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The Hon. USD (Army) Gabe Camarillo
Office of the Under Secretary of the Army
102 Army Pentagon, Washington, DC 20310-0102

Subj: Army Digital Engineering Directive vs. DoD Policy and GAO's Call for Output-based Metrics

Dear Hon. USD Camarillo:

The Army Directive 2024-03 Digital Engineering (DE) is silent on two of four DoD DE Capability Elements and on outcome-based metrics. The integration of these elements is required by DODI 5000.97 DE. Per the GAO, "without the use of outcome-based metrics and continually assessing the value of what was delivered against user needs, a program using Agile software development might deliver capabilities and features that are not essential to the customer and that could contribute to schedule and cost overruns."

At your nomination hearing, you were asked, "Who should be held accountable for large-scale acquisition failures?" Your response: "The Service Secretaries and Service Chiefs are ultimately responsible for large scale acquisition failures. A number of factors can contribute to the success of acquisition programs, including stable and feasible system requirements, technological maturity, affordability constraints, and shifting priorities regarding areas modernization investment. If confirmed, I will support the Secretary and the Chief to address these risk factors and to provide oversight and ensure accountability for program objectives in terms of cost, schedule and system performance."

The shortcomings of Army DE are consistent with DoD-wide shortcomings that I have reported to Rep. Wittman and USD LaPlante. I proposed acquisition reforms in white papers and in *Defense Acquisition Magazine* articles. Your Directive states, "Successful adoption across the Army can only occur if DE is used by the requirements, test, and sustainment communities-not just engineers and developers." I would add program managers and contract administrators to the mix.

Please revise the Directive and take actions to implement recommendations in the white papers, *Outcome-based Metrics Plus Systems Engineering (SE) = Integrated Program Management*, 6/20/24, and *Integrating the Embedded Software Path, Model-Based Systems Engineering, MOSA, and Digital Engineering with Program Management*, 6/22/2024.

The latest revisions of the white papers:

1. Add implementation planning guidance from the *DoD Data, Analytics, and AI Adoption Strategy* to establish and monitor outcomes-based performance indicators and to ensure performance measures are supported by authoritative data sources and maximize the use of automated data collection methods. This Strategy should also be referenced in the Army DE Policy.
2. Cite the House version of the NDAA for FY 2025 and its provision to develop and implement an acquisition strategy to develop digital twin models. Digital twins are included in the DE Ecosystem and provide digital threads to cost estimating and scheduling.

Background information is in two articles in *Defense AT&L Magazine/Defense Acquisition Magazine*:

- "Integrating SE with Earned Value Management (EVM)", May 2004
(Note: I no longer advocate the use of EVM)
- "Better Program Management Through DE," May 2022

Please read my letters to HASC Vice Chair Wittman, dated June 16 and 17.

Excerpts:

To obtain the speed of relevance and respond to GAO findings, please obtain certification that all DE capability elements are integrated and that outcome-based metrics are finally being used to manage the program. There should be a digital thread between those metrics, the digital models, and the digital artifacts.

Please take corrective legislative or oversight actions to include all DE Capability Elements in the requirements for certification on improvements. The four DE Capability Elements (in DoDI 5000.97 DE) are:

1. DE ecosystem.
2. Digital models (Including digital twins).
3. Digital threads.
4. Digital artifacts.

What good are digital twins to support development and test without adequate metrics and management controls? The F-35 program will repeat its past failures unless you hold its program managers accountable to integrate DE with systems engineering (SE), program management, and outcome-based metrics.

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.

I presented the following slide in **2001**, minus Yogi, and added Yogi's quote at the Naval Postgraduate School in 2021. Unfortunately, it's still déjà vu.



FYI, I made similar recommendations to SAF/AQ in 2021. The response from Lt. Gen Richardson, dated February 2, 2022, included "Program Management," as follows:

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.

My credentials:

- Army finance officer during Vietnam War.
- Recipient of David Packard Excellence in Acquisition Award
- Letters of Appreciation from Sen. McCain and former DCMA Director Darrel Scott
- Former Visiting Scientist at Carnegie Mellon U. Software Engineering Institute
- Worked on B-2, Global Hawk, F-35 and taught project management to commercial IT enterprises in India and S. Korea (support to you will be *pro bono*)

The articles, letters, and white papers may be downloaded from www.pb-ev.com. The letters are at the Acquisition Reform tab.

Paul J. Solomon

CC:

Hon. William LaPlante USD(A&S)

Hon. Adam Smith, HASC

Hon. Heidi Shyu, (USD(R&E))

Hon. SON Del Toro

Hon. Andrew Hunter, AF Asst. Sec. for AT&L

Anthony Capaccio, Bloomberg News

Hon. Robert Wittman, HASC

Hon. Donald Norcross, HASC

Hon. Elizabeth Warren, SASC

Hon. Nickolas Guertin (ASN RD&A)