

Earned Value Management Acquisition Reform

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Both Congress and the Executive Office are calling for acquisition reform regarding Earned Value Management (EVM) in general and Information Technology (IT) projects, in particular. DoD has reported that EVM, based on the EVM Systems Standard (EVMS), no longer serves its intended purpose. Project management standards and best practices that are used by commercial companies should be considered for acquisition reform.

The last major reform of EVM occurred fourteen years ago. Today, the implementation and management value of EVM have been strongly criticized by DoD, the GAO, and Congress. EVM is increasingly utilized by commercial corporations but most companies do not base their best practices on EVMS, ANSI/EIA-748. It is time to ask whether DoD, and other federal agencies, should continue to rely on ANSI/EIA-748 or should adopt the best practices of commercial companies that use EVM voluntarily, not because of a contractual mandate.

Intended Purpose of EVM

The intended purpose of an earned value management system (EVMS) was announced in 1996 when DoD accepted industry guidelines for EVMS to replace similar DoD criteria. DoD encouraged industry to develop a widely accepted industry or international standard. Per the announcement, "It has been our vision of acquisition reform to:

- Adopt...commercial practices in lieu of government unique practices
- Rely on our contractors to maintain management control systems that protect the public interest.
- Shift responsibility from government to industry
- Support the 'insight, not oversight' philosophy underlying DoD acquisition reform initiatives."

In 1998, ANSI/EIA-748, was issued with great fanfare as a U.S industry standard. The Government/Industry Team that wrote ANSI/EIA-748 received the David Packard Excellence in Acquisition Award. The award states the "Team has implemented a shift in EVM ownership and responsibility from government to industry and has created a recognized international best practice."

Finally, the purpose of EVM is stated in Office of Management and Budget Circular No. A-11, *Planning, Budgeting, Acquisition and Management of Capital Assets*, Section 300-5:

Performance-based acquisition management should be:

- Based on based on the EVMS Standard **and**
- Measure progress towards milestones
 - Cost
 - **Capability to meet specified requirements**
 - Timeliness
 - **Quality**

Status and Deficiencies of ANSI/EIA-748

In 2009, DoD reported to the House and Senate oversight committees that the "utility of EVM has declined to a level where it does not serve its intended purpose." Today, Congress is considering EVM as a target for acquisition reform.

EVM is still recognized as an international, commercial best practice but ANSI/EIA-748 has been largely ignored by commercial companies. When there is no government mandate to use EVM, the Project Management Institute (PMI) *Guide to the Project Management Body of Knowledge (PMBOK® Guide)* is a widely used standard for project management.

Quality Gap

ANSI/EIA-748 focuses only on the work scope and ignores the product scope (technical baseline). It also fails to link earned value with technical performance or quality (Quality Gap). The federal acquisition regulations that impose ANSI/EIA-748 have no requirements for reporting technical performance as a basis for earned value. Consequently, contractors may report progress based only on the quantity of work performed, not the quality of the system being designed and tested.

Additional information about the Quality Gap is provided in three previous AT&L articles. The articles discuss remedies which rely on systems engineering standards and contract incentives. The key messages of the articles are:

- If you are measuring the wrong things or not measuring the right way, then EVM may be more costly to administer and may provide less management value.
- EVM data will be reliable and accurate only if:
 - The right base measures of technical performance are selected and
 - Progress is objectively assessed

Links to the articles are at www.pb-ev.com at the [Advanced EV:PBEV](#) tab.

Risk Management Gap

The 32 Guidelines in ANSI/EIA-748 fail to address the integration of risk management with EVM (Risk Management Gap). Guidance on risk management was relegated to Section 3, EVMS Process Discussion. However, DoD contractors must be compliant with the Guidelines, not the Process Discussion.

Guidance to integrate risk management to EVM, based on *PMBOK® Guide* and other sources is available at the [Risk Management](#) tab.

Congressional Assessment

The Weapons System Acquisition Reform Act of 2009 (WSARA) directed DoD to provide recommendations to improve EVM and its implementation, to discuss merits of possible alternatives, and to submit a plan for possible improvements.

