Maintaining a SCAMPI A Rating using SCAMPI B&C

M. Lynn Penn
Director Quality Systems & Process Management
Lockheed Martin Management & Data Systems

Presentation Agenda

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Maintaining a SCAMPI A Rating using SCAMPI B&C

- **Introduction**
- **Instant Profile (SCAMPI C)**
- **Mini Appraisal (SCAMPI B)**
- **Advantages (ROI)**

And So it Begins…

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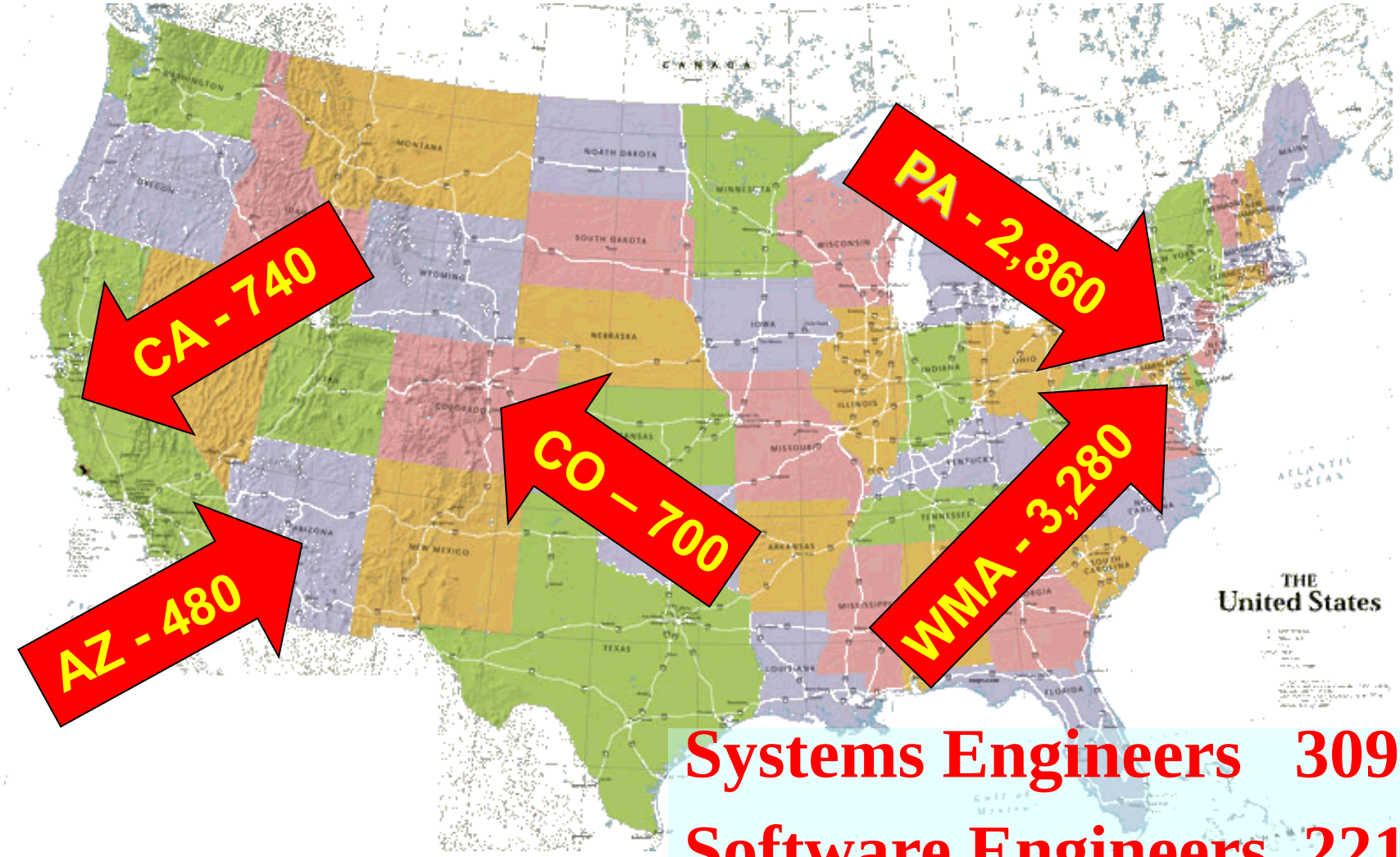
Maturity Level Rating

Based upon M&DS activities within the scope of the SCAMPI v1.1 appraisal conducted 3 - 7, 17 - 21 June, 2002:

Lockheed Martin
Management & Data Systems
organization is operating at
Maturity Level 5

of the Capability Maturity Model
Integration (CMMI) SE/SW v1.1, Staged

The M&DS Team



Systems Engineers 3090

Software Engineers 2210

Maturity at M&DS

- M&DS has achieved CMMI Maturity Level 5 recognition
- Customer expectations have been set across ALL of M&DS
- Attention in getting the rating was focused on major key M&DS programs (>60% of "bottom line"
- That same rigor must be applied across all programs at M&DS (approx. 160)
- Presidents Goal
  - Maintain CMMI Maturity Level 5 maturity across <u>all</u> programs

