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Redefining QA's Role in Process Compliance

Dean Wooley, Harris Corporation

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- Company overview
- The Role of QA
- The Business Changes
- Effects on Quality Engineers
- Effects on Projects
- Effects on the Organization
- Wrap-up

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.

...QA..

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- QA has existed because of the need for auditing, inspection, and reporting
- Historically in our organization QA was viewed as a ñpolice forceò
  - Find a problem
  - Write it up
  - Walk away!

- Seen as auditors who would come in and point out everything that was wrong
- The role of QA typically carried a negative connotation

W QA..

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- Foundation of QA was in HW and manufacturing operations
- Assuring that standards and procedures are established
- Evaluating the adherence to product standards, processes, and procedures
  - End-line inspections
  - Audits
- Product focused

QA..

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- Software Quality Assurance (SQA) evolved from the HW model
- Different standards, processes, and products
- Different set of skills needed
  - Process monitoring
  - Product evaluation
  - Process evaluations/audits
- Shifted a little towards a process focus
  - Still a major emphasis on inspecting quality into the product
- Distinct roles and functions for HW and SW Quality Engineers emerged

changes..

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- Industry models were adopted by our organization
  - SW-CMM
  - ISO-9000
  - Lean Initiatives
  - AS-9100
  - CMMI®
- More focus on building quality into the process instead of inspecting it in at the end
  - QA focus on prevention of problems, not just identifying them
- Our way of doing business had to change
  - Stovepipe mentality no longer acceptable
  - Integrated processes must be the norm

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GOVERNMENT COMMUNICATIONS SYSTEMS

- Examples
- Metrics
- Reporting

- Templates
- Assets
- Historical Data
- Standard Process

Plan
- Budget
- Schedule
- Resources
- Roles

Corrective Action

Measures CM

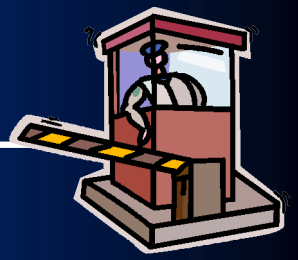
Monitor

Tasks Activities Procedures
- _____
- _____
- _____
- _____

Inputs

Outputs

Entry Criteria



Exit Criteria

Training

Verification / Reviews / QA

ocess evolution

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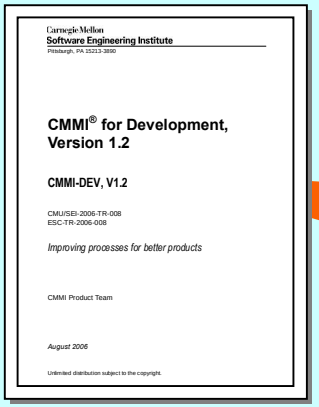
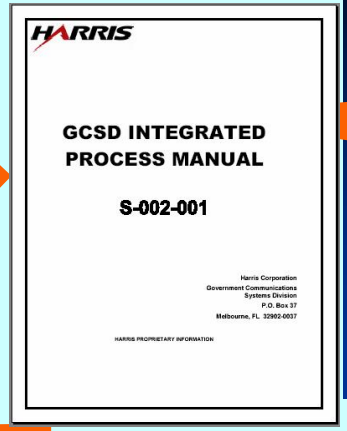
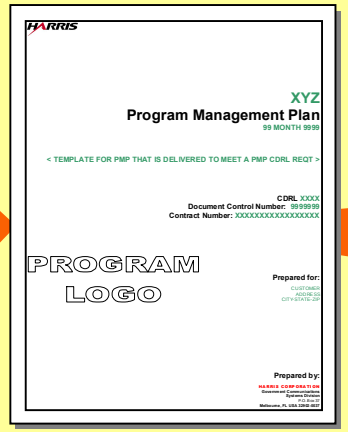
CMMI Model



