



HARRIS

**Assured Communications™
Anytime. Anywhere.**

Consistency in Quality Assessments

*Debra Perry
Harris Corporation
November 18, 2009*



Aviation electronics



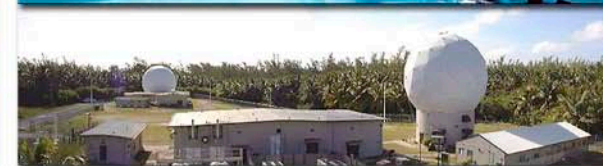
Space and ground satellite communications systems



Communications and information networks



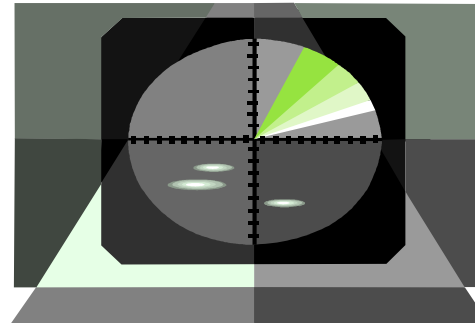
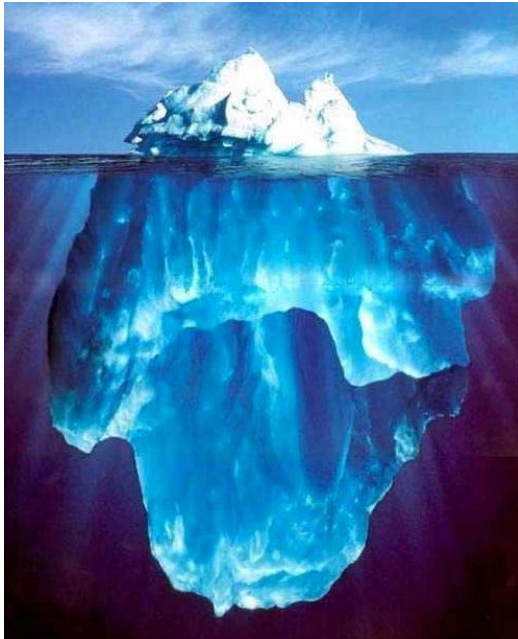
Intelligence, surveillance, and reconnaissance



Operations and support services

Innovation. Performance. Anytime. Anywhere.

- Program showing signs of difficulties
- How to determine if the problem is:



Tip of the Iceberg or Blip on the Radar Screen
Use Process Compliance to help assess

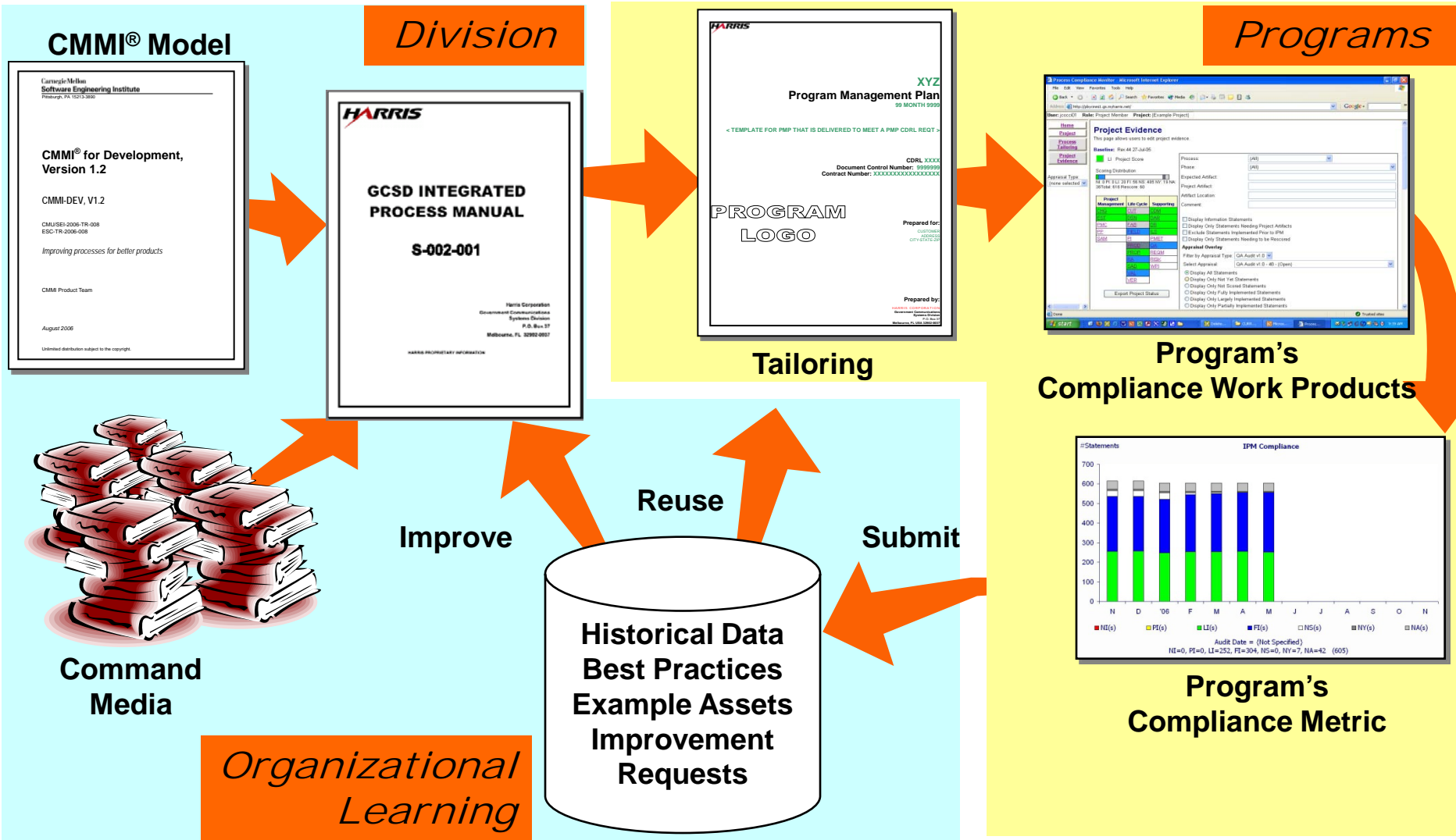
-
- Background
 - Action
 - Results
 - Conclusion
 - Suggestions

