

Revise DoDI 5000.02 to Integrate Systems Engineering, Technical Performance, and Test and Evaluation with EVM, and to Exclude Qualified Software Development

Paul Solomon March 31, 2019

This white paper includes recommended revisions to DoDI 5000.02. The revisions will correct misleading claims in that document and provide guidance for program managers (PM) to overcome the major shortcomings of Earned Value Management (EVM). Also, the recommendations add references to supporting DoD documents including the Systems Engineering Plan (SEP), Integrated Master Plan (IMP), Test and Evaluation Master Plan TEMP, and Defense Acquisition Guide (DAG).

Incorporation of the recommendation to eliminate mandatory EVM compliance and reporting requirements for FPI and LRIP contracts will decrease program costs. Incorporation of the recommendation to eliminate mandatory EVM compliance and reporting requirements for qualified, short-term, low-risk software development elements of EMD contracts will decrease program costs and accelerate incremental delivery of those software products.

The recommendations are complementary to but independent of those that were provided in the white paper, “DoD Acquisition Reform: EVMS-lite to Program/Project Management,” Jan. 31, 2019.

Misleading Claims

DoDI 5000.02 is misleading regarding its claim that EVM provides a PM with a “disciplined, structured, objective and quantitative method” to “integrate technical, cost, and schedule objectives into a single, cohesive contract baseline plan called a Performance Measurement Baseline (PMB).” Although EVM provides a “method,” it does not require inclusion of all the elements that are needed to achieve integration

Likewise, the DAG states that EVM is an “integrated program management tool” to assess the cost, schedule, and technical performance of contracts for proactive decision-making.” Not true.

In fact, a contractor may be compliant with the EVMS Standard, EIA-748-D, but choose not to integrate technical objectives (technical baseline or product scope) into the PMB or to link earned value with technical performance measures (TPM).

EVM Shortcomings

The shortcomings of EVM have been cited in two DoD reports:

1. DoD report to Congress that was required by the Weapon Systems Acquisition Reform Act of 2009 (WSARA), “DOD EVM: Performance, Oversight & Governance Report,” Sept. 2009 (DoD Report).
2. Section 809 Report of the Advisory Panel on Streamlining and Codifying Acquisition Regulations, Vol.1, January 2018 (Section 809 Report).

Per DoD Report:

1. Contractors “keep EVM metrics favorable and problems hidden.”

2. TPM:

- 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
 - “If good TPMs are not used, programs could report 100 percent of EV even though behind schedule in validating requirements, completing the preliminary design, meeting the weight targets, or delivering software.”

3. Integrate Systems Engineering (SE) with EVM

- EVM can be an effective program management tool only if the:
 - EVM processes are augmented with a rigorous SE
 - SE products are costed and included in EVM tracking
 - If the SE lifecycle management method is integrated with the planning of the PMB, then EVM will accurately measure technical performance and progress.

4. Quality, not Quantity

- PM ensures that the EVM process measures the quality and technical maturity of technical work products instead of just the quantity of work performed

Per Section 809 Report:

3. “Another substantial shortcoming of EVM is that it does not measure product quality. A program could perform ahead of schedule and under cost according to EVM metrics but deliver a capability that is unusable by the customer.”
4. “Traditional measurement using EVM provides less value to a program than an Agile process in which the end user continuously verifies that the product meets the requirement.”

DoDI 5000.02 has not been revised to address shortcomings of EVM that were identified in 2009 and reconfirmed in 2018.

Shortcomings of EIA-748-D

Two omissions in EIA-748-D enable a contractor to choose not to integrate technical performance with cost and schedule performance:

1. It is silent on the product scope or technical baseline. It cites only the work scope.
2. The use of TPMs is optional.

A detailed analysis of the shortcomings of EIA-748-D was provided in the white paper, “DoD Acquisition Reform: EVMS-lite to Program/Project Management.” The white paper also included a set of alternatives to replace that standard with a military standard or with the *Project Management Institute (PMI) Guide to the Project Management Body of Knowledge*. However, implementation of those recommendations would take several years. This white paper provides a faster route to integration of technical, cost, and schedule objectives.

Eliminate Mandatory EVM on Fixed Price Incentive and LRIP Contracts and Software

Fixed Price Incentive (FPI) contracts place most of the cost risk on the contractor. The contractual mandate for EVM, including reporting and oversight, is not cost-justified.

LRIP contracts have low technical risk. The contractual mandate for EVM, including reporting and oversight, is not cost-justified.

