HARRIS

Process Compliance the Smart Way

Gary Natwick, Dean Wooley, Jack Lawrence
Harris Corporation / ISD

ommunications ion: What We Do...

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Aviation electronics

Communications and information networks

Intelligence, surveillance, and reconnaissance

Space and ground satellite communications systems

Operations and support services

We innovate, integrate, and manage technology.

Getting There

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- Background
  - Goals, sources, and references
  - Organizational-centric set of integrated processes
  - Maintaining process compliance
- Implementation
  - Product-centric approach
  - Reverse engineering to achieve simplification
  - Reuse of unique artifacts
  - Organization default artifacts and locations
- Validation
  - SCAMPI^{SM} Class C approach
  - SCAMPI^{SM} findings
- Summary

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- Ensure expected artifacts are appropriate and adequate to provide objective evidence to measure process compliance
  - Organizational procedures using QA audits
  - CMMI® using SCAMPI℠ Class A/B/C appraisals
- Ensure each expected artifact description is clear and complete to explain why it is relevant
- Maximize the re-use of actual artifacts to minimize the number of unique artifacts
- Limit the impact to the programs by minimizing the changes

ces & References

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- Integrated Process Manual (IPM)
- Process Compliance Monitor (PCM) tool
- Standard directory structure
- SCAMPI℠ v1.1Class A artifacts
  - November 2005
- CMMI®-DEV+IPPD v1.2 model
- CMMI®-DEV+IPPD v1.2 PIIDS

Integrated Processes

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- Organizational-centric set of integrated processes
  - Integrated Process Manual (IPM)
  - Compliance mapping to CMMI®
- Collaboration across functional organizations
- Repeatable processes with objective criteria
  - Entry/exit criteria, inputs, outputs, verification, measures
- Planning each process, and tracking against plan
  - Tailoring standard processes and assets
- Budgets, schedules, resources
- Managing established baselines
- Managing Stakeholder involvement
- Measuring progress and improvement

ocess Manual

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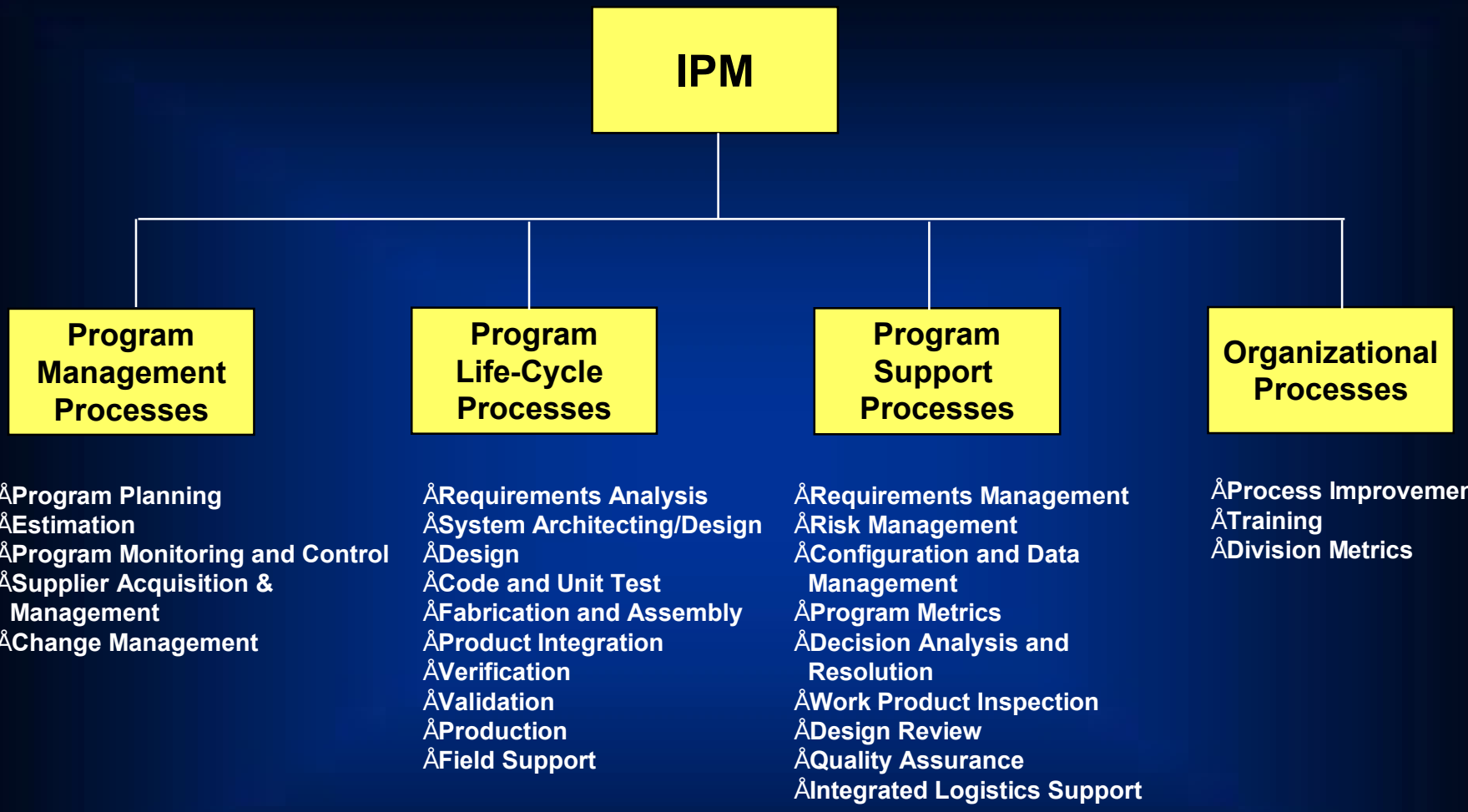

