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The Honorable William LaPlante USD(A&S)
1010 Defense Pentagon
Washington, DC 20301-1010

Subj: Outcome-based Metrics for LGM-35A Sentinel; Same Failures and Needs as F-35 TR-3/Block 4

Dear USD LaPlante:

This message mirrors my letter of January 29, subj: Outcome-based Metrics that Work to Build a Product that Works; F-35 Block 4. The program name has been changed to the Northrop Grumman (NG) LGM-35A Sentinel. Otherwise, the two programs are twins regarding early hype about new techniques, schedule slips, and cost overruns.

The F-35 letter includes a request to refine the scope of the Technical Baseline Review to include an assessment of the use, sufficiency, and effectiveness of outcome-based metrics. Then take corrective actions to improve F-35 program management and, more broadly, the defense industrial base (DIB) ecosystem. Please include the same scope and objectives in the Nunn-McCurdy breach review of the Sentinel program and add a review of Sentinel's integration of digital engineering (DE) with program management.

Early Hype of New Techniques

<u>F-35 (Agile methods)</u>

My letter to USD(A&S) Kausner, dated August 10, 2021, discussed failures of Agile practices on F-35 Block 4 software development. It cited Vice Admiral Winter's hyped assertions in 2019 that:

- This agile framework, C2D2, provides timely, affordable, incremental warfighting capability improvements.
- We rapidly and effectively deliver technically feasible and operationally relevant capability to the warfighter.
- Transition to C2D2 faster, more flexibly, and more affordably by breaking down and delivering in smaller increments, ultimately reducing our cost of doing business.

<u>Sentinel DE</u>

The Sentinel program has earned the e-Series designation, meaning the program has leveraged DE principles to model and authenticate virtual designs and significantly shorten development timelines. Please ensure that DE, and especially systems engineering (SE), are integrated with program management. Unfortunately, the Sentinel program's hype about DE is mirror's the F-35's hype about Agile methods, as follows.

9/26/21, *The National Interest*

- "DE…allowing us to go at a quick pace and focus on meeting milestones we have established."
- "We've made good progress on engineering the weapons systems," Manuel added. "DE is paying off quite well for us and expediting knowledge."
- DE brings the added advantage of being able to save time and lower costs by assessing and testing designs before "bending metal."

2/10/22, *Business Insider*

- DE is significantly reducing the time and cost of these efforts…"With DE, we can quickly proceed through the design, testing, and manufacturing phases, saving money and taking months or even years off of typical development timelines for large systems."
- As the Sentinel program proceeds, the scope has broadened to include *optimizing scheduling, cost management, and resource deploymen*t. "With DE, we can get solutions into warfighters' hands sooner to better address evolving threats."

Did NG Report's Provide Early Warnings that preceded the Nunn-McCurdy Breach?

NG stated that the Sentinel scope includes *optimizing scheduling and cost management.* Please direct DCMA to review NG's use of outcome-based metrics, as discussed in the F-35 letter, and verify that:

- NG's EVM reports and IMS provide early "joint situational awareness of program status and assess the cost, schedule, and technical performance for proactive course correction?"
- NG uses digital authoritative sources of truth (ASOT):
  - To assess the schedule progress of defining and completing requirements
  - To serve as base measures of DE metrics, including EV.
  - To provide evidence that SE work products are completed, such as:
    - Requirement definitions including approved technical performance measures (TPM), verification methods, and completion criteria in the functional and allocated baselines.
    - Trade studies
    - Completed products in the product baseline including the Minimum Viable Product (MVP) and MV Capability Release baselines, if applicable
    - Test artifacts (e.g., test cases, plans, deficiencies, and results)

Does DCMA Review NG's Use of Technical Performance Measures (TPM) as Base Measures of EV?

My letter to LTG Bassett, dated 5/30/23, was a second request to expand the scope of DCMA EVMS Compliance Metrics (DECM) and DCMA EVMS compliance reviews. The DECM metrics still exclude TPMs. As requested in previous letters, please direct that DECMs be overhauled to include only what's important to a program manager, such as TPMs, and add SE experts to EVMS compliance reviews (until compliance reviews are eliminated) to oversee the integration of DE with program management.

Although this letter cites two programs that are in trouble, the assessments and recommendations herein are applicable to all weapons systems programs. The F-35 letter has the bottom line, *"Use Outcome-based Metrics that Work to Build a Product that Works"* (not a SOW). Please ensure that the review of the Sentinel program has the same objective.

Paul J. Solomon

CC:

Hon. Robert J. Wittman, HASC   Hon. Heidi Shyu, (USD(R&E))
Hon. Donald Norcross, HASC   Hon. Andrew Hunter, AF Asst. Sec. for AT&L
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