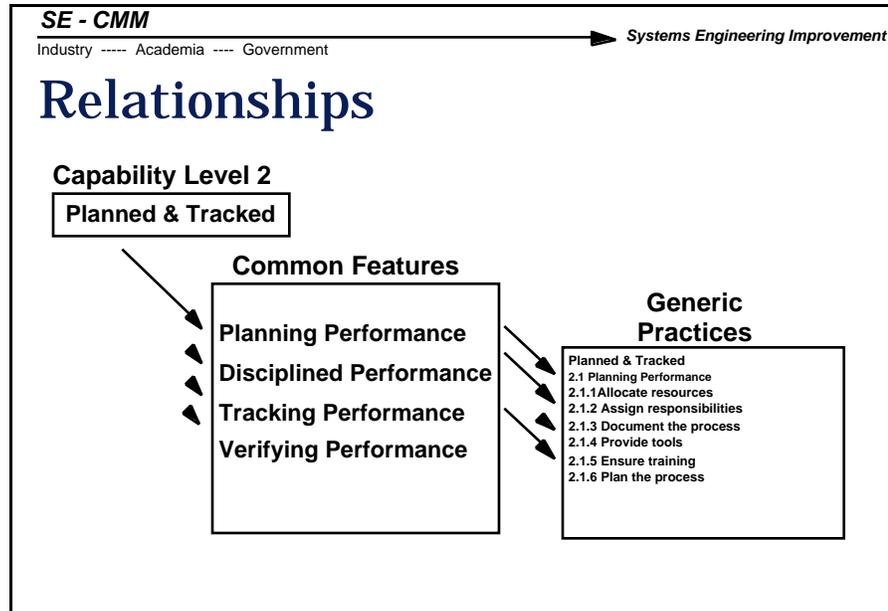
1.0 Performed Level

Common Feature 1: Base Practices are performed

1.1.1 Perform the process. Perform a process that implements the base practices of the process area to provide work products and/or services to a customer.

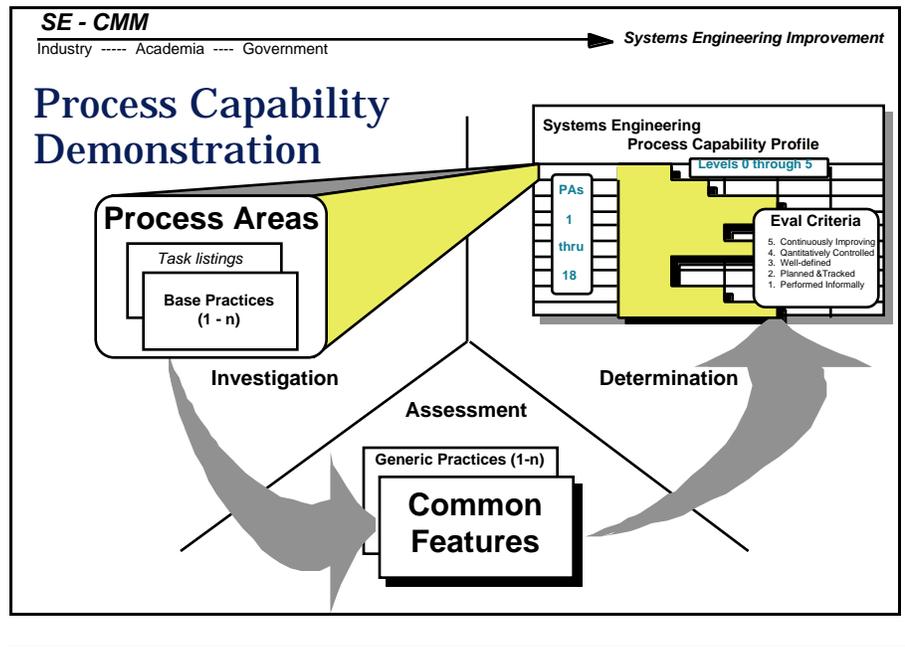
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Appendix A: Template for SAM Opening Briefing, Continued



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Appendix A: Template for SAM Opening Briefing, Continued



Appendix B: Template for SAM Final Findings Briefing

Introduction

The template for the final findings briefing provides ideas on how to present the findings resulting from the on-site period of the appraisal to the appraisal participants. Appraisers are welcome to design whatever materials suit their style/needs. The basic purpose of the final findings briefing and suggested contents are found in Section 2.2.14.

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Appendix B: Template for SAM Final Findings Briefing, Continued



SE - CMM
Systems Engineering Improvement

SE-CMM
Appraisal
Findings Briefing

<date>



Agenda

- **Assessment Background**
- **Rating Profile**
- **Strengths**
- **Weaknesses**
- **Next Steps**

continued on next page

Appendix B: Template for SAM Final Findings Briefing, Continued

Scope of the Assessment

- <organizational/site scope>
- Assessment followed the SE-CMM Appraisal Method <or cite tailoring>
- xx Systems Engineering Leads
 - <Proj A>
 - <Proj B>
 - ...
- xx systems engineers and support personnel chosen from an extended project set across the organization
- xx assessment team members

Assessment Team

- Assessment Team Leader:
 -
- Assessment Team Members
 -

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Appendix B: Template for SAM Final Findings Briefing, Continued

Conduct of the Assessment Process

- Entire team highly responsive
- Strong consensus for systems engineering improvement
- Collaborative and enthusiastic participation
- Candid data gathering

Primary Assessment Objectives

- **During On-site Week:**
 - Understand our organization's current systems engineering practices
 - Identify key areas for process improvement
 - Pre-release training on model/appraisal method
- **Post On-site Week**
 - Develop findings and recommendation report
 - Develop an action plan
 - Management decision on focus of process improvement effort

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Appendix B: Template for SAM Final Findings Briefing, Continued

Next Steps

- Develop findings and recommendation report
- Develop an action plan
- Obtain senior management commitment
- Build consensus on needs
- Provide framework for actions
- Obtain support for actions

Findings Development Process

- Findings synthesize:
 - responses from questionnaires
 - SE leader interviews
 - SE interviews
 - SE leader feedback on preliminary findings
 - Assessment team background/experience
- Process
 - xxx Initial comments from multiple sources
 - Synthesized ~xx weaknesses, ~xx strengths and reviewed with SE leaders
 - Summarized high agreement weaknesses as 8 items
 - Presented strengths and xx summary weaknesses summary to SEs and SE leaders

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Appendix B: Template for SAM Final Findings Briefing, Continued

Findings Development Process, continued

- Findings Criteria
 - We heard it
 - No sweeping statements
 - Only issues with potential recommendations
 - Appraisal team consensus

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Systems Engineering Improvement

Rating Profile

continued on next page

Appendix B: Template for SAM Final Findings Briefing, Continued

Process Area Ratings

PA #	PA Title
1	Analyze Candidate Solutions
2	Develop Fcnl/Perf Requirements
3	Develop Physical Architecture
4	Integrate Disciplines
5	Integrate System
6	Understand Customer Needs & Expectations
7	Verify & Validate System
8	Ensure quality
9	Manage Configurations
10	Manage Risk
11	Monitor & Control Technical Effort
12	Plan Technical Effort
13	Define Orgn's Systems Engrg Process
14	Improve Orgn's SE Processes
15	Manage Product Evolution
16	Manage Systems Engrg Support Environment
17	Manage Systems Engrg Training

R
A
T
I
N
G

<insert profile
histogram
or table here>

PA #

1=Performed Informally
2=Planned & Tracked
3=Defined Process
4=Quantitatively Controlled
5=Continuously Improving

SE - CMM



Systems Engineering Improvement

Findings Summary

continued on next page

Appendix B: Template for SAM Final Findings Briefing, Continued

Strengths

<these are some general ones to get the team started thinking>

- Dedicated People
- Commitment to customer satisfaction
- Technical competence
- Flexibility of workforce
- “Can do” attitude
- Historical successes
- Isolated pockets of successful process improvement efforts

<Finding Summary Title>

- **Finding:**
 - <finding summary framed as a problem statement>
- **Causes:**
 - <potential causes based on preliminary findings and other information heard by the appraisal team>
- **Consequences:**
 - <business-related consequences which provide a motivation for wanting to address the finding>

continued on next page

Appendix B: Template for SAM Final Findings Briefing, Continued

SE - CMM



**More
Model
Information**

Weakness Mapping

- Weakness findings relate to Process Areas:

<finding summary title>	<PA title related to finding>	#
<etc>		

continued on next page

Appendix B: Template for SAM Final Findings Briefing, Continued

General '<capability level>' Barriers

- **Findings:**
 - <findings which generally apply across the process areas which create a barrier to the next capability level>
- **Consequences:**
 - <process capability-related consequences of findings>

Next Steps

- Findings and Recommendations Report
- Action Plan
- Improvements!

continued on next page

Appendix B: Template for SAM Final Findings Briefing, Continued

***If you always do what you've
always done***

***you'll always get what
you've always gotten!***

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Appendix C: Data Tracking Sheet and Instructions

Introduction

The data tracking sheet (DTS) is the primary tool used throughout the on-site period to consolidate and track the information being gathered from the different data sources used in the appraisal. It is a key input into the ratings and findings development process, and when used effectively, adds greatly to the team's ability to understand where sufficient data have been obtained, and where additional information is still needed about the practice of the base and generic practices within the appraised entity. The DTS is referred to throughout the process elements of the on-site period described in Chapter 2.

Symbols used in the DTS

Data in the DTS are recorded primarily via the use of four symbols:

1 or + Indicates that information was heard or otherwise obtained that strengthens or corroborates the view that the practice under consideration is being performed.

0 or - Indicates that information was heard or otherwise obtained that weakens or opposes the view that the practice under consideration is being performed.

Blank or ? Indicates that information was heard or otherwise obtained in relation to the practice, but the nature of the information was such that questions related to the performance of the practice have not been answered.

NA Indicates that the practice is considered not to be applicable to the appraised entity.

The use of these symbols is explained in the process element descriptions in the main body of the document, and illustrated in the blocks below.

Structure of the DTS

The DTS is composed of three pages per process area. Each page lists the short titles of the base practices for that PA and the generic practices for all five capability levels as the rows of a matrix. The columns of the matrix provide space to record the gathering of corroborating or opposing information in relation to the base and generic practices of the SE-CMM. Note that information other than that specifically related to the model is likely to be gathered in the team notes, and may be used to create findings where appropriate. However, these data are not specifically used in the creation of the rating and so are not recorded in the DTS.

continued on next page

Appendix C: Data Tracking Sheet and Instructions, Continued

DTS Contents

Table C-1 explains each of the columns of the DTS:

Column Title	Explanation
Base/Generic Practices	This column contains a listing of the short titles of the base practices for the listed PA, as well as all the generic practices.
Questionnaires A-G	These columns record the translation of the yes/no responses from the questionnaires of the respondents into +/-/?/NA symbols.
Interviews A-D	It is assumed that a maximum of four projects will be appraised in a single appraisal. These columns provide space for recording impressions from the initial interviews with the SE leads.
Practitioner Interviews	These columns provide space for recording impressions from the practitioner interviews, of which there are usually three focus groups.
Preliminary Rating	This the first estimate of the rating of each base or generic practice. Each team member uses the pattern of corroborating and opposing information to formulate an initial opinion of the performance of that practice in the appraised entity as a whole.
Preliminary Findings Review A-D	These columns provide space for recording impressions from the preliminary findings review with the SE leads.
Draft Rating	This column is where the preliminary rating is refined with data gathered via the preliminary findings review, and is the rating that will be correlated with the findings development.
Findings Reviews	These columns provide space for recording information gathered during the draft findings reviews by the SE leads and practitioners.
Final Rating	This is the final rating for each base/generic practice upon which team has reached consensus, and is the basis for the profile that is presented in the final findings briefing.

