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Software Engineering Institute
Pittsburgh, PA 15213-3890



SCAMPI A Applied to Small Settings – A Success Story

***Sponsored by the U.S. Army Aviation and Missile
Research, Development & Engineering Center
(AMRDEC) Software Engineering Directorate (SED)***

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Agenda

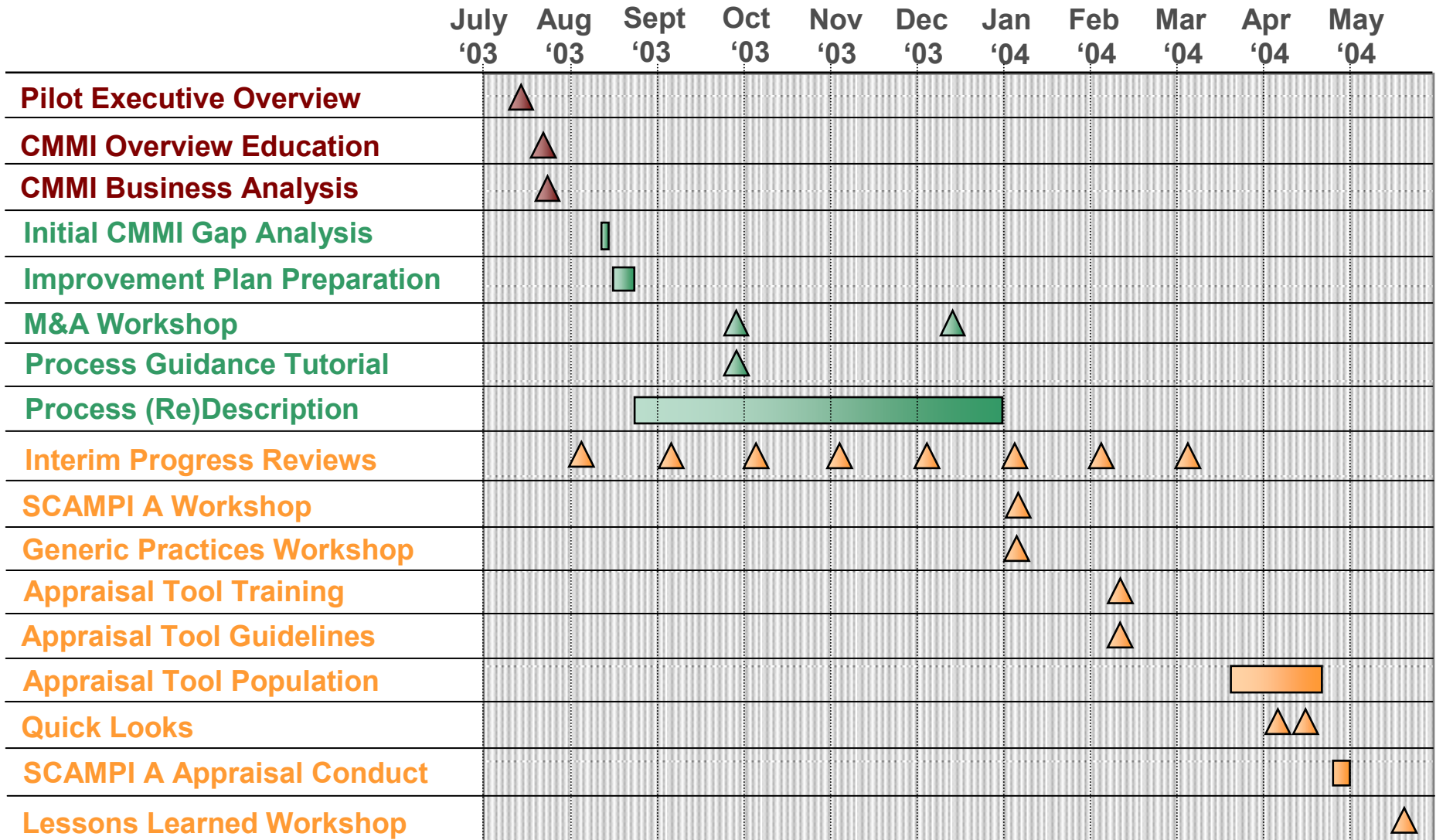
- Pilot Overview
- ASI - Company Profile
- Lead Appraiser's Perspective
 - Appraisal Preparation - Success Factors
 - Appraisal Conduct - Leveraging MDD Tailoring Options
- ASI's Perspective
 - Appraisal Preparation
 - Appraisal Conduct
- Lessons Learned
 - ASI's Perspective
 - Lead Appraiser's Perspective
- How Pilot Artifacts Can Help Small Businesses