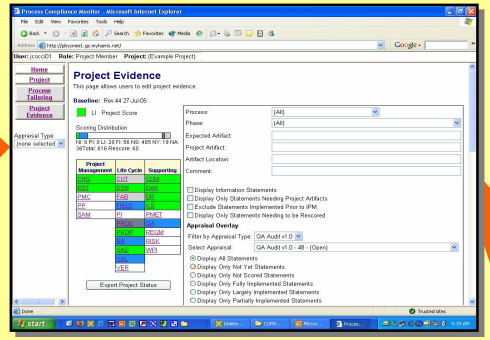
Division



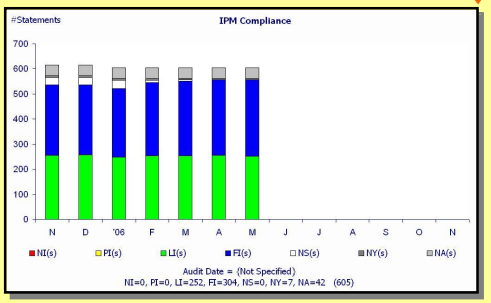


Tailoring

Programs



Program's Compliance Evidence



Program's Compliance Metric

Command Media

Improve

Reuse

Submit

- Historical Data
- Best Practices
- Example Assets
- Improvement Requests

Organizational Learning

Integrated

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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 Stakeholder involvement
- Measuring progress and improvement

ocess outcomes

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- Documented Evidence ï Every Qualifying Program
- Evidence for all activities & products of each integrated process as each is performed
- Verified by QA on frequent basis per an audit plan that aligns with programôs execution schedule
- IPM compliance metric derived from PCM tool
- Monitored throughout execution by program & division management
- Periodic program metric meetings
- Compliance reported at Monthly Program Reviews
- Systemic issues reported at quarterly Quality System Management Reviews (QSMR) with division staff

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Integrated Process Manual (IPM)

Program Management Processes
- ÅProgram Planning
- ÅEstimation
- ÅProgram Monitoring and Control
- ÅSupplier Acquisition & Management
- ÅChange Management

Program Life-Cycle Processes
- ÅRequirements Analysis
- ÅSystem Architecting/Design
- ÅDesign
- ÅCode and Unit Test
- ÅFabrication and Assembly
- ÅProduct Integration
- ÅVerification
- ÅValidation
- ÅProduction
- ÅField Support

Program Support Processes
- ÅRequirements Management
- ÅRisk Management
- ÅConfiguration and Data Management
- ÅProgram Metrics
- ÅDecision Analysis and Resolution
- ÅWork Product Inspections
- ÅDesign Review
- ÅQuality Assurance
- ÅIntegrated Logistics Support

Organizational Processes
- ÅProcess Improvement
- ÅTraining
- ÅDivision Metrics

Program ⟷ Division

...efined

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- In keeping with the ñIntegratedò aspect of CMMI®, the role of Quality Assurance has been redefined to encompass all of these integrated processes

- Quality engineers are moving away from end-line inspection and audit
  - More of an upfront, cross-functional, and consultative role
  - Not strictly manufacturing- and product-based
  - More business- and process-based

- QA provides an active and visible independent check and balance
  - Ensure products and services are of the highest quality and create customer value

ality Engineers[1]

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- Integrated view has blurred the distinction between HW QEs and SW QEs allowing for more consistency across programs
- More enabled to be ñorganizational agents of changeò
- QEs need to have a comprehensive understanding of all facets of the business rather than a limited understanding of one area

ality Engineers²

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- Quality Engineerôs responsibility has expanded beyond the engineering activities
- QE is not expected to be an expert in every area but they are expected to help focus on effective and repeatable process practices
- QEs conduct Integrated Process audits that span all of the IPM processes for each program
  - Determines program process compliance to the IPM
  - Process Compliance Monitor (PCM) tool used as the audit checklist
  - Compliance scores are entered into the PCM tool as the audit is performed
  - Process compliance automatically reported monthly to management

ojects[1]

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- QAôs ability to influence and impact key decisions on the teams they support is no longer based on the old view of the ñpolice forceò
- Better ñconnectionòbetween the project and the Quality Engineer
  - Breaking out of the stovepipe mentality
  - Stronger, more effective customer relationships (both internal and external)
- Desire to be a ñteam player,òto ñfit in,òto ñnot cause any wavesòcannot take precedence over ñdoing the right thingò

- Process compliance has become a high priority for the programs

- Program is not surprised by QA audits
  - Processes to be audited are well known
  - Expected evidence from performing the process is defined by the program

ence Required?