mpliance Approach

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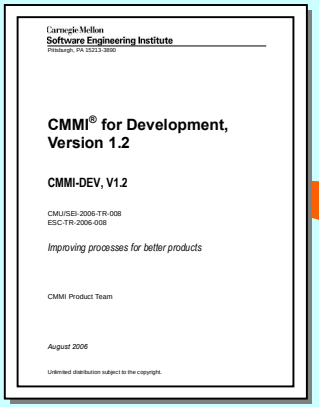
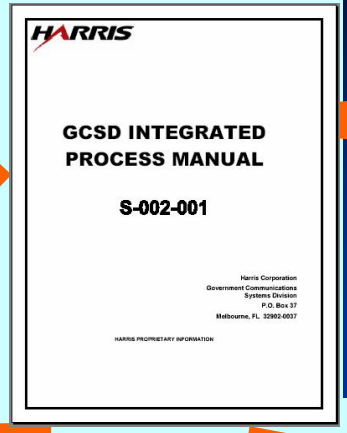
CMMI® Model



Division



Command Media

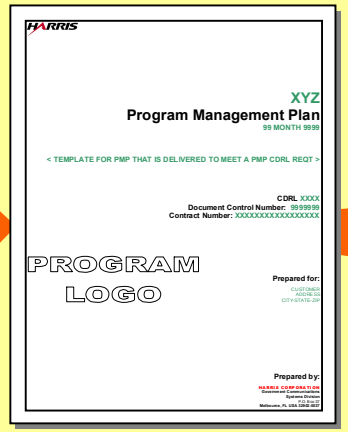
Improve

Reuse

Submit

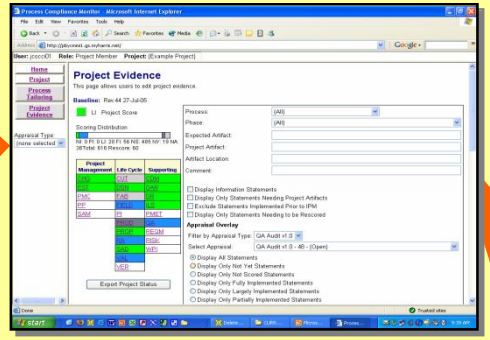
Historical Data
Best Practices
Example Assets
Improvement Requests

Organizational Learning

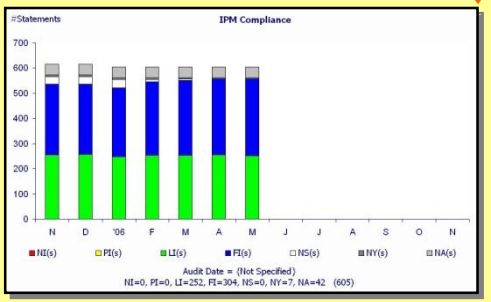


Tailoring

Programs



Program's Compliance Artifacts



Program's Compliance Metric

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Integrated Process Manual

Tailoring

1. Program Plans
2. Program process baseline
3. Program execution
4. Compliance artifacts
5. QA verification
6. Non-compliance mitigation

Program Start-up

Program Phase Execution

Program Appraisals

Process Compliance Monitor (PCM)

o Industry Standards

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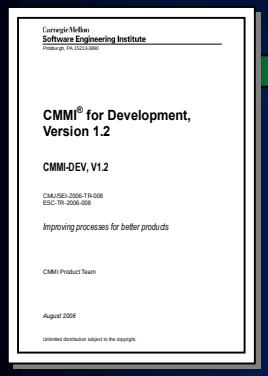
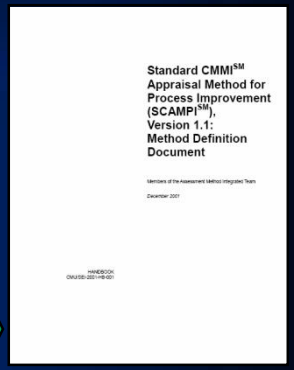
CMMI®



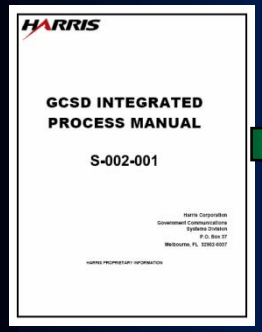
CMMI® Process Areas → CMMI® Specific/ Generic Practices → CMMI® Typical Work Products

