Cutting Appraisal Costs in Half

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Background

- **The SCAMPI method has significant flexibility and tailoring options**

- **Unfortunately, many Lead Appraisers do not take advantage of these options**
  - Some continue to conduct appraisals in the same style as the discovery-based CBA IPI methods used over 10 years ago

- **This presentation discusses the fundamental value-added steps of a SCAMPI appraisal, and how to tailor the methods to different organizational situations**
  - Preparation (scoping, planning, evidence gathering)
  - On-site (evidence review, interviews, consolidation)
  - Close-out (reporting, record keeping)

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Topics

- **Understanding the purpose of a SCAMPI appraisal**

- **Identifying the non-value added appraisal activities**

- **Scoping and planning the appraisal for minimum cost**

- **Tailoring choices, and how to make them**

- **Preparing the evidence**

- **Eliminating known time-wasters**

- **Being a smart buyer**

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Characteristics of CMMI Appraisal Classes

- **The ARC (Appraisal Requirements for CMMI) defines appraisal classes**
    - A guide to inventors of appraisal methods, and their customers

- **SCAMPI is a family of ARC-compliant methods**

Appraisal Requirements for CMMI, Version 1.1, CMU/SEI-2001-TR-034

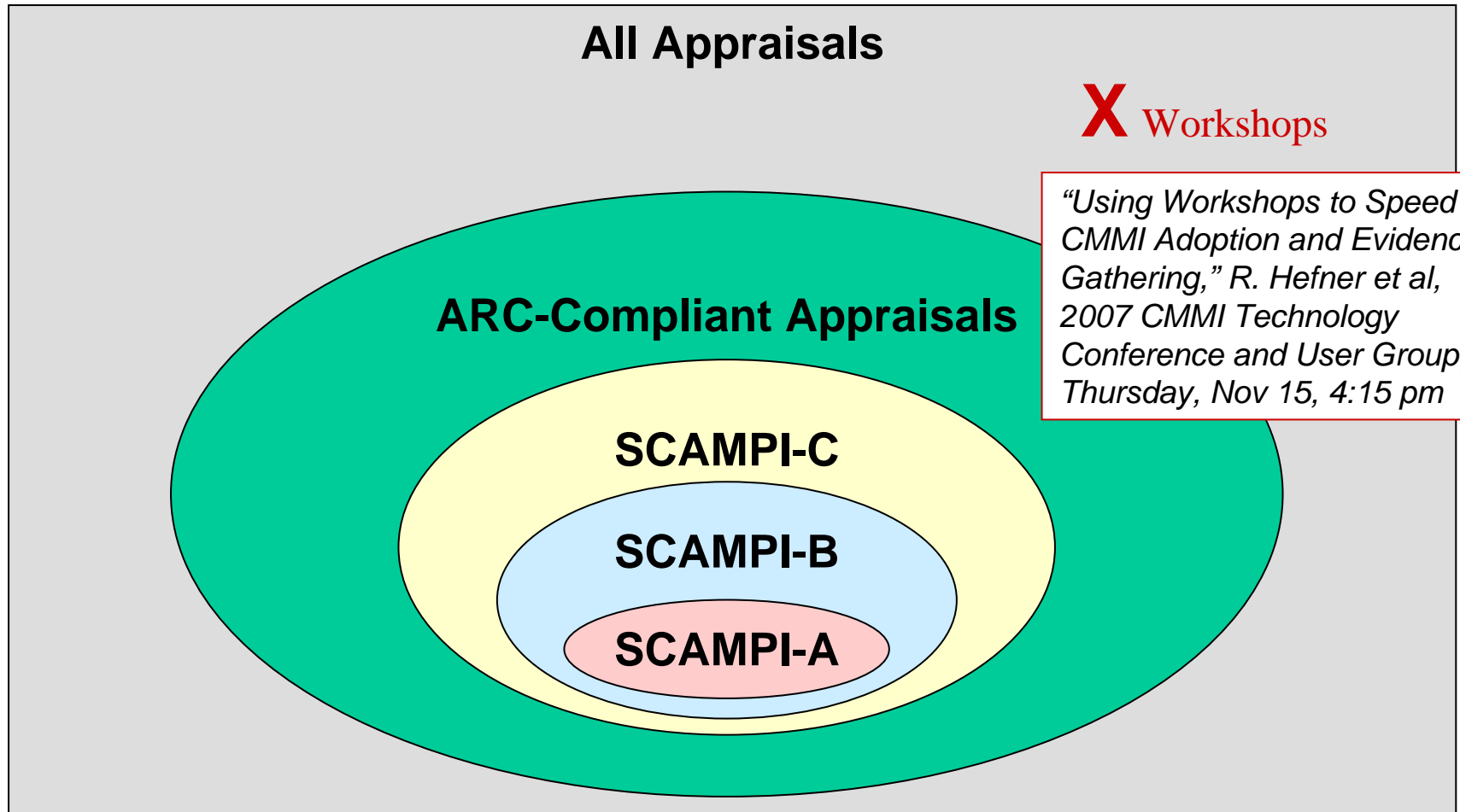| Characteristics	Class A	Class B	Class C
Amount of Objective Evidence Gathered (relative)	High	Medium	Low
Ratings Generated	Yes	No	No
Resource Needs (relative)	High	Medium	Low
Team Size (relative)	Large	Medium	Small
Appraisal Team Leader Requirements	Lead appraiser	Lead appraiser or person trained and experienced	Person trained and experienced