SCAMPI A,B,C's

- **Contrasting:**
  - **SCAMPI A takes two+ weeks to perform and costs >$100K**
  - **SCAMPI C is done in less than a day -> thumbnail problems identified**
  - **SCAMPI B is a three day exercise that yields major nuggets to work (not a rating)**

SCAMPI B&C Deployment

- Total of 160 programs
  - $$$$ and above = 80 programs
    - Requiring SCAMPI B
  - $$$ - $$$$ = 80 programs
    - 50% require SCAMPI B
    - 50% require SCAMPI C
- Growing at 10 programs per year
  - Year of award – require SCAMPI C
  - Next year – require SCAMPI B
- Maintenance via SCAMPI C
  (SCAMPI B only if C indicates a need – no percentage given since limited historical metrics available)

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SCAMPI C
Instant Profile Methodology

- **This is a quick pictorial representation of the relative *risk* of each Process Area's (PA) readiness / preparedness**
  - **A brief questionnaire discloses potential areas of development risk. An EXCEL spreadsheet weights and scores the questionnaires; output is a histogram depicting a risk score for each CMMI process area.**
  - **A profile of the program by CMMI levels reflects relative strengths of each process area for a given project/program.**
- **The M&DS Target for the initial *Instant Profile*, on each program, was an acceptability level of 80% in each PA**
  - **The difference between 80 and 100% would be made up through remedial training and institutionalization**

ARC Compliance

Characteristics	Class A	Class B	Class C
Usage Mode	**Rigorous a process(es** **Basis for i**		**Quick-look** **Incremental**
Advantages	**Thorough coverage; strengths and weak-nesses for each PA investigated; robustness of method with consistent, repeatable view; optic**	**Organization gains in-sight into own capability; provides a rting point or focuses on areas that ost**	**Inexpensive; short duration; rapid feed-back**
Disadvantages	**Demands significant resources**	**Does not emphasize d h of coverage and rigor an t be**	**Provides less buy-in and ownership of re-sults; not enough depth to fine tune process improvement plans.**
Sponsor	**Senior manager of organizational unit**	**Any manager sponsori PI program**	**Any internal manager**
Team Composition	**External and internal**	**External or internal**	**External or internal**
Team Size	**4-10 perso leader**		**1-2 persons, plus assessment team leader**
Team Qualifications	**Experienced**	**Moderately experience**	**Moderately experienced**
Assessment Team Leader Requirements	**Lead Asse**	**in method nced**	**Person trained in method**

Easy to understand

One hour to administer

Only major risks identified

One person administers

CMMI insight

The Instrument

- Instant Profile Questionnaire
- Tabulation of Responses
- Scoring the Results
- Excel Tool Output

The Instant Profile Questionnaire

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CMMI Instant Profile - Microsoft Word

File Edit View Insert Format Tools Table Window Help

Header Helvetica 11

Risk Topic 1: Requirements Management

Does the *project* manage the requirements of the project's product, and keep the project's plans and *work products* consistent with them?

CMMI PA: RM – Requirements Management (Maturity Level 2, Category: Engineering)

	Yes	Some Times	No	Don't Know	Does Not Apply
1) Requirements are managed so that they accurately reflect the projects plans and products.	☐	☐	☐	☐	☐
2) The project ensures that requirements management is institutionalized as a managed process.	☐	☐	☐	☐	☐
3) The project maintains requirements traceability.	☐	☐	☐	☐	☐
4) The project analyzes requirements quality.	☐	☐	☐	☐	☐
5) The project tracks work effort against requirements.	☐	☐	☐	☐	☐

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Results Are Tallied To Obtain Totals

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Microsoft Excel - iMM CMMI MQ Summary V1.3.xls

	A	B	C	D	E	F	G	H	I
1	iMM	⇦ Enter the name of the Program or Organ							
2		⇦ Enter the Date of the Benchmark							
3	Enter "M" for Managers ⇨								
4	Enter "X" to exclude questionnaire from results ⇨								
5	Percentage of "Don't Know" answers ⇨	36%	6%	0%	0%	36%	15%	2%	0%
6	Questionnaire Version 1	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	Q 8
28	2) The project monitors the supplier's and the project's performance and results to ensure that the supplier agreement is met.	3	1	1	1	4	1	1	1
29	3) The project ensures that supplier agreement management is institutionalized as a managed process.	1	1	1	2	4	4	1	2
30	4) The project performs make-or-buy analysis and decisions.	4	4	1	1	1	2	1	1
31	5) The project establishes and maintain requirements for the products being acquired.	1	1	1	1	1	1	1	1
32	6) The project selects suppliers.	1	3	1	2	2	1	1	1
33	**Measurement and Analysis**								
34	1) The project ensures that measurement objectives and practices are aligned with established information needs and objectives?	4	1	1	1	4	1	1	1
35	2) The project ensures that measurement results that address information needs are available.	4	1	1	1	4	1	1	1
36	3) The project ensures that Measurement and Analysis is institutionalized as a managed process.	4	1	1	1	4	1	1	1
37	4) The project collects and stores data (used to manage the project).	1	1	1	1	4	1	1	1
38	5) The project performs analysis and interpretation of project performance.	2	1	1	1	4	1	1	1
39	6) Training is provided to your project to support measurement collection and analysis.	4	4	1	1	4	4	4	1
40	**Process and Product QA**								

