THE ASSISTANT SECRETARY OF THE NAVY
(RESEARCH, DEVELOPMENT AND ACQUISITION)
1000 NAVY PENTAGON
WASHINGTON DC 20350-1000

JUL 22 2008

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Department of the Navy (DoN) Software Measurement Policy for Software Intensive Systems

Successful development and acquisition of software is paramount for Naval warfighting and business systems. The Software Process Improvement Initiative (SPII) was chartered in 2006 in response to Public Law 107-314 Section 804 to enhance our ability to develop and acquire software. Contract language policy was issued in November 2006 and amplified in July 2007 to establish common practices and accountability from software developers to the DoN acquirers. A major contributor to process improvement is the availability of software developer and acquirer metrics.

Metrics provide management visibility into the software development process. The metrics should clearly portray variances between planned and actual performance, enable early detection or prediction of situations that require management attention, and support the assessment of proposed changes on the program. All programs of record with any software, regardless of ACAT category, shall define, develop, and implement the following minimum set of core metrics specific to their program.

- Software Size
- Cost/Schedule (WBS focus on software)
- Software Quality
- Software Organization

The core metrics should be tailored and implemented consistent with both of the Program Office's and the developer's internal tools and processes. Program offices and developers should establish and agree upon additional metrics or means of insight to identify and address software issues deemed critical or unique to the program. All core software metrics information and supporting evidence shall be available at or to the Program Office. Additional guidance is provided in attachment (1). The Assistant Secretary of the Navy (Research, Development and Acquisition) Chief Systems Engineer (ASN (RD&A) CHSENG) will take action to include these metrics as part of the Program Health portion of the 2 Pass/6 Gate process.

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My POC for questions or modification recommendations is ASN (RD&A) CHSENG.

John S. Thackrah
Acting

Attachment:
as stated.

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Department of the Navy Software Measurement Policy For Software Intensive Systems

1 Introduction

Metrics are a critical risk management mechanism for successful acquisition of Naval systems and platforms. Metrics provide management visibility into the software development process. Software metrics can provide insight about the progress, quality, and expected completion of a software development effort. To be effective, metrics should clearly portray variances between planned and actual performance, provide prediction or early detection of situations that require management attention, and support the assessment of the impact of proposed changes on the Program. Metrics need to be continuously collected, readily accessible, independently verifiable, and integral to the requirements management and risk management activities.

The set of core metrics mandated here meet those objectives by providing measurements that are:

- Common across all programs
- Relational across the program office/prime contractor boundary;
- Reportable up the chain on a continuous basis
- Artifact based and statistically stable
- Industry standards based, especially IEEE 12207
- Public Law 107-314 Section 804 compliant

Four mandatory core metrics will be the basis of management display of program risk (including both Program Office and Contractor(s) performance) and will be reported at major and milestone reviews, and applicable Systems Engineering Technical Reviews (SETR), Weapons Systems Explosive Safety Review Board (WSESRB), and Technical Warrant reviews.

2 Core metrics

The following minimum set of core foundation metrics is to be implemented in all systems that include software development and/or integration:

- Software Size/Stability

- Software Organization
- Cost/Schedule (WBS focus on software)
- Software Quality

These core metrics are keyed to and flex with the DoD 5000/IEEE/EIA 12207 life cycle of events and are to be used through the program's life cycle. Effective immediately, all Programs of Record with any software, regardless of ACAT category, shall define, develop, and implement the core software metrics for their program at contract award or the next major upgrade. The core metrics should be tailored and implemented consistent with both of the Program Office's and the developer's internal tools and processes but shall include the attributes listed in the following table.

Metric	**Highlights risk in:**	**Includes measures of:**
Software Size	Planning, Requirements Development, Requirements Management	e.g., Equivalent KSLOC or Number of SW requirements, or Function Point
Organization	Program Office and Developer Staff Planning, Resource Management	Key Billets filled/to be filled, Key Billet KSAs required /trained/unfilled, Key Billets filled by more than one person or part-time
Cost/ Schedule	Government independent Cost Estimate (ICE), Official Program Baseline, Delta in KPP/Requirements	Scope Creep versus KPP delta, Defect effected changes
Software Quality	KPP/Requirements driven, Technology Readiness Changes, Defects, Safety, Security	Defect Rate and Cost of rework (balance with cost metric), Process quality data, Training deficiencies, Open and Closed Risk issues, Subtraction of defects caused by KPP/Requirements delta

As noted earlier, a key attribute of the mandated metrics is that they are relational across the acquirer and developer organizations. This is based on Naval lessons-Learned showing that there is a cause and effect relationship between acquirer

and developer use of the core metrics. Program Offices and developers should agree upon and establish additional metrics or means of insight to address other software issues deemed critical or unique to the program. All core software metrics information and supporting evidence shall be available at or to the Program Office. This availability of display, metric, or evidence should be provided by on-line or electronic means and accessible with proper security.

