

Paul Solomon
3307 Meadow Oak Drive
Westlake Village, CA 91361
Paul.solomon@pb-ev.com

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The Honorable Pete Hegseth
Secretary of Defense
1010 Defense Pentagon
Washington, DC 20301-1010

Subj: Unfinished Business with Former USD(R&E) Heidi Shyu and with F-35 Program

Dear Hon. Secretary of Defense Hegseth:

In 2021, I sent a letter to then-USD Heidi Shyu with recommendations for acquisition reform regarding digital engineering (DE) and model-based systems engineering (MBSE). The recommendations were included in my white paper, *Integrating the Embedded Software Path, MBSE, and DE with Program Management*.

I am pleased that she implemented some of the recommendations. However, there is still unfinished business for you to consider.

The latest revision of the white paper, dated February 22, includes recommendations to update DoD instructions and manuals to incorporate commercial best practices, to improve consistency in disparate documents, and to ensure that schedule data is included in the digital thread. Automated, accurate schedule data, not manipulated cost performance data, is necessary to manage risks to program success.

My letter, subj: Modernize Systems Engineering (SE) Processes to Leverage DE and MBSE; Reduce Risks to GBSD (now Sentinel) Program, December 16, 2021, addressed objectives that she expressed at her nomination hearing as well as unfinished business from the 2009 DOD Earned Value Management (EVM): Performance, Oversight & Governance Report to Congress (required by WSARA). My assessments and recommendations addressed objectives that she stated in her responses:

1. Modernize systems engineering (SE) processes to leverage digital engineering (DE) and model-based systems engineering (MBSE).
2. DoD still has work to do to align its test activities with the new Adaptive Acquisition Framework (AAF) and to ensure that test and evaluation (T&E) processes are properly structured to assess software-intensive systems.

Mission Partially Accomplished

The following documents were published that incorporate some of my recommendations:

- DODI 5000.97 DE
- DODI 5000.98 OPERATIONAL T&E AND LIVE FIRE T&E
- DOD MANUAL 5000.96 OPERATIONAL AND LIVE FIRE T&E OF SOFTWARE

- DOD MANUAL 5000.100 T&E MASTER PLANS AND T&E STRATEGIES

My recommendation to use the embedded software path to develop software embedded in weapon systems was implemented in DOD MANUAL 5000.100. However, there is still much work to do to accomplish to achieve the first objective and to meet the information needs of program managers, as stated in the cited letter. There is also work to do to ensure that DE is implemented effectively and consistently in each of the Services.

Recap of December 2021 Letter

Pertinent excerpts of the referenced letter follow:

DoDD 5000.01, The Defense Acquisition System (DAS), includes policies to speed up delivery of products that work as planned, e.g., products that meet the documented capability needs. However, several DoD instructions and guides should be revised to better enable achievement of DAS objectives. Revisions are needed to benefit programs with the following characteristics:

- Use the embedded software path to develop software embedded in weapon systems
- Employ DE metrics

Information Needs of Program Managers

The current set of instructions and guides focuses on engineering, not program management, and is insufficient to enable rapid corrective actions based on enhanced transparency and increased efficiency in acquisition practices.

The metrics are needed to inform the PM:

- If the definitions of the technical baselines (functional, allocated, product, and if applicable Minimum Viable Product (MVP) and Minimum Viable Capability Release (MVCR), will be completed on schedule.
- If the needed capabilities, features, and functions will be delivered on schedule.

Recommendations

Recommendations are provided herein that define the PM's information needs and the DE metrics that meet those needs. Recommended digital artifacts that should be considered as base measures of the DE metrics are also provided in Appendix B.

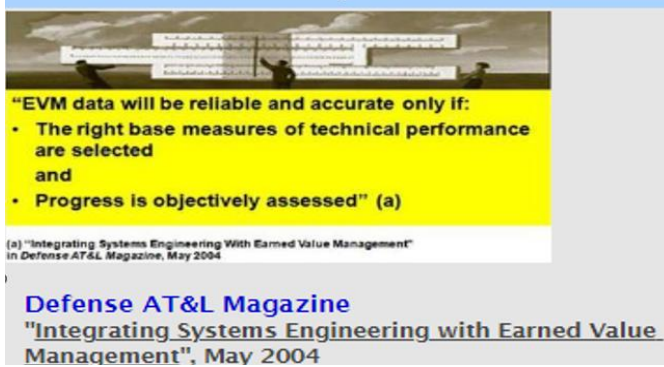
The PM needs accurate schedule status and situational awareness of program execution for proactive resolution of issues impacting cost, schedule, and technical achievement of program objectives. The technical achievement criteria are defined in the technical baselines. The PM also needs situational awareness of the degree of product quality as measured by functional completeness.