SCAMPI℠

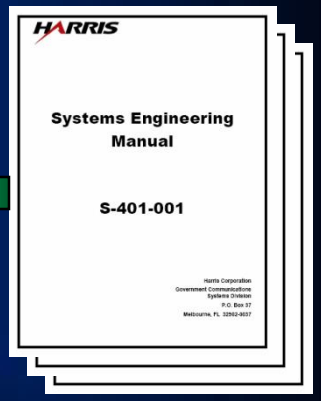


SCAMPI℠ Artifacts (Direct/Indirect)

IPM



IPM Processes → IPM Process Statements → IPM Expected Artifacts (Direct/Indirect)



Process Compliance Monitor (PCM)

- Functional command media
- Best practices

- Product-centric approach
- Reverse engineering to achieve simplification
- Reuse of unique artifacts
- Organization default artifacts and locations

ementation

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- Programs are required to demonstrate compliance to the organizationôs integrated processes, as defined in IPM
- PCM tool is used to collect artifacts (i.e. work products)
  - Each process statement has one or more expected artifacts
  - Short description of each expected artifact provided
  - Program provides work product name and location that meets that expected artifact description
- PCM tool provides objective, online auditing and real-time monitoring of process compliance
  - QA conducts regular assessments of the artifacts to determine program compliance with IPM
  - Compliance scores are recorded in the tool
    - Available to the team and management in real-time
    - Reported monthly to division management

ifacts required?

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Overview
A brief description of the process intent

Entry Criteria	**Exit Criteria**
State, Prerequisites, Criteria	State, Criteria
Inputs	**Outputs**
Needed work products, resources	Resulting work products

Required Activities
Mandatory tasks to implement the process

Measures
Process performance against plans

Organizational Improvement Information
Metrics, reusable work products

Verification
Process compliance oversight

Tailoring
Approved tailoring, process specific

Implementation Guidance
Common implementation descriptions

Supporting Documentation and Assets
Applicable organizational references

Program artifacts needed to demonstrate IPM process compliance

neer Artifacts[1]

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- Instead of looking from the process view ï looked from a program work products view
- Basic guidelines
  - ï Every CMMI® practice shall have a minimum set of adequate expected artifacts in PCM
  - ï Every IPM statement shall have a minimum set of adequate expected artifacts in PCM
  - ï Every PCM artifact (existing or new) shall map to one or more IPM statements and CMMI® practices
  - ï Maximize the re-use of existing artifacts
    - PCM Startup Template
    - Standard Directory Structure

neer Artifacts²

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- Mapped program work products to IPM statements and to relevant CMMI® practices
  - IPM mapping clearly documented in PCM tool
  - CMMI® mapping in PCM tool - transparent to the program
- Artifact descriptions clarified to help the program understand relevance
  - Descriptions let the program know why this artifact is important
  - IPM perspective
  - CMMI® perspective
- Provided name of typical project work product to be used as an artifact
- Provided standard directory structure location where that work product should be maintained

ectory Structure

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- Supports IPM Compliance with artifacts in a common structure across programs
- Top level directories are used as location for program artifacts
  - Avoids tying PCM artifacts to low level directories
  - Easy access by all program team members
  - Avoids confusion as to which is the latest version of an artifact
  - Flexibility for custom directories which contain ñwork-in-progressò
- Pre-populated with latest forms, checklists and plan templates
  - Set up by IT group when program data server is assigned

ectory Structure

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\\gs.myharris.net\Data\General\DPG\public\products\Standard_Directory_Structu...

File Edit View Favorites Tools Help

Back Search Folders Links

Name	Size	Type	Date Modified
CM_DM		File Folder	1/19/2006 12:10 PM
Contracts		File Folder	4/3/2007 1:07 PM
Data_Library		File Folder	1/31/2006 9:02 AM
Electrical_Engineering		File Folder	1/19/2006 12:10 PM
IPT_[Name]		File Folder	1/19/2006 12:10 PM
Manufacturing		File Folder	1/19/2006 12:10 PM
Material_Management		File Folder	1/31/2006 9:02 AM
Mechanical_Engineering		File Folder	1/19/2006 12:10 PM
Program_Controls		File Folder	4/3/2007 1:04 PM
Program_Management		File Folder	1/19/2006 12:10 PM
Project_Engineering		File Folder	2/24/2006 12:24 PM
Quality_Assurance		File Folder	1/19/2006 12:10 PM
Software_Engineering		File Folder	1/19/2006 12:10 PM
Subcontracts		File Folder	1/31/2006 9:02 AM
System_IandT		File Folder	1/19/2006 12:10 PM
Systems_Engineering		File Folder	2/15/2006 5:05 PM
Systems_Support_Engineering		File Folder	1/19/2006 12:10 PM
Owner.txt	1 KB	Text Document	4/29/2007 5:09 PM

18 objects 209 bytes Trusted sites

ementation Results[1]

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- Work products reused to support multiple process statements
  - Artifact descriptions provide the specific application
  - Minimized the number of unique work products that programs need to provide in PCM tool
- Tool repositories hold many of the program artifacts
  - DOORS, ClearQuest, Rose, Pro-E, etc.
- Some evidence/artifacts for a program may be subject to customer data requirements
  - Programs can tailor or change the expected artifacts to better align with their execution
  - Still required to comply with the IPM (and consequently CMMI®)

ementation Results²

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- Significant reduction in the number of artifacts needed to demonstrate IPM compliance
  - Model-centric approach
    - 1360 unique artifacts
  - Product-centric approach
    - 326 unique artifacts
    - 718 pre-defined artifact descriptions
- Complete mapping to CMMI® practices simplifies effort required for SCAMPI℠ preparation
  - Multiple artifacts map to CMMI® practices