Pilot Project Overview

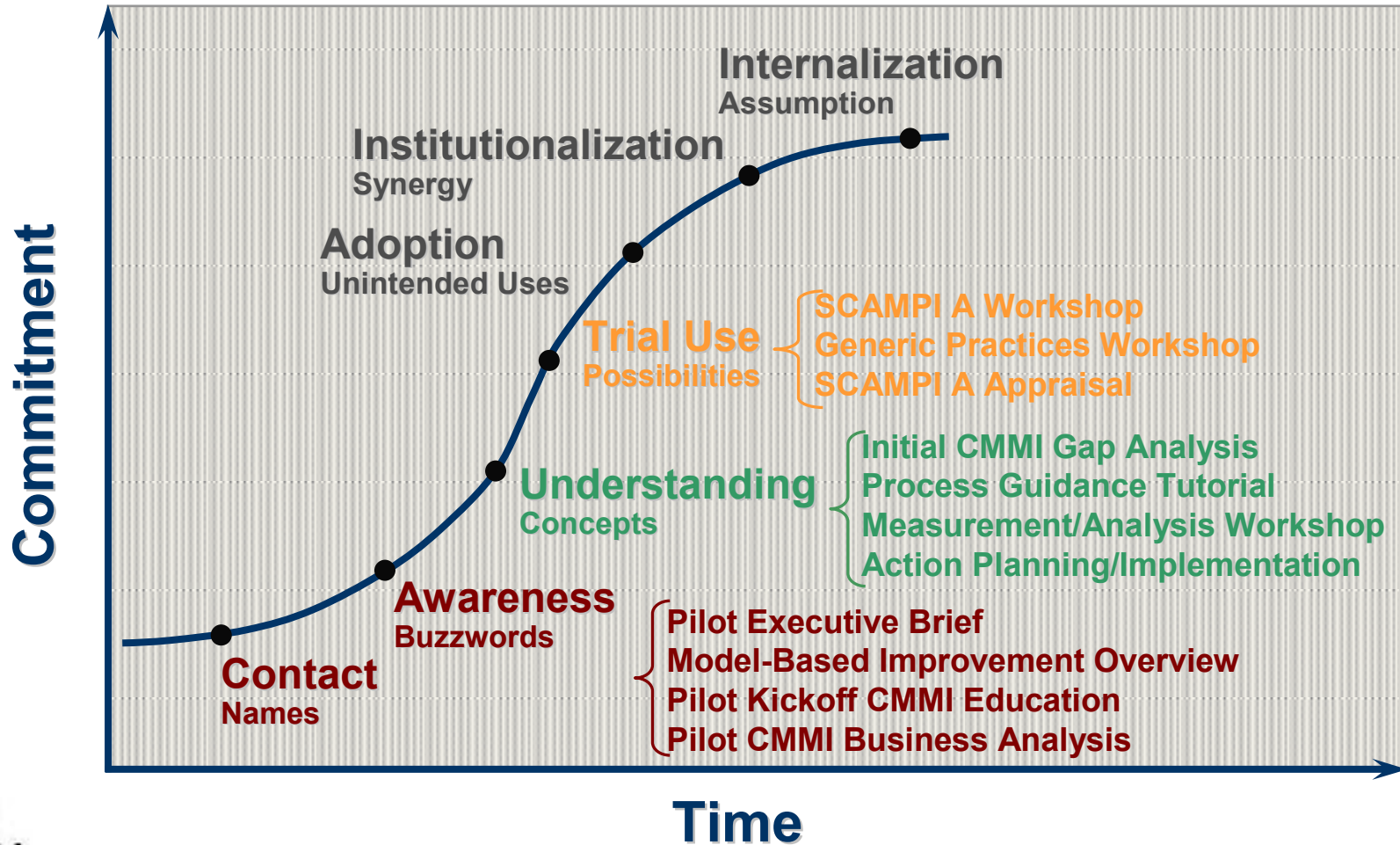
- A Joint Project Performed by the Partnership Between the Software Engineering Institute (SEI) and AMRDEC SED to Establish the **Technical Feasibility** of Developing Guidance and Other Special-Purpose Transition Mechanisms to Support Adoption of CMMI by **Small and Medium Enterprises** (25 to 250 Employees in Huntsville)
- Selected 2 Pilot Companies: Analytical Services, Inc. (ASI) and Cirrus Technology, Inc. (CTI)
 - Presentation Today Focuses on ASI Appraisal
- Pilot Artifacts Will Be Available at the SEI Website by the End of the Year
 - Toolkit
 - Experience Reports (One for Each Company)