Finally, the exchange of schedule status information via model exchanges and automated transformations will eliminate or reduce the manual entry of estimated schedule performance such as the percent of work complete used with EVM.

Additional Rationale

Additional rationale...is provided in my 2004 article in *Defense AT&L Magazine*, "Integrating SE with EVM." Despite the potential of DE to deliver performance faster using data-driven analysis, programs such as the Sentinel may encounter the same fate as programs which use EVM; schedule slips, Over Target Baselines, and Nunn-McCurdy breaches. You can mitigate these risks if the right base measures of technical and schedule performance are employed with proper contractual

direction and incentives. The article is still relevant even if EVM is not contractually-required. Excerpts follow:



Unfinished Business, DoD-wide

Please implement the Action Plan in the White Paper. Excerpt of one of those actions:

The EVMS DFARS clause should be revoked. It is an impediment to achieving DBB's objectives such as:

- Use digital threads to account for interrelated processes, data needs, and information flows (regarding measuring schedule, technical and cost performance based on Authoritative Sources of Truth.
- Break down organizational, process and production silos using an open digital ecosystem and access to a common set of data.
- Overcome bureaucratic inertia and risk-adverse culture...significant barriers to success (in holding program managers and contractors accountable for program failures).
- Changing DoD's prevailing inefficient business processes (for measuring cost, schedule, and technical performance and for providing early warning of pending failures) for the success of any enterprise-level digital initiative.

Regarding EVM, former Undersecretary Shyu said in her email to me:

I agree with you whole- heartedly! EVMS is not adequate to assess the performance of a program. I have always considered it as a waste of time.

You have made a number of excellent points and I do hope that the incoming USD(A&S) in collaboration with R&E will incorporate your recommendations.

Unfinished Business, Air Force

I received a letter from Gen. Duke Richardson when he was at SAF/AQ. He wrote:

The Department of the Air Force supports Ms. Shyu and her goals to modernize systems engineering processes while leveraging digital engineering and model-based systems engineering. I have provided a copy of your letter and white paper *Integrating the Embedded Software Path, MBSE, and DE with Program Management* to my staff for their consideration as they modernize acquisition policy to take full advantage of digital engineering and to enable the use of digital artifacts that accelerate our development, manufacturing, sustainment, and operations of warfighter capabilities. We agree the institutionalization of “going digital” must include program management if we are to be successful. We are collaborating with the Office of the Secretary of Defense to improve current directives, instructions, and guides to evolve systems engineering and program management practices with regards to utilization of digital engineering and model-based acquisition. Your recommendations are appreciated.

Thank you again for sending a copy of your letter and recommendations. The Department of the Air Force is fully committed to improving our warfighter’s capability, and we recognize digital engineering is vital to maintaining our dominance in air, space, and cyberspace.

Please follow up with SAF/AQ to verify that effective and sufficient actions were taken.

Army

I sent a letter to then-USD (Army) Gabe Camarillo, Subj: Army Digital Engineering Directive vs. DoD Policy and GAO’s Call for Output-based Metrics, June 23, 2024. It had recommended actions.

Excerpt (which also refers to F-35 program) :

Please take actions to hold Army program managers and contractors accountable if they fail. Per my letter to Rep. Wittman, June 17:

Integration of DE with PM

Returning to yesterday’s letter, the proposed certification of the F-35 digital twin models is a band aid, not a cure. Please limit procurements until you get a DE ecosystem and outcome-based metrics. From my letter to USD LaPlante, May 16,

The F-35 program has been touting its use of Agile methods and the benefits of its SE Transformation for several years. Has the Block 4 subprogram ***put its metrics where its mouth is?***



Don’t let the program managers off the hook and settle for digital twins. Get certification of a DE ecosystem with outcome-based metrics.

Please follow up with the Secretaries of the Army and AF to verify that effective and sufficient actions were taken.

Your Other Actions

Please ensure that effective and sufficient actions will be taken, including reforms needed at all the Services and by the F-35 program. I hope that Mr. Feinberg commits to do the same at his confirmation hearing tomorrow.

This letter and the referenced letter are posted on my website, www.pb-ev.com, at the "Acquisition Reform" tab along with the white paper.

Good luck,



Paul Solomon

Yours truly,



Paul Solomon

CC:

Hon. Glen Grothman, HOAC

Hon. Adam Smith, HASC

Hon. Ken Calvert, HAC

Hon. Mike Rogers, HASC

Hon. Robert J. Wittman, HASC

Hon. Donald Norcross, HASC

Hon. Ro Khana, HASC

Hon. Jim Jordan, HASC

DOGE

Hon. David L. Norquist, NDIA

Anthony Capaccio, Bloomberg News