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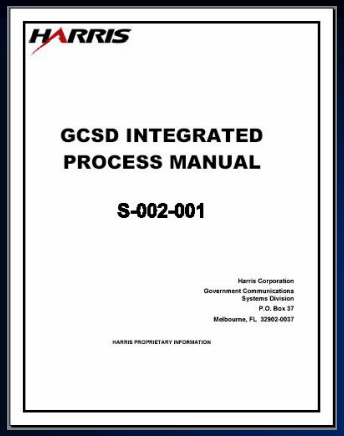
- SCAMPI^{SM} Class C
  - Planning
  - Preparation
  - Data Review
- SCAMPI^{SM} Findings
  - Implementation Risk
  - Process Definition Characterizations

- Given three different sets of data develop a map to show the IPM to CMMI® relationships
  - IPM statements
  - CMMI® practices
  - IPM/CMMI® artifacts
- Capture a set of findings to characterize the process implementation risks and degree of process definition for each CMMI® practice
- Make the task of preparing for and conducting an appraisal as simple as possible



An interim appraisal of process activities to revalidate existing processes based command media against CMMI®ï DEV+IPPD v1.2

Context: Command media recently updated to reflect changes in the organizationôs process improvement goals. Desire to revalidate existing capability with respect to CMMI®ï DEV+IPPD v1.2

Appraisal Objective: Conduct a SCAMPI℠ C on the GSCD command media (documentation only) using CMMI®ï DEV+IPPD v1.2

Desired Outcome : Provide information that management can use to baseline process performance and to prioritize improvement actions

parations

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CMMI® for Development, Version 1.2

CMMI-DEV, V1.2

CMU/SEI-2006-TR-008
ESC-TR-2006-008

Improving processes for better products

CMMI Product Team

August 2006

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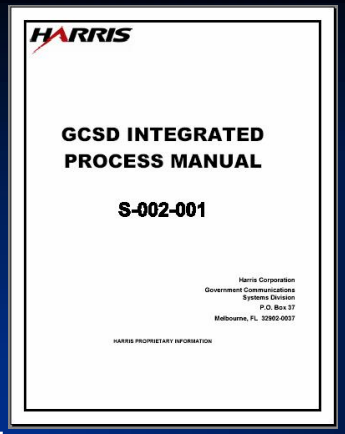
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GCSD INTEGRATED PROCESS MANUAL

S-002-001

Harris Corporation
Government Communications Systems Division
P.O. Box 37
Melbourne, FL 32902-0037

HARRIS PROPRIETARY INFORMATION

- Establish IPM to CMMI® relationships
- Load IPM into appraisal tool (Appraisal Wizard)
- Establish a list minimum but complete set of artifacts each IPM statement
- Automatically map artifacts to CMMI® which is our starting point for the appraisal

Mapping

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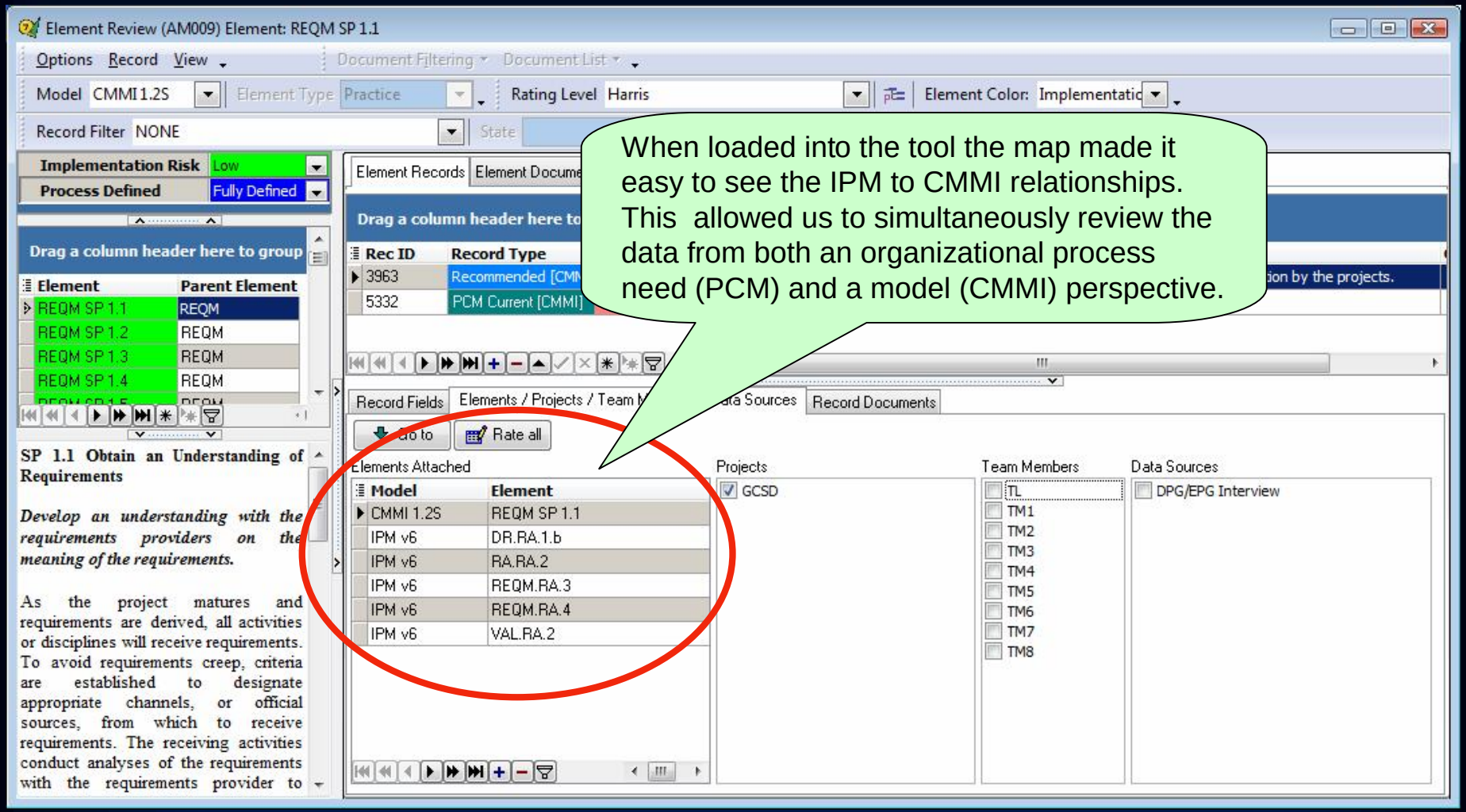

