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March 23, 2025

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 and F-47 Programs

Dear Hon. Secretary of Defense Hegseth:

This letter updates that of February 24 to include the F-47 program. Please revise DoD directives, instructions, and guides immediately to ensure that the F-47 program starts off on the right foot and employs lessons learned from the F-35 program.

Excerpts from Letter dated February 24

In 2021, ...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*.

...she implemented some of the recommendations. However, there is still unfinished business for your corrective action.

The latest revision of the white paper...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 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 SE processes to leverage DE and 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

....use the embedded software path to develop software embedded in weapon systems was implemented in DOD MANUAL 5000.100. ...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

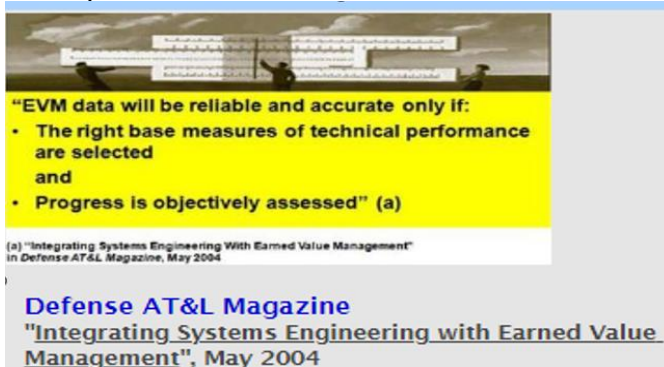
Recommendations are provided herein that define the PM's information needs and the DE metrics that meet those needs. Recommended digital artifacts that should be considered as base measures of the DE metrics are also provided in Appendix B.

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,...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.

Reiteration of Actions to Take Now for Successful F-47 Kickoff

Please take the following corrective actions to start off the F-47 on the right foot and to provide transparency and accountability for all major acquisition programs. The source of these actions is my white paper, Table 3, Recommended Revisions to Authoritative Sources of Truth for Embedded Software and DE Metrics Specifications.

1. Revise the following documents for all programs or issue a temporary directive for the F-47: DAS, DoDI 5000.80, DODI 5000.87, DODI 5000.88, DE Strat, Systems Engineering Plan (SEP), and IPMDAR Guide.
2. Update the SEP to reflect:
 - Boeing’s technical approach reflected in the Systems Engineering Management Plan (SEMP).
 - Details not available before contract award.
3. Verify that all corrective actions have been completed before the Integrated Program Review.
4. Don’t let Boeing or the F-47 program manager rain on your “parade.” See Appendix A.

X posts and notifications to DOGE

Additional recommendations are provided in my X posts and notifications to DOGE, Appendix A.

This letter and the referenced letter are posted on my website, www.pb-ev.com, at the “Acquisition Reform” tab. The white paper is at the “White Paper” tab.

Yours truly,



Paul Solomon

CC:

Hon. Tammy Duckworth, SASC

Hon. Glen Grothman, HOAC

Hon. Ken Calvert, HAC

Hon. Robert J. Wittman, HASC

Hon. Ro Khana, HASC

Hon. Roger Wicker, SASC

Hon. Elizabeth Warren, SASC

Jon Sindreu, WSJ

Steven Morani, DoD

Hon. Adam Smith, HASC

Hon. Mike Rogers, HASC

Hon. Donald Norcross, HASC



Hon. Jim Jordan, HCOA

Hon. Joni Ernst, SASC


DOGE

Anthony Capaccio, Bloomberg News



Appendix A Additional recommendations in my X posts and notifications to DOGE

Charlie Kirk   @charliekirk11 · Mar 21


BREAKING: Alongside SecDef Pete Hegseth, President Trump announces production of a brand new fleet of Sixth Generation Fighter jets called the F-47, the most advanced jets anywhere in the world. Boeing has won the "highly competitive" bidding process.



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From **Rapid Response 47**  

1.1K 2.4K 19K 1M

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F-47 will never be operational, except for parades, and will repeat F-35 failure, unless DoD fixes its weapon system acquisition process. Must change contract type and incentives then use outcome-based metrics, digital engineering, and Common Sense Project Management. The fix: nebula.wsimg.com/18da39899b33c6...

2:19 PM · Mar 22, 2025



Eric Schmitt @Eric_Schmitt · 54m

The Next generation fighter — the F-47 — will be built by the hardworking folks in Missouri.

Big win for Missouri and big win for America. 🇺🇸



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125

863



9K











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Congratulations. But help DoD and your constituents succeed by completing acquisition reform work started by Ike Skelton and myself. Letter to you, Subj: Amend NDAA to Revoke DFARS Earned Value Management System Clause. 4/18/24, has remedy. Team with Wicker on markup. nebula.wsimg.com/a576e0064dce89...


3:01 PM · Mar 22, 2025 · 51 Views







Paul Solomon  @PaulSolomonPBEV · 1h  ...
Will it finish development, test, and be OPERATIONAL with needed capabilities? Unlike F-35. Use outcome-based metrics, Common Sense Project Management, digital eng, effective incentives. Letter to Wittman, Limit F-35 Procurements Until DE and Outcome-based Metrics..., 6/16/24. nebula.wsimg.com/09550d2ecf7965...


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Paul Solomon  @PaulSolomonPBEV · 28m  ...
Make PEO responsible to monitor outcome-based metrics and flow down of requirements status, DE artifacts, and technical performance measures to schedule. Use DCMA engineers, not Earned Value Mgt. specialists, to monitor baseline and variances. Require System Eng. Management Plan.

    3  

Paul Solomon  @PaulSolomonPBEV · 59m ...
Also, see letter to Shyu, Subject: Modernize SE Processes to Leverage Digital Engineering and MBSE; Reduce Risks to GBSD Program, 12/16/21 Subject: Modernize SE Processes to Leverage Digital Engineering and MBSE; Reduce Risks to GBSD Program. nebula.wsimg.com/40d0da291eabd4...

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Paul Solomon  @PaulSolomonPBEV · 43m ...
Ltr to Feinberg, subj: Part 3, Acquisition Reform To Do List – Gaps in DoD Policy, Instructions, and Guides, 3/18/25. Apply to F-47 or repeat F-35 failure (not operational). Needs NDAA provision for oversight and eliminate EVMS DFARS clause. nebula.wsimg.com/18da39899b33c6...

DOGE team including OMB: If you don't act now, at F-47 inception, you will be complicit in eventual F-47 failure and harm to taxpayers and warfighters. OMB needs to fix Capital Programming Guide . See nebula.wsimg.com/c69917cba1d123