CMMI Small Business Pilot Schedule





Summary of Materials Provided by Pilot





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LEAD APPRAISER'S PERSPECTIVE

Appraisal Preparation Success Factors





Company Profile

Analytical Services, Inc.

- Management and Technical Services Company
- Incorporated in 1992
- Hispanic, Woman-Owned, Small Disadvantaged Business
- ISO 9001:2000 Registered/Successful CMMI SCAMPI A Appraisal
- Top Secret Facility

**Information
Technology**

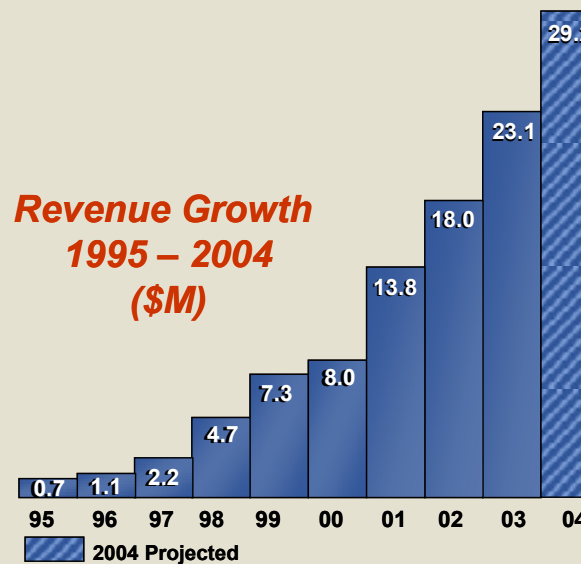
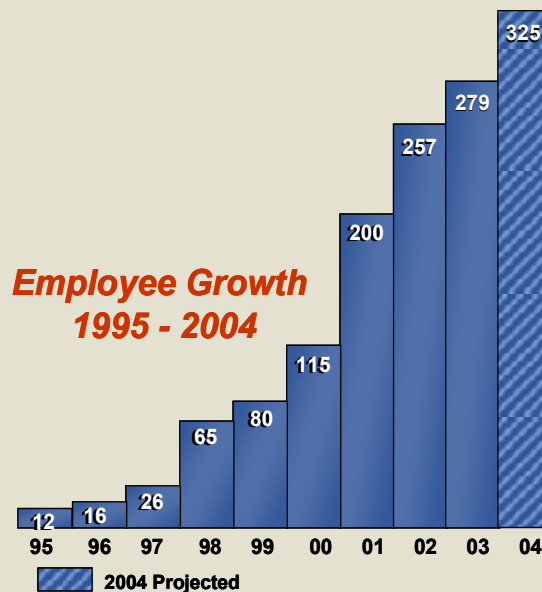
**Systems Engineering/
Program Management**