Table C-1. DTS Contents.. DTS Contents.;{ TC "Table C-1. DTS Contents." \ 1 }

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Appendix C: Data Tracking Sheet and Instructions, Continued

Diagram of an example DTS

A DTS can be created in a spreadsheet, database, or other tool compatible with the appraiser's environment. The following diagram provides an example of a DTS created in a spreadsheet environment.

		Ratings	Questionnaire						Preliminary				Draft				Final				
PA 01: Analyze Candidate Solutions		Questionnaire						SE Leads		Practitioners				SE Leads				Feedbk			
		A	B	C	D	E	F	A	B	C	D	1	2	3	4	A	B	C	D	1	A
Base	1.1	Establish Evaluation Criteria	11																		
	1.2	Define Analysis Approach	12																		
	1.3	Identify Additional Alternatives		13																	
	1.4	Analyze Candidate Solutions			14																
	1.5	Select Solution				15															
	1.6	Capture Results					16														
Generic	2.1.1	Allocate resources	11																		
	2.1.2	Assign responsibilities	12																		
	2.1.3	Document the process	13																		
	2.1.4	Provide tools	14																		
	2.1.5	Ensure training	15																		
	2.1.6	Plan the process	16																		
	2.2.1	Use plans, standards, and procedures	21																		
	2.2.2	Do configuration management	22																		
	2.3.1	Verify process compliance	31																		
	2.3.2	Audit work products	32																		
	2.4.1	Track with measurement	41																		
	2.4.2	Take Corrective Action	42																		
	3.1.1	Standardize the process	11																		
	3.1.2	Tailor the standrad process	12																		
	3.2.1	Use a well-defined process	21																		
	3.2.2	Perform defect reviews	22																		
	3.2.3	Use well-defined data	23																		
	4.1.1	Establish quality goals	11																		
	4.2.1	Determine process capability	21																		
	4.2.2	Use process capability	22																		
	5.1.1	Establish process effectiveness goals	11																		
	5.1.2	Continuously improve the standard process	12																		
	5.2.1	Perform casual analysis	21																		
	5.2.2	Eliminate defect causes	22																		
	5.2.3	Continuously improve the defined process	23																		

Figure C-1. DTS Example Diagram.. DTS Example Diagram. ;{ TC "Figure C-1. DTS Example Diagram." \ 1 }

Appendix D: Sample Schedules for the On-Site Week

Introduction Sample on-site schedules and labor templates are provided in this section. The bases of the samples are an appraisal of three projects with three sets of practitioner groups.

It should be noted that a series of 30 minutes breaks are embedded into the schedules. These breaks can be used by the team as situations and requirements dictate.

Five Day SAM

The following figures and table provide an overview of a typical five day on-site appraisal period. The process flow is demonstrated in Figure D-1

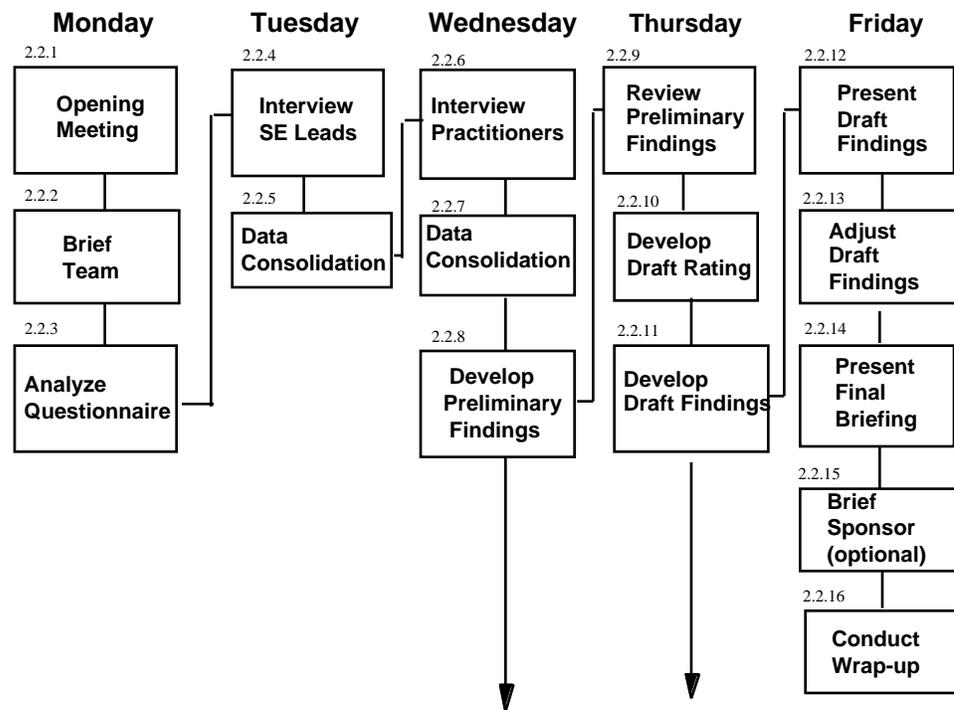


Figure D-1
Typical Five Day Appraisal Process Flow

**Typical Five Day
SAM Schedule &
Labor
Requirements**

Start	Finish	Dur.	Description
Monday			
8:00 AM	9:30 AM	1:30	Opening Meeting
10:00 AM	12:00 PM	2	Brief Team
12:00 PM	1:00 PM	2	Lunch
1:00 PM	5:00 PM	2	Analyze Questionnaire and Develop Response
Tuesday			
8:00 AM	9:00 AM	1	Interview SE Lead #1
9:30 AM	10:30 AM	1	Interview SE Lead #2
11:00 AM	12:00 PM	1	Interview SE Lead #3
12:00 PM	1:00 PM	1	Lunch
1:00 PM	3:00 PM	2	Interview Practitioner Group #1
3:30 PM	4:30 PM	1	Data Consolidation
Wednesday			
8:00 AM	10:00 AM	2	Interview Practitioner Group #2
10:30 AM	12:30 PM	2	Interview Practitioner Group #3
12:30 PM	1:30 PM	1	Lunch
1:30 PM	2:30 PM	1	Data Consolidation
3:00 PM	6:00 - 9:00 PM	3-6	Develop Preliminary Findings
Thursday			
8:00 AM	9:30 AM	1	Review Preliminary Findings with SE Lead #1
9:30 AM	10:30 AM	1	Review Preliminary Findings with SE Lead #2
11:00 AM	12:00 PM	1	Review Preliminary Findings with SE Lead #3
12:00 PM	1:00 PM	1	Lunch
1:00 PM	3:00 PM	1	Develop Draft Rating
3:00 PM	7:00 - 11:00 PM	4 - 8	Draft Finding Ratings
Friday			
8:00 AM	9:00 AM	1	Present Draft Findings to Practitioners
9:30 AM	10:30 AM	1	Present Draft Findings to SE Leads
10:30 AM	12:30 PM	2	Adjust Draft Findings
12:30 PM	1:30 PM	1	Lunch
2:00 PM	3:30 PM	1:30	Present Final Briefing
3:30 PM	4:30 PM	1	Conduct Executive Session
4:30 PM	5:30 PM	1	Wrap-up

**Figure D-2.
Typical Five Day Appraisal Schedule**

Role	Recommended number of people	Hours per person	Total Hours for this role
Facilitator	2	60	120
Appraisal team member (in addition to facilitators)	4-6	50	200-300
Systems engineering leads	3 (1 per project @ 3 projects)	7	21
Practitioners from across organization	30 (3 groups of 10)	6	180
TOTAL			521 - 621

Table D-1. Sample Labor Requirements for a 5 Day Appraisal

Appendix D: Sample Schedules for the On-Site, Continued

Two+Five Day SAM

The following figures and table provide an overview of a typical Two+Five day on-site appraisal period. The process flow is demonstrated in Figure D-3

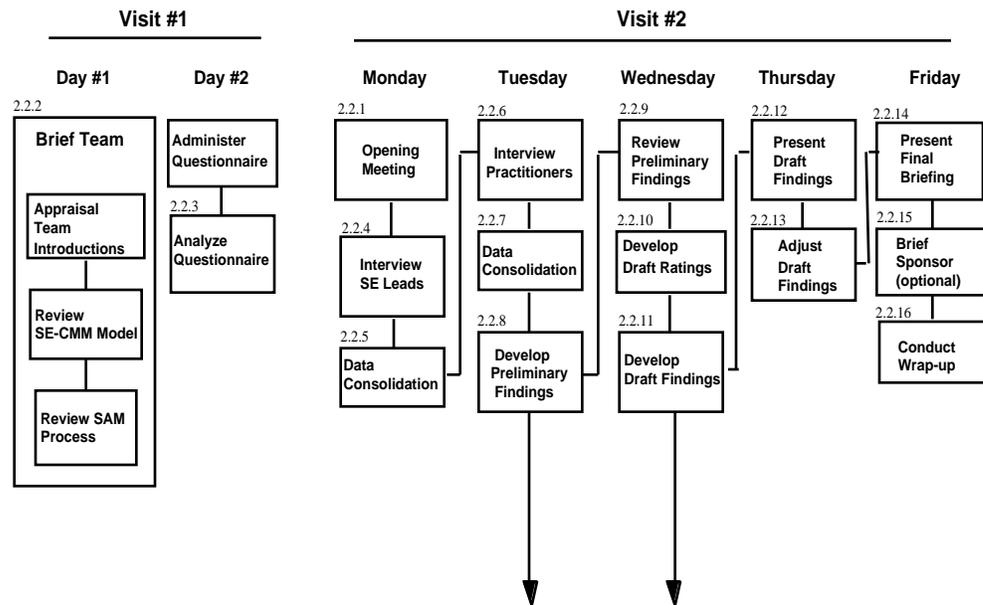


Figure D-3
Typical Two+Five Day Appraisal Process Flow

Typical Two+Five Day SAM Schedule & Labor Requirements

Start	Finish	Dur.	Description
Day #1			
8:00 AM	9:00 AM	1	Appraisal Team Introductions
9:00 AM	12:00 PM	3	Present SE-CMM Model
12:00 PM	1:00 PM	1	Lunch
1:00 PM	5:00 PM	4	Present SAM
Day #2			
8:00 AM	10:00 AM	2	Administer Questions
10:00 AM	11:00 AM	1	Enter Data in Data Tracking Sheet
11:00 AM	12:00 PM	1	Review Questionnaire Responses
12:00 PM	1:00 PM	1	Lunch
1:00 PM	5:00 PM	4	Analyze Questionnaire and Develop Response

Figure D-4. Typical Two+Five Day Appraisal Schedule

Appendix D: Sample Schedules for the On-Site, Continued

Role	Recommended number of people	Hours per person	Total Hours for this role
Facilitator	2	76	152
Appraisal team member (in addition to facilitators)	4-6	66	264-396
Systems engineering leads	3 (1 per project @ 3 projects)	9	27
Practitioners from across organization	30 (3 groups of 10)	8	240
TOTAL			683 - 815

Table D-2. Sample Labor Requirements for a Two+Five Day Appraisal

SE or Project Lead's Appraisal Schedule

Name: _____

Individual: Lead Systems Engineer
Appraisal participant identified as having responsibility for the systems engineering aspects of a project. The systems engineering lead should have a broad knowledge of the full life cycle of the product development cycle.