SCAMPI-A   **SCAMPI-B**   **SCAMPI-C**

"A Quantitative Comparison of SCAMPI A, B, and C," R. Hefner and D. Luttrell, CMMI Technology Conference and User Group, 2005

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A Variety of Appraisals

All Appraisals

X Workshops

"Using Workshops to Speed CMMI Adoption and Evidence Gathering," R. Hefner et al, 2007 CMMI Technology Conference and User Group, Thursday, Nov 15, 4:15 pm

ARC-Compliant Appraisals

SCAMPI-C

SCAMPI-B

SCAMPI-A

"Lower Cost, More Effective Alternatives to SCAMPIs," R. Hefner, 2007 CMMI Technology Conference and User Group, Thursday, Nov 15, 3:30 pm
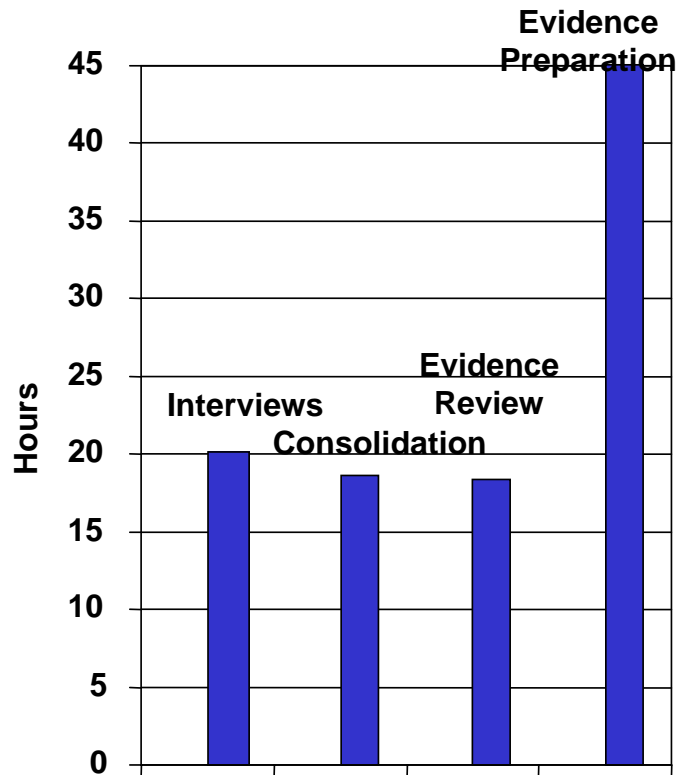
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Applying Six Sigma To Appraisals

- **Several Six Sigma projects were conducted to optimize the SCAMPI appraisal process**