Core

Competencies

**Engineering and
Scientific Analysis**

**Professional and
Organizational Development**





ASI's Process Improvement History

Development of our Quality System

- Until '02, written corporate policies - few written processes
- 2002 - Began investigation of Quality Systems – ISO 9001-2000
 - Worked with consultants from local university
 - Mentor Protégé Program provided guidance
- Nov '02 – Mar '03 - Established Quality Management System (QMS)
- Feb '03 - Pre- Assessment NQA Audit (external)
- Mar '03 - External certification audit for ISO 9001-2000 Registration -NQA
- May '03 - Selected to participate in CMMI Small Business Pilot Project
- Jun '03 - ISO Audit - 3 Month Registration Surveillance Audit
- Aug '03 - Initiated CMMI Pilot Project – (Continuous Representation)
- Apr '04 - ISO Audit - 2nd Surveillance Audit
- Apr/May '04 - Completed Pilot - SCAMPI A Appraisal of 5 process areas.
 - Achieved Target Capability Level Profile
- Oct '04 - ISO Audit - Oct '04 - 3rd Surveillance Audit



Initial Gap Analysis

- Collaborative Sessions Between ASI and Lead Appraiser to Identify Gaps Between ASI's Practices and the CMMI
- Gap Analysis Used SCAMPI C Techniques
- In Each Session, ASI's Practitioner/SME and the Lead Appraiser Walked Through the CMMI Practices to
 - Determine How Well the Practice Was Implemented
 - Identify Gaps
 - Develop Actions Required to Close the Gaps

- ✓ ***Significantly Increased ASI's Understanding of CMMI***
- ✓ ***Helped ASI Interpret CMMI for Their Environment***
- ✓ ***Provided the Basis for the Development of an Improvement Plan***
- ✓ ***Ensured That New Process Implementation Was Compliant With the CMMI***



SCAMPI A Workshop

- Lead Appraiser Provided a SCAMPI A Workshop to ASI
 - Described Method
 - Addressed Appraisal Preparation and Conduct Activities
 - Provided Overview of Appraisal Plan and Schedule
 - Clearly Identified Roles and Responsibilities During Appraisal Preparation and Conduct
 - Appraisal Team Members
 - Appraisal Sponsor
 - Appraisal Organizational Unit Coordinator
 - Appraisal Participants

- ✓ *Helped Set Expectations (ASI Understood What They Were Getting Themselves Into)*
- ✓ *Resulted in No Surprises During Appraisal Preparation or Conduct*



Generics Workshop

- Objective Was to Reduce the Risk Associated With Misinterpretation of Generic Practices
- Workshop Scope
 - Overview of Generic Practices
 - Exercise Applying Each of the CL 2 Generic Practices to ASI's Requirements Management Process
- Generic Practice Application Was Reinforced During Subsequent Meetings

- ✓ ***Helped ASI Understand and Interpret Generic Practices for Their Environment***
- ✓ ***Ensured That Implementation of Generic Practices Was Consistent With CMMI Requirements***



Guided Practice Implementation Indicator Descriptions Population

- Recommended Use of a Database Tool (Tracker) to Capture Mappings of ASI Evidence to the CMMI Practices
- Provided Very Specific Guidelines for the Population of PIDDs Using the Tracker Tool
- Held PIDDs Workshop to Ensure Guidelines Were Understood and Rules of SCAMPI Method Were Clear
- Performed Quick-Looks (Database Content Reviews) Prior to the Appraisal

- ✓ ***Ensured That PIDDs Were Readily Available for the Appraisal Team***
- ✓ ***Significantly Reduced the Duration of the Readiness Review and Appraisal***



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LEAD APPRAISER'S PERSPECTIVE

Appraisal Conduct





Appraisal Scope

- ***CMMI Model Scope***
 - PP, CL 2 (CCWS)
 - REQM, CL 2 (CCWS, TMDE)
 - M&A, CL 2 (System Management Group)
 - OPF, CL 3 (ASI Huntsville)
 - OT, CL 3 (ASI Huntsville)
- ***Application Domain Characterization***
 - Services
- ***Model/Version/Representation***
 - CMMI-SE/SW Version 1.1 (Continuous)