- Harris policy requires compliance to Integrated Process Manual (IPM) as tailored by each program
- IPM specifies requirements for all required models, standards and best practices for program execution
- Harris monitors compliance to IPM using Process Compliance Monitor (PCM) tool
 - “What You Measure You Will Improve.”
 - author unknown
- IPM Compliance is a leading indicator for programs
- If a program is having trouble
 - is it the tip of an iceberg or
 - just a blip on the radar
- Need to find out, need to look at Process Compliance

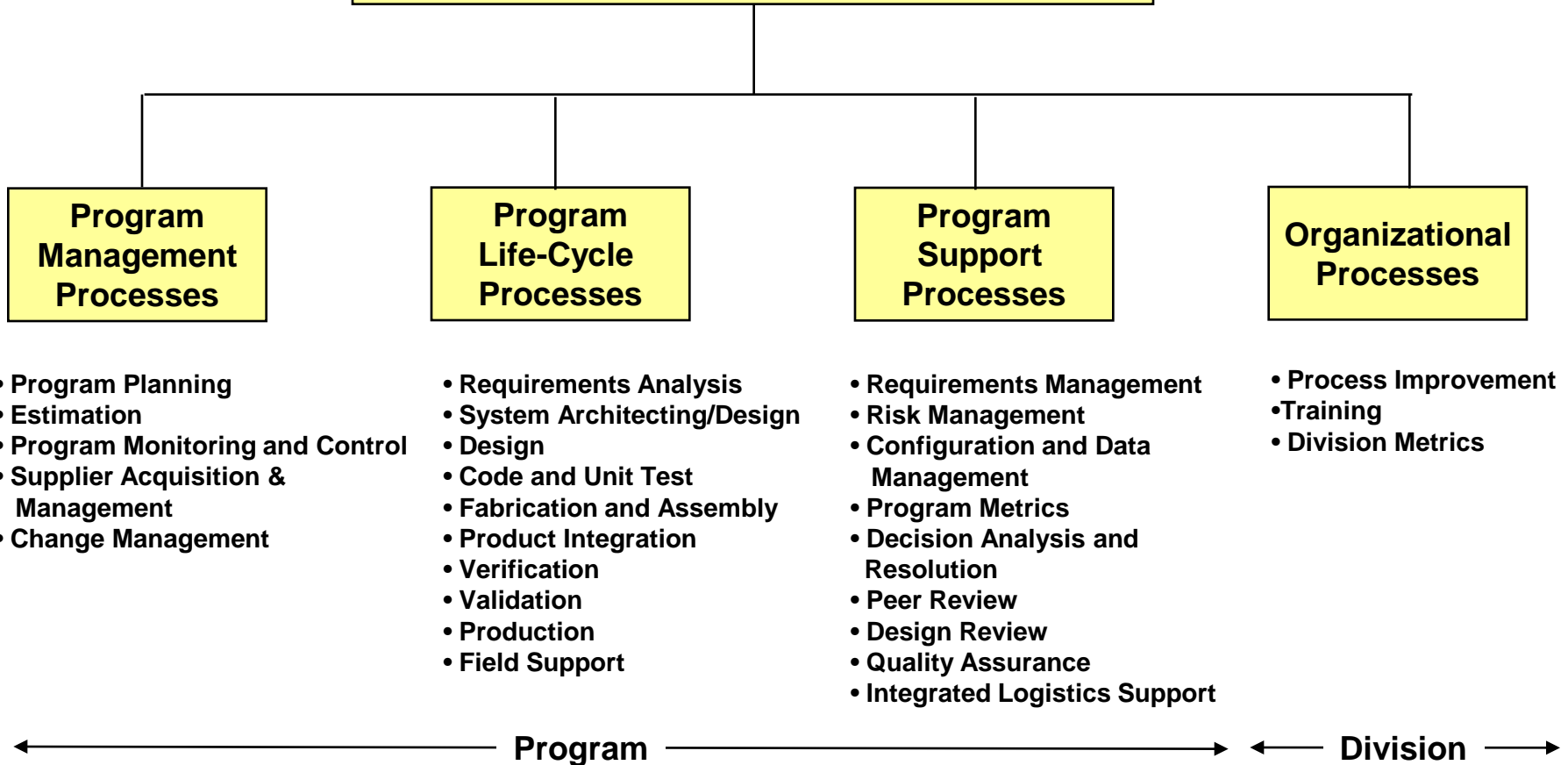
- **Process Requirements** – statements that explain what products or processes are expected for proper program execution of required processes
- **Process Baseline** – process requirements accepted or modified by program for their application of the process requirements, considered a tailored baseline
- **Process Compliance** – demonstrating implementation of required processes per tailored baseline