Labor Requirements: 7 Hours per Person total
1 Person Per Project

Overview: During the SE-CMM, the appraisal team will be using the responses to the SAM (Systems Engineering Capability Maturity Model Appraisal Method) Questionnaire to develop a series of exploratory questions. The intended use of these questions is to develop a better understanding of the organization. Lead SEs are interviewed to clarify questionnaire responses. The interview responses of the lead systems engineers and the practitioner focus groups are combined to develop preliminary findings. Preliminary findings are reviewed and prioritized by lead SEs. The findings are then refined into draft findings. The draft is then reviewed by both the lead systems engineers and the practitioners to develop the final findings. These are presented with ? to the sponsor in ? session with lead SEs and practitioners.

SE-CMM Events:

- Complete the SAM questionnaire
 - Complete the SAM Questionnaire prior to the SE-CMM Appraisal on-site week

Room: _____ Date: _____ Time: _____

- Participate in the Opening Briefing
 - Attend Opening Briefing

Room: _____ Date: _____ Time: _____

- Participate in a series of question and answer sessions
 - Based upon the questionnaire, the appraisal team will develop a set of exploratory questions for each of the systems engineering lead, and "listen fors".
 - The questions will be proposed to the lead systems engineers and the responses recorded
 - The appraisal team will consolidate the answers, along with the practitioners responses, into preliminary findings

Room: _____ Date: _____ Time: _____

Appendix D, Continued

- Provide feedback on the validity of the findings
 - Each of the preliminary findings are presented to each lead systems engineer to assess:
 - > Is it true for his/her project
 - > Is it true for the organization
 - Additional questions may be asked for clarification or for follow-on

Room: _____ Date: _____ Time: _____

- Provide feedback on the draft findings
 - Provide feedback on whether the appraisal team captured what is happening in the organization
 - Assist crafting of draft into final findings for maximum impact

Room: _____ Date: _____ Time: _____

- Participate in the final briefing
 - Be prepared to support findings to sponsor
 - Consider activities that could mitigate findings or improve practice in areas identified

Room: _____ Date: _____ Time: _____

SE or Related Practitioner's Appraisal Schedule

Name: _____

Individual: Practitioners
Individuals who perform or support the systems engineering process (directly or indirectly, e.g., training, QA, CM, marketing, logistics, field support).

Labor Requirements: 5 Hours per Person
4-10 People Per Group

Overview: Through open-ended discussion with different types of practitioners, corroborating or contradictory data is gathered on SE, program and organizational practices. The responses of the individual practitioners and those of the lead systems engineers are combined to develop preliminary findings. The preliminary findings are then refined into draft form with feedback from the lead systems engineers. The draft is reviewed by both the lead systems engineers and the practitioners to develop the final findings.

SE-CMM Events:

- Participate in Opening Briefing
 - Listen, and ask clarifying questions about method or goals.

Room: _____ Date: _____ Time: _____

- Participate in focus groups.
 - A free-form discussion centered around the question "what works or doesn't work well in the systems engineering process?"
 - The facilitator may provide minimal direction in appropriate process areas
 - The responses are recorded
 - The appraisal team will consolidate the information gathered, along with the lead systems engineers' data, into preliminary findings

Room: _____ Date: _____ Time: _____

- Provide feedback on the draft findings
 - Provide feedback on whether the appraisal team captured what is happening in the organization

Room: _____ Date: _____ Time: _____

- Participate in the final briefing
 - Be prepared to support findings to the sponsor

Room: _____ Date: _____ Time: _____

Sponsor's Appraisal Schedule

Name: _____

Individual: Appraisal Sponsor
The sponsor is the person(s) with authority to direct and pay for an appraisal. The sponsor has a leadership role in changing the practice of the organization. Visible endorsement of the appraisal's goals and its results during opening session, and acceptance of results and commitment to improvement at final briefing are critical to the appraisal success.

Labor Requirements: 4 Hours per Person
1 or 2 People

Overview: The sponsor relates the appraisal to business objectives and the improvement efforts of the organization. An initial pre-appraisal session sets goals and context or motivation for performing the appraisal. At the opening briefing, the sponsor visibly encourages open and candid participation and provides his/her motivation for the appraisal. At the final presentation, the sponsor accepts the results, notes that there is plenty to do, thanks the participants for their contributions, and may indicate how the appraisal results will be used in the organization's improvement plan.

SE-CMM Events:

- Establish appraisal goals, scope, resources, and approximate schedule
 - Meet with team leader or facilitator and perform pre-on-site planning activities

Room: sponsors' office Date: _____ Time: _____

- Participate in Opening Briefing.
 - Address appraisal participants as to the purpose and scope of appraisal, outline business objective and organizational improvement efforts.
 - Encourage open, candid dialogue by all participants
 - Indicate interest in outcomes
 - Assure participants of safety regardless of results.

Room: _____ Date: _____ Time: _____

- Participant in Final Findings briefing
 - Accept results after briefing (say, "I hear you")
 - Thank participants for effort and outcome
 - Indicate how results will be used in improvement efforts (e.g., action plan part in improvement efforts).

Room: _____ Date: _____ Time: _____

- Optional: Executive Session (may precede final session)
 - Provide an opportunity for classifications closer to detail level but still non-attributable to project(s) or individuals
 - Provides an opportunity to ask ancillary questions such as "what was your biggest insight not in the briefing?" to each team member.
- Support Report Development, Action Planning, and Improvement
 - Provide resources and visible support for recommendations, and action planning and
 - Provide resources, implementation visible interest and support for plan performance.

Appraisal Team Member's Schedule

Appraisal Team Member Appraisal team members are expected to take training and assist with appraisal questionnaire interviews distribution, collection and analysis as requested pre-on-site, and to special 8am to "whenever done" Monday through Friday of on-site week.

Appraisal Team Leader Schedule

Appraisal Team Leader

The difference between ATL and other team members is that the ATL assumes authority by welcoming participants and acting a master of ceremonies for the opening meeting, she or he also delivers the draft findings and final findings presentations.

Appendix E: SAM Training Support

Introduction

The SE-CMM Project has not committed to producing training materials for SAM. However, the project recognizes that some training beyond similar organizational appraisal methods is necessary to prepare appraisal team members. Many of the materials provided in the SAM appendices can be viewed as training support materials. The information sheets provided in this appendix summarize the steps of the on-site period for SAM and provide an easy reference for appraisers to determine the sequence of events.

Conduct Opening Meeting

Goals

- Visibly demonstrate senior management support for the assessment process.
- Introduce principles of process management.
- Review schedule for the assessment period.

Participants: Senior management + Assessment team + SE leads + Practitioners

Duration: 1.5 hour

Approach

The senior site manager begins this meeting by welcoming the assessment team and indicating management support for the assessment process. The assessment team leader delivers a brief presentation on process management and the assessment process flow. Finally, the site coordinator reviews the assessment schedule, reminding everyone of when and where they are expected to participate.

Q Senior management opening.

- Introduce and welcome assessment team.
- Indicate support for assessment and process improvement.
- Solicit full support and participation.

Q Briefing on process management principles.

Q Briefing on assessment process flow.

- Stress openness.
- Emphasize confidentiality.

Q Repeat confidentiality rules

- No individuals or projects named in results.
- They may *not* disclose comments of others made at this meeting.
- Team will take notes. All notes will be treated as confidential.

Q Review of assessment schedule.

Q Question and answer period.

Familiarize Team with SAM

Goals

- Introduce the team to the assessment process.
- Prepare for the discussions with the SE leaders and practitioners.
- Review the answers to the questionnaire.

Participants: Assessment team

Duration: 3 hours

This is an opportunity for the assessment team to begin to work together. The assessment steps are presented in greater detail than at the opening meeting, and the team's role in each step is clarified. The assessment work begins with a review of the answers to the questionnaire along with the exploratory questions for the project leaders. The exploratory questions may be tailored where special conditions are identified.

Approach

- Q Team building exercise (optional).
- Q Review of assessment steps.
 - Explain conduct of SE leader discussions.
 - Explain conduct of practitioner discussions.
- Q Examine exploratory questions and answers to the questionnaire.
- Q Review assessment schedule.
- Q Question and answer period.

Analyze Questionnaire

Goals

- Review the answers to the questionnaire.
- Develop exploratory questions.
- Prepare for discussions with the SE leader.

Participants: Assessment team

Duration: ~4 hours

The assessment begins with a review of the answers to the questionnaire. Based on the answers to the questionnaire, the team develops exploratory questions. Approximately 40-50 questions should be generated for each project lead. The questions should be designed to elicit more than just a "yes/no" response. For example, questions often begin with, "Would you please describe . . ." When developing a question we are often looking for certain responses, e.g., "SE management plan." Note these words as "listen fors," which the facilitator can use as a cue to ask additional questions if they are not mentioned. Some questions may be accompanied by a request for relevant or supporting documents.

Questions should be used to refine answers or explore inconsistencies. There is a separate set of questions for each SE lead. However, there is usually some overlap. Once the questions are developed, they should be transcribed onto the appropriate form, and copies should be made for each team member. The form should include each question, any "listen fors," document requests, and room for notes.

Approach

- Q Review answers to the questionnaire.
- Q *Brainstorm* a preliminary set of questions.
- Q Organize and eliminate redundant questions, add "listen fors."
- Q Transcribe questions onto forms and make copies for team.
- Q Review next day's schedule.

Interview SE Leads

Goals

- Resolve any misunderstandings from the questionnaire.
- Clarify any anomalies or inconsistencies.
- Focus assessment team on process areas that need improvement.

Participants: Assessment team + SE leads (separately)

Duration: 1.0 hour for each project (+ breaks in between)

Approach

The team leader will conduct the discussions. All other team members should take notes. Any team member can ask a question, although the team leader should be allowed to lead the questioning to ensure that all high-priority questions are covered. The team leader should follow-up on the “listen fors” and note any document requests.

Q Introduce SE lead and the team.

Q Repeat confidentiality rules

- No individuals or projects named in results.
- They may *not* disclose comments of others made at this meeting.
- Team will take notes. All notes will be treated as confidential.

Q Explain the purpose of this session.

Q Cover the material in the exploratory questions.

