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Fast Track to CMMI Implementation

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CMMI at the Kansas City Plant (KCP)

- **Organizational Overview**

- **CMMI Implementation**
  - **Self-Assessments**
  - **Appraisals**
  - **Lessons Learned**
  - **Keys to Fast Track Implementation**

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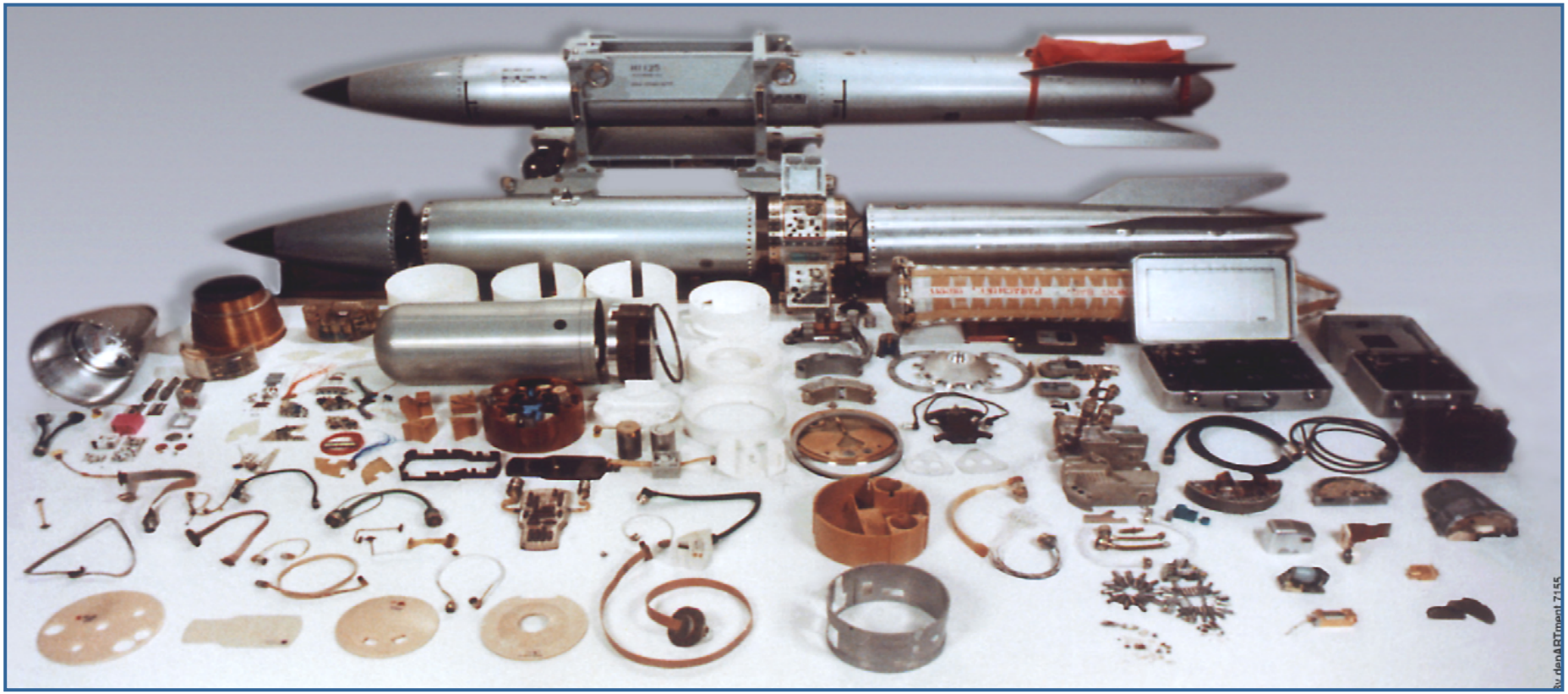
Complex Products



Responsible for 85% of nuclear weapon components

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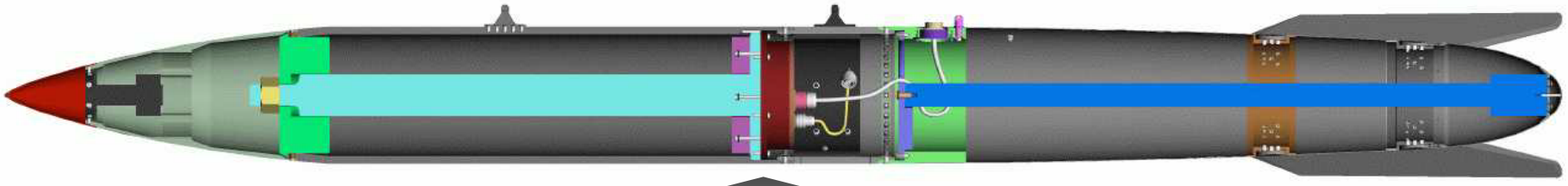
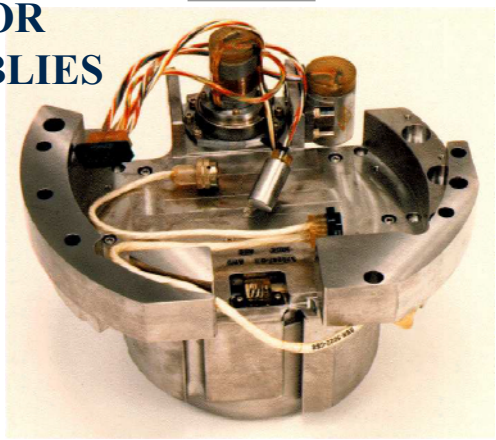
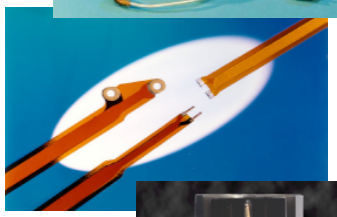
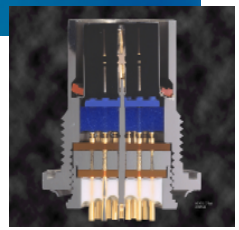
Quality is Never Compromised