These core metrics contribute to performance measurement and continual process improvement across program management activities. The display of these metrics to senior management and the consistent review at major technical and programmatic reviews will complete the relationship between specific metrics and program management activities directed by Public Law 107-314 Section 804.

3 Supporting Artifacts

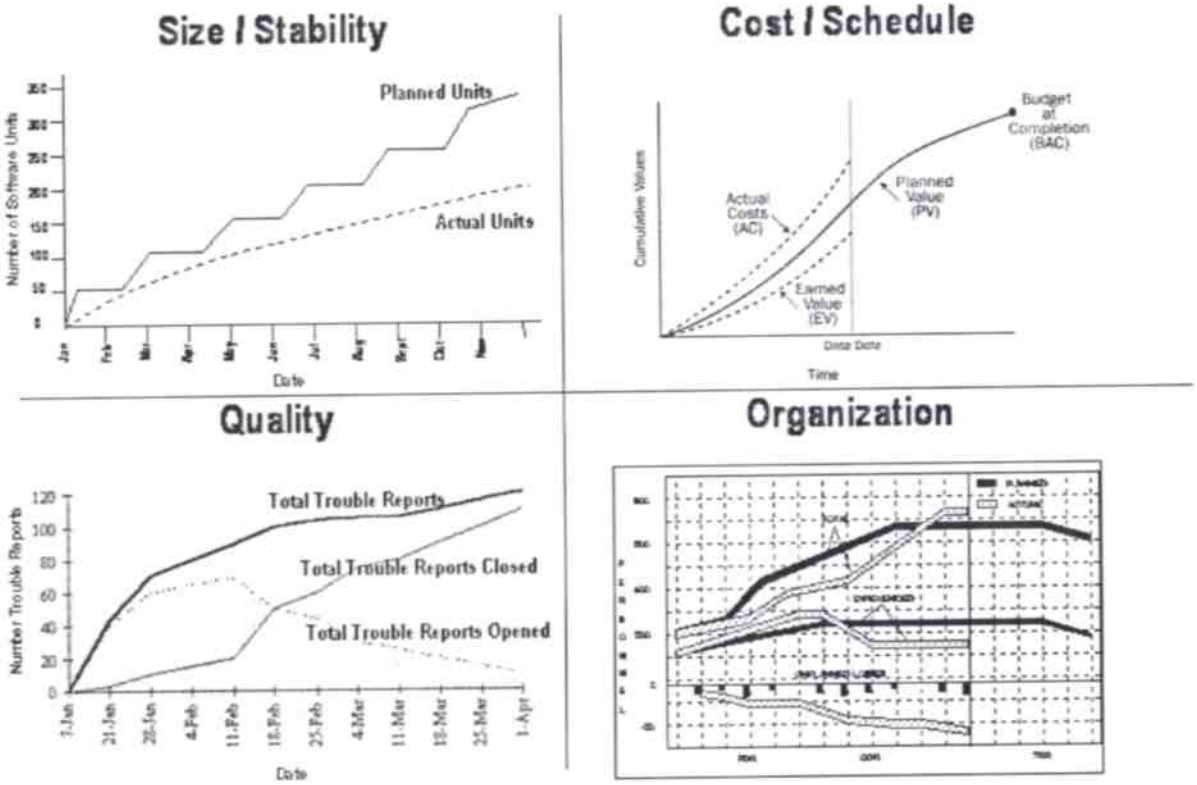
Metrics alone will not meet the measurement challenge. The software measurement process will be closely aligned with risk management, requirements management and configuration management to provide a rigorous, repeatable and definable process.

The minimum set of program artifacts that will support development of metrics include:

- A Work Breakdown Structure (WBS) that clearly separates and identifies the software components of system development that are traceable to system requirements and cost estimates
- A Systems Engineering Plan (SEP) organizational structure that clearly identifies key software and support billets that are driven by DAWIA and DAU knowledge skills and ability (KSA) attributes.
- Systems Engineering Technical Review (SETR) products that focus on the development of the software product at key points between DOD 5000 milestone reviews
- SECNAVINST 5000 programmatic reviews that will assess sufficiency over time and roll-up software risk into programmatic risk.

4 Summary

A key characteristic of the Naval software measurement program is that it will integrate software risk, requirements management, and program management. Each metric will be replicable and verifiable due to the artifact driven nature of the data. As such, the data is compatible with a variety of assessment and display mechanisms available to the Department of Defense (e.g., DASHBOARD, POPS).

Additional assistance with developing and implementing the four core metrics, to include supporting processes, sub-processes, and life cycle phase driven metrics reports for each of the metrics, will be included in the Guidebook for Acquisition of Naval Software Intensive Systems.

PEOs and Program Managers are responsible to enact this policy at the next contract or contract modification. Final approval of the metrics will rest with the appropriate Milestone Decision Authority (MDA). Final approval of the appropriate display and rules for rolling up the Program's measurement assessment into a senior display mechanism will be in compliance with Probability of Program Success (PoPS).