Raw Data | Data Tabulation | Level 2 | Level3 | Levels 4 & 5 | Organi

EXCEL Scores Answers

Microsoft Excel - IP Worksheet

	A	B	C
1			
2	**Number of Questionnaires**	**7**	
3			
4		**Raw Score**	**Weighted Score**
5	Requirements Management	18	51
6	Project Planning	34	81
7	Project Monitor & Control	27	77
8	Supplier Agreement Management	19	45
9	Measurement & Analysis	13	31
10	Process & Product QA	15	36
11	Configuration Management	30	71
12	Requirements Development	24	69
13	Technical Solution	21	60
14	Product Integration	33	67
15	Verification	29	59
16	Validation	28	80

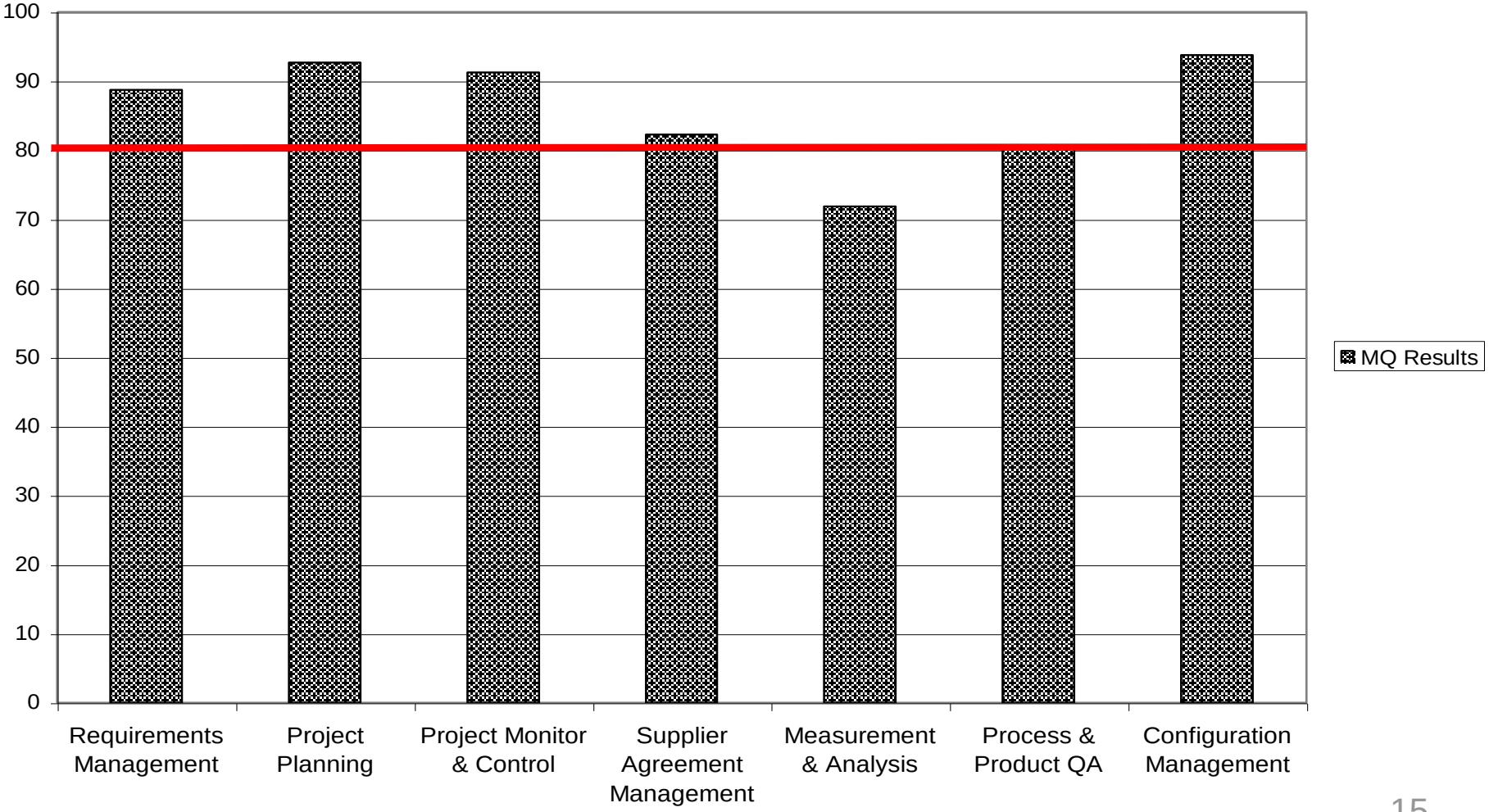
Worksheet | Data Tabulation | Sheet1 | Level 2 | Level