When loaded into the tool the map made it easy to see the IPM to CMMI relationships. This allowed us to simultaneously review the data from both an organizational process need (PCM) and a model (CMMI) perspective.

ngs

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- Compared the required data (as defined in the IPM) to that needed to satisfy the model
- Adjusted the total dataset as needed to correctly reflect artifacts as direct and indirect evidence or to remap them if mapping errors were found
- Team consensus on the necessity of each artifact to demonstrate complete implementation of a practice
- Concise set of summary findings statements to reflect the adequacy of the data set and potential risk of successful deployment and implementation

rtifacts

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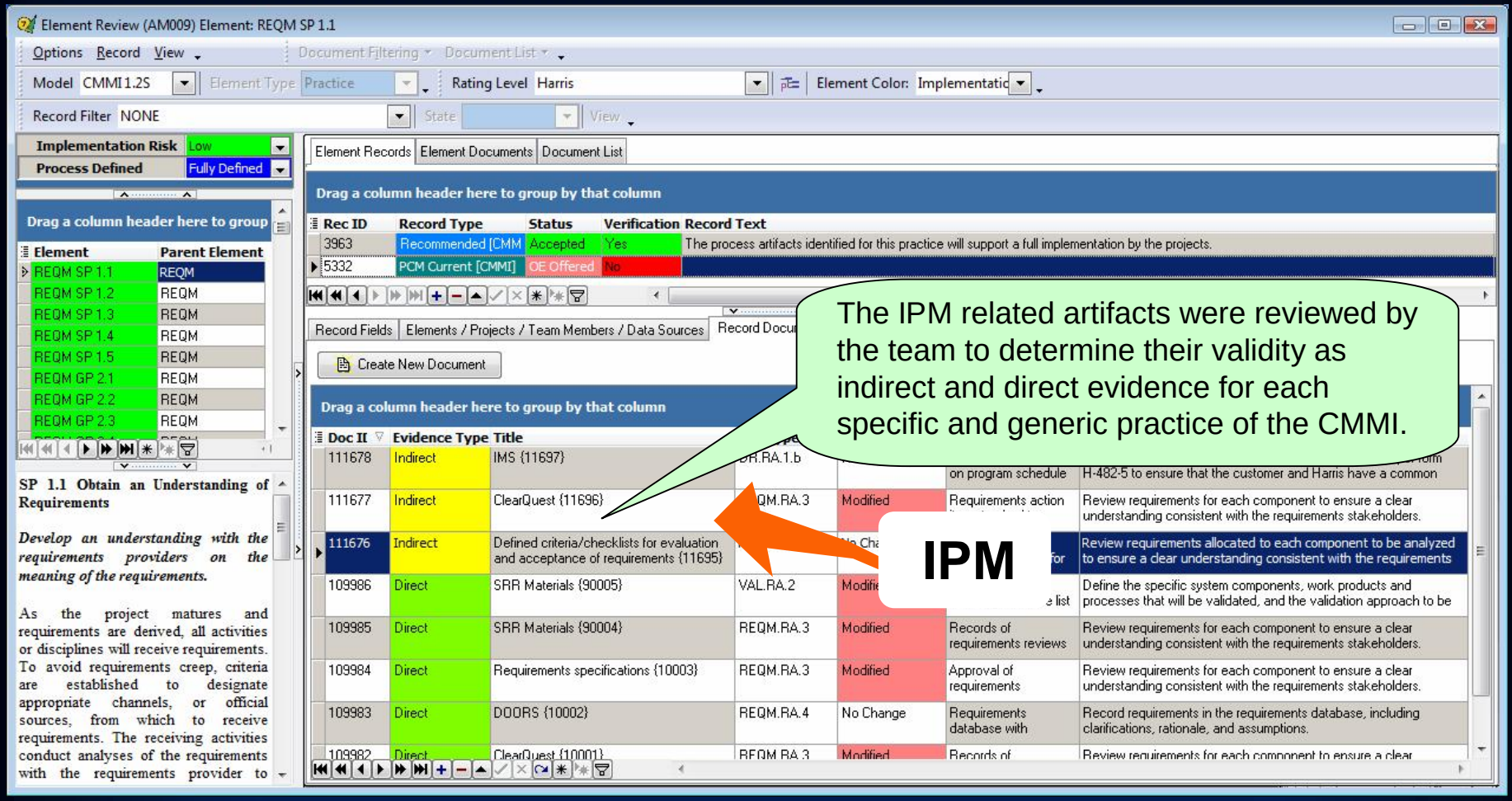