Bar chart — Hours by activity:
- Interviews: ~20
- Consolidation: ~18.5
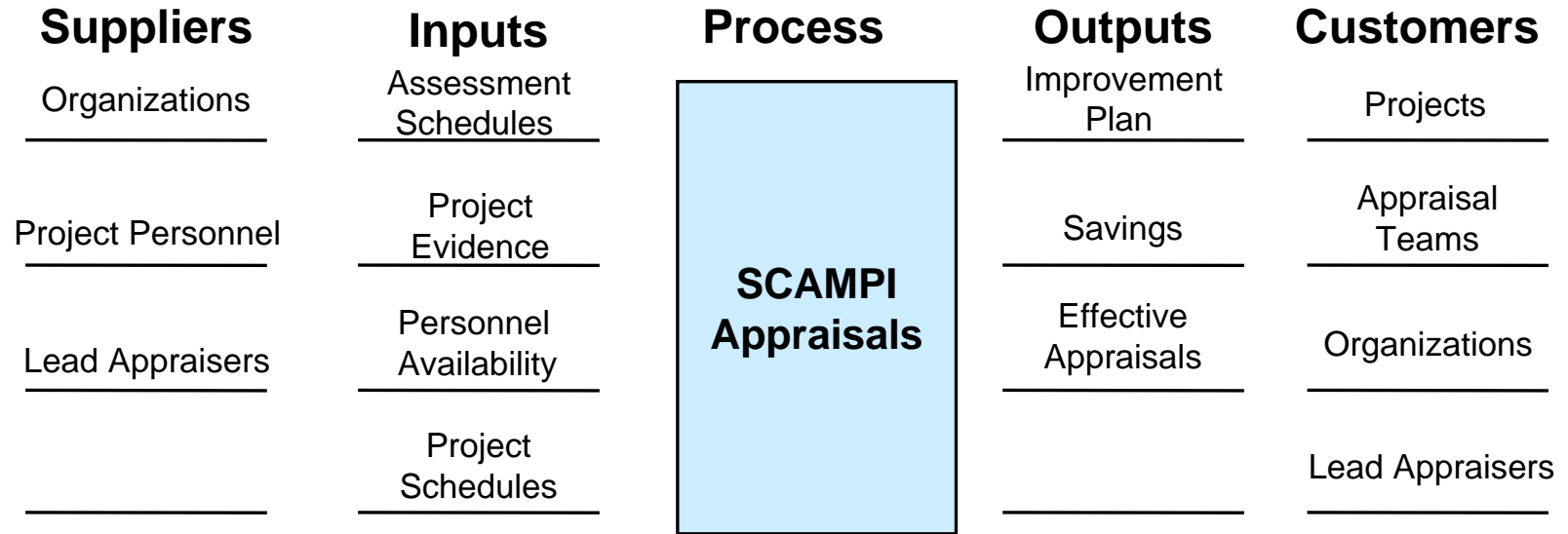- Evidence Review: ~18.5
- Evidence Preparation: ~45

"Minimizing SCAMPI Costs via Quantitative Methods, " R. Hefner and Ron Ulrich, CMMI Technology Conference & User Group, 17-20 November 2003
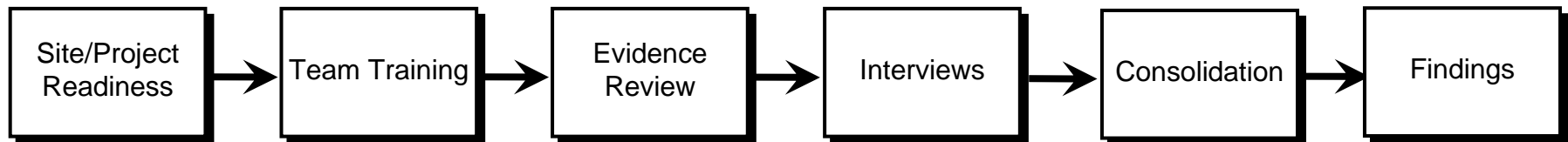
- **Collected metrics on time spent on various appraisal activities, defects**

- **Used Pareto chart to identify bottlenecks, opportunities for improvement**

- **Used individuals charts to study variation in the appraisal process**

- **Used fishbone charts and other causal analysis methods to identify potential improvements**

- **Key considerations:**
  - Project preparation time
  - On-site appraisal time
  - Cost & resources
  - Accuracy of appraisal results

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Mapping the Process to Identify Bottlenecks