In the WSARA House/Senate conference report, Sen. Collins stated that the GAO observed that contractor EVM reporting lacks consistency and leads to inaccurate data and faulty application of the EVM metric. “In other words, garbage in, garbage out.” Sen. Collins concluded that “With improved EVM data quality, both the government and the contractor will be able to improve program oversight, leading to better acquisition outcomes.”

DoD Assessment

The DoD’s response to WSARA was the report, *DoD Earned Value Management: Performance, Oversight, and Governance* (DoD Report). Its findings and recommendations include:

- Inaccurate EVM status data provided by vendors
- Use Technical Performance Measures (TPM)
- Integrate Systems Engineering with EVM

With regard to linking EVM to TPMs, the report stated that:

- EV process is reliable and accurate only if
 - TPMs are identified and associated with completion of appropriate work packages
 - Quality of work must be verified
 - Criteria must be defined clearly and unambiguously
- If good TPMs are not used:
 - Programs could report 100 percent of earned value even though behind schedule in validating requirements, completing the preliminary design, meeting weight targets, or delivering software releases that meet the requirements.
- Program Manager ensures that the EVM process measures the quality and technical maturity of technical work products instead of just the quantity of work performed

A detailed summary and link to the report are available at the [DoD EVM Implementation](#) tab of the cited website.

GAO Guide

The GAO provides guidance regarding TPMs in its *GAO Cost Assessment Guide, Best Practices for Estimating and Managing Program Cost*, as follows.

- Progress and milestone events should represent measurable performance in terms of quality and technical performance as well as cost and schedule.
- Performance measures used to report progress in achieving milestones should be integrated with TPMs. Examples of objective measures are requirements traced, reviews successfully completed, software units coded satisfactorily, and number of units fully integrated.
- Management should use the EVM data captured by the Contract Performance Report data to integrate cost and schedule performance data with technical performance measures.

DoD Guides

Many DoD guides, including the Defense Acquisition Guidebook (DAG) discuss TPMs or quality. DAG includes new guidance for integrating TPMs with EVM and the IMS, including contractual TPM reporting. Per DAG, a contractor must now have a TPM plan, defined in terms

of expected performance at specific points in the program as defined in the WBS and IMS, the methods of measurement at those points, and the variation limits for corrective action.

DAG also includes expanded responsibility for Systems Engineering to integrate the:

- Technical scope of effort in the WBS
- Corresponding event driven program implementation in the IMS and EVM
- Technical baselines, TPMs, and EV

These guides are not applicable to contractors. Without corresponding contractual requirements, Program Managers will be unable to implement much of this guidance. Additional DoD guidance information, including matrices that relate all pertinent guides and discuss technical baselines, is in the website at the [Dept. of Defense](#) tab and subordinate tabs.

Quality Gap Examples

During my experience as the EVM monitor on the B-2, F-35, Global Hawk, and other programs, I have seen many practices which, although compliant with the EVM guidelines, resulted in overstatement of true technical progress and understatement of the cost and schedule variance. If the contractors' processes had closed the Quality Gap, there would have been more accurate status reporting, meaningful variance analysis, and more realistic Estimates at Completion.

Some examples of compliant practices that led to misleading management information and that would not be permitted if the Quality Gap were closed are:

- Taking EV based on percent of drawings or software modules complete even though the hardware design did not meet requirements or the software did not meet planned functionality.
- Including budget and schedule for tests and rework in Management Reserve instead of in the initial PMB, work packages, and planning packages.
- Taking earned value for rework and engineering changes based on the actual vs. estimated percent of units, iterations, or problem reports instead of on the percent of requirements met.
- Taking earned value for software releases based on turning over the release, even though some of its baselined functionality was deferred to the next release.
- Not taking negative earned value to show the true, net percent complete when the number of drawings or other units increased from the baselined number, with no change in the technical requirements.
- Not taking earned value for drawings or other units returned for rework, when rework is planned in the same work package as the initial work.

Complete information about the Quality Gap, with reference to specific deficiencies in ANSI/EIA-748, is provided at the [EVMS Quality Gap](#) tab of the website.