Key Appraisal Personnel

- **Team Leader:** Sandra Cepeda, CSSA
- **Team Members:**
 - Scott Reed, SEI (Mini-Team 1 Lead)
 - Beth Smith, ASI (Mini-Team 1)
 - Miguel Serrano, CIMAT (Mini-Team Lead 2)
 - Jeff Kauffman, SED (Mini-Team 2)
- **Organizational Unit Coordinator:** John Sullivan
- **Tool Support:** Annette Hughes, Jimmi Hendrix
- **Infrastructure:** Darin Rushing and Luis Torres
- **Executive Support:** Jack Conway, ASI Systems Management VP
- **Appraisal Sponsor:** Irma Tuder, ASI President and CEO



Leveraging MDD Tailoring Options

- Team Training
 - Method: Focused, Hands-On, First Pass for OE Review
 - Reinforce Complex Model Concepts (GP -> PA Relationships, Content Overlap, etc.)
- Presentations by the Organization
 - Useful to Set Context and Familiarize Team With Organization
 - Opportunity to Get Affirmations
- Depth of Readiness Review
 - Characterize Practices as Much as Possible -> Key Risk Mitigation Activity
 - Use to Optimize Team Dynamics



Leveraging MDD Tailoring Options

- Re-Planning
 - To Address Lack of Objective Evidence
 - To Capitalize on High States of Readiness
 - To Ensure Expectations Are Met
- Structured Approach
 - Help Appraisal Team Stay Focused
 - Drive Efficient Method Execution
 - Meet Schedule
- Interviews
 - Run Concurrent Sessions (Assumes Highly Capable Mini-Teams)
 - Perform Concurrently With OE Review, if Possible
 - Capitalize on Resources