Suppliers	Inputs	Process	Outputs	Customers
Organizations	Assessment Schedules		Improvement Plan	Projects
Project Personnel	Project Evidence	SCAMPI Appraisals	Savings	Appraisal Teams
Lead Appraisers	Personnel Availability		Effective Appraisals	Organizations
	Project Schedules			Lead Appraisers

Process Steps

Site/Project Readiness → Team Training → Evidence Review → Interviews → Consolidation → Findings

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Techniques for Reducing Cost - Preparation

- **Scoping – Determining the portion of the organization to be appraised (the "organizational unit")**
  - Any logical portion of the organization may be chosen, e.g., a division, a site, a domain, etc.
  - The scope will impact both the utility of the appraisal results in marketing and the organizational buy-in
  - :"Cherry-picking" only part of the organization to be appraised may send the signal that CMMI is cost without value

- **Planning – Determining the budget, schedule, and logistics**
  - Highly driven by the approach to evidence review and interviewing

- **Evidence gathering – Compiling the direct and indirect evidence needed to provide compliance with the CMMI goals and practices**
  - Biggest preparation cost and effort
  - Perceived by the projects to be non-value-added

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Minimum Team Size

- **Cost is composed of:**
  - Team costs – goes up with team members
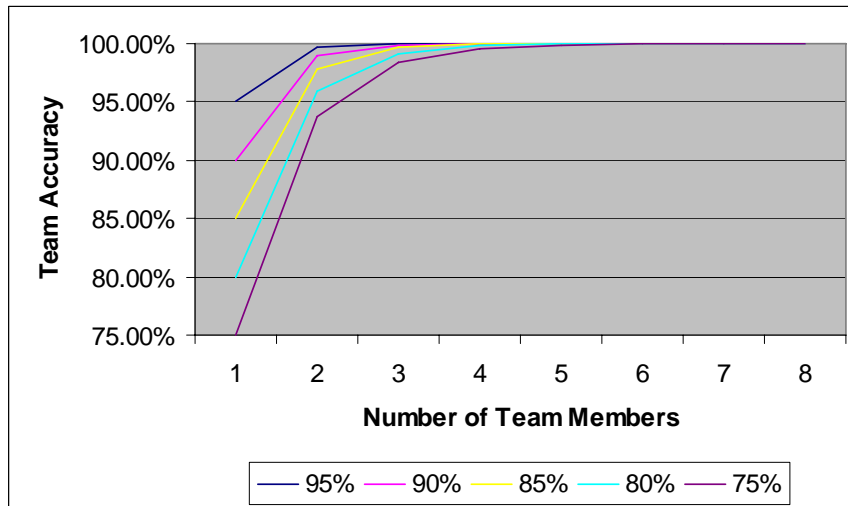 - Organizational costs (interview, presentations) – largely fixed regardless of size
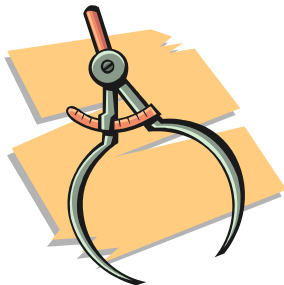
- **Accuracy goes up with as team size increases**

- **Buy-in is driven by the confidence the organization's members has in the appraisal process and appraisal team**
  - Larger teams can increase the likelihood that a respected person is on the team

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Team Accuracy vs. Team Size

- **Team accuracy vs. team size, for given individual accuracies**

- **Same, assuming 90% leader accuracy**

Team accuracy vs. team size chart — X-axis: Number of Team Members (1–8), Y-axis: Team Accuracy (75.00%–100.00%). Legend: 95%, 90%, 85%, 80%, 75%

Same chart assuming 90% leader accuracy — X-axis: Number of Team Members (1–8), Y-axis: Team Accuracy (75.00%–100.00%). Legend: 95%, 90%, 85%, 80%, 75%

- **As team size goes up, team accuracy rapidly increases (assuming the right answer is obvious once presented)**