Ready

Typical Tool Output

CMMI Level 2

16 Questionnaires



Conclusions

- Instant Profile tool has been used internally for two years
- Successful Implementation Includes
  - Start Ups
  - Subcontractor/ Supplier Risk Evaluations
- There is correlation between high / low scores and readiness for a formal appraisal
- Has been used successfully in conjunction with the SCAMPI B method (supports validity)

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SCAMPI B Methodology
Mini Appraisal

- Performed by Three M&DS organization representatives
  - Trained in CMMI (minimum requirement CMMI Intro Course)
  - Trained in M&DS Tool
  - Trained in SCAMPI B methodology
- Kickoff Meeting
  - Educate program on process, Identify Point of Contact (organization and program)
- Before Visit
  - Program will be asked to fill out a detailed spreadsheet against CMMI – identifying compliance documentation
  - Program will find a way to make documentation available to group
  - Program should identify list of individuals to be interviewed (list of disciplines and positions will be provided)
- Readiness Review
  - Member of SCAMPI B team reviews completed binders for gaps before proceeding to on-site visit

SCAMPI B Methodology
Mini Appraisal (cont.)

- On-Site Visit
  - Three M&DS representatives will review documentation and interview program participants; Duration – 3 days
  - SCAMPI B will commence with opening brief to PM or rep and all participants (minimum mandatory attendance)
  - Quick Look (instant profile) of program against CMMI compliance
    - Identifies Risks/ Gaps
  - Instant Profile administered and scored
  - Results tabulated to give a picture of compliance
  - Measured specifically against the 17 Program related Process Areas
    - Expectation – 80% compliance in each Process Area
  - Asked about organizational Process Areas to determine knowledge of M&DS Process Hierarchy
  - Benchmark will end with debrief to PM (others at discretion of PM)
  - Action Plan responsibility will be assigned

ARC Compliance

Characteristics	Class A	Class B	Class C
Usage Mode	**Rigorous and in-depth investigation of process(es)** **Basis for improvement activities**	**Initial (first-time)** **Incremental (partial)** **Self-assessment**	**Qu**
Advantages	**Thorough coverage; strengths and weak-nesses for each PA investigated; robustness of method with consistent, repeatable results; provides ob-jective view; option of 15504 conformance**	**Organization gains in-sight into own capability; provides a starting point or focuses on areas that need most attention; promotes buy-in**	**Inexpensive; short duration; rapid feed-back**
Disadvantages	**Demands significant resources**	**Does not emphasize depth of coverage and rigor and cannot be used for level rating**	**Provide s buy-in and ownership of re-su**
Sponsor	**Senior manager of organizational unit**	**Any manager sponsoring an SPI program**	**Any inter manager**
Team Composition	**External and internal**	**External or internal**	**External or internal**
Team Size	**4-10 persons, plus assessment team leader**	**1-6 persons, plus assessment team leader**	**1**
Team Qualifications	**Experienced**	**Moderately experienced**	**Moderat experienced**
Assessment Team Leader Requirements	**Lead Assessor**	**Lead assessor or person experienced in method**	**Per**