At Harris we capture a compliance score that represents the level of process compliance in the Process Compliance Monitor (PCM) tool by evaluating compliance with statements that identify the different requirements for each process area

Integrated Compliance Approach



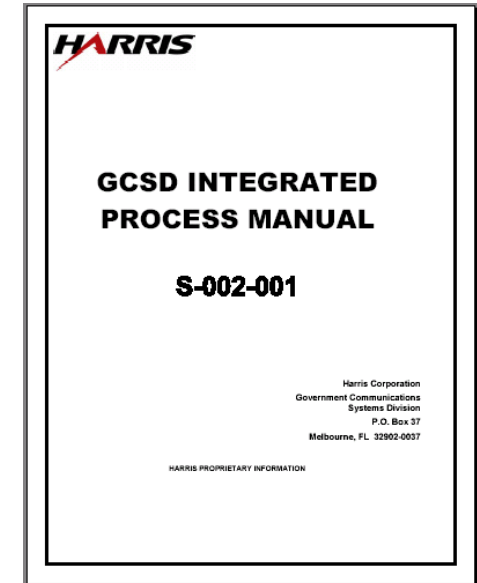
Integrated Process Manual (IPM)




Where are Work Products Required?



Overview A brief description of the process intent	
Entry Criteria State, Prerequisites, Criteria	Exit Criteria State, Criteria
Inputs Needed work products, resources	Outputs 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 Guidance Approved tailoring, process specific	
Implementation Guidance Common implementation descriptions	
Supporting Documentation and Assets Applicable organizational references	



 Program work products needed to demonstrate IPM process compliance

Process Compliance Color Scores



ASSESSMENT STATUS COLORS	NY	Not Yet	<ul style="list-style-type: none"> To be appraised at a later date (i.e., the process has not yet been executed by the program and cannot be appraised)
	NA	Not Applicable	<ul style="list-style-type: none"> Outside the scope of the project (e.g., Code and Unit Test Process is not applicable to a production-type program)
	NS	Not Scored	<ul style="list-style-type: none"> Pending an appraisal
PROCESS COMPLIANCE COLORS	FI	Fully Implemented	<ul style="list-style-type: none"> Work Products are present and appropriate (Note 2) No weaknesses noted (Note 1)
	LI	Largely Implemented	<ul style="list-style-type: none"> Work Products are present and appropriate (Note 2) One or more weaknesses noted (Note 1)
	PI	Partially Implemented	<ul style="list-style-type: none"> Work Products are missing in the initial scoring audit or Work Products are inadequate (Note 3) One or more weaknesses noted (Note 1)
	NI	Not Implemented	<ul style="list-style-type: none"> Work Products are missing for more than 30 days from the initial scoring audit.

Note 1: A weakness ("gap") is considered if it is an impact to or risk of implementation of the process statement

Note 2: An appropriate work product is the IPM Expected Work Product or equivalent that demonstrates implementation of the process statement

Note 3: An inadequate work product does not demonstrate implementation of the process statement

Process Compliance



- Represents overall process compliance score for program
- Based on lowest color score – harsh, but in keeping with CMMI standards

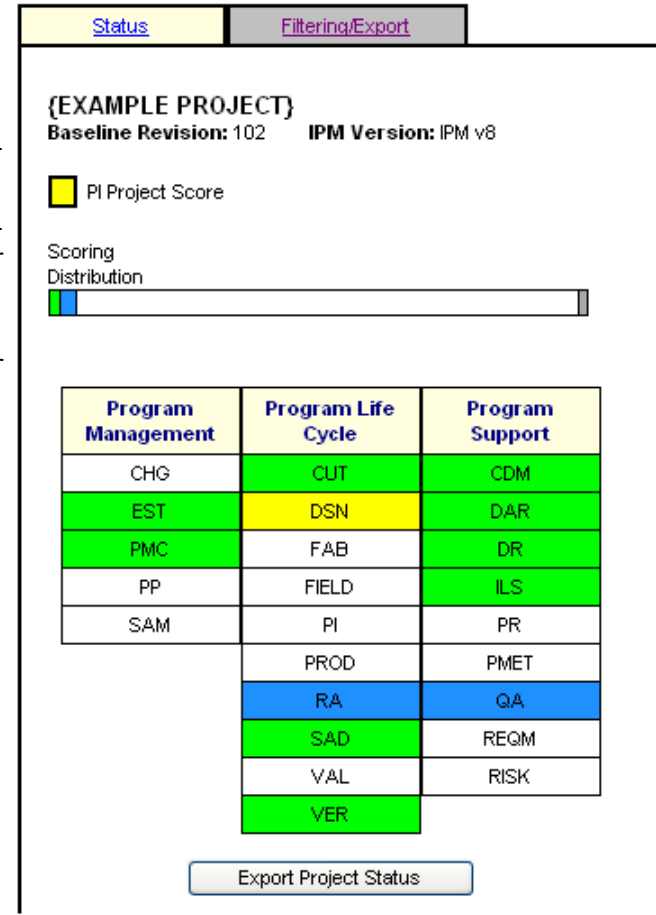
- Depicts scoring distribution over all process items
- More insight on overall project score

- Depicts score for each process executed or being executed by this program
- 3 columns identify categories of processes

A

B

C



- Program claims IPM Compliance but is not being demonstrated in PCM (Red)
 - Work Products not entered into PCM
 - Statements not scored
- Program claims not enough time to work PCM, need to deliver products not show compliance
- Many Quality Engineers on program but all too busy
- Engineering Change Proposal (ECP) recently added development work to previously only production job
 - Need to re-tailor baseline to add other program life cycle process areas (SAD, CUT, FAB, PI, etc.)