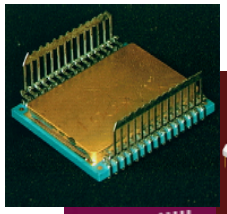
MAJOR ASSEMBLIES

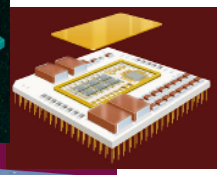


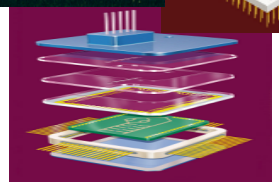




INTERCONNECTS

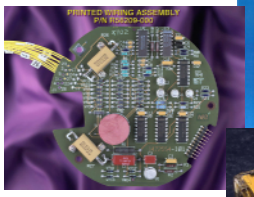


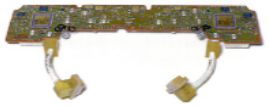




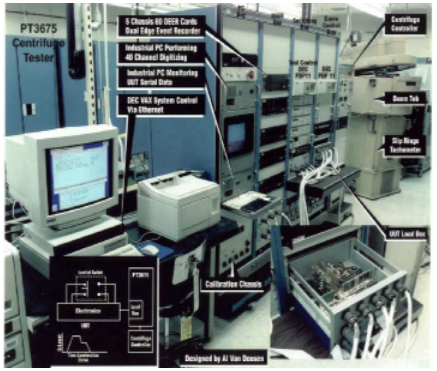
MICRO-ELECTRONICS

ELECTRONIC ASSEMBLY & SUBASSEMBLY





TEST EQUIPMENT



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Test Equipment Operations

Tester Includes

- Hardware
- Software
- Documentation
  - Tester Drawings
  - Operating Procedures
  - Calibration Procedures

Testers Used to Accept Manufactured Product

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CMMI at KCP - Why?

- **Implementation is customer-driven**
- **TE project forecasts indicate a sharp increase in business**
  - **Requires strong, stable processes to rely upon**
  - **Requires institutionalization of processes to ensure high quality with increased level of production**
- **TE identified the need for knowledge preservation**
  - **Attrition rate expected to increase**
  - **Complex processes require a high learning curve**

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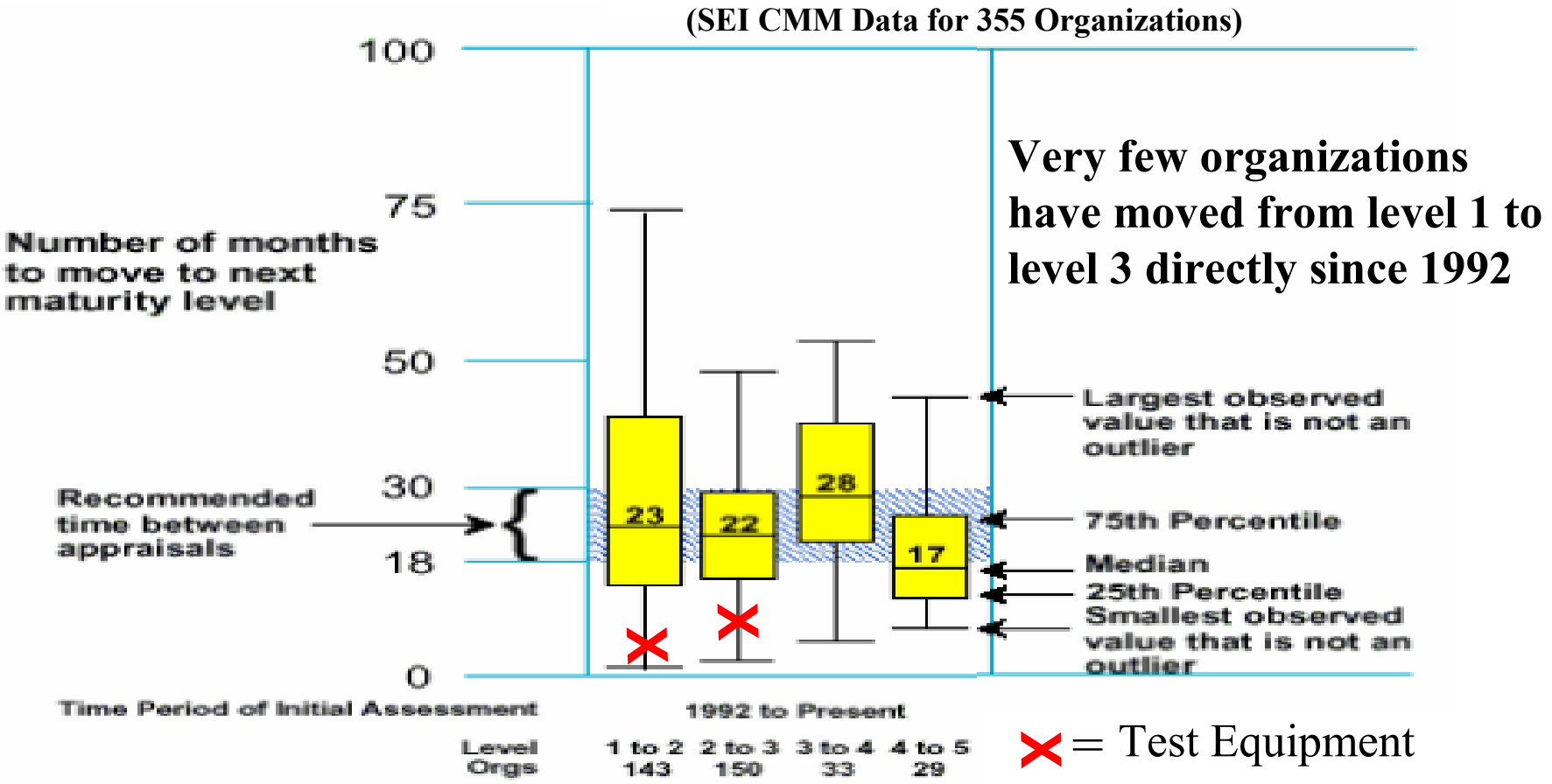
CMMI Overview
(Risks)