Internal preparation

3-4 days on-site

No level rating

3-4 people

CMMI Experienced

The Instruments

- **SCAMPI C Instant Profile©**

  Quick identification of risk areas

- **CMMI Compliance Matrix**

  CMMI → Company Standards → Project Implementation

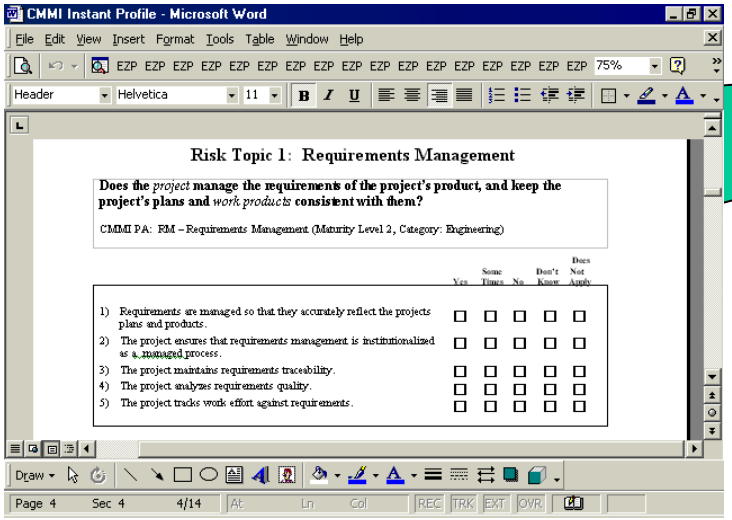
  Identification of major holes

  Similar to SEI's PIID, direct / indirect categorization

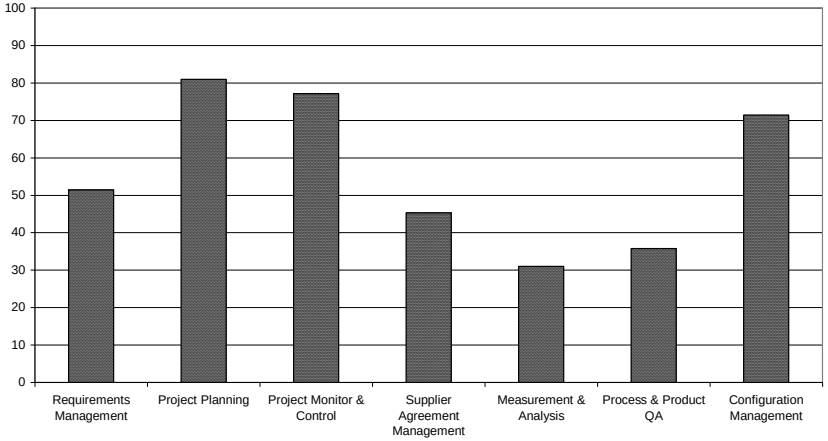
  Input template for artifact collection