Q Remind SE lead of any document requests.

Q Remind SE lead of the time and place for the preliminary findings review.

Q Thank and excuse SE lead.

Consolidate Data from SE Lead Interviews

Goals

- Give team members a chance to reflect on previous sessions.
- Discuss any confusing or missing information.
- Perform adjustments to upcoming activities.

Participants: Assessment team

Duration: 1.0 hour

Approach

These sessions give the team a chance to absorb the data they have been given in previous sessions. They begin by reviewing their notes and then discuss any confusing or missing data. Next, changes (if any) to upcoming activities are discussed.

- Q Quietly review notes.
- Q Discuss issues.
- Q Adjust upcoming activities.

Interview Practitioners

Goals

- Hear concerns and views from the perspective of the practitioners.
- Verify information gathered from questionnaire and discussions with the SE leaders.
- Listen for new process issues or areas of concern.

Participants: Assessment team + 1 Practitioner group (6-10 practitioners) per session

Duration: 2 hours for each session + break in between

Approach

Each group consists of 6-10 professionals considered to be experts and opinion leaders in the organization. They should be actually working on projects (i.e., not staff or management). The team leader opens and closes each session and facilitates the discussion. Assessment team members need to relax and let the discussion flow: they should *not* lead the discussions. All assessment team members should, however, take notes during these discussions. Team members should occupy every other seat around the table in order to avoid an “us vs. them” atmosphere.

Q Introduce the topic (if appropriate).

Q Explain the conduct of the meeting.

- How the operation looks to them.
- Free-form discussion (team will not ask specific questions).
- Chance to summarize your major issues at the end.

Q Repeat confidentiality rules.

- No individuals or projects named in results.
- They may *not* disclose comments of others made at this meeting.
- Team will take notes. All notes will be treated as confidential.

Q Introduce everyone (state name and function).

Q Turn meeting over to the practitioners.

Q About 20-30 minutes from the end (5 minutes per person), ask each practitioner
If you could change one thing in your organization other than your boss or your paycheck, what would it be?

Other than the people, what do you think is this organization's major strength?

Q Remind practitioners of the time and place for the draft briefing presentation.

Q Thank and excuse the practitioners.

Develop Preliminary Findings

Goals

- Identify list of key process issues.
- Generate preliminary findings.

Participants: Assessment team only

Duration: 3-6 hours

Approach

Focus on issues for the entire organization. It is important that the findings have the broadest possible application, both to preserve confidentiality and have maximum impact with senior management. Try to keep the goals in mind and use the team's expertise to solve the problems. Avoid the following:

- Issues without useful recommendations.
- Findings based on hearsay.
- Sweeping statements.

Formulating the findings is the most difficult part of the assessment. We begin with preliminary findings which are 40-60 simple statements. At this point in the assessment, it is not necessary to have team consensus. Nor is it necessary to *wordsmith* the findings although redundant questions should be consolidated.

- Q Brainstorm a list of findings - organized by PA.
- Q Review each PA with issues and eliminate redundant questions.
- Q Transcribe list onto form and make copies for each team member.

Review Preliminary Findings

Goals

- Get feedback on preliminary findings.
- Collect any requested documentation.
- Ask SE leads for strengths and weakness.

Participants: Assessment team + SE leads (separately)

Duration: 1 hour for each project

Approach

The team leader will conduct the session, and all other team members should take notes. Any team member can ask a question, although the team leader should be allowed to lead the questioning to ensure that all preliminary findings are covered.

Q Re-introduce SE lead and the team.

Q Repeat confidentiality rules.

- No individuals or projects named in results.
- They may *not* disclose comments of others made at this meeting.
- Team will take notes. All notes will be treated as confidential.

Q Collect any requested documents.

Q Explain the purpose of this session.

Q State each preliminary finding and ask:

Is the finding true for your project?

Is the finding true for the organization?

Q About five minutes from the end ask:

If you could change one thing in your organization other than your boss or your paycheck, what would it be?

Other than the people, what do you think is this organization's major strength?

Q Remind SE lead of the time and place for the draft findings presentation.

Q Thank and excuse SE lead.

Develop Draft Rating

Goals

- Establish team consensus on process capability profile.
- Produce process capability profile for presentation in Final Briefing.

Participants: Assessment team

Duration: 2 hours

Approach

As a result of the data gathering that has taken place so far, team members should have updated DTSs that reflect the data provided via the questionnaires, interviews, and any documentation reviews or presentations conducted. The profile is determined prior to synthesizing the draft finds so as to inform the team's decision making on how to prioritize the findings. The findings should provide the 7-9 top issues that improvement should focus on—without the rating process being relatively complete, issues which may have voluble supporters but do not provide significant leverage points could creep into the findings. The rating algorithm for SAM is relatively simple: at least 90% of applicable base practices should be exhibited across the entire sample of projects selected for a rating of "1" to be achieved. For higher levels, 100% of lower level practices (base and generic) must be satisfied and 90% of the level's GPs must be exhibited across the projects for the rating of that level. That is, if there are 4 GPs and 3 projects, at most one project could fail to perform one GP to still achieve the rating at that level (depending on the capability level) of the generic practices.

- Q Step through each process area.
 - Review notes from interviews
 - Apply rating algorithm.
 - Obtain team consensus on process area rating.
- Q Review profile as a whole for consistency.
- Q Determine presentation style for profile and prepare for the final briefing.

Develop Draft Findings

Goals

- Assign a level of practice for each PA.
- Identify list of (7 ± 2) key process issues
- Generate draft findings briefing.

Participants: Assessment team only

Duration: 4-8 hours

Approach

The assessment team will assign a level of practice (0-5) for each PA. Use the questionnaire analysis and notes from the discussions to assist in this process.

Focus on issues for the entire organization. It is important that the findings have the broadest possible application, both to preserve confidentiality and have maximum impact with senior management. Limit the number of findings to 7 ± 2 . This gives definite direction for process improvement without overloading limited resources. Each finding should consist of

Finding - A single statement of the issue.

Causes - Observations that contribute to the finding.

Consequences - Results that will get management attention, e.g., increased rework.

Preliminary findings are often found to be causes of a more general finding. Both findings and causes should reflect what the team has heard from the SE leads and the practitioners. The consequences are developed by the team to ensure management attention, and need not represent consequences voiced by the SE leader or the practitioners. Again, avoid issues without useful recommendations, unsubstantiated findings, or sweeping generalizations.

Formulating findings is the most difficult part of the assessment. It is the place where the team is most likely to have conflict. Try to keep the SE-CMM in mind and use the team's expertise to solve the problems. For each finding, the team should

- Q Identify level of practice for each PA.
- Q Review notes and discussions of preliminary findings.
- Q Refine issues into findings, causes, and consequences.
- Q Form mini-teams to *wordsmith* individual findings.
- Q Review each finding to reach consensus on wording (entire team).
- Q Complete briefing and produce overheads for presentation.

Present Draft Findings

Goals

- Provide SE leads and practitioners with the opportunity to comment on findings.
- Allow the team to judge the impact of the findings on the organization.
- Build organizational momentum for process improvement.

Participants: Assessment team + Practitioners. Assessment team + SE leads (separate sessions)

Duration: 1 hour for each of two sessions

Approach

The assessment team leader presents the findings to the practitioners and SE leads in separate sessions, first to the practitioners, and then to the SE leads. These groups are kept separate so opening comments are not inhibited. The ratings are *not* presented at this time. In each session, the findings are first presented without interruption so that the audience has a chance to hear all of the findings. The presenter should use the *exact* wording from the slides. The presenter then steps through each finding and asks for comments. The assessment team members may assist the leader in explaining any issues, but should concentrate on taking notes.

- Q Welcome participants and set the context.
- Q Repeat confidentiality rules.
 - No individuals or projects named in results.
 - They may *not* disclose comments of others made at this meeting.
 - Team will take notes. All notes will be treated as confidential.
- Q Make presentation (without interruption).
- Q Repeat each finding and solicit comments.
- Q Remind participants of the time and place of the final presentation.

Adjust Draft Findings

Goals

- Refine wording for final findings presentation.
- Prepare final presentation.

Participants: Assessment team

Duration: 2-4 hours

Approach

As a result of hearing the findings presentation and hearing the two groups' comments, the team will see places where the focus or wording of some of the findings needs refinement. The goal should be to maximize the acceptance of the assessment. It is important to use the assessment to build momentum for process improvement. This sometimes requires weakening or strengthening the wording for a finding.

Therefore, a set of next steps should be scheduled that builds on the findings and results in observable changes. If the organization's expectations are not satisfied, the opportunity for change may be lost forever!

- Q** Step through each finding.
- Review notes from presentations.
 - Refine wording.

Present Final Briefing

Goals

- *Visibly* present the results of the assessment to senior management.
- Build support for addressing the findings.
- Review next steps.

Participants: Senior management + Assessment team + SE leads + Practitioners

Duration: 2 hours

Approach

The assessment team leader presents the final findings brief. The final briefing will include

1. Assessment scope - projects & participants (thank everyone!).
2. Rating - level of maturity for each PA.
3. Strengths - organization's strong points.
4. Findings - adjusted draft findings.
5. Next steps - findings & recommendations report, action plan, . . .

Brief Sponsor (optional)

Goals

- Provide additional background.
- Resolve any open issues with senior management.
- Discuss next steps.

Participants: Senior management + whomever they wish to attend

Duration: 1 hour

Approach

This optional session gives senior management an opportunity to ask questions and discuss any issues that they were reluctant to raise in the open form of the final briefing. It is also an opportunity for the team leader (or the entire team) to promote follow-on activities. Remember that the confidentiality rules still apply! Do *not* let senior management use this session to fix blame for any problem or to attribute particular findings to a project or individual.

Conduct Wrap-up

Goals

- Evaluate the SE-CMM.
- Evaluate the assessment process.
- Plan next steps.

Participants: Assessment team

Duration: 1 hour

Approach

The assessment team uses this session to generate feedback on the SE-CMM pilot assessment. Each team member completes the questionnaire evaluation form. These results, along with the questionnaire evaluation form from the SE leads is returned to the SE-CMM authors for review. Next, a discussion focuses on the model and the assessment process.

- Q Each team member completes a questionnaire evaluation form.
- Q The team discusses the SE-CMM. What works? What doesn't? What's missing?
- Q The team discusses what in the assessment process worked and what did not.

Before the team breaks, the next steps should be scheduled and responsibilities assigned.

- Q Discuss next steps.
 - Findings and recommendations report?
 - Action plan?
- Q Schedule next steps.