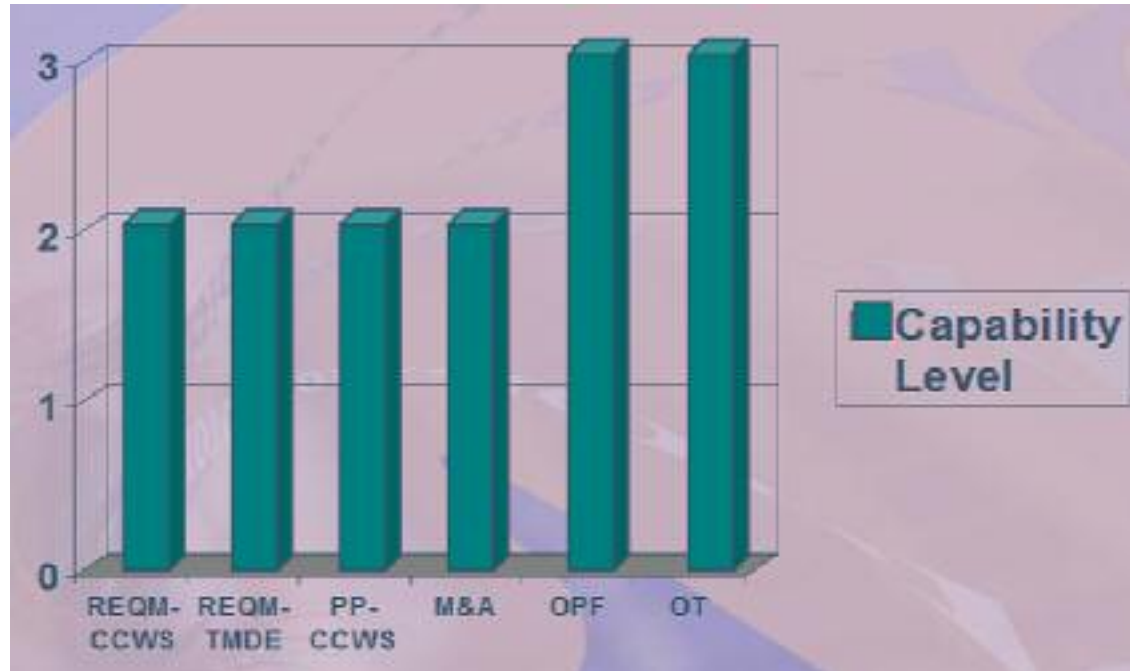
Scaling Down SCAMPI A

	Tuesday	Wednesday	Thursday		Friday	
8:00	Team	Tracker Training	Team 1: Finish RM CCWS/TMDE and PP CCWS Characterizations	Team 2: Finish M&A, OPF, OT Characterizations	Draft Findings Presentation	8:00
8:30	Introductions					8:30
9:00	Team Training	Project Characterization Example	Team 1: Hold Senior Management, Pilot Project Leads, Infrastructure/QA Interviews and update Tracker	Team 2: Hold Senior Management, OT, OPF, M&A Interviews and Update Tracker	OU Level Characterizations, Goal Ratings, Prepare Final Findings Presentation	9:00
9:30						9:30
10:00						10:00
10:30						10:30
11:00	Lunch	Lunch	Team 1: Hold Senior Management, Pilot Project Leads, Infrastructure/QA Interviews and update Tracker	Team 2: Hold Senior Management, OT, OPF, M&A Interviews and Update Tracker	OU Level Characterizations, Goal Ratings, Prepare Final Findings Presentation	11:00
11:30						11:30
12:00	Lunch	Lunch	Team 1: Hold Senior Management, Pilot Project Leads, Infrastructure/QA Interviews and update Tracker	Team 2: Hold Senior Management, OT, OPF, M&A Interviews and Update Tracker	OU Level Characterizations, Goal Ratings, Prepare Final Findings Presentation	12:00
12:30						12:30
13:00	Team Training	Mini-Teams Evaluate OE and do Characterizations	Hold Pilot Project Practitioners, Organization Practitioners, and Senior Management Interviews and Update Tracker	Finalize affirmations and characterizations (mini-teams)	Lessons Learned, Lunch, and Feedback Forms	13:00
13:30						13:30
14:00						14:00
14:30						14:30
15:00	Opening Briefing	Mini-Teams Evaluate OE and do Characterizations	Hold Pilot Project Practitioners, Organization Practitioners, and Senior Management Interviews and Update Tracker	Finalize affirmations and characterizations (mini-teams)	Lessons Learned, Lunch, and Feedback Forms	15:00
15:30	15:30					
16:00	ASI Briefings and Demo's					16:00
16:30	16:30					
17:00	Homework		Develop Draft Findings Presentation			17:00
17:30						17:30
18:00						18:00

- 415 Documents Reviewed
- Conducted Team Training, Readiness Review and Appraisal in 4 Days (Two 1-Week Events Initially Planned)



Appraisal Results



Target Capability Level Profile Achieved



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ASI'S PERSPECTIVE



Challenges/Surprises



SCAMPI Appraisal

- Challenges:
 - Level of Detail Required for Appraisal
 - Thoroughness of Appraisal
 - Documentation Required
 - Preparation Required
- Surprises
 - Appraisal Was Positive
 - Tools Provided Really Worked to Prepare for Appraisal
 - Preparation Efforts Paid Off
 - ISO 9001-2000 Was Excellent Preparation to SCAMPI Appraisal

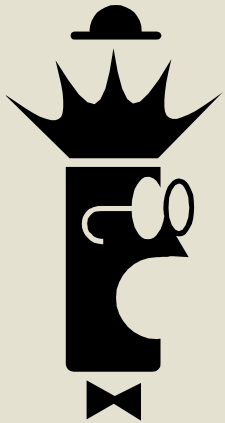




Appraisal Preparation

ASI Experience & Perspective

- Initial Confidence/Optimism
- Intimidation Factor - Overwhelming
- Tracker Tool Provided
- Initial Reaction – Overwhelming
- Problems With Tracker Tool
- Get Serious
- Organize Artifacts
- Populate Data in Tool
- Develop Confidence
- Preparation for Appraisal Readiness Review