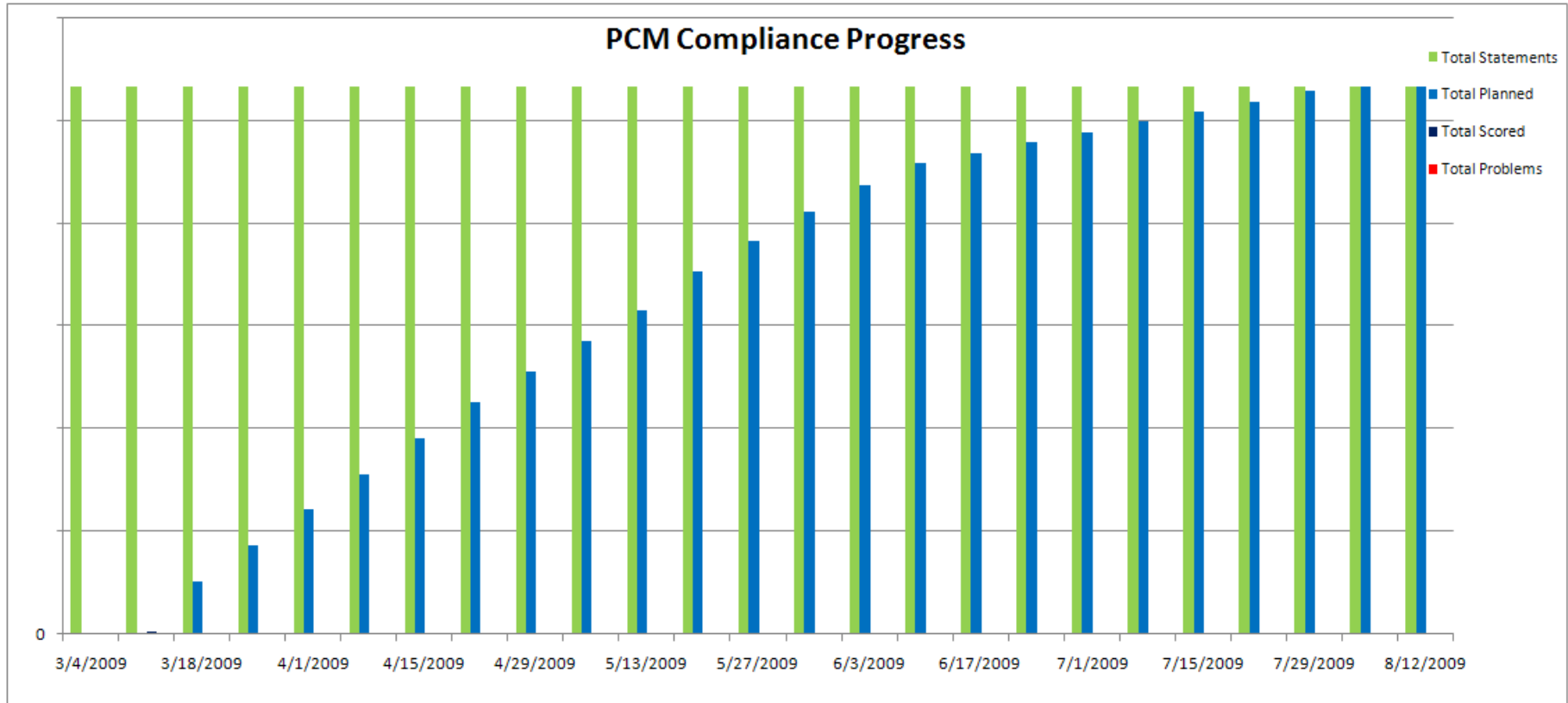
1. Do nothing, leave PCM Red
2. Wave PCM monitoring
3. Provide additional support to verify compliance

- Management chose #3 - verify compliance

- Management assigned Division Process Group (DPG) Point of Contact (POC) to assist program
 - Help with adding development process areas to PCM baseline for new ECP
 - Develop Return to Green Plan
 - Provide mentoring and training as needed
 - Coordinate QE efforts
 - Inside vault work products
 - Outside vault work products
 - External reviewer