- **Interviews**

Instant Profile Questionnaire



Level 2

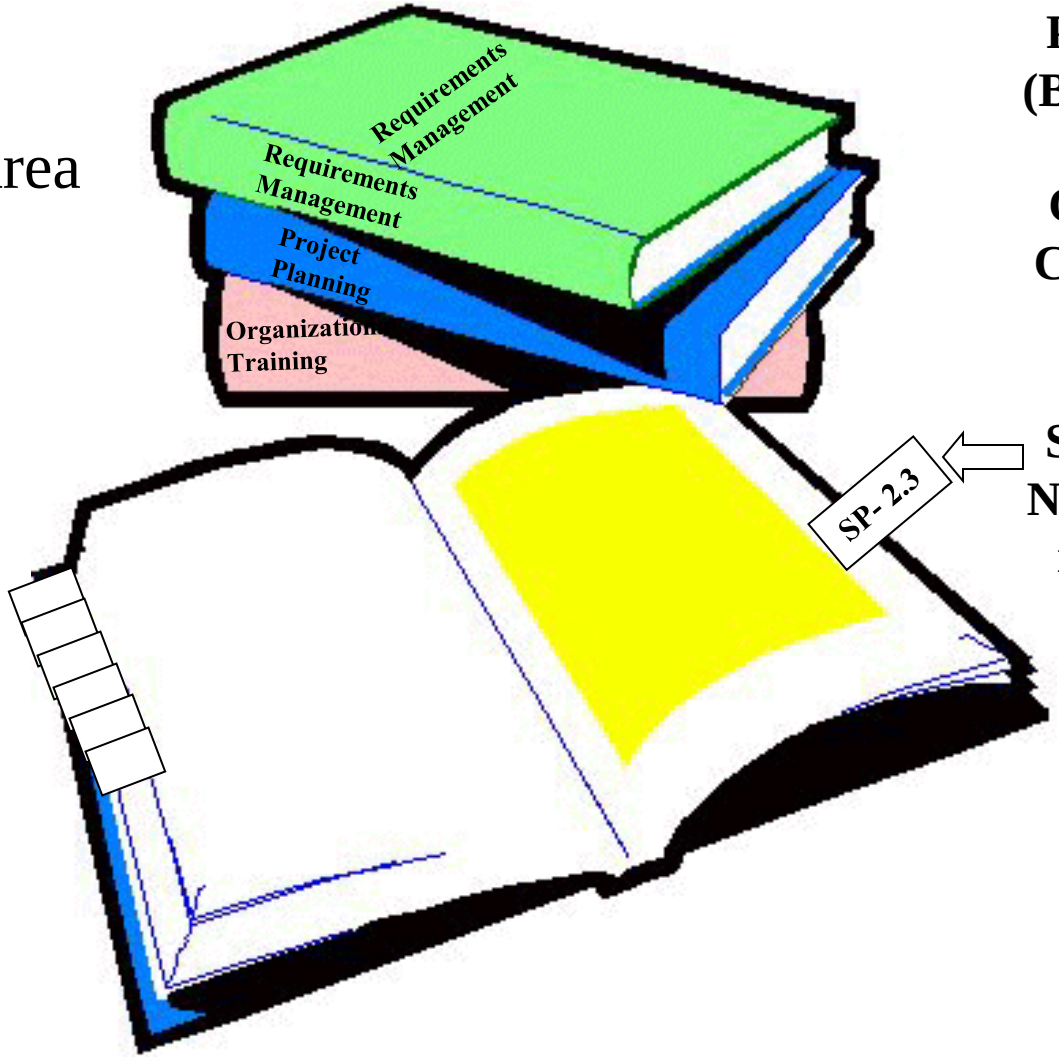


CMMI Compliance Matrix

			Description	Organizational Policy	Project x : Procedures	Project x: Output
VER	**SG 1**		Preparation for verification is conducted.			
VER		**SP 1.1**	Select the work products to be verified and the verification methods that will be used for each.	PPS 1.1 (6) PPS 3.2 (9, 10, 17, 25) PPS 3.3 (4g & h, 7) PPS 3.5 (6, 17)	PP 3.7.4 Formal Qualification Testing; PP 3.12 Integration and Test; SDP 3.2 Process Description, Figure 3.2.1-1 Software Development Tasks and Products, 3.2.4.2 Software Formal Qualification Test Activities and Methodology	ABCDE-00-0155 Formal Qualification Test (FQT) Software Test Plan for the Common Services (CS) CSCI, Table of Contents, Section 4.1 General Information
VER		**SP 1.2-2**	Establish and maintain the environment needed to support verification.	PPS 3.2 (7) PPS 3.3 (5) PPS 3.7 (5) PPS 3.9 (20) PPS 3.11 (6, 7, 8) PPS 3.12 (1)	PP 3.7.4 Formal Qualification Testing; PP 3.12 Integration and Test; SDP 3.2.4.2 Software Formal Qualification Test Activities and Methodology	ABCDE-00-0155 Formal Qualification Test (FQT) Software Test Plan for the Common Services (CS) CSCI, Section 3 Software Test Environment; ABCDE System Design Certification Test (SDCT) TRR, Software Under Test, SDCT Entrance Criteria, I5 Software Status
VER		**SP 1.3-3**	Establish and maintain verification procedures and criteria for the selected work products.	PPS Section 1 PPS 3.2 (7) PPS 3.5 (23) PPS 3.6 (5) PPS 3.7 (4) PPS 3.9 (8, 19) PPS 3.10 (2) PPS 3.11 (2) PPS 3.12 (3)	PP 3.7.4 Formal Qualification Testing; PP 3.12 Integration and Test; SDP 3.2.4.2 Software Formal Qualification Test Activities and Methodology, 3.2.4.3 Software Formal Qualification Test Exit Criteria	ABCDE-00-0531 Formal Qualification Test (FQT) Software Test Procedures for the Engagement Manager (EM) CSCI, Table 1 EM FQT Testing (Surface); ABCDE System Design Certification Test (SDCT) TRR, Test Methodology and Sequence
VER	**SG 2**		Peer reviews are performed on selected work products.			
VER		**SP 2.1**	Prepare for peer reviews of selected work products.	PPS 1.3 (6) MPE-0902 (5.2)	SDP 4.7.2 (Inspections); JI 016 (ABCDE Inspection Support Data)	Inspection Notice for Inspection EM0056 with completed SWAD Checklist
VER		**SP 2.2**	Conduct peer reviews on selected work products and identify issues resulting from the peer review.	MPE-0902 (5.2 - 5.5) PPS 1.1 PPS 3.3 (8) PPS 3.5 (25) PPS 3.6 (4h) PPS 3.7 (TBD)	JI 016 (ABCDE Inspection Support Data)	Inspection Notice/Report for Inspection EM0056, Defects