- **Teams of greater than 4 provide little increase in accuracy**
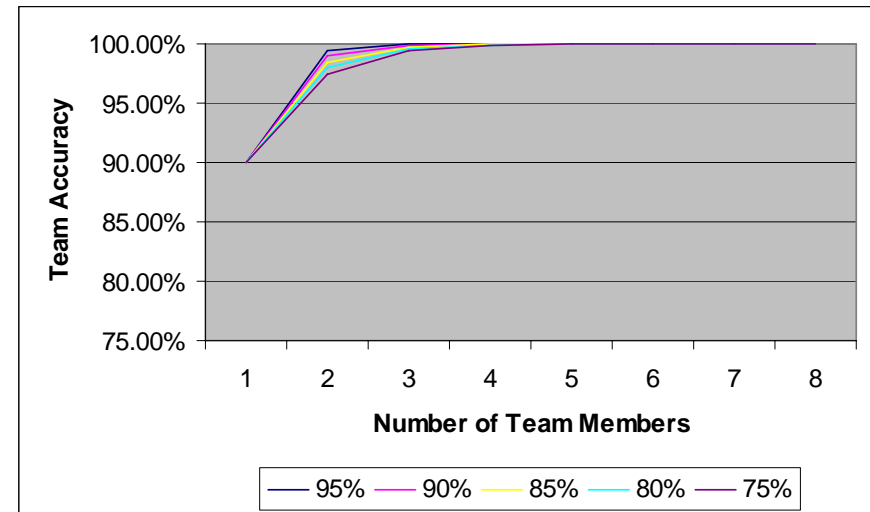
- **If the team leader is 90% accurate, additional team members add little accuracy**

- **Adding team members does give a chance for them to learn**

Appraiser accuracy, not team size, is critical

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Evidence Mapping Should Use An Automated Tool

- **Key Tool Capabilities**
  - Point to existing project file structures
  - Capture status and needed actions
  - Provide statistics over time - project compliance, organizational compliance
  - Identify common gaps across projects
  - Identify typical evidence for each practice

- **Tips**
  - Finding the "right" evidence will involve iteration
  - Remember that the goal is <u>improvement </u>(learning/implementing new practices effectively), not finding/creating the evidence
  - Use workshops to educate, motivate, populate
  - Careful preparation reduces on-site evidence review time

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Techniques for Reducing Cost – On-Site

- **Evidence review – Evaluating the gathered evidence to verify CMMI goal and practice compliance**
  - Remember the goal is to validate that the practice is performed, not to judge goodness of the document
  - Inexperienced appraisers should be coached to develop the proper perspective and speed

- **Interviews – Verifying the evidence is appropriate**
  - Not as important as evidence review
  - Simply verifies that what you saw is what is being used (verification, not discovery)
  - Not a test of practioners' memory

- **Consolidation – Using direct, indirect and affirmations to form judgments about goal and practices compliance**
  - Biggest time-waster

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Reducing Interview Costs

- **To reduce cost:**
  - Use pre-scripted interview questions
  - Conduct interviews simultaneously in mini-teams (Remember that more than 3-4 people don't increase accuracy much.)
  - Schedule one interview per practice & instantiation (no SCAMPI requirement for multiple interview sources like in CBA IPI)

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Reducing Variation in Evidence Review