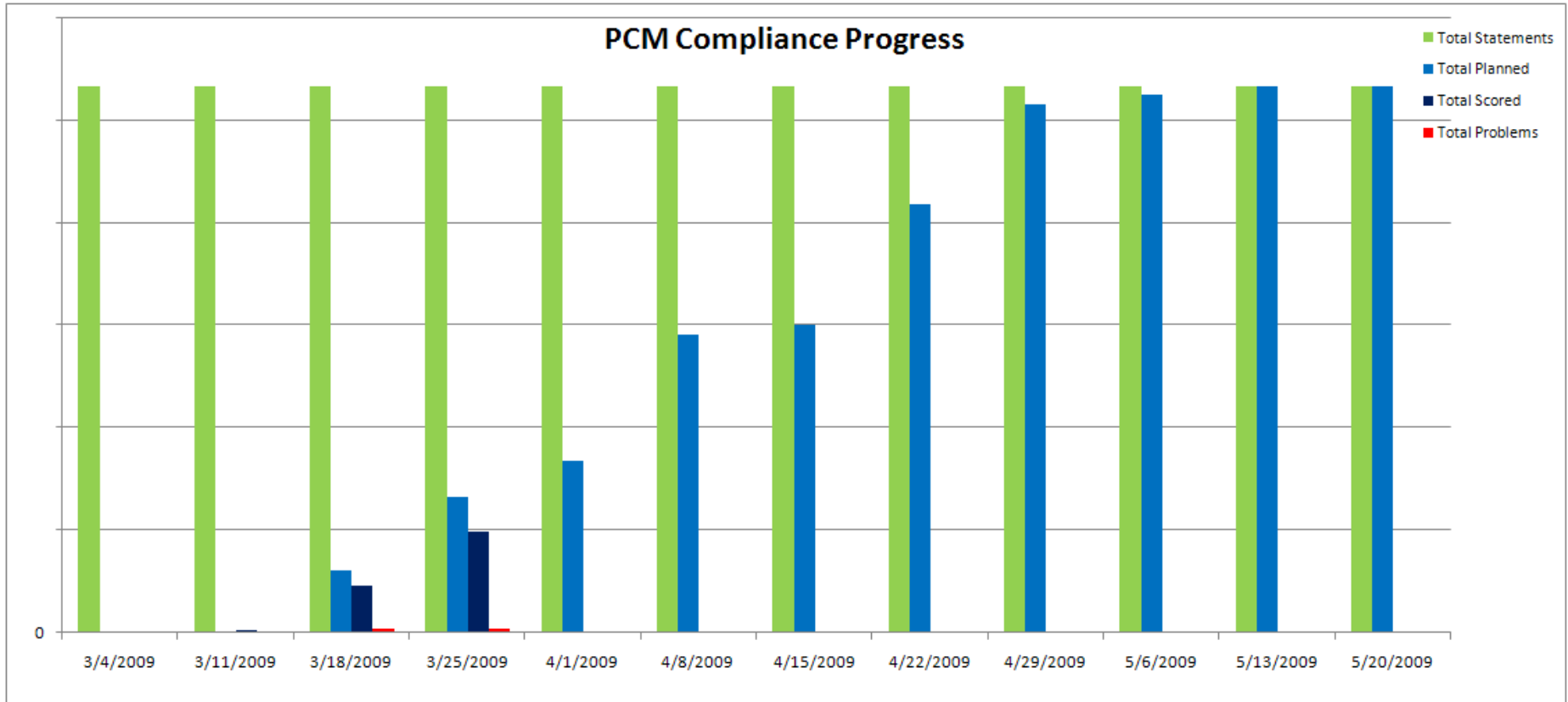
- DPG POC met with Program Manager
 - Drafted DPG Statement of Work
 - Established DPG roles and responsibilities
- Investigated ECP
 - Recommended PCM baseline changes
 - Added life cycle process areas that were tailored out
- Met with QEs
 - QEs all have full time work without PCM effort
 - QEs are not all equally experienced with PCM
- Developed Return to Green Plan
 - Estimated 10 statements scored per week per QE

Original Return to Green Plan



6 Months to complete Process Compliance Effort - TOO LONG!

- DPG POC met with Executive Management
 - Return to Green Plan time line unacceptable
 - Additional Quality Engineers assigned
 - Overtime authorized
- Updated Return to Green Plan
- Assessed PCM status
- Identified issues and needs
 - Training
 - Coordination
 - Encouragement



3 Months to complete Process Compliance Effort - BETTER!

- Provided additional training to QEs
 - PCM scoring standards and tool tips
 - Commenting
 - Valid through dates
 - Verification decomposition
 - Coordination (inside vs. outside)
- Identified external QE reviewer for Quality process area
- Provided additional training to program process owners
 - New process areas being added, new work products required
 - Standard directory structure reminder
 - Specific versus general work products and links
- PCM Scoring begins

PCM Scoring Example



Process Compliance Monitor - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://pbypcm.gs.myharris.net/

User: dperry Role: Global Reader Project:

Evidence and Scoring
This page is used for evidence entry and scoring.

IPM Tree Sorting: IPM Alpha Score

- Program Planning
- Estimation
- Program Monitoring and Control
- Supplier Acquisition Management
- Change Management
- Requirements Analysis
- System Architecting and Design
- Design
- Code and Unit Test
- Fabrication and Assembly
- Product Integration
 - Required Activities
 - PI.RA.1**
 - PI.RA.2.a
 - PI.RA.2.b
 - PI.RA.2.c
 - PI.RA.2.d
 - PI.RA.3
 - PI.RA.4
 - PI.RA.5
 - PI.RA.6
 - PI.RA.7
 - PI.RA.8
 - PI.RA.9
 - PI.RA.10
 - Measures

Appraisal Values:
NY
NS
FI
U
PI
NI

Status	Filtering/Export	Process	Section	Statement
PI.RA.1 >>				
Statement				TC Score
Plan product integration activities for the program concurrent with overall program planning as described in the IPM Program Planning process.				A FI
Valid Through	Comment			
1/12/2010	No evidence of artifacts #1-#4 provided. Need X clearance to verify artifact #5. Link to artifact #6 is broken. RS 4/29/09 Artifact #5 & 6 verified. 05/13/09 VN. Acceptable evidence has been provided. TB 7/7/09			
Type		Expected Artifact		Modified
D		Integration Development Plan (IDP) describing the processes, roles/responsibilities, tools, measures, reviews for product integration		No
Project Evidence		Evidence Location		
The second set of evidence is the integration plan for the Clock Module with the DTU.		...2MDN\Electrical\Clock CCA\P78_Clock_CCA_DPT_Plan_7028995.doc		
Project Evidence		Evidence Location		
Since the Customer for P78 is responsible for Product Integration, Harris was not responsible for generating a Product Integration plan for the subsystems being delivered by Harris. The level of integration being performed by Harris on the MDN includes the software with the Development Test Unit (DTU), and modules with design changes and the DTU.		...ONE_7_8\Software_Engineering\CDR\SW_ICDR\MDC_7-8_SW_ICDR.ppt		

- QEs:
- Valid Through Dates
 - Commenting
 - Score

- Process Owners:
- Descriptions
 - Links

Early March PCM Status is Red



Evidence and Scoring

This page is used for evidence entry and scoring.

