Practical Software Measurement

PSM Revised Guidance Review Workshop

Office of the Under Secretary of Defense Acquisition and Technology

Joint Logistics Commanders Joint Group on Systems Engineering

Practical Software Measurement

Objectives of the Workshop

- *Summarize what's new*

- *Resolve outstanding comments from review cycle*

- *Resolve remaining technical issues*

- *Identify major issues for elaboration or inclusion*

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Workshop Background

- **PSM Guidance Products**
  - PSM Version 1.0 - April 1995
  - PSM Version 2.1 - March 1996
  - PSM Version 3.1 - April 1998
  - PSM: MPM Version 1.0 - April 1997
  - PSM Version 4.x - Fall 1999

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Workshop Background

- **PSM Version 4.x Addresses**
  - *Systems Engineering*
  - *Product Engineering*
  - *Related Commercial Standards*
  - *Wider Audience than DoD and Software Acquisition Organizations*
  - *Usability of Guidance Material and Other Technical Recommendations*

Workshop Background

- **PSM Version 4.x Consolidates Efforts of**
    - *Systems Engineering Measurement Study Group*
    - *Software Product Engineering Measurement Study Group*
    - *PSM User Conference Workshops 1997, 1998*
    - *INCOSE Metrics Working Group*
    - *TWG Comments*

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Workshop Agenda

Wed. 21 July

| 13:30 - 14:30 | Summary of Changes |
| 14:30 - 17:00 | Disposition, Resolve High-Level Concerns |

Thu. 22 July

08:30 - 12:00	Sub-Group Disposition, Resolve ICM, Indicator, Other Concerns
12:00 - 13:00	Lunch
13:00 - 15:00	Sub-Group, cont'd.
15:00 - 16:00	Sub-Group Reports
16:00 - 17:00	Group Discussion and Summary

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Intended Output

- ***Assessment of Draft Guidance***
- ***Prioritized List of Comments, Concerns***
- ***Recommended Resolutions***

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Primary Areas Affected

- **Scope and Point of View**
- **Additional Guidance and Detail**
- **Issues-Categories-Measures (ICM)**
- **Indicators**
- **Terminology**
- **Guide Presentation Format**
- **Graphics**

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Scope and Point of View

- *Software-Intensive <u>Systems</u>*
- *Life-Cycle Phases Addressed More Evenly*
- *Commercialize Terms and Approaches*

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Guidance Amplified

- ## *Analyzing Issues*
  - ### *Cost-Estimation*
  - ### *Historical Data*
  - ### *Thresholds*
  - ### *Presenting Measurement Data*
- ## *Integrating Measurement into Business*
  - ### *Measurement Plan*
  - ### *Action Plan*
  - ### *Return on Investment*

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Guidance Added

- **Assessing the Measurement Program's Effectiveness**
  - *Is measurement contributing to informed decision making? If not, why, and improve.*
  - *Adding new issues, categories and measures to the PSM set*

- **Enterprise and organization measurement needs**

ICM Changes   *Summary*

- **ICM**

	Ver. 3.1	Ver. 4.x	
Issues	6	7	+1
Categories	16	21	+5
Measures	42	51	+9

- **Indicators**

	Ver. 3.1	Ver. 4.x	
Total	36	39	+3

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Category and Measure Changes

- *Generalized to Apply to Either Systems or Software Engineering*
  - *Only 4 exceptions*
- *Discipline-Unique Considerations Added*

Issues – Categories – Measures Mapping		
Issue	**Category**	**Measures**
Schedule and Progress	Milestone Performance	Milestone Dates Critical Path
	Work Unit Progress	Requirement Status Problem Report Status Reviews Completed Change Request Status Component Status Test Case Status Tracked Item Status
	Incremental Capability	Increment Content - Component Increment Content - Functionality
Resources and Cost	Personnel	Effort Staff Experience Staff Turnover
	Financial Performance	Earned Value Cost
	Environment and Other Resources	Resource Availability Resource Utilization
Product Size and Stability	Physical Size and Stability	Database Size Components Interfaces Lines of Code Physical Characteristics
	Functional Size and Stability	Requirements Change Requests Function Points

(Changes to name only are not highlighted.)

Issues – Categories – Measures Mapping		
Issue	**Category**	**Measures**
Product Quality	**Functional Correctness**	**Defects** **Test Coverage** **Achieved Accuracy in Performance** **(Technical Performance Measures)**
	Supportability	**Recovery Impact** **Cyclomatic Complexity** **System Maintenance**
	Efficiency	**Utilization** **Throughput** **Timing**
	Portability	**Standards Compliance**
	Usability	**Operator Errors**
	Dependability	**Failures** **Fault Tolerance**
Process Performance	**Process Compliance**	**Reference Model Level** **Process Audit Findings**
	Process Efficiency	**Productivity** **Cycle Time**
	Process Effectiveness	**Escapes** **Rework**
Technology Effectiveness	**Suitability**	**Technology Fit**
	Impact	**Technology Impact**
	Volatility	**Product Releases**
Customer Satisfaction	**Customer Feedback**	**Survey Results** **Performance Award** **Unsolicited Comments**

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Indicator Changes

- **Presentation Reorganized**
  - *Grouped by analysis task in Ver. 3.1*
  - *Single measure and multi-measure sections in Ver. 4.x*
  - *One or more analysis tasks addressed in single measure descriptions*

- **Additional Indicators for New Measures**

Terminology

- **Align with commercial standards**
  - *ISO 12207*
  - *ISO 15939, 15504*
  - *ISO 9001, 9004*
  - *SEI Capability Maturity Models (CMMs)*
  - *IEEE 632*
  - *IEEE 1220*

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Format

- **Integrate Systems View Throughout**
- **Multi-Volume Set**
  - **Primary Guidance (Vol. 1)**
  - **Case Studies (Vol. 2)**
  - **DoD Implementation Guide (Vol. 3)**
  - **Self-Study Workbook (Vol. 4)**
  - **PSM Adaptions**
    - **Small Projects, COTS, Prototyping, Open Systems, Outsourcing, Process Improvement, etc.**

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Graphics

- **Software-Only Focus Expanded to Project**
- **Interfaces to Enterprise and Organization More Explicit**