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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

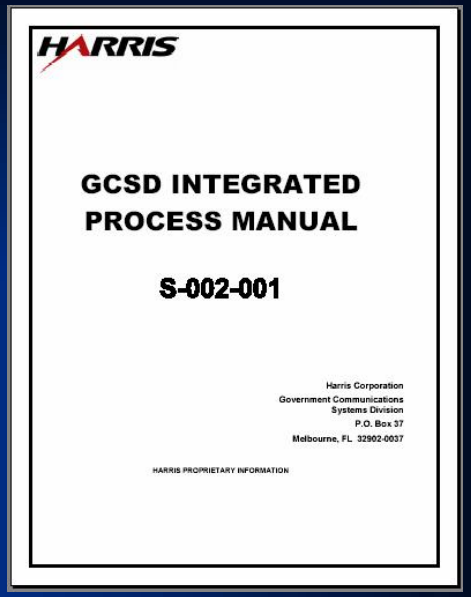
Organizational Improvement Information
Metrics, reusable work products

Verification
Process compliance oversight

Tailoring Guidance
Approved tailoring, process specific

Implementation Guidance
Common implementation descriptions

Supporting Documentation and Assets
Applicable organizational references



Program evidence needed to demonstrate IPM process compliance

...cess Compliance

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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)

e Organization

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- Management at all levels now has insight into process compliance as determined by QA at any time
- PCM Tool provides capability to roll up the data at multiple levels ï program, product line, business unit, group, division
- Systemic compliance issues are easily identified across multiple levels
- QA Management provides a monthly report and analysis of the compliance issues and top process issues

pliance view

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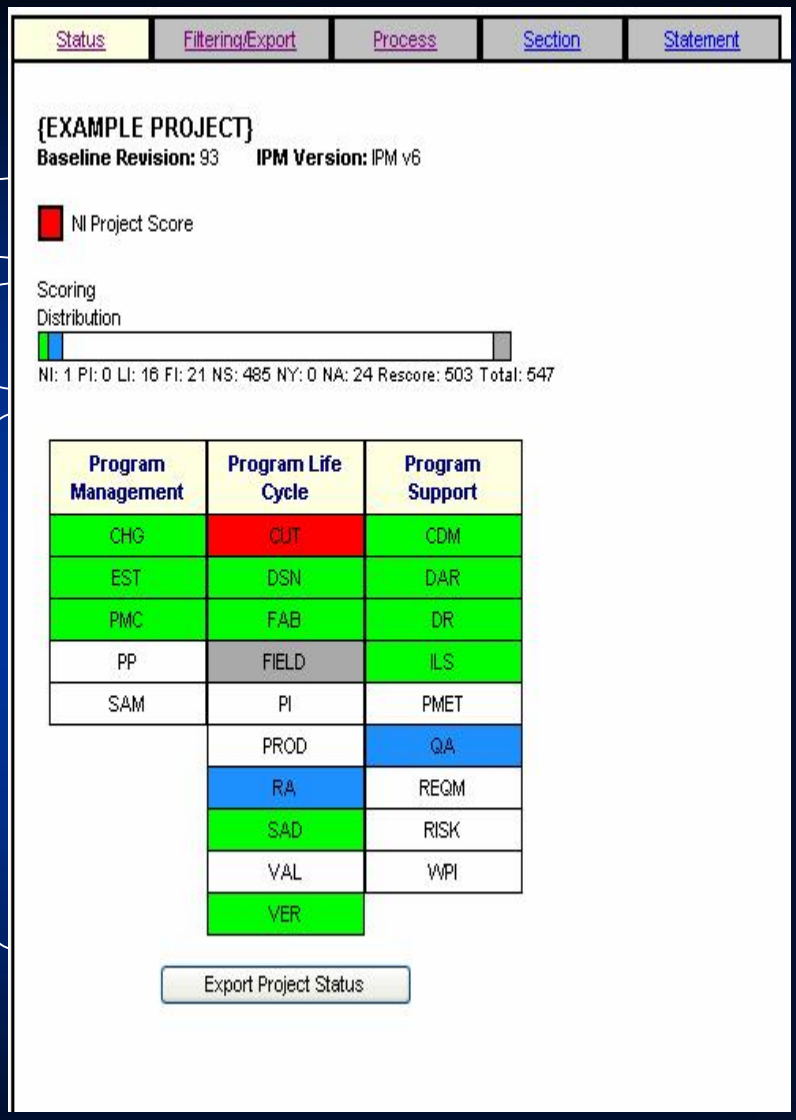
- Represents overall process compliance score for program
- Based on lowest color score ï harsh, but in keeping with CMMI standards