IPM Tree Sorting:

IPM Alpha Score

- Program Planning
- Estimation
- Program Monitoring and Control
- Supplier Acquisition Management
- Change Management
- Requirements Analysis
- System Architecting and Design
- Design
- Code and Unit Test
- Fabrication and Assembly
- Product Integration
- Verification
- Validation
- Production
- Requirements Management
- Risk Management
- Configuration and Data Management
- Program Metrics
- Decision Analysis and Resolution
- Peer Review
- Design Review
- Quality Assurance
- Integrated Logistics Support

[Status](#) [Filtering/Export](#)

Baseline Revision: 6 **IPM Version: IPM v9**

NI Project Score

Scoring Distribution

Program Management	Program Life Cycle	Program Support
CHG	CUT	COM
EST	DSN	DAR
PMC	FAB	DR
PP	FIELD	ILS
SAM	PI	PR
	PROC	PMET
	RA	QA
	SAD	REQM
	VAL	RISK
	VER	

[Export Project Status](#)

-
- More work products entered
 - More statements scored
 - Issues identified
 - Issued worked
 - Compliance demonstration improving

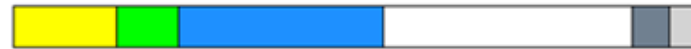
April PCM Status is Yellow



Baseline: Rev 6 - New IPM Baseline
Appraisal: 12 -
Data Valid Through: 4/22/2009 4:40:30 PM

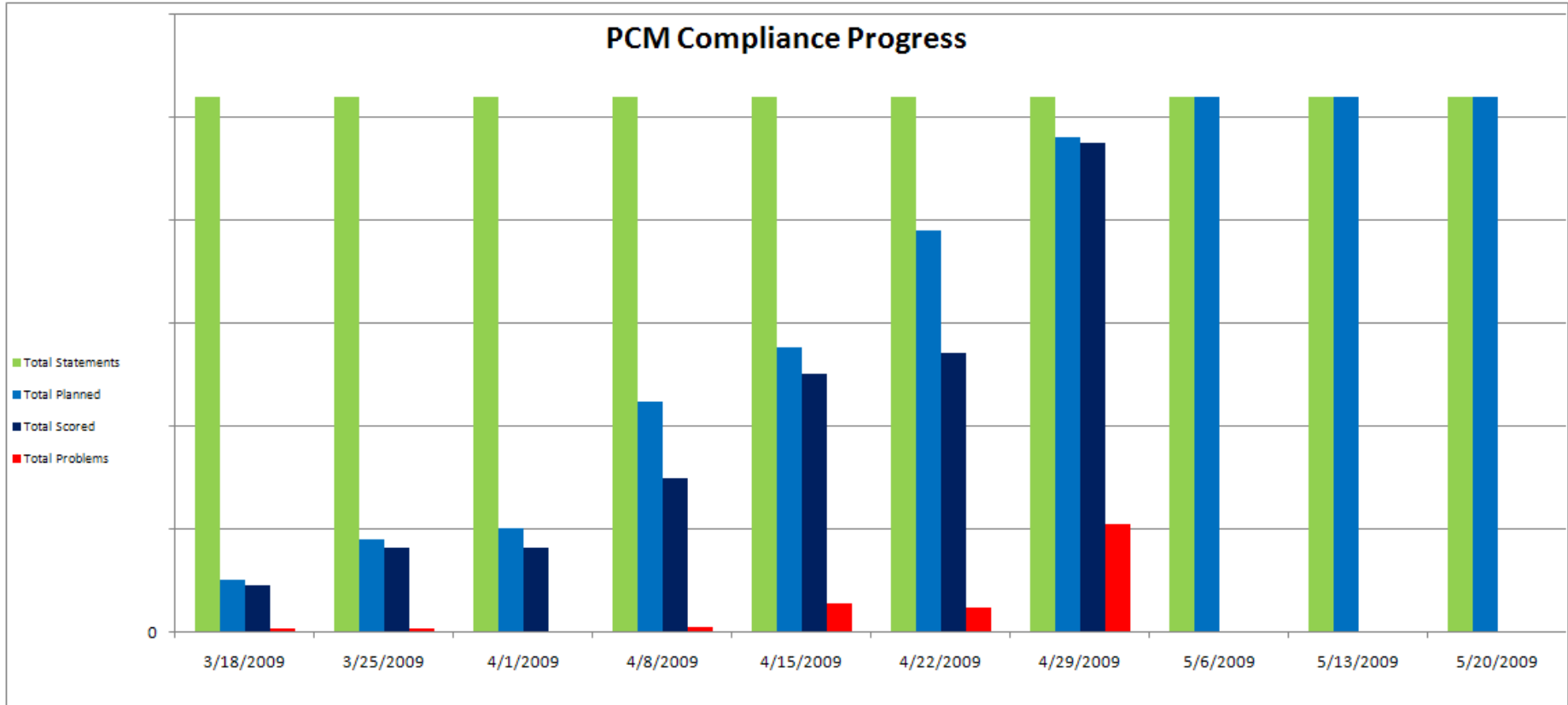
 PI Project Score

Scoring Distribution



Program Management	Program Life Cycle	Program Support
CHG	CUT	CDM
EST	DSN	DAR
PMC	FAB	DR
PP	FIELD	ILS
SAM	PI	PMET
	PROD	PR
	RA	QA
	SAD	REQM
	VAL	RISK
	VER	

All of ILS marked as Not Yet due to phase of the program.