inexperienced

time for review
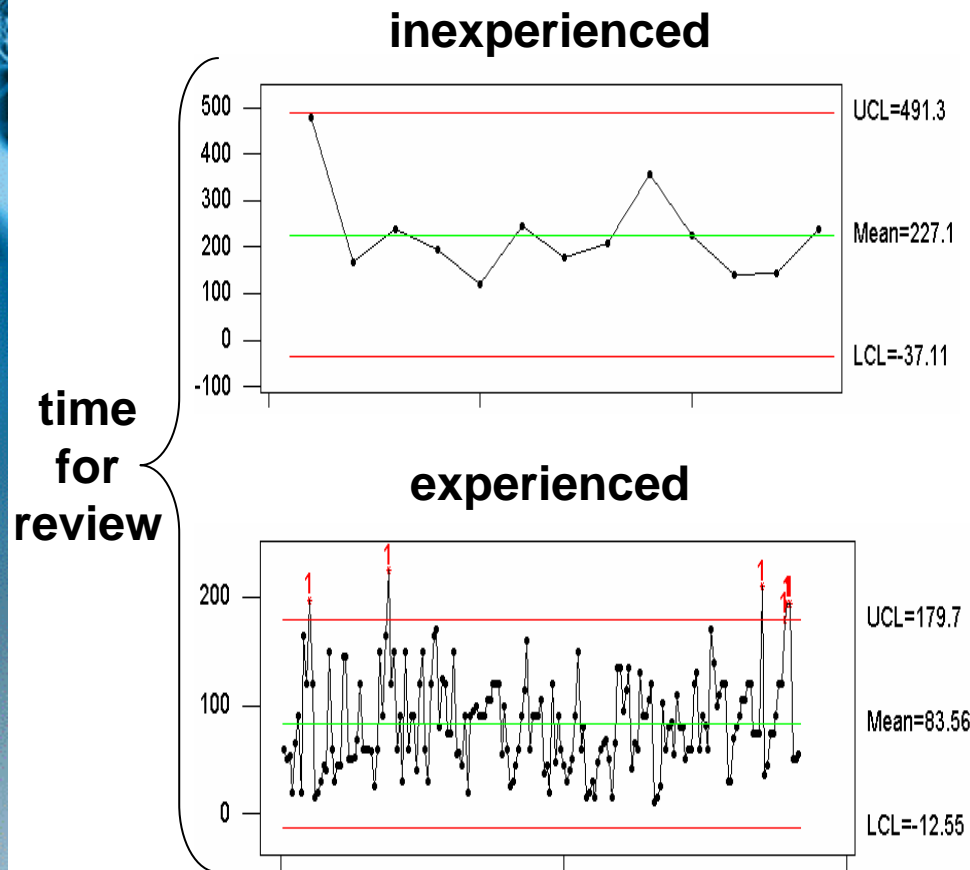
experienced

- **The time is takes to review evidence is predictable**
  - Some variation by process area

- **The mean review time and variation is much higher among inexperienced appraisers**
  - At least half of the appraisers on the team should be experienced

- **Review time is driven by the clarity with which evidence is assembled and mapped to the CMMI practices**
  - Ensure thorough evidence scrub prior to on-site period
  - Inappropriate evidence ("defects") causes unexpected schedule overruns

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Reducing Consolidation Time

Crafting observations

- **Voice of Customer data indicates organizations and projects simply want to know which practices they do not comply with**
  - Consistent with Verification mode
  - No need to wordsmith charts

- **Use an Appraisal Findings tool to capture the ratings at the instantiation level (every project, every practice)**
  - Simplifies data consolidation, team discussion

Reviewing as a team

- **Most of the time is spent arguing about how to interpret a few CMMI practices**
  - Especially Generic Practices

- **We created "CMMI Interpretation" training which clarifies how ambiguous practices will be evaluated**
  - Driven by areas where disagreement occurred
  - Useful in reaching team (and organizational) consensus

Stickies

Non-CMMI Findings

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Ten Most Misinterpreted CMMI Practices

- **Requirements Management**
  SP 1.4 Maintain Bidirectional Traceability of Requirements
- **Project Planning**
  SP 1.2 Establish Estimates of Work Product and Task Attributes
- **Project Monitoring and Control**
  SP 1.1 Monitor Project Planning Parameters
- **Measurement and Analysis**
  SP 1.1 Establish Measurement Objectives
- **Configuration Management**
  SP 3.2 Perform Configuration Audits
- **Verification**
  SP 2.2 Conduct Peer Reviews
  SP 2.3 Analyze Peer Review Data
- **Risk Management**
  SP 1.1 Determine Risk Sources and Categories
  SP 1.3 Establish a Risk Management Strategy
- **Generic Practices**

"The 10 Most Commonly Misunderstood CMMI Practices, " R. Hefner, CMMI Technology Conference and User Group, 17-20 November 2003
"Applying CMMI® Generic Practices with Good Judgment, " R. Hefner and G. Draper, CMMI Technology Conference and User Group, 15-18 November 2004

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Summary

- **Mission Systems is typically conducting Level 5 SCAMPI appraisals of 5-6 focus projects in 5-6 days**
    - Post-appraisal follow-up indicates >95% accuracy rate

- **We are continuing to look at ways to decrease cost and increase effectiveness and value**
    - Effective sampling using non-focus projects
    - Re-appraisals to prevent "back-sliding"
    - Handling evidence refresh
    - Combining with ISO 9000, AS-9100 appraisals

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