- Based on SEI data, Test Equipment planned an extremely short period of time to move from level 1 to level 3.



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CMMI at KCP

- Completed high level gap analysis (05/03)
- Developed a CMMI planning and appraisal tool
- Established project team size and schedule *driven by the high level gap analysis*
- Developed project plans for each gap
- Completed intermediate Class B and C appraisals
- Achieved CMMI Maturity Level 3 (08/04)

Test Equipment Self-Assessment during Training (5/03)

Level Class B	Process Area	Abbrev												Min	Max	Mean	Median	Std Dev
3	Decision Analysis and Resolution	DAR	0	2	3	0	0	0	0	3	3	0	3	0	3	1.3	0	1.5
3	Organizational Process Focus	OPF	0		3	0	0	0	3	3	0	0	7	0	7	1.6	0	2.4
3	Risk Management	RSKM	0	3	0	0	0	7	3	3	3	0	3	0	7	2	3	2.2
3	Organizational Process Definition	OPD	3		3	0	3	3	3	3	3	0	7	0	7	2.8	3	1.9
3	Integrated Project Management	IPM	3	5	0	0	3	3	3	7	0	0	7	0	7	2.8	3	2.7
3	Requirements Development	RD	3	3	3	3	3	7	3	7	3	3	7	3	7	4.1	3	1.9
2	Measurement and Analysis	MA	0	5	7	3	3	0	7	7	3	3	7	0	7	4.1	3	2.7
2	Project Planning	PP	7	7	7	0	0	3	3	3	7	7	7	0	7	4.6	7	2.9
2	Project Monitoring and Control	PMC	7	7	7	3	0	0	7	7	7	3	7	0	7	5	7	2.9
2	Requirements Management	REQM	10	5	3	3	3	7	5	7	3	7	7	3	10	5.5	5	2.3
3	Organizational Training	OT	7		7	7	7	7	7	3	7	3	3	3	7	5.8	7	1.9
3	Product Integration	PI	7	7	3	3	3	7	7	7	7	7	7	3	7	5.9	7	1.9
3	Verification	Ver	7	7	7	3	3	7	10	7	7	7	7	3	10	6.5	7	2.0
2	Process and Product Quality Assurance	PPQA	7	10	10	7	7	7	7	3	7	7	7	3	10	7.2	7	1.8
2	Supplier Agreement Management	SAM		7	7	7	7		7	7	10	7	7	7	10	7.3	7	1.0
2	Configuration Management	CM	10	9	7	10	10	10	7	7	7	3	7	3	10	7.9	7	2.2
3	Technical Solution	TS	10	7	7	10	10	7	7	7	10	7	7	7	10	8.1	7	1.5
3	Validation	Val	10	7	10	10	10	10	7	10	10	10	7	7	10	9.2	10	1.4
							= 0											
4	Organizational Process Performance	OPP	7	7	7	3	3	3	7	3	3	3	7	3	7	4.8	3	2.1
4	Quantitative Project Management	QPM	7	7	7	1	3	3	7	3	3	3	7	1	7	4.6	3	2.3
5	Causal Analysis and Resolution	CAR	7	5	7	3	3	1		3	7		7	1	7	4.8	5	2.3
5	Organizational Innovation and Deployment	OID	7	5	7	3	3	1		3	3		7	1	7	4.3	3	2.2
2	Level 2 Summary	Level 2	5.9	7.1	6.9	4.7	4.3	3.9	6.1	5.9	6.3	5.3	7	3.9	7.1	5.8	5.9	1.1
3	Level 3 Summary	Level 3	4.5	3.7	4.2	3.3	3.8	5.3	4.8	5.5	4.8	3.4	5.9	3.3	5.9	4.5	4.5	0.9
4	Level 4 Summary	Level 4	7	7	7	2	3	3	7	3	3	3	7	2	7	4.7	3	2.2
5	Level 5 Summary	Level 5	7	5	7	3	3	1	0	3	5	0	7	0	7	3.7	3	2.7