If software-intensive EMD contracts require incremental development and delivery of short-term, low risk, software products for demonstration and testing, then those software elements may be excluded from EVM requirements to reduce costs and accelerate delivery of usable software products.

Contractual EVM should be restricted to high risk, cost plus EMD contracts and may exclude qualified software development elements of those contracts.

Provide Consistency with Supporting Plans and Guides

The recommendations provide improved integration and consistency with supporting plans and guides including the SEP, IMP, TEMP, and DAG.

Proposed Revisions to DoDI 5000.02

The following revisions to DoDI 5000.02 provide guidance to the PM. If the PM implements that guidance internally and provides enabling contractual direction and incentives, then contractors will be required to report accurate progress towards completing the contract objectives.

Recommended Changes to DODI 5000.02			March 31, 2019
Section	Is	Should be	Rationale
Enclosure 2, Program Management 6. Program Management (PM) Responsibilities Page 82 c. Earned Value Management (EVM)	It is normally used in conjunction with cost plus and fixed-price incentive (FPI) contracts.	It is normally used in conjunction with cost plus EMD contracts. <i>(Delete FPI). It may be excluded from software development elements of EMD contracts when incremental functionality is frequently delivered for demonstration and testing or requirements are rapidly changing.</i>	Reduce non-value added EV costs on FPI contracts for which contractor, not DoD, has cost risk. Restrict mandatory EVM to EMD, because of high technical and cost risks. Contractual EVM not cost-justified for LRIP. Provides exception for elements of software-intensive programs, when appropriate.
Enclosure 2, Program Management 6. Program Management (PM) Responsibilities Page 82 c. Earned Value	EVM provides a disciplined, structured, objective, and quantitative method to integrate technical work scope , cost, and schedule objectives into a	EVM provides a disciplined, structured, objective, and quantitative method to integrate technical, (“ work scope ” deleted) cost,	Replaces work scope objectives with technical objectives to shift focus to the technical baseline or <i>product</i> scope, not <i>work</i> scope.

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Section	Is	Should be	Rationale
Management (EVM)	single cohesive contract baseline plan called a Performance Measurement Base-line (PMB) for tracking contract performance	and schedule objectives into a single, cohesive contract baseline plan called a PMB for tracking contract performance <i>when properly integrated with the SEP, the Integrated Master Plan (IMP), the Test and Evaluation Master Plan (TEMP), and the technical baseline.</i>	Points to sufficient guidance already in DAG, SEP, and IMP documents and in DoDI 5000.02 regarding the TEMP.
Enclosure 3, Systems Engineering 2. Systems Engineering Plan (SEP) Page 87	a. PMs will prepare a SEP as a management tool to guide the SE activities on the program...The SEP will describe the program's overall technical approach, including key technical risks, processes, resources, organization, metrics, and design considerations. It will also detail the timing and criteria for the conduct of technical reviews. criteria for the conduct of technical reviews. <i>The minimum success criteria of key technical reviews are specified as accomplishment criteria in the Integrated Master Plan (IMP).</i>	Require that the accomplishment criteria for key technical reviews are included in the IMP. (The criteria will subsequently be flowed down to the contractor's IMS via contractual direction.).
Enclosure 6, Technical Performance Measures (TPM) and Metrics Page 89	The PM will use TPMs and metrics to assess program progress. Analysis of TPMs and metrics, in terms of progress against established plans, will provide insight into the technical progress and risk of a program.	The PM will use TPMs and metrics to assess program progress. Analysis of TPMs and metrics, in terms of progress against established plans, will provide insight into the technical progress and risk of a program. <i>When EVM is</i>	Adds mandatory, not optional, linkage of EV to TPMs. Cites TPMs that support meeting the exit criteria in the SEP, IMP, and TEMP.

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Section	Is	Should be	Rationale
		<i>employed, the PM should ensure that earned value is linked quantitatively with TPMs and that it measures progress towards the exit criteria documented in the SEP, IMP, and TEMP.</i>	
7, Technical Reviews Page 89	a. Conduct technical reviews of program progress for systems in development as a basis for transitioning between phases within the development plan of work. Reviews will be event-driven, and based on the review entrance criteria as documented in the SEP.	a. Conduct technical reviews of program progress for systems in development as a basis for transitioning between phases within the development plan of work. Reviews will be event-driven, and based on the review entrance criteria as documented in the SEP and IMP. Program progress will be reported towards meeting the exit criteria documented in the SEP, IMP, and TEMP.	Current version includes review of entrance criteria as documented in the SEP. Revision adds exit criteria and also includes documentation of entry and exit criteria documented in the SEP and TEMP and flowed down to the IMP.