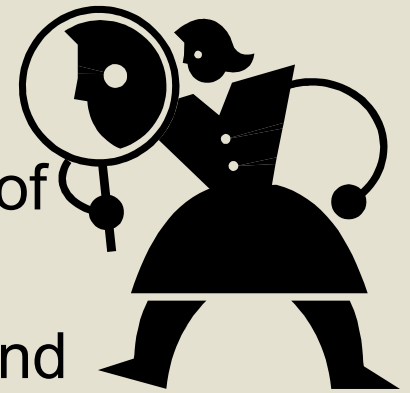


Appraisal Conduct



ASI Experience & Perspective

- Appraisal Well Organized and Non Intrusive
- Appraisal Team Established Schedule and List of Resources Required
- Information Required for Appraisal Was Clear and Definitive
- Appraisal Reviewed Tracker Tool and Artifacts Provided
- No Surprises
- Positive Experience



Adoption Activities & Statistics

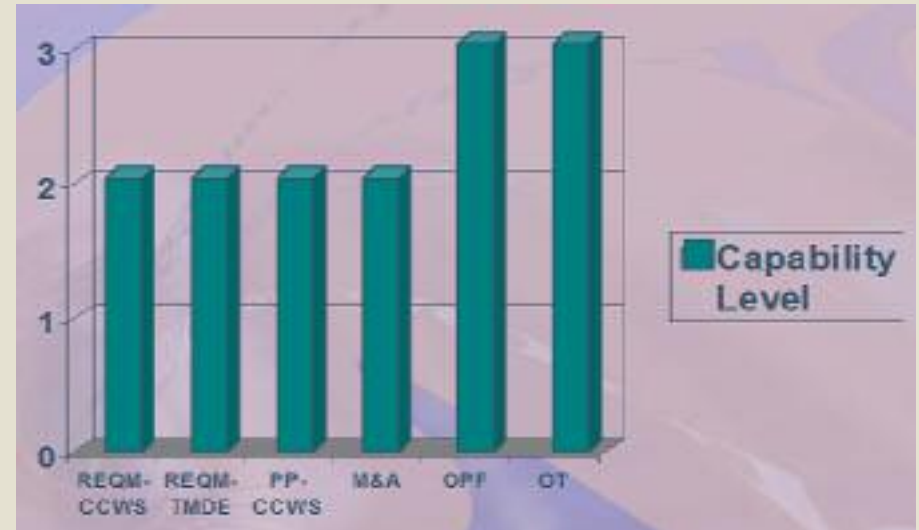
ASI Pilot Program

	Total	Team Mtngs.	Telecons	Process Develop	Training & Awareness	Implementation	Appraisal Prep	Appraisal
Exec. Lead	286	96	80	40	24	10	20	16
PM	240	80	60	40	24	20	12	4
PM	252	96	80	40		20	12	4
SW Eng.	312	96	80	60		30	40	6
Prog Analyst	144	60	50	20		10		4
SW Developer	124	60	50			10		4
SW Eng.	134	80	50					4
QA	206	60	50		24		40	32
QA	50	30	20					
Prog Control	30					20	4	6
SW Developer	42				12	30		
Executive	76	35				33	4	4
Workforce	45	25						20
Total Hours	1941	718	520	200	84	183	132	104
% of Hours		37%	27%	10%	4%	9%	7%	5%
Total Cost	\$138,833	\$52,219	\$36,662	\$15,621	\$5,510	\$13,348	\$8,753	\$6,719
% of Cost		38%	26%	11%	4%	10%	6%	5%

Results of SCAMPI

ASI Perspective

- Achieved Target Profile Capability Level Profile
- CL2 for 3 Process Areas From Pilot Program
- CL3 for 2 Process Areas
- Compatible With ISO 9001-2000
- Processes Are Incorporated Into QMS
- Pilot Program, CMMI Adoption and SCAMPI Appraisal Were All Beneficial and Worth Investment