EVM Practice in Private Sector

A world-wide survey of EVM users by the PMI disclosed that the private sector has largely ignored ANSI/EIA-748. When the use of EVM is voluntary and not a contractual mandate, only 17% of the respondents used EVM based on ANSI/EIA-748.ⁱ

I have taught EVM to commercial IT companies in India and S. Korea for use on fixed-price contracts. Their EVM processes and best practices were based primarily on *PMBOK Guide* and its focus on the technical baseline and TPMs. *PMBOK® Guide* practices include:

- Differentiating the product scope from the project (work) scope
- Establishing a quality baseline within the Performance Measurement Baseline (PMB)
- Use of TPMs to integrate technical, cost, and schedule performance.

PMBOK® Guide citations are shown at the EVMS Quality Gap tab of the website. An article that describes how Samsung integrates earned value and technical performance was published in the *PMI Measurable News*. See “*Performance-based EV in Commercial IT Projects*” at the [Advanced EV:PBEV](#) tab of the website.

Pending Acquisition Reform Legislation and Policy

House

The House version of the National Defense Authorization Act for Fiscal Year 2011 was passed and placed on the Senate calendar. Section 106(a) requires DoD to review acquisition guidance, including DoD Instruction 5000.02, and to “***consider whether measures of quality and technical performance should be included in any earned value management system*** (Sec. 106(b)(4)).”

This legislation was proposed because the DoD and Industry have not taken action to hold contractors responsible for reporting earned value that is tied to technical performance or quality. DoD Report did not discuss any corrective actions to require contractors to link earned value to technical performance. The Council of Defense and Space Industry Associations (CODSIA), in its letter to DoD for the WSARA response, stated that “Industry recognizes that EVM practices have atrophied and that performance reporting on many programs has been superficial.” However, CODSIA ignored technical performance.

Senate

The Senate passed S.920, the IT Investment Oversight Enhancement and Waste Prevention Act. One of its purposes is to improve the processes agencies implement to manage IT technology investments. The Act opens the door to using an alternative to ANSI/EIA-748. It provides for cost, schedule, and performance reporting of all major IT investments using earned-value management data based on either ANSI/EIA-748 or another objective performance-based management system approved by the E-Government Administrator.

Office of Management and Budget (OMB)

The OMB recently issued policy memoranda to reform and improve the management and oversight of IT projects. One memorandum includes direction to the OMB Deputy Director for Management to develop recommendations for improving the Federal Government's IT procurement and management practices. He must focus on proven best practices from inside and outside the Federal Government and include higher standards for project management practices. This direction also opens the door to using practices and project management standards that are used by commercial enterprises.

Conclusion

Although Government policies and regulations require that contractors be compliant with EVMS, there are no contractual requirements for contractors to integrate technical performance or risk management with EVM. These gaps impair the management value, validity, and accuracy of EVM reports.

Whether or not the cited provisions of H.R. 5136 become law, DoD should consider revising its acquisition policies to require that earned value be linked to technical performance or quality, not just to the quantity of work performed. The quality objectives should be defined in the technical baseline and PMB.

Risk mitigation plans should be budgeted and incorporated into the schedules and PMB. Finally, The Estimate at Completion should incorporate quantified risks.

One way to implement the reform is to replace ANSI/EIA-748 with pertinent components of *PMBOK® Guide*. An alternative is to revise acquisition policies and regulations, including DoDI 5000.02, to augment ANSI/EIA-748 with provisions for TPMs, other objective measures of progress towards achieving the technical baseline, and risk management. Systems Engineering standards and *PMBOK® Guide* provide appropriate language for the provisions. Suitable language is already in DAG and other DoD guides.

These acquisition reforms are needed for EVM to serve its intended purpose. Implementation of these reforms can finally enable EVM to integrate a program's technical, schedule, and cost objectives and to integrate risk management. These reforms can lead to "insight, not oversight" for Program Managers.

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ⁱ Song, Lingguang, (2010). *Earned Value Management, A Global and Cross-Industry Perspective on Current EVM Practice*. Newton Square, PA: PMI.