for Each Practice

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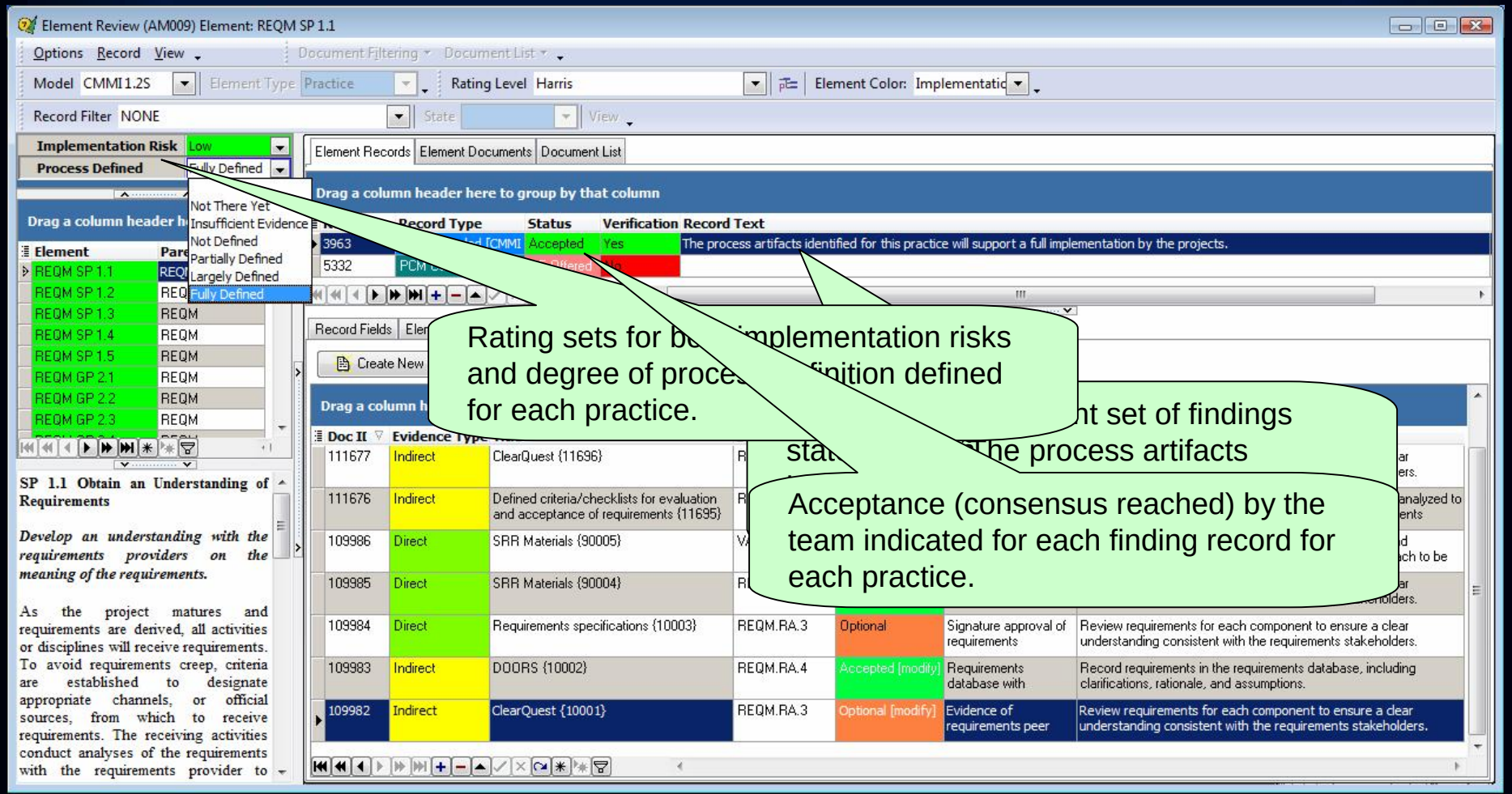