Post-On-Site Week Activities

Goals

- Document findings for future comparison
- Develop, validate, and present recommendations to mitigate findings
- Establish sponsorship for improvement efforts
- Develop action plans to implement recommendations
- Perform action plans

Participants:	Appraisal sponsor
	Some members of appraisal team
	Those with knowledge and skills to help with planning and performance of improvement program
Duration:	Findings and Recommendations Report - approximately 2 weeks (should start before On-Site Week)
	Action planning - approximately 2-4 weeks but may be longer
	Action plan implementation - 11 - 35 months depending on organization maturity and extent of changes needed and resources available

Approach

This phase is where the organization's wheels meet the road. The findings must be documented and this is usually done with the recommendations as a short report. The report may be separate from, or included as an appendix to, the Action Plans developed to implement or deploy the recommendations. Part of the Action Plans is the priorities and schedule for implementation. Often an organization needs to prototype its change mechanisms on one project before trying to extend them to the organization as a whole, or place infrastructure such as a software, systems, or product process group in place with resources and change charter. Sponsorship for the appraisal must also be extended to the implementation of changes. Developing this sponsorship is non-trivial. Finally, the action plans must be turned on and allowed to run before a re-appraisal can show that improvements have happened (or not) and permit a refocus of organizational change efforts.

A Technique for Recommendation Generation and Documentation of Findings and Recommendations

- Identify selected personnel for their knowledge in the subject area of a finding (especially those who seemed to be doing the area well or better than others)
- With the appraisal team or a subset, review the finding and develop a common vision of the root causes if not evident in the findings statement or supporting findings (causes/consequences).
- Perform a solution generation tree diagram exercise (Ref: “Memory Jogger Plus+” Program Decision Process Chart [PDPC technique] description)
 - Write the problem statement (what is to be changed from the finding)
 - Brainstorm possible solutions/actions that would eliminate or reduce its impact
 - For each alternative, brainstorm the consequences (costs, benefits, other side effects)
 - For each consequence, come to consensus and record whether it is +, -, or implementation-dependent on whether it would be good (+) or bad (-) and leave blank
 - Collect those alternatives with mostly + or blank consequences - these are low-risk actions to eliminate or mitigate the problem!
 - Write these up as a recommendation in format: Finding, Recommendation, Rationale (no more than 1-3 paragraphs)
- Brief the practitioners group and ask for improvement suggestions
- Incorporate as the team feels need
- Brief the systems engineering or project leaders (interviewees) and ask for improvement suggestions and any political sensitivities that might require better wording
- Incorporate as indicated
- Deliver the report and brief the sponsor within a week for feedback. At the meeting work on what will be needed for long term sponsorship of the change effort, and the desired format for action plans if any (offer that below or the organization’s “usual” plan template)

A Technique for Action Planning

- Identify and obtain participation of those with knowledge, skills, and organizational influence useful to plan success and efficiency (one organization requires participation in this of at least one “Archie Bunker” to ensure broad enough understanding of resistance to change)
- Meet on each recommendation having prepared by reviewing the entire set (for leverage between them) and the preferred format or template
 - Develop measures of success (observable outcomes that can serve as exit criteria so that an objective outsider could say when the project was done)

- Develop output descriptions (what will the outputs needed to achieve the success criteria look like or be like? Make these as measurable as possible.)
- Develop validation/verification mechanisms (who will check what and when during and at the end of the plan to ensure it's working the way it was planned and achieving the desired outcomes?)
- Develop entry criteria - what must be done before the action plan can begin
- Develop inputs descriptions - what will be needed from others during the plan
- Develop task descriptions (high level or detailed flow charts or deployment charts are fine)
- Much of this can be developed by assignment to subgroups, but then the action planning team must peer review the sections to ensure everyone agrees that it is not too much or too little, and that it provides sufficient motivation and achievement to do
- After the initial proposal, a force field analysis (Ref: "Memory Jogger") should be performed to identify risks and leverage forces and develop contingencies if needed
 - Write the action plan title at the top of a flip chart
 - Draw a vertical line down the page under the title
 - On the left write "forces for", and on the right, "barriers to"
 - Brainstorm both and record on the flip chart(s)
 - Assign consensus or median weights from 1 (trivial force for or barrier to the plan working) to 5 (overwhelming force for, or insurmountable barrier to the plan working)
 - Add the weights and if the ratio is 3:2 or better for the plan, write it up and submit it
 - If the ratio is less than 2:3 for, then consider seriously NOT suggesting the plan
 - If the ratio is between 2:3 and 3:2, draw a line at the bottom of the flips and on the barriers side, write "Additional costs" with a force of 4. Brainstorm things that could be done for more resources or sponsorship, etc. that could overcome each barrier of level 3 or 4 (or 5), until the total of the original force field ratio and the additional 4 barrier and contingencies on the forces for side surpass 3:2 ratio. The Action Plan write up then includes these extra forces that cost more than your original plan as "contingencies" to be executed if the barriers become real - that is, they are risk mitigations.
- Prioritize and consider the sequencing of the action plans for each finding. Which ones are least risky but provide more than nominal impact or improvement? Make these first. Ensure you pilot actions on a "friendly group" before deploying to the whole organization. Note that the schedule will be longer than anyone hopes for or expects routinely. Consider how to shorten it, but stick to your estimates the first time.

Appendix F: Site Coordination Checklist

Introduction

This checklist is used to support the SE-CMM appraisal site coordinator in preparing for the on-site period of the SE-CMM appraisal method (SAM).

Preparation tasks (prior to on-site period)

Major events that the site coordinator is responsible for arranging are described in the table below. The time frames given are approximate, and are based around the beginning of the on-site period. The coordinator can use this list as a checklist for preparation.

	Task	Description	Time frame
	Executive briefing to obtain sponsorship for SAM	Briefing by site coordinator, appraisal team leader or facilitator, as appropriate, to the potential sponsor introducing the SE-CMM and SAM concepts.	At least six weeks prior to on-site period
	Determine confidentiality requirements	Determine with senior management the need for nondisclosure and confidentiality of agreements.	Four to six weeks prior to on-site period
	Select projects (three to four projects)	Site coordinator, working with the sponsoring manager, selects projects appropriate to the appraisal purpose.	Four to six weeks prior to on-site period
	Determine on-site week	Working with senior management and the facilitator, determine a week when the systems engineering leads, senior management, facilitators, and potential appraisal team members are available as needed.	Four to six weeks prior to on-site period

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Appendix F: Site Coordinator Checklist, Continued

Preparation tasks, continued

	Task	Description	Time frame
	Select appraisal team (five to seven team members plus one to two facilitators)	Site coordinator typically determines the pool of appraisal team members for consideration by management, unless the coordinator has been empowered to make the selection, in which case the selections are made. The facilitator is usually available to help in screening candidates. Provide a copy of the SE-CMM and SAM description to the appraisal team members.	Four to six weeks prior to on-site period; goal is to select the team far enough in advance to be able to get the team members to schedule the appraisal week
	Select systems engineering lead	For each project selected, identify the systems engineering leads for the selected projects and talk to them about their involvement. Also, verify their availability during the appraisal week (approximately seven hours per person).	Three to four weeks prior to on-site period
	Select practitioners	Select potential interviewees in the selected projects as well as other projects in the organization being appraised. Typically, the facilitator is available to consult on participants, and management typically approves the participant list.	Three to four weeks prior to on-site period

Table F-1. Preparation Tasks for Site Coordinator, continued

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Appendix F: Site Coordinator Checklist, Continued

Preparation tasks, continued

	Task	Description	Time frame
	Administer questionnaire	The selected systems engineering leads (and other practitioners, if selected for questionnaire analysis) are provided with the SAM questionnaire, and the site coordinator provides the time frame for returning the questionnaire. Hand out the SE-CMM glossary with the questionnaire. The site coordinator should be available to answer any clarifying questions; usually a one or two day turnaround is requested if the questionnaires are not completed.	Two weeks prior to on-site period
	Handout about questionnaire	For pilots, when the questionnaire is handed out, also hand out the questionnaire about the questionnaire and emphasize the need for feedback from people who answer the questionnaire.	Two weeks prior to on-site period
	Collect questionnaire	The site coordinator collects the completed questionnaires, makes a copy for disaster recovery purposes, and mails questionnaires back to the facilitator for initial analysis.	To be received by facilitator one week prior to on-site

Table F-1. Preparation Tasks for Site Coordinator, continued

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Appendix F: Site Coordinator Checklist, Continued

Preparation tasks, continued

	Task	Description	Time frame
	Prepare appraisal team notebook	Prepare a three-hole binder (for each appraisal team member) that contains copies of the completed questionnaires and blank paper for taking notes. Tabs for each project, each practitioner discussion, preliminary findings, and findings briefing are often helpful. These notebooks are handed out during the team training at the beginning of the on-site period.	One week prior to on-site period
	Schedule rooms for opening and final briefing rooms	Schedule rooms large enough to hold all anticipated participants, including management, appraisal participants, and other identified invitees.	Two weeks prior to on-site period, depending on how tight facilities are
	Schedule rooms for practitioner interviews	Schedule rooms large enough to hold 20 people for the practitioner interviews.	Two weeks prior to on-site period, depending on how tight facilities are

Table F-1. Preparation Tasks for Site Coordinator, continued

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Appendix F: Site Coordinator Checklist, Continued

Preparation tasks, continued

	Task	Description	Time frame
	Schedule rooms for systems engineering lead interviews and assessment team	Schedule a room large enough for 10 people plus some extra workspace that can be blocked off for team use for the entire week of the on-site period. Preferably, this area is somewhere that can be locked at night, but not in an area that will require escort of the appraisal team members/facilitators during the week.	Two to three weeks prior to on-site period, depending on how tight facilities are

Table F-1. Preparation Tasks for Site Coordinator, continued

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Appendix F: Site Coordinator Checklist, Continued

Preparation tasks, continued

	Task	Description	Time frame
	Schedule support facilities	<p>The following support tools should be provided:</p> <ul style="list-style-type: none"> • If possible, a personal computer of the type most often used in the organization (usually Windows-based or Mac) and an associated dedicated laser printer scheduled for the week. (Desired software is MS Word and MS Powerpoint for current facilitator group.) • Instructions for obtaining photocopies in the building being used. (This is not much of an issue if a building familiar to the appraisal team members is being used.) • Lists of facilities, hotels, and restaurants that are close by (preferably with a map) and information on restaurant delivery service. • Flip charts/markers, transparencies, notepads, power strips, 3-hole punch, binders, lots of post-it notes. 	Computer may take several weeks to arrange; other arrangements just need to be made prior to on-site period

Table F-1. Preparation Tasks for Site Coordinator, continued

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Appendix F: Site Coordinator Checklist, Continued

Preparation tasks, continued

	Task	Description	Time frame
	Schedule support staff	If possible, provide dedicated secretarial support for the last three days of the on-site period to provide transcription, revision, printing, reproduction and note-taking services. (In many cases the appraisal team ends up doing their own support, but having a secretary to do these tasks can really relieve some of the grunge work.)	Two to three weeks prior to on-site period
	Verify senior management schedule	Verify that senior management is prepared to attend and speak at the opening briefing, and attend the final briefing.	Two weeks, then one week prior to on-site period
	Verify participant schedule	Verify that participants are available in their allotted time slots; make any revisions necessary to the schedule.	Two weeks, then one week prior to on-site period
	Verify team member schedule	Verify that appraisal team members have no conflicts during the on-site period.	Two weeks, then one week prior to on-site period

Table F-1. Preparation Tasks for Site Coordinator, continued

Appendix G: Approved SAM Requirements

Introduction

This appendix contains the requirements for SAM approved by the SE-CMM Steering Group.