- 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 types of processes



compliance view

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	PL1	PL2	PL3	PL4	PL5	PL6
Overall	NI	LI	LI	LI	PI	PI
Program Management	LI	LI	LI	LI	LI	PI
Program Planning	LI	LI	LI	LI	LI	PI
Estimation	LI	LI	LI	LI	LI	PI
Program Monitoring and Control	LI	LI	LI	LI	LI	PI
Supplier Acquisition Management	LI	LI	LI	LI	LI	PI
Change Management	LI	LI	LI	LI	LI	PI
Program Life Cycle	NI	LI	LI	LI	PI	PI
Requirements Analysis	NI	LI	LI	LI	LI	NS
System Architecting and Design	LI	LI	LI	LI	LI	FI
Design	LI	LI	FI	LI	LI	NS
Code and Unit Test	NS	FI	LI	LI	LI	NS
Fabrication and Assembly	LI	FI	LI	LI	PI	PI
Product Integration	LI	LI	LI	LI	LI	NS
Verification	PI	FI	LI	LI	LI	LI
Validation	NI	FI	FI	LI	LI	NS
Production	LI	FI	FI	FI	PI	FI
Field Support	LI	FI	FI		FI	FI
Program Support	NI	LI	LI	LI	LI	PI
Requirements Management	LI	LI	FI	LI	LI	NS
Risk Management	LI	LI	LI	LI	LI	FI
Configuration and Data Management	NI	LI	FI	LI	LI	PI
Program Metrics	FI	LI	LI	LI	LI	PI
Decision Analysis and Resolution	LI	LI	LI	LI	LI	
Work Product Inspection	LI	LI	LI	LI	LI	NS
Design Review	NI	LI	FI	LI	LI	NS
Quality Assurance	LI	LI	LI	LI	LI	PI
Integrated Logistics Support	LI	LI	FI	LI	LI	FI

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- The QA role has been significantly redefined in our organization
- Transitioning to be less focused on end products and inspections
- More focused on integrated processes and process compliance
- Paradigm is shifting from a "reactive detection" model to a "proactive predictive" model
- Teams are leveraging QA and using them to help improve their processes

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- Some things have remained unchanged
  - Customers (internal and external) still depend on and expect QA to have the courage and integrity to make the hard decisions that support õdoing the right thingò
  - QA retains its organizational independence to allow them to identify non-compliances and recommend corrective actions
- Overall the redefined role has had a positive impact for the Quality Engineers, our programs, and the organization as a whole

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Dean Wooley dwooley@harris.com

Harris Corporation
P.O. Box 37
Melbourne, Florida 32902-0037

http://www.harris.com/
SEI Partner

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Questions???