A Tabbed Binder for Each Process Area

17 Process Area Binders

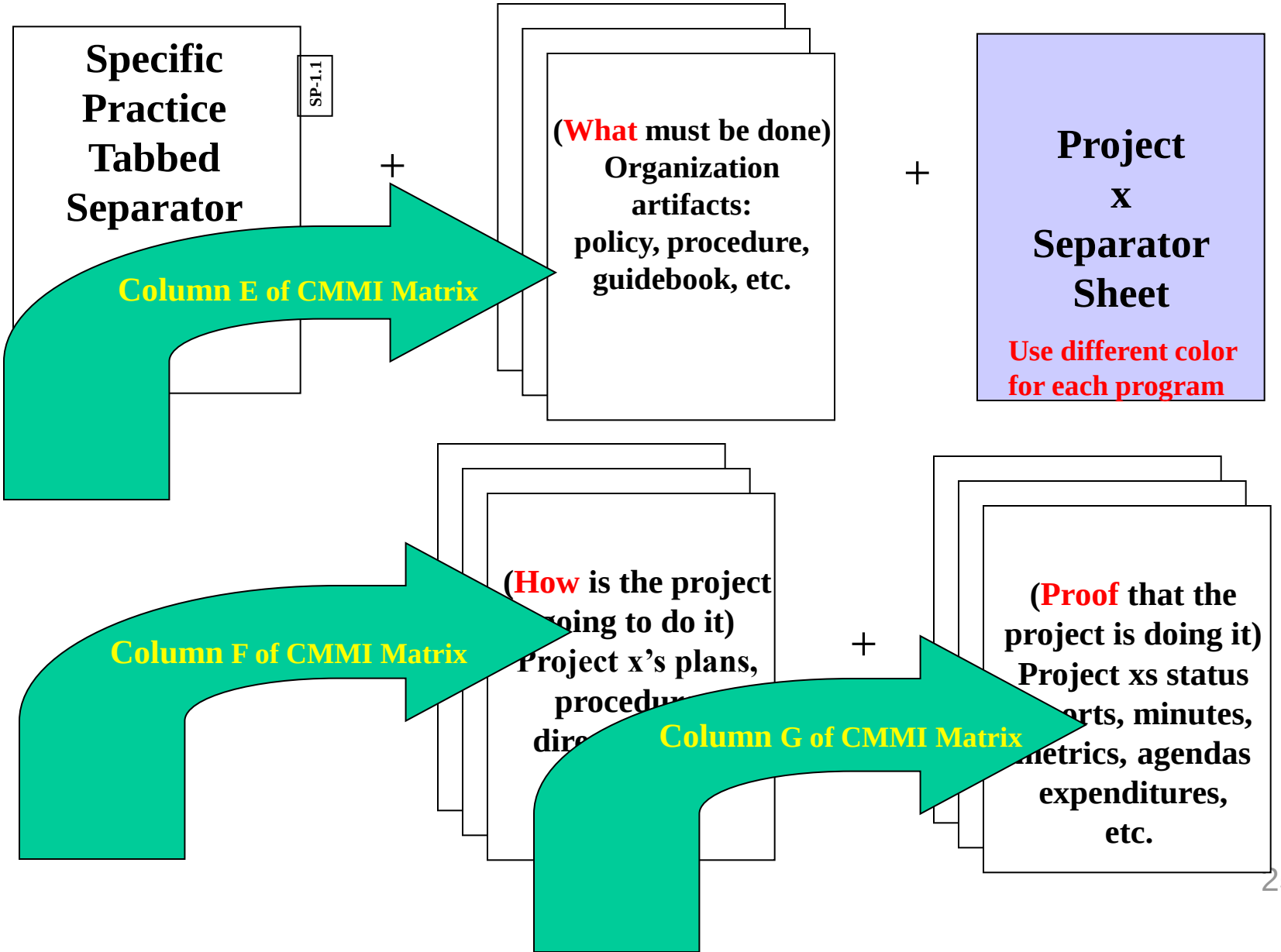


Process Area (Binder Names) Identified in Column A of CMMI Matrix

Specific Practice Number identified in Column C of CMMI Matrix

Specific Practice Tabs

For Each Specific Practice



Formal On-Site Period

The focus changes from one of DISCOVERY to that of VERIFICATION

Due to:

- **Pre-collection and assembly of artifacts**
- **Completion of CMMI compliance matrix**
- **Instant profile insights**

Typical Agenda

Tuesday

8:00 -10:30	**Artifact & Matrix Review**
11:00 -11:45	**Opening Briefing**
1:00 - 2:00	**Process Area of Special Interest**
2:30 - 4:30	**First Line Supervisors ***

Wednesday

9:00 - 10:00	**Management Team**
10:30 - 11:30	**CM / DM / QA**
1:00 - 2:00	**Individual Contributors**
2:30 - 5:00	**Findings Consolidation**

Thursday

8:00 - 1:30	**Debrief Prep**
2:00 - 2:30	**Executive Session**
3:00 - 4:00	**Program's Debrief**

** Includes administration of Lockheed Martin's Instant Profile*

Typical Outbrief

- Purpose: Recent History
- Schedule for This Week
- Observed Strengths
- Non-Model Related Observations
- Model Related Observations
- Current Situation
- Going Forward
- Team Conclusions