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Appendix G: Approved SAM Requirements, Continued

Introduction

The following requirements are synthesized from the "Sources of Requirements" v.3 used at the 3/8/94 SE-CMM author's meeting. In addition, some requirements (i.e., those in 6.0 and 7.0) are derived from the SEI's Common Appraisal Framework (CAF), with which the method is intended to be compatible. Ultimate compatibility with the CAF depends on the final form of that framework.

1.0 Scope

- 1.1 The 1994 SE-CMM Appraisal Method (SAM) scope is limited to assessment of the appraised entity's process capability.
 - 1.2 The SAM deals with the diagnostic phase of a process improvement program.
 - 1.3 v1.0 of the SAM is focused on appraisal to support self-improvement.
-

2.0 Applicability

The SAM will be

- 2.1 Applicable to multiple types of appraised entities (e.g., sites, organizations, and projects).
 - 2.2 Adaptable to in-house process improvement situations.
 - 2.3 Adaptable to supplier selection situations.
 - 2.4 Applicable to contract-driven environments.
 - 2.5 Applicable to market-driven environments
-

3.0 Pre-on-site work

- 3.1 Pre-on-site work for participants of SAM will be limited to four hours per appraisal participant.
 - 3.2 Pre-on-site work for SAM appraisal team members will be limited to 40 hours per appraisal team member, not including training.
 - 3.3 SAM appraisal team members will be trained prior to participation in an SE-CMM appraisal.
-

continued on next page

Appendix G: Approved SAM Requirements, Continued

4.0 On-site work

- 4.1 On-site work for appraisal participants will be limited to five calendar days, of which not more than two staff-days per person will be required over that time.
 - 4.2 SAM will target 8-10 hour days for skilled appraisal team members.
-

5.0 Post on-site work

- 5.1 Post-on-site work for appraisal participants will be limited to four hours per participant.
 - 5.2 Post-on-site work for appraisal team members to complete the SAM-related work will be limited to 40 hours per team member.
-

continued on next page

Appendix G: Approved SAM Requirements, Continued

6.0 CAF conformance

Note: The SE-CMM project intends for the SAM to conform to the SEI's common appraisal framework. This satisfies a higher level project requirement that the SE-CMM avoid conflicts with the CMM. The individual requirements below collectively serve this purpose.

- 6.1 The SE-CMM is the reference model for the SAM.
- 6.2 No applicable part of the SE-CMM is excluded in the SAM.
- 6.3 SAM uses the CAF rating scale:
 - Satisfied
 - Not satisfied
 - Not applicable
 - Not rated
- 6.4 Judgments made as part of SAM are made by the appraisal team.
- 6.5 Judgments made by the appraisal team address base practices, generic practices, and process areas.
- 6.6 CAF rules of evidence will be applied in SAM; i.e., data will be corroborated by multiple sources. (See CAF for specific rules of evidence.)
- 6.7 Confidence ratings will be determined as defined in the CAF, i.e., confidence associated with both the criteria selected and the execution of the method will be addressed.
- 6.8 The SAM will document how and where it conforms with the CAF.
- 6.9 The SAM will limit the number of appraisal team members to a minimum of four and a maximum of eight.
- 6.10 The SAM will require the appraisal team to document the domain of the appraisal (project, organization, site).

continued on next page

Appendix G: Approved SAM Requirements, Continued

7.0 Appraisal activities

The following activities are required to be addressed in the SAM, to achieve CAF conformance:

- 7.1 Planning
- 7.2 Selection
 - 7.2.1 Selection of appraised entity
 - 7.2.2 Selection of appraisal team
- 7.3 Data collection
- 7.4 Data consolidation
- 7.5 Rating
- 7.6 Reporting
- 7.6 Post-appraisal activities

8.0 Confidence

8.1 SAM will address issues related to confidence and risk in versions beyond v1.0. Version 1.0 of SAM does not meet the CAF requirement to address confidence and risk.

9.0 Tailoring

9.1 SAM will describe limits of tailoring expected.

10.0 Coverage

10.1 SAM will describe coverage requirements related to a particular confidence rating.

11.0 Support materials

SAM will describe

11.1 The training materials required for an SE-CMM appraisal.

11.2 The supporting briefing materials required for an SE-CMM appraisal.

11.3 The supporting data-gathering materials required for an SE-CMM appraisal.

11.4 Data-analysis materials required for an SE-CMM appraisal.

Appendix H: Traceability Matrix to SEI CMM Appraisal Framework (CAF)

The CAF is a standard against which appraisal methods can be compared. Compliance generally means that the appraisal method will provide an accurate, repeatable set of findings and rating according to the model, if used in its domain of reference.

SAM/CAF conformance matrix

Requirement in CAF 1.0	SAM Paragraph
R1. Method documentation references: <ul style="list-style-type: none"> • Reference to CMM version • Reference to CAF version • How it implements CAF appraisal activities • How it implements CAF appraisal artifacts • How it implements CAF appraisal guidance 	Abstract 1.1.2, Assumptions This Appendix 1.1.1 Phases 1.1.1 Relate to CBA-IPI 1.1.3 Plan Appraisal Details 1.1.4 Exit Criteria 2.2.5 Consolidate Data 1 2.2.6 Interview Practitioners 2.2.7 Consolidate Data 2 2.2.9 Review Prelim Findings 2.2.10 Develop Draft Rating 2.2.13 Adjust Draft Rating 2.2.14 Final Briefing 2.2.15 Sponsor Briefing 2.2.16 Appraisal Wrap-up This Appendix
R2. Guidance on: <ul style="list-style-type: none"> • Planning and preparing for appraisal • Conducting appraisal • Reporting results 	2.1 Preparation 2.1.4 to 2.3.3 2.2.13 to 2.2.14 and 2.3.1 to 2.3.2

Table H-1. Traceability Matrix to SEI CAF. Traceability Matrix to SEI CAF;{ TC "Table H-1. Traceability Matrix to SEI CAF" \ 1 }

continued on next page

Appendix H: Traceability Matrix to SEI CMM Appraisal Framework (CAF), Continued

SAM/CAF conformance matrix, continued

Requirement	SAM Paragraph
R3. Guidance for: <ul style="list-style-type: none"> Identifying appraisal goals Identifying appraisal constraints Determining suitability wrt goals/constraints/Abstract to Scope 	2.1.1 Sponsor Commit 2.1.1 Sponsor Commit 2.1.2 Appraisal Parameters 2.1.3 Appraisal. Details 2.1.1 Sponsor Commit
R4. Guidance to select CMM scope	2.1.1 Purpose/Summary * 2.1.1 Tailor Parameters
R5. Guidance to select organizational scope	2.1.2 Summary Description
R6. Guidance to obtain organization. commitment	2.1.1 to 2.1.3
R7. Appraisal team qualification criteria: <ul style="list-style-type: none"> >= 5 yrs experience for majority of team >= 25 yrs experience total on team >= 6 yrs management experience for manager on team >= 10 yrs management experience total for team 	* 1.3 Roles * 1.3 Roles * 1.3 Roles * 1.3 Roles
R8. Appraisal team leader has experience: ** <ul style="list-style-type: none"> Using appraisal method Managing teams Facilitating group discussions Making presentations 	* 1.1.3 Facilitator * 1.1.3 Roles 1.1.3 Facilitator * 1.1.3 AT leader
R9. Guidance for determining appropriate team size	1.1.3 (1st paragraph.) 2.1.2 Table 2-5 * target = 6 members

Table H-1. Traceability Matrix to SEI CAF, continued

continued on next page

Appendix H: Traceability Matrix to SEI CMM Appraisal Framework (CAF), Continued

**SAM/CAF
conformance
matrix, continued**

Requirement	SAM Paragraph
R10. Guidance on preparing a team to do appraisal	1.4 Collect data 2.2.1 Table 2-10 2.2.2 SAM training
R11. Guidance for site selection	* 2.1.2 Select Parameters * based on goals/project status
R12. Guidance for project selection	* 2.1.2 Select Parameters * based on goals/project status
R13. Guidance for participant selection	1.1.3 Roles 1.1.4 to 2.1.4
R14. Guidance for appraisal participants	2.2.1
R15. Guidance for appraisal planning: <ul style="list-style-type: none"> • Identifies appraisal goals • Identifies appraisal scope • Identifies appraisal activities • Provides appraisal schedule • Identifies resources • Identifies outputs and their usage • Identifies anticipated follow-on activities • Documents tailoring and trade-offs • Identifies risks with appraisal execution 	2.1.1 Sponsorship 2.1.1 to 2.1.3 2.1.3 Plan 2.0 On-site (missing figure) 2.1.2 Summary 2.1.3 Summary 2.1.3 Summary 2.3.0 Post-Appraisal * 2.3.4 Develop Report 1.2 Summary/Tailor * 2.1.3 Summary * plan includes "force field"
R16. Guidance for time to conduct appraisal	2.1.0 Typical Duration
R17. Guidance for appraisal logistics	2.1.3 Summary * hours, meals, space, etc. Appendix C

Table H-1. Traceability Matrix to SEI CAF, continued

continued on next page

Appendix H: Traceability Matrix to SEI CMM Appraisal Framework (CAF), Continued

**SAM/CAF
conformance
matrix, continued**

Requirement	SAM Paragraph
R18. Define artifacts for: <ul style="list-style-type: none"> • Recording observations • Categorizing observations • Classifying observations • Validating observations • Recording coverage • Making rating decisions Reporting findings and ratings Managing logistics	2.1.4 Questionnaire 2.2.3 Generate Qs Appendix C 2.2.5 Data Tracking Sheet 2.2.3 Summary 2.2.5 Update DTS 2.2.6 Summary 2.2.7 Update DTS 2.2.9 Review Finds 2.2.10 Update DTS * Use PA graphics with findings stickies to display coverage 2.2.7 Prelim ratings 2.2.10 Draft rating 2.2.12 Present Finds 2.2.14 Present brief 2.2.15 Brief sponsor 2.3.2 Output to others 2.1.3 Notes Appendix G, coord checklist

Table H-1. Traceability Matrix to SEI CAF, continued

continued on next page

Appendix H: Traceability Matrix to SEI CMM Appraisal Framework (CAF), Continued

SAM/CAF conformance matrix, continued

Requirement	SAM Paragraph
R19. Guidance to implement data collection techniques: <ul style="list-style-type: none"> • Administering instruments • Conducting presentations • Conducting interviews • Reviewing documentation 	2.1.4 Appraisal participants 2.2.1 Table 2-10 2.2.9 Table 2-26 2.2.12 Table 2-32 * 2.2.14 Table 2-36 * 2.2.15 Table 2-38 2.2.4 Table 2-16 2.2.6 Table 2-20 * 2.2.3 Table 2-14 * suggestions for process documentation/artifacts to ask for and quality attributes (add appendix template)
R20. Guidance for collecting data: <ul style="list-style-type: none"> • Extracting data from data gathering sessions • Recording data as observations • Classifying observations • Categorizing as CMM/non-CMM findings • Categorizing as CMM/non-CMM findings 	2.2.3 Table 2-14 * needs explicit map of instrument answers to KPAs 2.2.5 Table 2-18 2.2.7 Table 2-22 2.2.10 Table 2-28 2.2.13 Table 2-34 2.2.5 Table 2-18 2.2.7 Table 2-22 2.2.10 Table 2-28 * 2.2.3 Table 2-14 * note how to set up KPA graphics with non-CMM section(s) * 2.2.8 Table 2-24 * 2.2.11 Table 2-30