tion Characterizations

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Fully Defined (FD)	One or more direct artifacts are present and judged to be adequate At least one indirect artifact exists No weaknesses are noted
Largely Defined (LD)	One or more direct artifacts are present and judged to be adequate At least one indirect artifact exists One or more weaknesses are noted
Partially Defined (PD)	Direct artifacts are absent or are judged to be inadequate One or more indirect artifacts suggest that some aspects of the practice are defined One or more weaknesses are noted - OR - One or more direct artifacts are present and judged to be adequate No other evidence (indirect artifacts) supports the direct artifact(s) One or more weaknesses are noted
Not Defined (ND)	Direct artifacts are absent or judged to be inadequate No indirect artifacts support the practice implementation One or more weaknesses are noted

s/Artifacts

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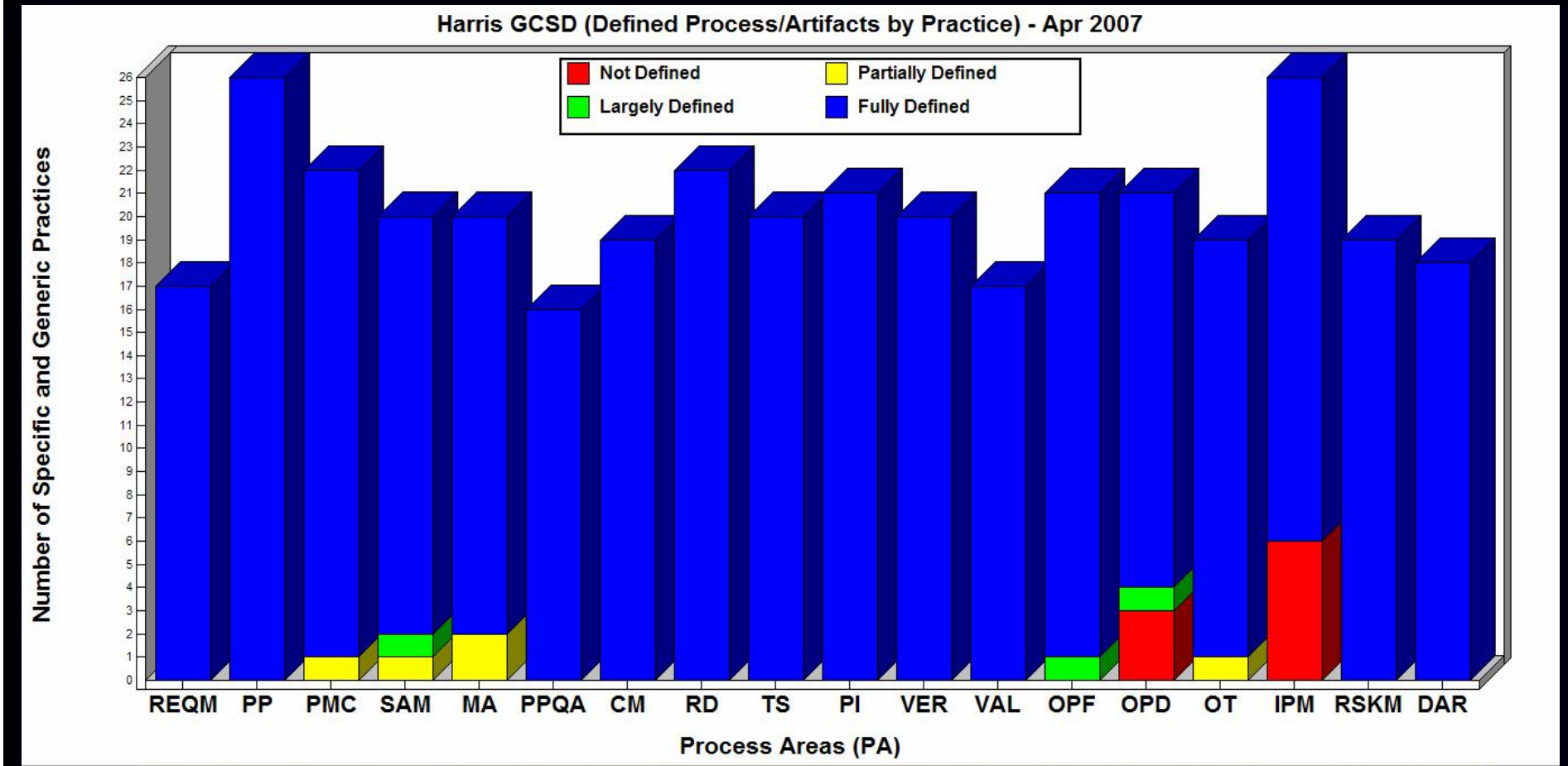

	REQM	PP	PMC	SAM	MA	PPQA	CM	RD	TS	PI	VER	VAL	OPF	OPD	OT	IPM	RSKM	DAR
Not Defined	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	6	0	0
Partially Defined	0	0	1	1	2	0	0	0	0	0	0	0	0	0	1	0	0	0
Largely Defined	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Fully Defined	17	26	21	18	18	16	19	22	20	21	20	17	20	17	18	20	19	18

Note: Weaknesses subsequently mitigated to achieve Fully Defined

olementation Risk

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Label	Meaning
Red	The intent of the model practice is judged to be absent or poorly addressed in the set of artifacts identified – gaps or issues that will prevent goal achievement, if the deployment occurred in this way across the organizational unit, were identified.
Yellow	The intent of the model practice is judged to be partially addressed in the set of artifacts – some gaps or issues were identified, which might threaten goal achievement if the deployment occurred in this way across the organizational unit.
Green	The intent of the model practice is judged to be adequately addressed in the set of artifacts identified – in a manner that would support goal achievement, if the practice were deployed across the organizational unit.