With more scoring you sometimes identify more issues!

- Tracking progress
- Scoring statements
- Resolving issues
- Reporting status

May Open Issues Status



PAs	OUT-SIDE	IN-SIDE	SCOPE	N/A	NI	PI	LI	FI	NS	NY	Re-score	% Scored	OPEN ISSUES	Missing links	Needs vault review	Other
PP	Tres	Tres	ALL	0.0%	0.0%	0.0%	10.7%	89.3%	0.0%	0.0%	82.1%	100.0%	0	0	0	0
EST	Tres	Tres	ALL	6.7%	0.0%	0.0%	14.3%	85.7%	0.0%	0.0%	28.6%	100.0%	0	0	0	0
PMC	Tres	Tres	ALL	7.4%	0.0%	0.0%	16.0%	84.0%	0.0%	0.0%	20.0%	100.0%	0	0	0	0
SAM	Tres	Tres	ALL	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	19.0%	100.0%	0	0	0	0
CHG	Regan	Vince	ALL	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	100.0%	0	0	0	0
RA	Regan	Tres	MDN ONLY	0.0%	0.0%	0.0%	40.0%	60.0%	0.0%	0.0%	20.0%	100.0%	0	0	0	0
SAD	Regan	Tres	MDN ONLY	0.0%	0.0%	47.4%	5.3%	26.3%	0.0%	21.1%	52.6%	26.3%	14	2	5	7
DSN	Greg	Vince	MDN ONLY	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	85.0%	100.0%	0	0	0	0
CUT	Regan	Vince	MDN ONLY	0.0%	0.0%	0.0%	11.1%	88.9%	0.0%	0.0%	11.1%	100.0%	0	0	0	0
FAB	Regan	Vince	MDN ONLY	0.0%	0.0%	33.3%	16.7%	16.7%	0.0%	33.3%	8.3%	66.7%	5	4	0	1
PI	Regan	Vince	MDN ONLY	0.0%	0.0%	68.8%	6.3%	12.5%	0.0%	12.5%	6.3%	31.3%	12	12	0	0
VER	Regan	Tres	ALL	0.0%	0.0%	0.0%	0.0%	72.7%	0.0%	27.3%	18.2%	100.0%	0	0	0	0
VAL	Regan	Vince	ALL	0.0%	0.0%	0.0%	0.0%	57.1%	0.0%	42.9%	0.0%	100.0%	0	0	0	0
PROD	Vince	Vince	ALL	0.0%	0.0%	0.0%	0.0%	80.0%	0.0%	20.0%	6.7%	100.0%	0	0	0	0
REQM	Regan	Tres	MDN ONLY	0.0%	0.0%	0.0%	14.3%	85.7%	0.0%	0.0%	14.3%	85.7%	1	0	1	0
RISK	Frank	Frank	ALL	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	100.0%	100.0%	0	0	0	0
CDM	Greg	Vince	ALL	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	100.0%	0	0	0	0
PMET	Regan	Tres	ALL	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	7.1%	100.0%	0	0	0	0
DAR	Tres	Tres	MDN ONLY	0.0%	0.0%	0.0%	23.1%	76.9%	0.0%	0.0%	7.7%	100.0%	0	0	0	0
PR	Tres	Tres	MDN ONLY	0.0%	0.0%	23.8%	23.8%	52.4%	0.0%	0.0%	9.5%	76.2%	5	5	0	0
DR	Regan	Tres	MDN ONLY	0.0%	0.0%	0.0%	0.0%	85.7%	7.1%	7.1%	7.1%	92.9%	1	0	0	1
QA	Regan	TBD	ALL	0.0%	0.0%	34.8%	13.0%	30.4%	0.0%	21.7%	26.1%	73.9%	11	2	3	6
ILS	Vince	Vince	ALL	0.0%	0.0%	12.5%	0.0%	25.0%	0.0%	62.5%	12.5%	37.5%	6	0	0	6
FIELD	N/A	N/A	N/A	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0	0	0	0
Totals				5.1%	0.0%	10.7%	13.6%	66.9%	0.3%	8.5%	28.5%	86.7%	55	25	9	21

Weekly meetings and up to date status helped to facilitate progress.