Table H-1. Traceability Matrix to SEI CAF, continued

continued on next page

Appendix H: Traceability Matrix to SEI CMM Appraisal Framework (CAF), Continued

SAM/CAF conformance matrix, continued

Requirement	SAM Paragraph
R21. Guidance for validating observations: <ul style="list-style-type: none"> • Corroboration from multiple, independent sources • Interviews by doers of work or outcome document reviews 	2.2.5 Table 2-18 2.2.7 Table 2-22 2.2.10 Table 2-28 2.2.13 Table 2-34 2.2.6 interviews
R22. Guidance to validate a portion of interview data by KPA (goal-related) documentation	2.1.4 Notes 2.2.3 Notes 2.2.4 Notes 2.2.6 Notes
R23. Guidance for observation coverage of scope and institutionalization: <ul style="list-style-type: none"> • Each goal satisfied • Each KPA institutionalized (common features) • Each ML is satisfied 	Not applicable * 2.1.4 Summary * How generic practices are covered in Questionnaire and document review 2.2.10 Table 2-28 2.2.13 Table 2-34 Not applicable
R24. Mechanisms to adjust collection to obtain coverage	2.2.3 Table 2-14 2.2.5 Table 2-18 2.2.7 Table 2-22 2.2.10 Table 2-28
R25. Guidance for collected data traceability to outputs	* 2.1.4 Summary * Add graphic display of +/- data from Questionnaire 2.2.5 Table 2-18 2.2.7 Table 2-22 2.2.10 Table 2-28 2.2.13 Table 2-34

Table H-1. Traceability Matrix to SEI CAF, continued

continued on next page

Appendix H: Traceability Matrix to SEI CMM Appraisal Framework (CAF), Continued

SAM/CAF conformance matrix, continued

Requirement	SAM Paragraph
R26. Require ratings of: <ul style="list-style-type: none"> KPA: Goals 	* 2.1.4 Summary * How generic practices are covered in Questionnaire and document review 2.2.10 Table 2-28 2.2.13 Table 2-34 Not applicable
R27. If appraisal calculates maturity level rating, consistent w/ five level scale in CMM for SW	Not applicable
R28. Rating process uses the rating values: <ul style="list-style-type: none"> Satisfied Unsatisfied Not applicable Not rated 	Not applicable
R29. Rating process specifies: <ul style="list-style-type: none"> Goals can be rated when coverage is sufficient KPAs can be rated when goals have been Maturity level can be rated when KPAs have been 	Not applicable (goals) Not applicable (goals) Not applicable (ML)
R30. Rating process uses consensus of team	2.2.10 Table 2-28 2.2.13 Table 2-34
R31. Ratings are based on CMM for software, V1.1	Not applicable
R32. Rating process requires ratings to be based on findings	2.2.10 Table 2-28 2.2.13 Table 2-34
R33. Rating process specifies goals are rated: <ul style="list-style-type: none"> Satisfied (conditions) Unsatisfied (conditions) Not applicable (conditions) Not rated (conditions) 	Not Applicable (there are no goals included in the SE-CMM model)

Table H-1. Traceability Matrix to SEI CAF, continued

continued on next page

Appendix H: Traceability Matrix to SEI CMM Appraisal Framework (CAF), Continued

**SAM/CAF
conformance
matrix, continued**

Requirement	SAM Paragraph
R34. Rating process for KPAs based on goals	Not applicable
R35. Rating process which specifies maturity level by KPA satisfaction	Not Applicable
R36. Reports the team provides are identified:	2.1.1 Tailor Parameters 2.2.14 Summary 2.3.1 Lessons learned 2.3.2 Report to others
R37. Reporting includes the following data: <ul style="list-style-type: none"> • Scope • Selections (site, projects, participants, team) • Findings • Ratings • Risks associated with accuracy/completeness 	Appendix B (example) Appendix B (example) 2.2.11 Table 2-30 2.2.13 Table 2-34 2.2.10 Table 2-28 2.2.13 Table 2-34 * 22.2.10 Table 2-28 * Appendix B (example)
R38. Guidance for protecting confidentiality	Appendix Questionnaire 2.2.1 Table 2-10 Appendix F Training Materials 2.2.4 Table 2-16 2.2.6 Table 2-20 * 2.2.9 Notes * add note to remind of confidentiality 2.2.12 Table 2-32 2.2.14 Summary 2.2.15 Summary
R39. Guidance for retention of records	2.3.3

Table H-1. Traceability Matrix to SEI CAF, continued

continued on next page

Appendix H: Traceability Matrix to SEI CMM Appraisal Framework (CAF), Continued

Table H-1 Notes *Items preceded by "*" are suggestions to satisfy this requirement.

There is an implicit assumption which should be explicit (experience, "how to").

**Item where SAM deviates acceptably from CAF by re-allocating requirement

Appendix I: References

Introduction

This appendix provides the references for documents cited within the SAM.

Reference List

[Anno1][[Anno2]SECMM]Bate, R., Garcia, S. et al. *A Systems Engineering Capability Maturity Model, Version 1.0*, (SECMM-94-04|CMU/SEI-94-HB-04). Pittsburgh, PA: Carnegie Mellon University, Software Engineering Institute: December 1994.

[CAF] Masters, S. *CMM Appraisal Framework, Version 1.0*, " (ESC-TR-95-001|CMU/SEI-95-TR-001). Pittsburgh, PA: Carnegie Mellon University, Software Engineering Institute: 1995.

Appendix J: SAM Questionnaire Context

Introduction This appendix contains the instructions and forms for the SAM questionnaire.

In this appendix The following table provides a guide to the information found in this appendix.

Topic	See Page
Instructions for the SAM Questionnaire	A-76
Glossary	A-78
Respondent Feedback	A-81
Site Coordinator Instructions for Distributing Questionnaire	A-82
Questionnaires by Process Area	A-87

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Instructions for the SAM Questionnaire

Purpose

The purpose of this questionnaire is to gather preliminary data on your organization's systems engineering process capability for the upcoming systems engineering appraisal.

Respondent information

Please identify yourself and your project or team, as appropriate.

Name: _____ Date: _____

Project: _____

Questionnaire structure

Following this introduction is a glossary of terms used in the questionnaire.

Following the glossary is a place for you to provide feedback on this questionnaire to the developers of the SE-CMM appraisal method. Please complete this form after you have completed the questionnaire. Your comments drive improvements to the appraisal method and questionnaire.

The body of the questionnaire has three pages of questions for each of the 17 process areas of the Systems Engineering Capability Maturity Model (SE-CMM). Each process area begins with a summary description and a list of its base practices. The base practices are followed by three series of questions (parts 2, 3, and 4), each series addressing a different perspective (performing the work, managing the process, and infrastructure support).

continued on next page

Instructions for the SAM Questionnaire, Continued

Instructions

Before You Begin

Please read the glossary to become familiar with how specific terms are used in the questionnaire. Different organizations have different internal meanings for common and uncommon terms. The glossary provides a context for you to understand the intended meaning of the terms throughout your appraisal. Then follow these steps for each process area.

Step	Action
1	Read the process area summary.
2	Identify the base practices that are performed on your project with a in the “Yes” box. Also indicate “No” or not applicable (N/A). (part 1)
3	If you had no “Yes” answers, please proceed directly to the next process area.
4	Answer the questions that follow (parts 2, 3, and 4) from the perspective of the practices for which you answered “Yes” in part 1.

Table J-1. Steps for Process Areas.. Steps for Process Areas.;
TC "Table J-1. Steps for Process Areas." \1 1 }

When You Are Finished

Please fill out the Respondent Feedback form. Feel free to comment on both content and format, being as specific as possible. *Thank you for taking the time to fill out this questionnaire.*

Glossary

Introduction

This glossary defines terms used in the questionnaire. It is recommended that you read through these definitions *before* you begin answering the questions in the questionnaire.

Organizational terms

This table defines how the terms “organization” and “project” are used in the questionnaire.

Term	Definition
exploratory questions	Questions that are open-ended (e.g., begin with "would you plan ? ..."). They are asked of interviewees to explain or clarify questionnaire answers.
interview script	The Appendix E, p.A-47 approach bullets which includes exploratory questions.
organization	In the context of the SE-CMM, “organization” refers to the business entity being appraised. That entity should have been defined for you by those who gave you this questionnaire. Specifically, an organization is a unit within a company or other entity, e.g., government agency or branch of service, within which many projects are managed as a whole. (All projects within an organization share common policies at the top of the reporting structure.)

project	<p>In the context of the SE-CMM, a project is an entity within an organization that produces system engineering work products, which are typically associated with a particular deliverable system.</p> <p>The project is the aggregate of effort and other resources focused on developing and/or maintaining a specific product. The product may include hardware, software, and other components. Typically a project has its own funding, cost accounting, and delivery schedule. Some projects are organized around teaming structures. Consult your site coordinator for interpretation of project if your experience appears inconsistent with the above definition.</p> <p>Some aspects of systems engineering process are associated with the project and some with the organization. Even though you may primarily work in one of these contexts or both, answer the questions based on your best knowledge of what is happening in the context in question.</p> <div data-bbox="695 762 1344 1050" style="text-align: center;"> <pre> graph TD Org["organization"] Org --- L1[" "] L1 --- L2[" "] L2 --- P1["project"] L2 --- P2[" "] L2 --- P3[" "] style L1 fill:none,stroke:none style L2 fill:none,stroke:none style P2 fill:none,stroke:none style P3 fill:none,stroke:none </pre> <p style="text-align: right;">organization-level process issues</p> <hr style="width: 100%;"/> <p style="text-align: right;">project-level process issues</p> </div>
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Table J-2. Organizational Terms.. Organizational Terms.;{ TC
"Table J-2. Organizational Terms." \l 1 }

continued on next page

Glossary, Continued

SECMM Appraisal Method acronym expansions and glossary definitions.

Acronym	Expansion
DoD	Department of Defense which sponsors SEI's involvement in EPIC
DTIC	Defense Technical Information Center at Cameron Station, VA in Alexandria, VA from which this and related documents can be ordered by US Government and contractors with accounts
ESC	Electronic Systems Command of the US Air Force (SEI's contracting office for EPIC support funds)
ENS	(I don't know this one - probably a typo)
F&R	(I don't know this one either - let's check the context)
FDRA	(Good question - give me context)
GP	Generic Practice - a practice which is added to the base practices (BPs) of a process area (PA) to create a higher process capability process. See the SECMM chapter 4.
GTE	General Telephone Company which provided an author for SECMM
Hanscom AFB	Hanscom Air Force Base near Boston, MA. Site of ESC
http	Action command which initiates a World Wide Web connection
NTIS	National Technical Information System run by the US Department of Commerce in Springfield, VA from which this and related documents can be purchased
OSD	Office of the Secretary of Defense (US)
PA01	Process Area 1: Analyze Candidate Solutions, from SECMM
PA__	Process Area (followed by number between 01 and 18) from SECMM
RA1	(A typo, should be PA01, check context - ref to trade studies or Analyzing Candidate Solutions - if so, change it)
URL	(Unix designator for files used on World Wide Web sites (check context could also be typo - not clear why this is in text!))