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CMMI Planning and Appraisal Tool

- The entire CMMI model has 794 goals and practices, Test Equipment had 428 (Level 3, software/systems)
- The project team needed to manage over 11,000 pieces of information
- Provided structure to the team: Definitions of "red/yellow/green" changed at key project milestones
- Significant efficiency improvements in the process
  - Remote monitoring reduced team meetings to <1 hr/week
  - Tracking reports provided easy focus and accountability
  - Allowed quantifiable objectives, critical to the culture of Test Equipment
- Tool allowed data collection to evolve and build throughout the life of the project

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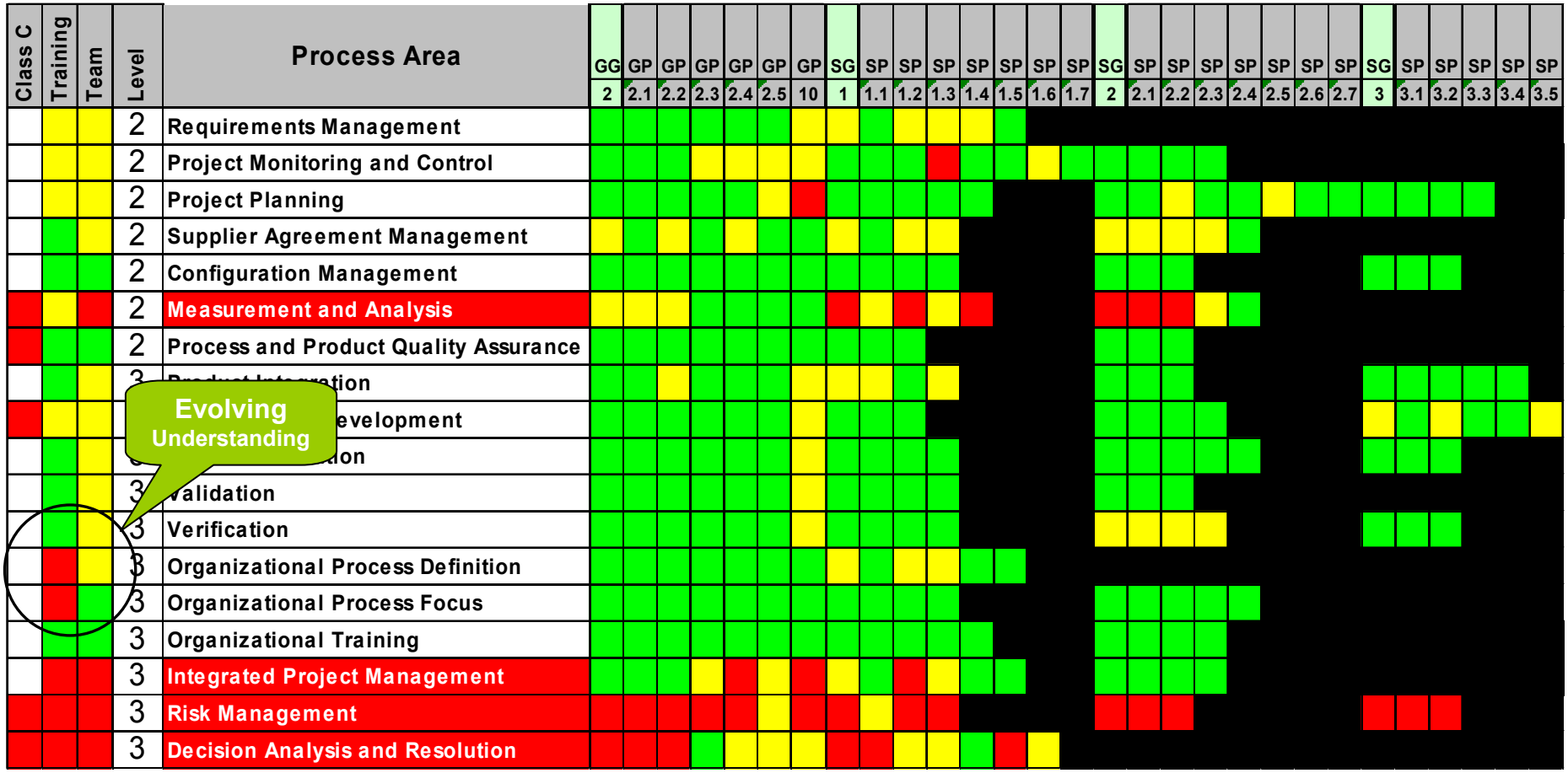
CMMI at KCP