Manager's Objective

What We Did

Risk: Instant Profile

Primarily Matrix Holes

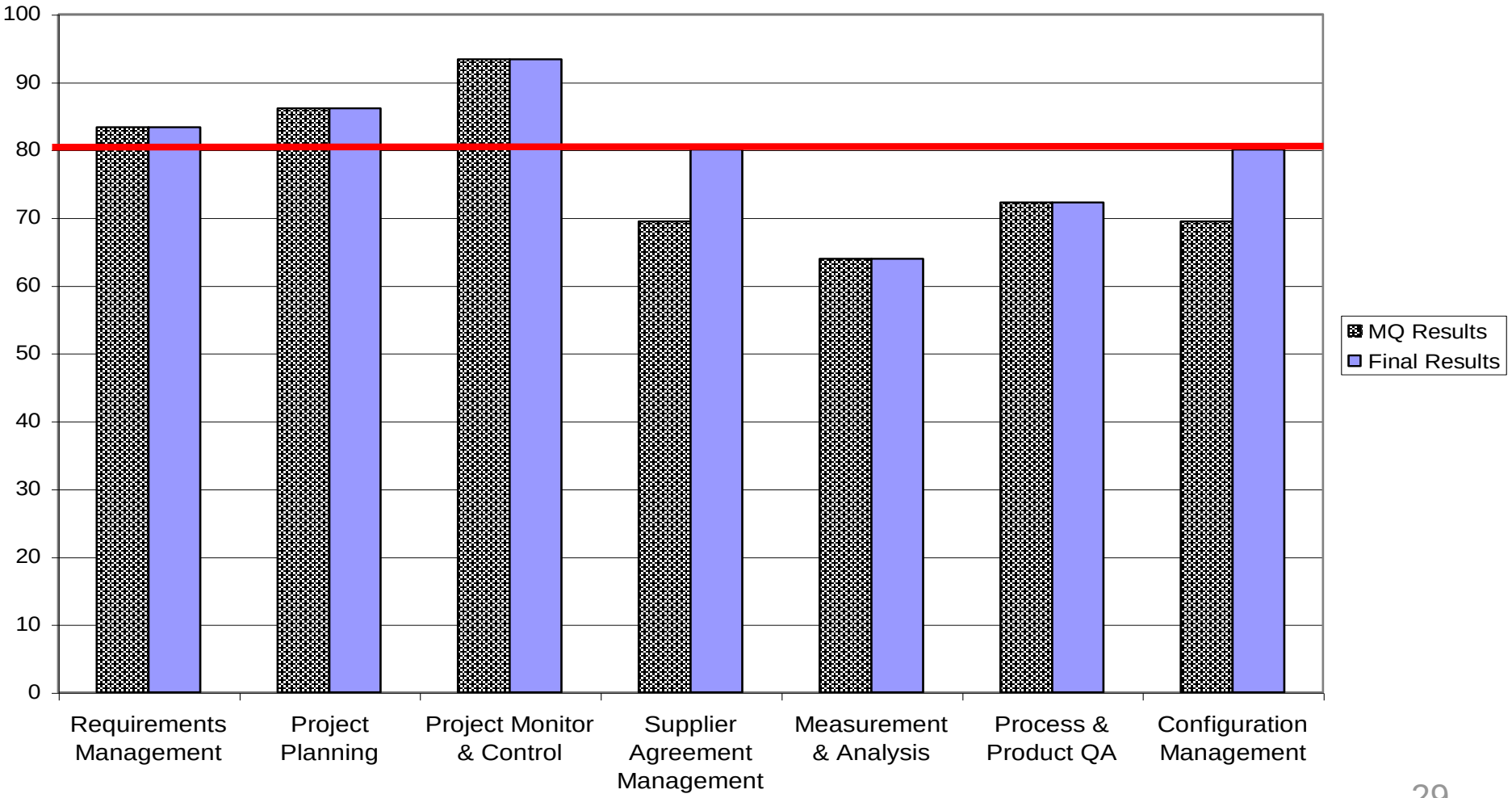
This is only the beginning …

Typical Tool Output

6/24/2003

CMMI Level 2

6 Questionnaire



Conclusion

- This methodology has been used successfully for more than three years to stimulate internal process improvement
- Provides inputs into our standard processes
- Allows all parts of the organization to feel they are part of the CMMI Banners hanging in the lobbies

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Advantages

- Validates our processes - (analogous to software validation - are the processes being used the way they were intended in their operational environment) with objective quantitative measures – provides the data to quantitatively manage process improvements.
- Illuminates the weak areas across the organization to pinpoint areas needing CPI efforts
- Expands the buy-in
- Improves the ROI vs a Scampi A - Compare the cost of doing B & C vs a scampi A - same return with a significantly smaller investment
- Measures and Strengthens institutionalization of the processes
- Avoids complacency after successful process improvement program.
- Emphasizes the principle that we aren't just doing it for the rating.
- Reiterates Management commitment to process improvement

Return On Investment

- **Return on Investment:**
  - **SCAMPI B's are much cheaper to conduct (>$100K -> $20K)**
    - **SCAMPI A = 82 hours to conduct**
  - **SCAMPI B is less intrusive for the programs**
    - **SCAMPI B = 24 hours to conduct**
  - **SCAMPI C's allow the company a quick way to identify weak programs requiring intensive followup.**
    - **SCAMPI C = 4 hours to conduct**

Contact Information

Lynn Penn	**(610) 354-1188** **mary.lynn.penn@lmco.com**
Bob Weiser	**(610) 354-3365** **clinton.r.weiser@lmco.com**
Dennis Ring	**(512) 292-8090** **dennis.a.ring@lmco.com**
Bill Pohle	**(610) 354-5704** **bill.pohle@lmco.com**