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LESSONS LEARNED

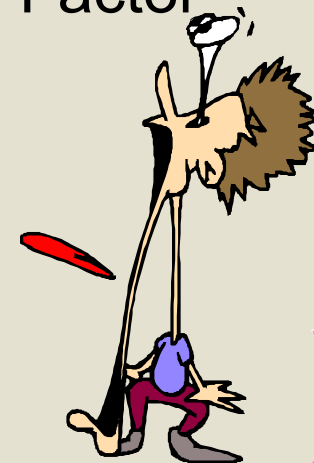




Lessons Learned – ASI Perspective

SCAMPI Appraisal

- Preparation Is Critical
- Consultants Required (First Time)
- Listen to the Consultants
- Set Schedule and Keep It Moving
- Experience With Quality Audits (ISO 9001-2000) Is Helpful
- State of Quality Management System Big Factor
- Use Tools to Prepare
- Organize Artifacts
- Leadership Involvement Is Essential





Appraiser's Perspective - Preparation

- Existing Quality Management Systems Should Be Leveraged
 - Organizational Process Focus and Organizational Training Goals Were Met by the Existing ISO 9000:2001 Implementation
- Organization's Understanding of the SCAMPI A Method Is Critical in Setting Expectations for Appraisal Preparation and Conduct
- Quick Looks (B's and C's) Significantly Improve the Chances for a Successful SCAMPI A
- Well-Populated PIDDS Are Critical for Appraisal Success - a Collaborative Approach Between the SLA and the Organization Is Recommended
- Misinterpretation of Generic Practices Is a Major Cause for Appraisal Failures – Generic Practices Workshops Can Help Prevent Misinterpretation
- Using the Same Tool for the Initial Gap Analysis, the Incremental Quick Looks, and the SCAMPI A Appraisal Increases the Efficiency of the Appraisal
- Using the Same Tool for PIIDs Population and the Appraisal Can Also Increase the Efficiency of the Appraisal



Appraiser's Perspective – Appraisal

- Leveraging SCAMPI A MDD Tailoring Options Can Significantly Decrease the Duration of the Appraisal
- A Consistent Understanding of Generic Practice Interpretation for the Organization Being Appraised Is Critical for an Appraisal Team
- A Documented, Well-Defined Appraisal Process That Integrates Tool Usage Simplifies the Implementation of the Appraisal Method for Appraisal Team Members
- Applying the Method as a Team, to One Instance in the Scope of the Appraisal, Is a Powerful Training Exercise for the Appraisal Team
- Ensuring Consistency Across Appraisal Mini-Teams Early in the Appraisal Simplifies the Team Consensus Activities

✓ ***Both CMMI and SCAMPI A Scale Down to Fit Small Settings***



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How Pilot Artifacts Can Help Small Businesses





Using CMMI in Small Businesses

- CMMI Provides a Set of Best Practices From Which Small Businesses Can Benefit
- The Continuous Representation of the CMMI Allows Small Companies to Focus on Improvements That Have the Highest Payoff for the Company
- Aligning Improvement With Business Goals Is Particularly Important for Small Businesses
- Simple CMMI-Based Improvements Can Have a Significant Impact in Small Organizations
- “Changing” the Practices Isn’t Necessary in Most Cases; Finding Alternative Practices Is Often Relevant
- Both CMMI and SCAMPI A Scale Down to Fit Small Settings

✓ ***The Greatest Challenge for Small Businesses Is the Affordability of Subject Matter Experts, and the Implementation and Appraisal Costs***



How the Pilot Artifacts Can Help Small Businesses

Three Artifacts From the Pilot Will Be Available on the SEI Website

- Toolkit
- 2 Experience Reports

The CMMI for Small Business Pilot Artifacts Should Prove Useful in Helping Small Businesses

- Focus Their Improvement Efforts
- Figure Out How and Where to Get Started
- Tie Their Improvements to Business Goals
- Train Their Staff
- Realize Payoffs Early in the Improvement
- Improve Their Ability to Prepare for Appraisals



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