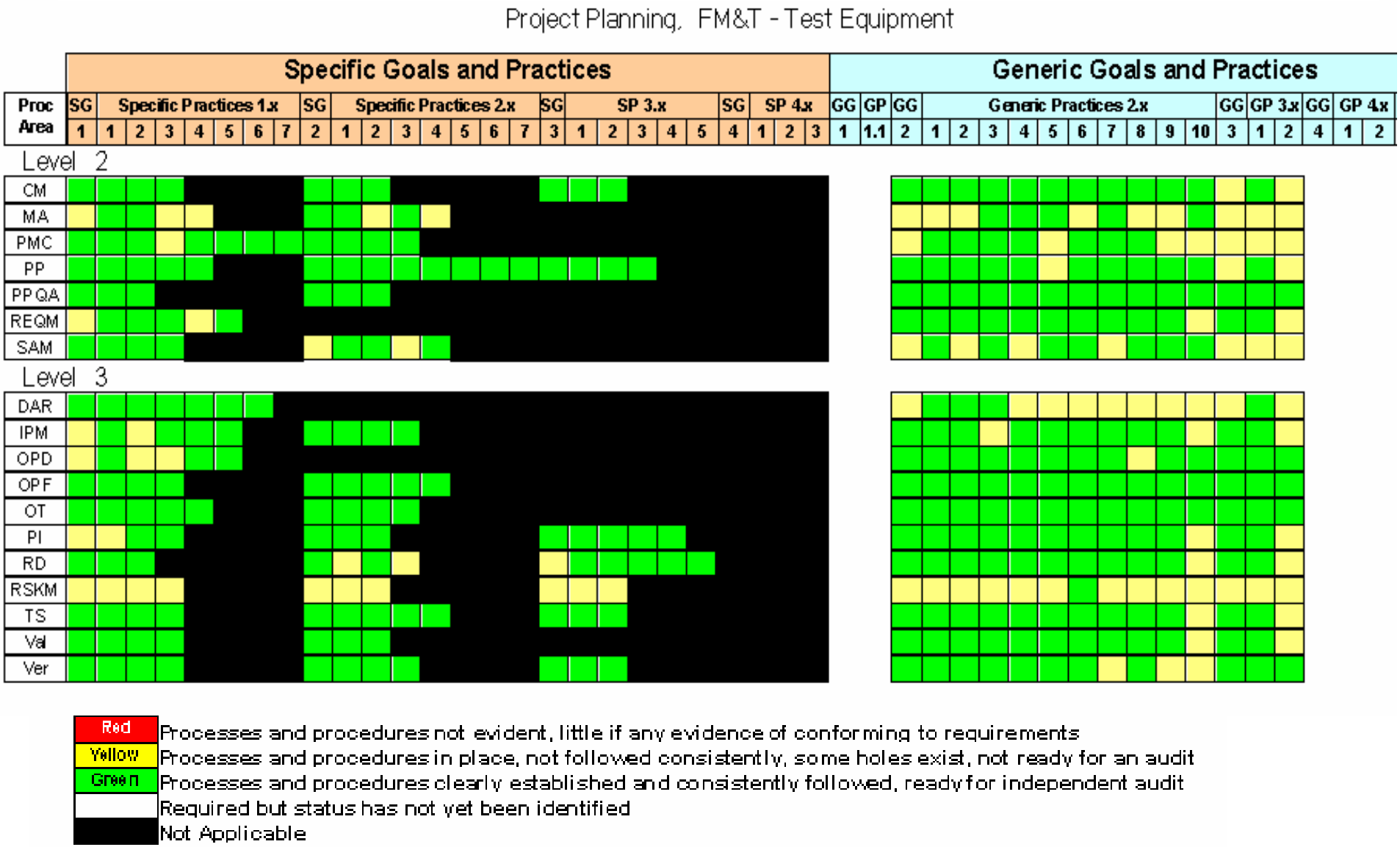
- **Put a project team together** (Internal and external to Test Equipment)
  - Using the tool, developed a *detailed* gap analysis
  - Assigned process improvements to sub teams
  - Had management sponsorship of each sub team

Detailed Team Assessment (07/03)



- Charter process improvement teams for four “red” areas
- Validate and develop improvements for “yellow” items
- Document evidence of all “green” items

Project Team Self-Assessment prior to Class B (01/04)



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Appraisal Methodology

- **Standard CMMI Appraisal Method for Process Improvement (SCAMPI)**
  - **Family of Appraisal Methods**
    - **Used the premise that building off previous appraisals is beneficial to the organization**

Characteristic	SCAMPI C	SCAMPI B	SCAMPI A
Amount of objective evidence	Low	Med	High
Ratings generated	No	No	Yes
Resource Needs	Low	Med	High
Team Size	Small	Med	Large