May PCM Status is Yellow



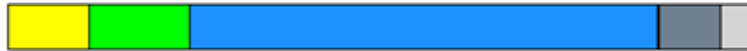
Baseline: Rev 7 - New IPM Baseline

Appraisal: 14 - Appraisal created due to new IPM Version {Open}

Data Valid Through: 5/27/2009 9:19:08 AM

 PI Project Score

Scoring Distribution



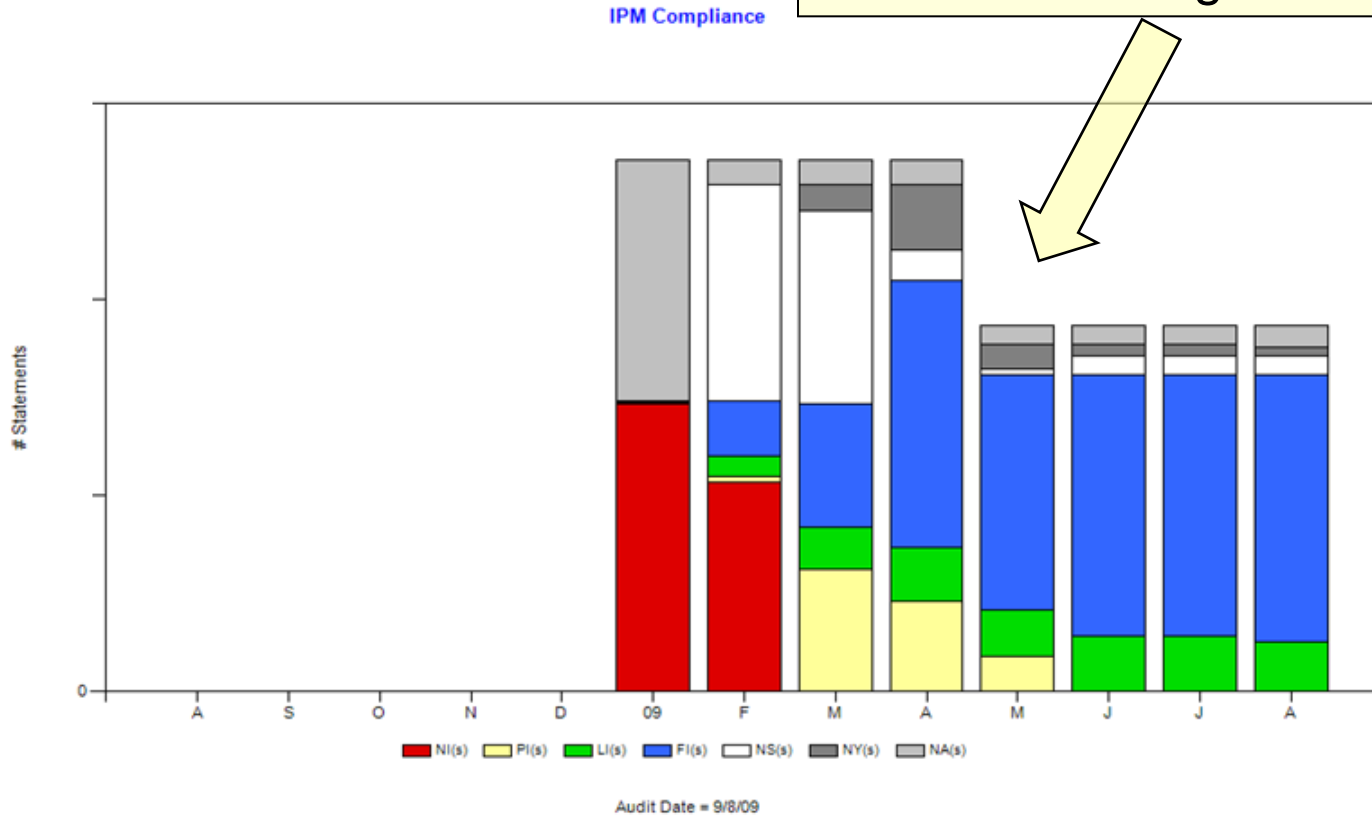
Program Management	Program Life Cycle	Program Support
CHG	CUT	CDM
EST	DSN	DAR
PMC	FAB	DR
PP	FIELD	ILS
SAM	PI	PMET
	PROD	PR
	RA	QA
	SAD	REQM
	VAL	RISK
	VER	

Plans for ILS scored but many statements still Not Yet.

PCM Compliance Status Trends



IPM Streamlining Effort completed



SUCCESS! PCM Green in June!

- Program was process compliant, only minor issues
- Program process compliance is verified in PCM
- Program problems not due to lack of proper process
- What could we have done differently?
 - Increase QE consistency and competency
 - Require less monitoring
 - Risk Based Monitoring
 - Evaluate program for Risk and establish PCM process verification requirements based on Risk level
 - Priority Based Monitoring
 - Track process verification for most important process areas only based on program type and phase

- All programs required to comply with their tailored version of IPM, but how much process compliance verification is needed?
- Evaluate Program Readiness Level
- Evaluate Program Risk Level
- Determine process compliance verification level based on these inputs

		RISK		
		Low	Med	High
READINESS	High	No PCM	Low PCM	Some PCM
	Med	Low PCM	Some PCM	More PCM
	Low	Some PCM	More PCM	Full PCM

- All programs required to comply with their tailored version of IPM, but how much process compliance verification is needed?
- Determine Most Important Processes for Program Execution (MIPPEs)
- MIPPEs - different per program and change over time
- Require PCM process verification for MIPPEs only

	Months						
	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10
MIPPEs	PP	PP	PMC	PMC	REQM	REQM	FAB
	EST	EST	RA	RA	DSN	DSN	CUT
	PMC	PMC	SAD	SAD	PMET	PMET	CDM
	RA	RA	RISK	RISK	QA	QA	
	RISK	RISK	CHG	CHG			
	CHG	CHG					

- Pros
 - Cost Savings
 - Less verification in PCM saves time and therefore dollars, allows the program team to concentrate on other tasks
 - Programs tend to follow best practices anyway
- Cons
 - Higher Risk of Problem Programs
 - Less verification in PCM increases risk of programs not following all the required processes
 - Less chance of finding and correcting process problems
 - Higher Risk for SCAMPI Readiness
 - Less verification in PCM increases risk of programs not being ready for SCAMPI

- QE consistency is desired by everyone
 - **Provide more training**, require and test for proficiency
 - Tool usage
 - Scoring competency
 - **Perform more cross checking**, functional leads facilitate
 - Between QEs
 - Across programs
 - Over time
 - **Present QE Forums**
 - Share information, changes, lessons learned and tips

Contact Information



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