...entation Risk

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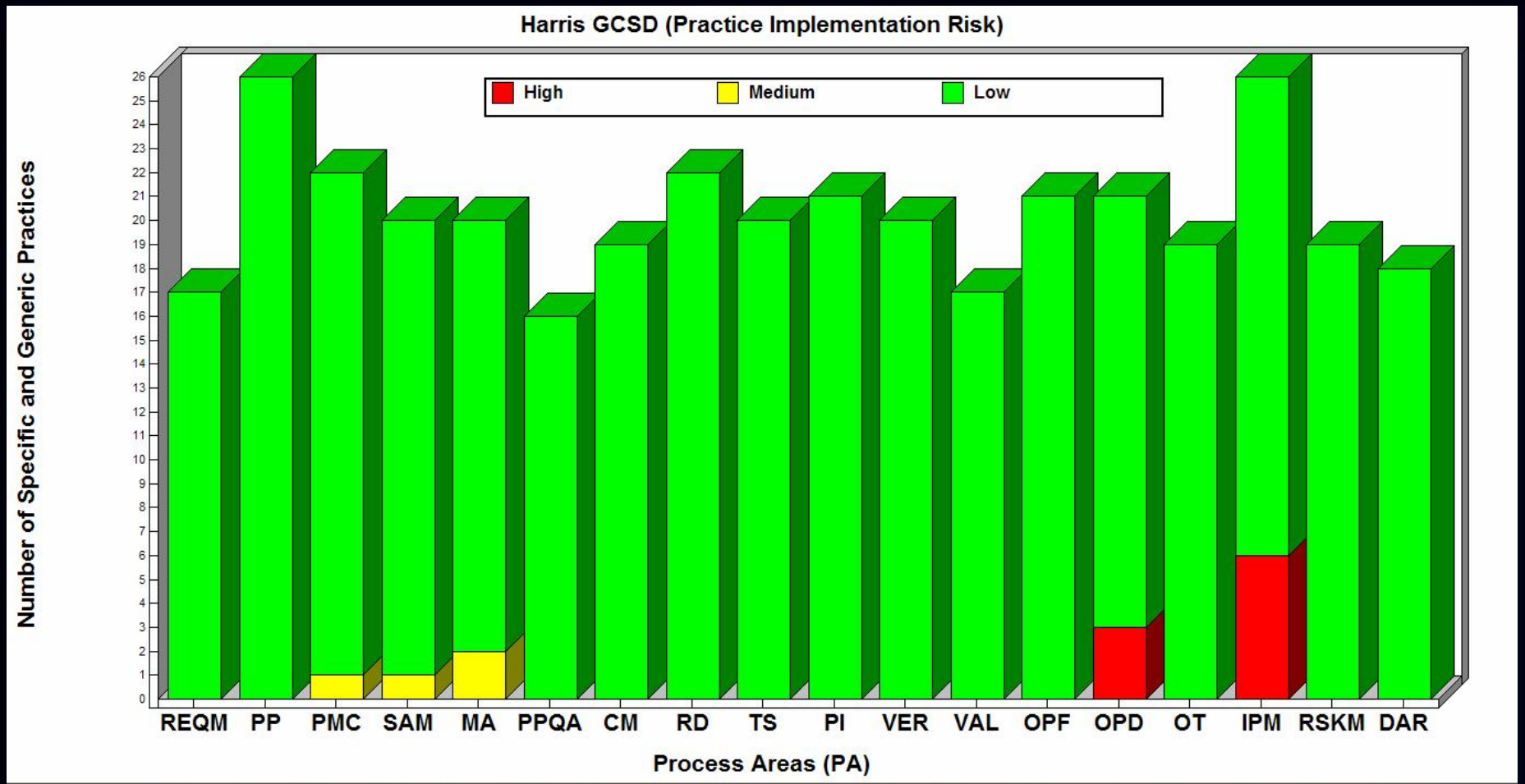

	REQM	PP	PMC	SAM	MA	PPQA	CM	RD	TS	PI	VER	VAL	OPF	OPD	OT	IPM	RSKM	DAR
High	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	6	0	0
Medium	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Low	17	26	21	19	18	16	19	22	20	21	20	17	21	18	19	20	19	18

Note: Weaknesses subsequently mitigated to achieve Fully Defined

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- Product-centric approach
  - Practical and proven to applying across organizational and CMMI® process areas and practices
  - Efficient project data collection
  - Fewer redundant findings
  - Improved support for projects and the organization
  - Maintains integrity of the appraisal method and achievement of sponsor objectives

mation

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