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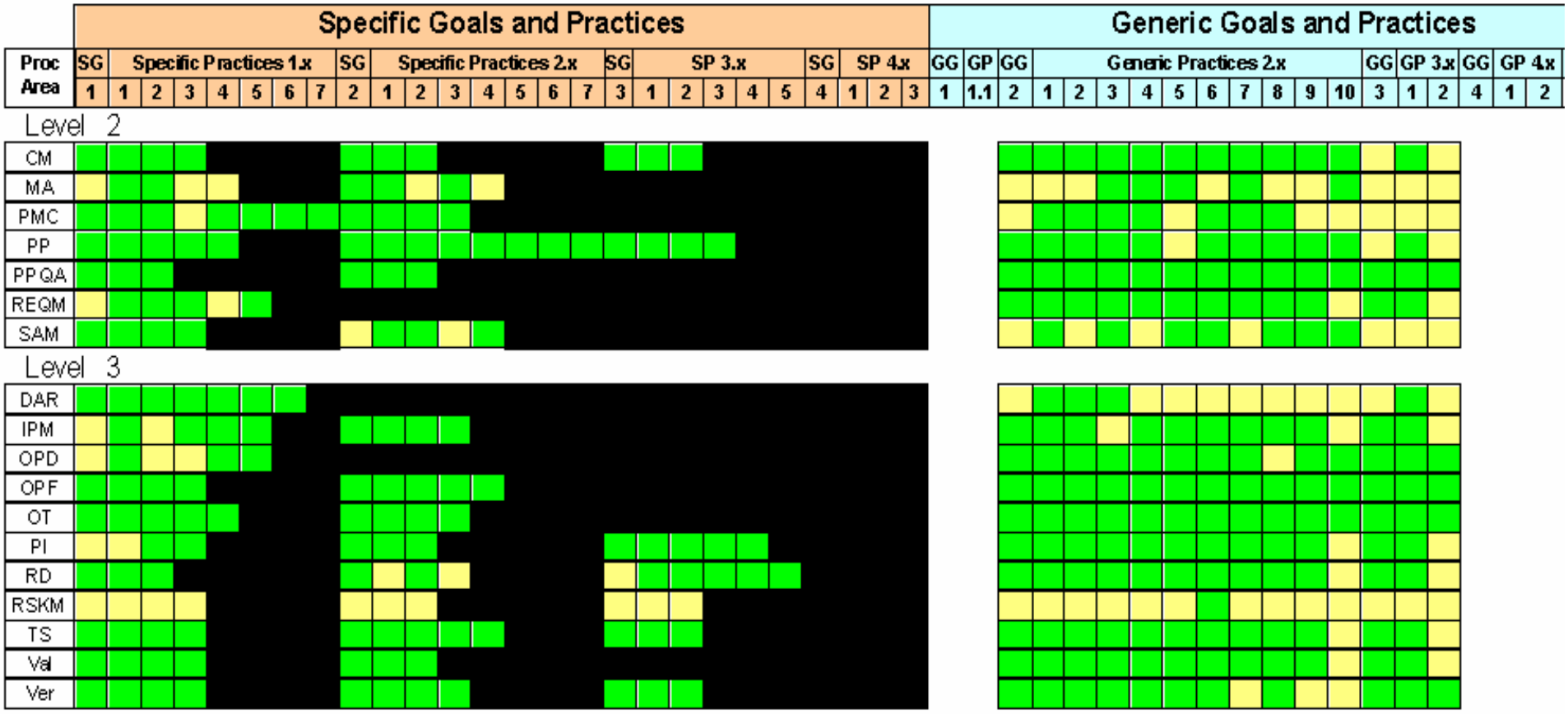
Honeywell SCAMPI B Pilot Appraisal

- **Mini Appraisal**
  - Conducted an abbreviated version of a benchmarking appraisal; a "dress rehearsal"
    - Team Size: 8
    - Appraisal Time: 4.5 Days
  - Conducted interviews (mini teams)
  - Reviewed and verified existing evidence
  - Added new evidence
  - Focused on Specific Practices first
  - Bottom Line Question: Is the organization moving toward readiness for a SCAMPI A Appraisal?

Project Team Self-Assessment
Prior to Class B (01/04)