Glossary, Continued

Expression	Definition
Affinitized	Verb form of affinity diagram technique. This implies that the results of a data collection exercise have been recorded on stickies or other visual medium and have been clustered according to underlying factors or themes. They may or may not have been labelled yet, but would be before the technique is completed.
Infeasible	Not do-able with the resources or schedule or to the minimum quality to make the task worth doing
Iteratively	Repeatedly, as in “requirements and design are performed iteratively until they converge to a customer-satisfying product description that can be made (has a feasible design, development schedule, and resources)”
Penalized Resequencing	(misspelling of penalized almost surely - check context) To resort in temporal (time) order as in an agenda or program for which some pre-requisites have not occurred, so other later activities are begun instead
Substeps	Activities performed within a step of the SECMM Appraisal Method
Wordsmith	Craft exact statements with exactly the intended meaning rather than leave an expression which is “good enough” but not very exact

Glossary, Continued

Process terms

The process terms in the table below are arranged in the order that they appear in the questionnaire.

Term	Definition
Common causes of variation	Common causes are causes of natural variation inherent in a process. Removing common causes of variation involves making changes to the process itself.
Defect review	A review of a work product, interim or deliverable, that occurs prior to the release of the work product to the next process step. The review involves the creator of the product and subject matter peers who identify defects in the product that would make it unsuitable for use in the next work process. It is a form of static testing of the work product.
Organization's standard process (family of processes)	A process described at the organizational level for use by projects in the organization. It may be a family of processes in order to capture the different classes of processes that frequently occur in organizations. It is intended that the <i>standard process</i> be tailored into a <i>defined process</i> to meet the needs of specific projects.
Process	Any specific combination of machines, tools, methods, materials, and/or people employed to attain specific qualities in a product or service.
Process area	A set of practices (i.e., process requirements) that address the same purpose.
Process capability	At its simplest, process capability indicates the range of results expected by performing a process. Process capability implies competence. Initially a process is <i>chaotic</i> . (In this context, chaotic implies a high degree of variation.) It is <i>stable</i> when special causes of variation have been removed, and <i>capable</i> when common causes of variation have been reduced to meet customer validated requirements (specification limits). This is the process improvement framework upon which the SE-CMM process dimension is based.
Process performance data	Measurements that are used to manage the process used on your project or in your organization. These are measures of the actual results achieved using the process.

Table J-3. Process Terms.. Process Terms.;{ TC "Table J-3. Process Terms." \ 1 }

continued on next page

Glossary, Continued

Process terms, continued

Term	Definition
Process and product measures	<p>Note: both work products and the process can be measured.</p> <p><i>Product measures</i> are measurable attributes of a <i>product</i>, such as size or number of defects, and generally do not vary over time (i.e., the product measure can be measured at any time and get the same result).</p> <p><i>Process measures</i> are measurable attributes of the <i>process</i> used to produce the product, such as resources expended per product or percent rework. (They <i>must</i> be measured during the process; after the process has completed, only product measures may be taken.)</p>
Special causes of variation	Special causes of variation are <i>assignable</i> to people, places, materials, events, etc. They are causes of variation that are not attributable to the process itself, although they may be attributable to some aspect of its execution.
This process	The process or processes that your project or organization uses to implement the process area about which you are answering questions.
Work products	Anything produced by a process. This includes specifications, documents, engineering drawings, etc., not just the product delivered to the ultimate customer. <i>Delivered products</i> are those work products that the customer receives. These may also include specifications, interim documents, prototypes, etc., in addition to the final end product (the deliverable system).

Table J-3. Process Terms, continued

**Process terms,
continued**

Term	Definition
Defined process	The operational definition of a set of activities. A defined process is well characterized and understood, and is described in terms of standards, tools, and methods. Note: A defined process is developed by tailoring the organization's standards process to fit the specific characteristics of its intended use. (See also <i>standard process</i>)
Well-defined process	A process with inputs, entry criteria, tasks, verifications, outputs, and exit criteria that are documented, consistent, and complete. [SPICE - modified]
Project's defined process	The operational definition of the process as used by a specific project. Well characterized and understood, it is described in terms of standards, procedures, tools, and methods. It is developed by tailoring the organization's standard process to fit the specific characteristics of the project. [SECMM]
Process performance	A measure of actual results achieved by following a process. [SECMM]
Performance	The degree to which a system or component accomplishes its designated functions within given constraints, such as speed, accuracy, or memory usage. [IEEE 90]

Table J-3. Process Terms

Respondent Feedback

Respondent information

Please identify yourself and your project.

Name: _____ Date: _____

Organization: _____

Amount of time spent filling out questionnaire: _____

PAs you were given to answer questions about: _____ all

If not all, then please list the numbers you were given: _____

Feedback

We would greatly appreciate your comments on the questionnaire. The developers of the SE-CMM appraisal method will use this feedback to improve the SE-CMM, the appraisal method, and the questionnaire. Feel free to comment on both content and format; the more specific, the better. We are specifically interested in the following areas: clarity of instructions, usefulness of the glossary, other terms that need to be defined, structure of the questionnaire, and understandability of the questions. Thank you for your time and input!

Site Coordinator Instructions for Distributing Questionnaire

Introduction

The SE-CMM questionnaire is the first step in a data gathering process designed to provide the managers and practitioners with insight into the organization's systems engineering practices. When determining who should fill out the questionnaire, it is important to choose individuals who will provide answers that represent the entire project/organization.

Time constraints

It typically takes around two hours for an experienced project lead-level systems engineer to complete the entire SE-CMM questionnaire. For a subject matter expert to fill out a single process area set of items typically takes between 5-10 minutes. Questionnaire response time is reduced when the respondents have immediate access to a site coordinator who understands the model/appraisal method, and when the entire questionnaire is answered in one sitting.

Recommended administration approach

To maximize the use of both the site coordinator's and respondents' time, it is recommended that one or two "appointments" be set up in a room large enough to accommodate all respondents with a suitable writing surface, e.g., a large table or several small tables. Respondents are invited to schedule themselves for one of the two appointments. (One is optimal, because then all respondents hear answers to questions together. However, at many sites getting the individuals needed to answer the questions at the same meeting is often difficult.) Before the individuals start filling out the questionnaires, the site coordinator introduces the respondents to the model and appraisal, distributes the questionnaire, and makes clear that the answers are to reflect their individual opinions. He/she also makes clear that the site coordinator is there to clarify terminology and concepts, and respondents are encouraged to voice questions. The site coordinator can then answer to the entire group assembled. The site coordinator also records any questions he/she cannot answer so he/she can contact an SE-CMM facilitator for guidance.

After each respondent is finished, the site coordinator collects the questionnaire and, if not already filled in by respondent, completes the 'time spent' portion of the feedback form.

continued on next page

Site Coordinator Distribution Instructions, Continued

Questionnaire distribution table

To maximize the accuracy of initial responses to the questions in the SE-CMM questionnaire, it is recommended that the questionnaires be distributed to individuals with the skills and roles expressed in the following table.

Process Area	Primary Respondents	Secondary Respondents
01: Analyze Candidate Solutions	Systems engineering leads for the projects selected for appraisal	Any senior practitioner with significant system design experience
02: Derive and Allocate Requirements	Systems engineering leads for the projects selected for appraisal	
03: Evolve System Architecture	Systems engineering leads for the projects selected for appraisal	
04: Integrate Disciplines	Systems engineering leads for the projects selected for appraisal	Senior specialty engineers (e.g., reliability, safety, manufacturing, human factors) working on the projects selected for appraisal
05: Integrate System	Systems engineering leads for the projects selected for appraisal	
06: Understand Customer Needs and Expectations	Systems engineering leads for the projects selected for appraisal	<ul style="list-style-type: none"> • Technical marketing personnel • Proposal personnel • Customer service personnel
07: Verify and Validate System	Systems engineering leads for the projects selected for appraisal	System verification manager or senior test engineers

Table J-4. Questionnaire Distribution Table.. Questionnaire Distribution Table.;{ TC "Table J-4. Questionnaire Distribution Table." \ 1 }

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Site Coordinator Distribution Instructions, Continued

Questionnaire distribution table, continued

Process Area	Primary Respondents	Secondary Respondents
08: Ensure Quality	Senior project-level quality manager or lead (in environments with shared quality leadership responsibility, systems engineering lead for the project)	<ul style="list-style-type: none"> Systems engineering leads for the projects selected for appraisal Organizational quality manager, total quality management coordinator
09: Manage Configurations	Senior project-level CM manager for the projects selected for appraisal	Systems engineering leads for the projects selected for appraisal
10: Monitor and Control Technical Effort	Systems engineering leads for the projects selected for appraisal	
11: Plan Technical Effort	Systems engineering leads for the projects selected for appraisal	
12: Manage Risk	Systems engineering leads for the projects selected for appraisal	Project or program manager for the projects selected for appraisal
13: Define Organization's Systems Engineering Process	Individuals responsible for defining organization level processes; may be part of the quality leadership area, policies/procedures area, or other support group	Systems engineering leads for the projects selected for appraisal

Table J-4. Questionnaire Distribution Table, continued

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Site Coordinator Distribution Instructions, Continued

Questionnaire distribution table, continued

Process Area	Primary Respondents	Secondary Respondents
14: Improve Organization's Systems Engineering Processes	Individuals responsible for deploying organization level process improvement activities; may be part of the quality leadership area, policies/procedures area, or other support group	Systems engineering leads for the projects selected for appraisal
15: Manage Product Line Evolution	Individuals at organization level responsible for strategic product line positioning and advancement; may be in R&D, technical marketing, or other support structure	Systems engineering leads for the projects selected for appraisal
16: Manage Systems Engineering Support Environment	Systems engineering leads for the projects selected for appraisal	Individuals at organization level involved in deploying new development technologies
17: Provide Ongoing Skills and Knowledge	Individuals responsible for recruiting, subcontracting or deployment of organization-level training; may be part of an R&D group, training department, or other support structure	Systems engineering leads for the projects selected for appraisal
18: Coordinate with Suppliers	Buyers, subcontract managers or project leaders of projects with teammates	Systems engineering leads for projects with non-organizational subcontractors or teammates.

Table J-4. Questionnaire Distribution Table, continued

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Site Coordinator Distribution Instructions, Continued

**Distribution
recommendation**

Even though there are other roles called out as primary targets for the questionnaire in certain instances, having the SE leads answer all the PAs provides an overall context of how things appear from the project viewpoint, which can be very valuable. Therefore, it is recommended that the SE leads complete all the PAs whenever feasible.