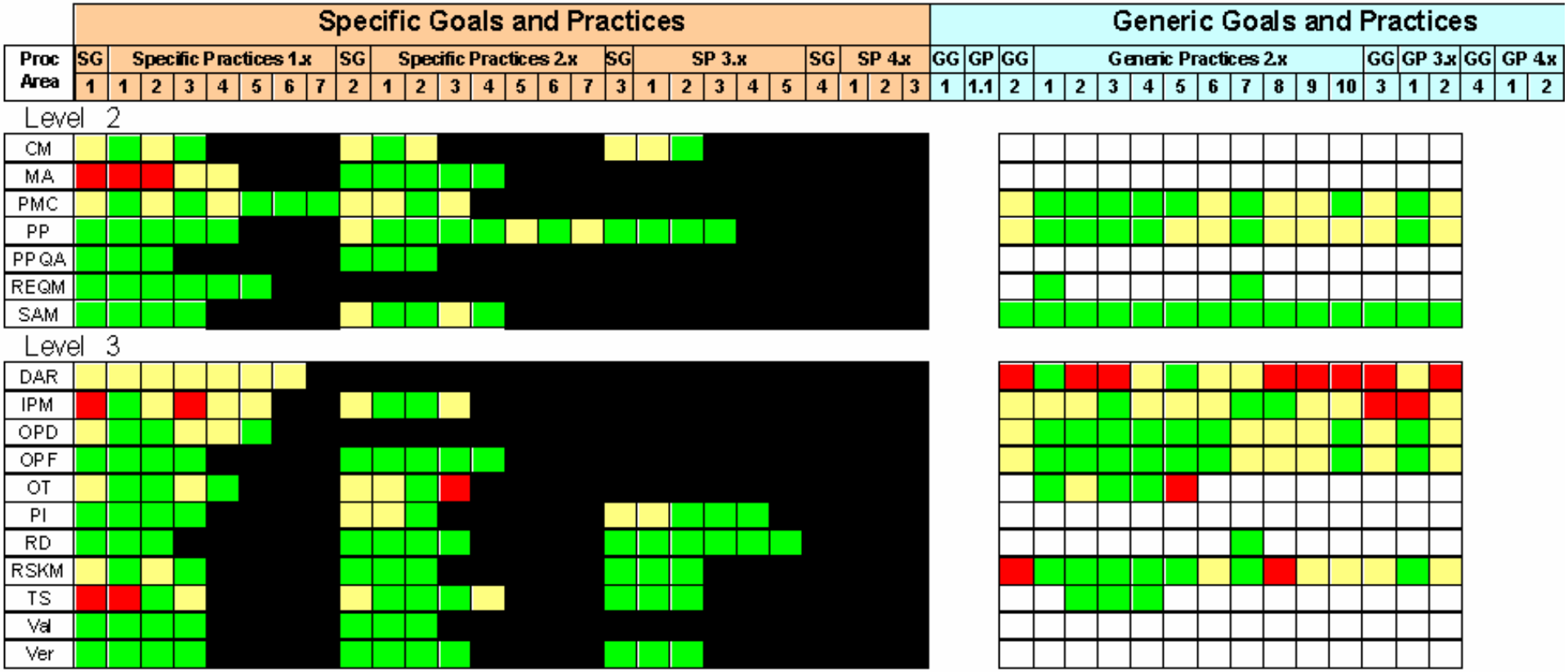
Project Planning, FM&T - Test Equipment



Red	Processes and procedures not evident, little if any evidence of conforming to requirements
Yellow	Processes and procedures in place, not followed consistently, some holes exist, not ready for an audit
Green	Processes and procedures clearly established and consistently followed, ready for independent audit
	Required but status has not yet been identified
	Not Applicable

SCAMPI B Appraisal Results (01/04)

Class B Appraisal, FM&T Test Equipment



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Honeywell SCAMPI C Pilot Appraisal

- **Gap Analyses**
  - **Identified specific deficiencies in implemented generic practices only**
    - **Team Size: 1**
    - **Appraisal Time: 2.5 Days**
  - **Used as a supplement to the SCAMPI B Pilot**
  - **Conducted interviews (informal, on-call)**
  - **Reviewed and verified existing evidence**
  - **Added new evidence**
  - **Bottom Line Question: Is the organization moving toward readiness for a SCAMPI A Appraisal?**

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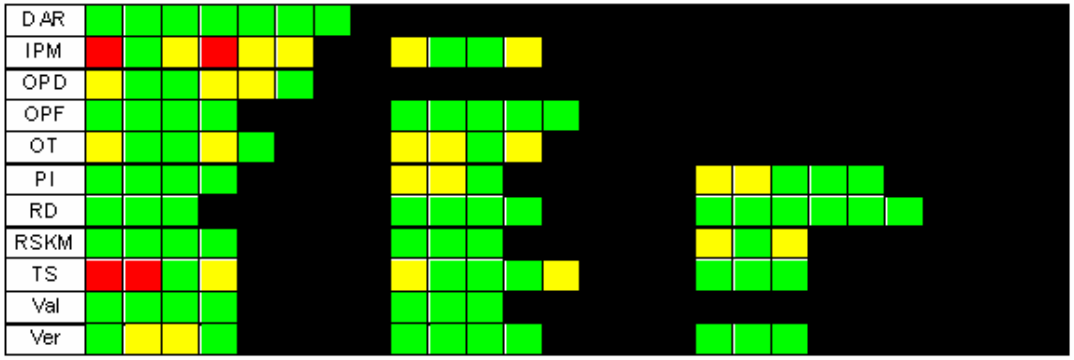
SCAMPI C Appraisal Results (02/04)

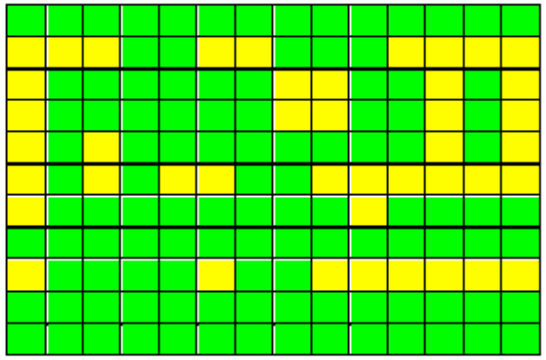
SCAMPI C Appraisal, Generics Appraisal

	Specific Goals and Practices																									Generic Goals and Practices																								
Proc Area	SG	Specific Practices 1.x							SG	Specific Practices 2.x							SG	SP 3.x					SG	SP 4.x			GG	GP	GG	Generic Practices 2.x										GG	GP 3.x	GG	GP 4.x		GG	GP 5.x	
	1	1	2	3	4	5	6	7	2	1	2	3	4	5	6	7	3	1	2	3	4	5	4	1	2	3	1	1.1	2	1	2	3	4	5	6	7	8	9	10	3	1	2	4	1	2	5	1	2

Maturity Level 2

Maturity Level 3





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Independent SCAMPI A Appraisal

- **Lead Appraiser: Jeanie Kitson, KAMO Consultancy, Pittsburgh, PA**
- **Mini-Team Leads**
  - **Boeing Company, Houston, TX**
  - **Honeywell Propulsion Systems, Tucson, AZ**
  - **Honeywell Corporate IT, Tempe, AZ**
  - **Honeywell FM&T/NM, Albuquerque, NM**
  - **Honeywell FM&T/KC, Kansas City, MO**
- **6 internal team members paired with each mini-team lead**

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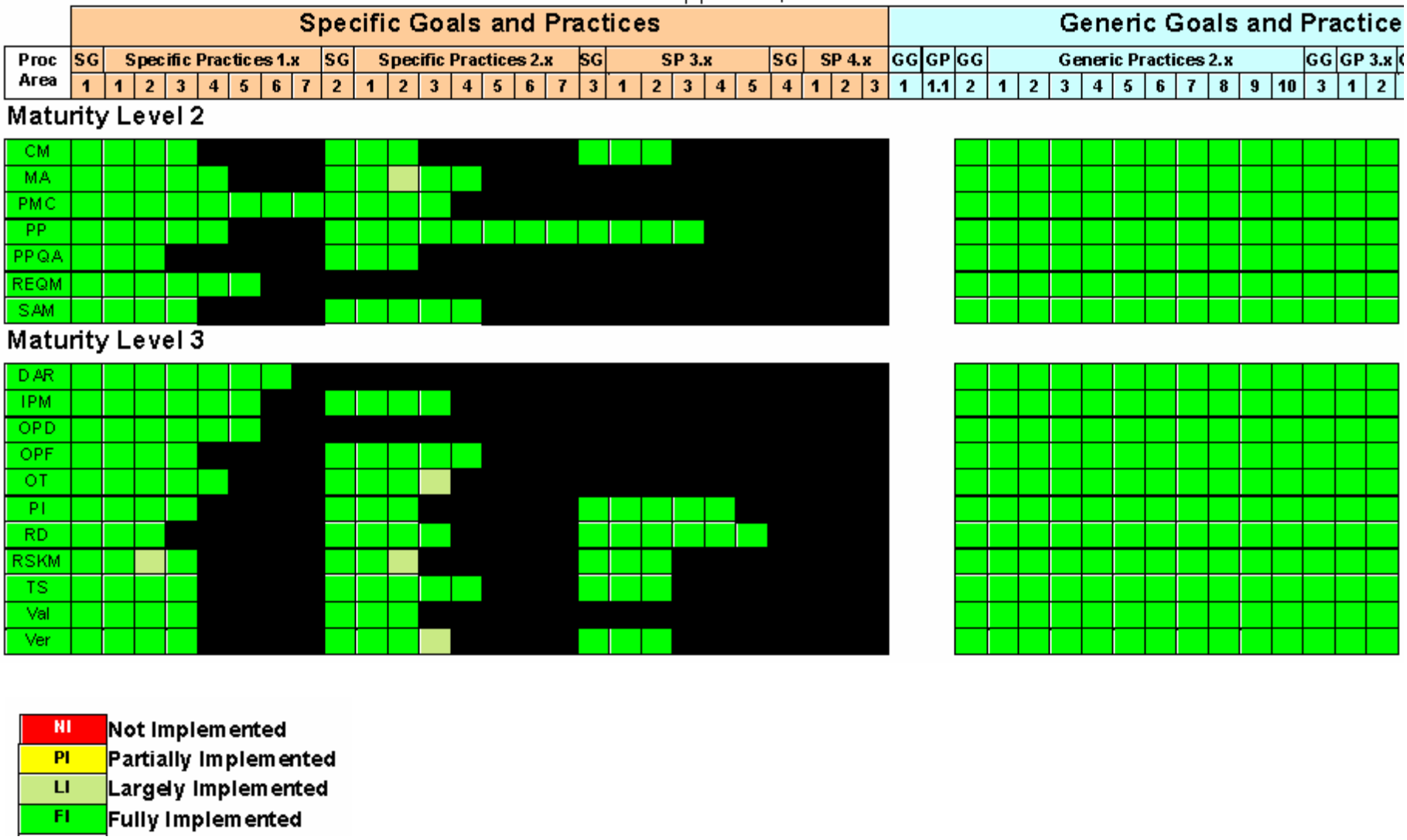
SCAMPI A Appraisal

- 10 weeks before appraisal, conducted readiness review of all direct evidence
- For the appraisal, mini teams reviewed/verified existing evidence in the CMMI Tool
  - Team Size: 12
  - Appraisal Time: 6.5 Days
- Conducted interviews (whole team)
- Generated ratings

SCAMPI A Appraisal Results (08/04)

Current Status of Generic and Specific Goals and Practi

SCAMPI A Appraisal, SEI reference 1628



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How has CMMI Improved Test Equipment?

- Improved project planning and better project history
- Proactive approach to managing risk on projects
- Critical decisions are made using structured tools
- Better and more consistent learning process (mentoring checklist)
- Tighter and more appropriate control and monitoring of projects
- Measurements closely aligned with business objectives
- Organizational systems for project management – less vulnerable to the loss of key people

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Lessons Learned

- Let the organization develop the processes
- Use a mix of internal and external people on the implementation and appraisal teams
- Couple key managers tightly to the team
- If possible, start in a small area of the organization
- ***Do Not*** try to “skip” from level 1 to 3 when implementing

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Keys to Fast Track Implementation

- Have some kind of tool to manage and control the process
  - Reduced data collection time dramatically
  - Eliminated coordination problems
  - Shortened appraisal time 40-50%
- Train a core group of people
- Complete a high level gap analysis
  - *Do not* commit to resources and schedule until completed
  - Include a mix of managers and project leads
- The *Organizational Process Areas* must be very strong for a quick implementation of CMMI (ISO supports these Process Areas very well)
- Work with a good consultant
- A control plan needs to be implemented into the CMMI project plan to ensure improvements are truly institutionalized

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The Bottom Line

Process improvement should be done to help the business - not for its own sake

**"In God we trust,
all others bring data."**

- W. Edwards Deming