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The Honorable Tammy Duckworth, Joni Ernst, Kamala Harris (Senate)
The Honorable Chairman Adam Smith (HASC)

Subj: F-35 Software Deliveries Using Agile Methods; Schedule Slips and “Technical Debt” per DOT&E

Dear Senators and HASC Chairman Smith,

Software delivery problems continue to plague the F-35 Joint Strike Fighter (JSF) Program despite the use of an allegedly better method, Agile Methods. Last week, the Director for Operational Test and Evaluation (DOT&E) reported that Lockheed Martin’s (LM) use of the Continuous Capability Development and Delivery process (C2D2), aka “Agile,” has **not** delivered new increments of capability at the pace originally planned. There is a growing “technical debt” (aka deferred functionality). Lessons learned from recent and past F-35 failures to perform should be considered while developing two, new DOD acquisition management pathways, Major Capability Acquisition (the software-intensive components) and Software Acquisition.

DOT&E assesses the Agile process as “high risk.” Although DOT&E did not address costs, schedule slips almost always lead to cost overruns. Consequently, it is recommended that your committees investigate both cost and schedule performance and estimates at completion. Please initiate oversight actions and draft remedial provisions regarding the use of Agile methods in the NDAA for 2021. Ensure that DOD considers remedies that can be incorporated into DODI 5000.021, “Operation of the Adaptive Acquisition Framework.”

This letter also reiterates previous recommendations for acquisition reform regarding Earned Value Management (EVM). EVM reform is needed DOD-wide for the total weapon system, not just the embedded software.

Detailed DOT&E Findings

The catalyst to write this letter was the release to Congress of the *FY2019 DOT&E Annual Report*, Jan. 30, 2020. Pertinent excerpts follow:

- The program recently updated its software release schedule to reflect a delivery process termed “agile.” This process culminates in the delivery of a “Minimum Viable Product” (MVP) to the Services every 6 months.
- The aggressive 6-month development and fielding cycle limits time for adequate regression testing and has resulted in significant problems being discovered in the field. For these reasons, a separate (but currently unplanned) OT must be accomplished on the final integrated configuration of the air system prior to being fielded.
- The current C2D2 process has not been able to keep pace with adding new increments of capability as planned.
- Software changes, intended to introduce new capabilities or fix deficiencies, often introduced stability problems and adversely affected other functionality.

- As of November 4, 2019, the program had 873 open deficiencies, 13 of which were designated Category I.
- After almost 2 years and four fielded software releases since completing SDD with Block 3F development in April 2018, 66 percent of the current open deficiencies were identified prior to SDD completion. The program has not been able to address more of these deficiencies for several reasons, including new discoveries with the fielded configurations, contractual problems, and limitations in software development and test capacity.
- This “technical debt,” especially the most significant deficiencies, should be addressed by the program to ensure the SDD baseline configuration of software and hardware is stable, prior to introducing a large number of new capabilities to the software in the new hardware configuration associated with Block 4.
- DOT&E assesses the MVP and “agile” process as **high risk** due to limited time to evaluate representative integrated developmental test/operational test (IDT/OT) data before fielding the software. Testing will not be able to fully assess fielding configuration of the integrated aircraft, software, weapons, mission data, and ALIS capabilities prior to fielding.

LM’s and the Joint Program Office’s (JPO) Hype and Misleading Status Report

In April 2018, LM reported that F-35 flight testing uses the JPO’s C2D2 framework (also known as “Agile”) and asserted that the Agile process “**will provide timely, affordable** incremental warfighting capability improvements.” In May 2019, the JPO affirmed to the House Armed Services Committee that the use of the C2D2/Agile framework “**provides** (note present tense) **timely, affordable**, incremental warfighting capability improvements.”

DOT&E concluded otherwise. The Agile framework does **not provide** timely, affordable improvements. Unfortunately for the taxpayer and the warfighter, the current condition is “*déjà vu* all over again.” Evidence from past assessments follows.

2015: DOT&E’s More Realistic Assessment

The failure to release software increments, called “blocks,” within time and cost constraints has been documented for years. In January 2015, DOT&E disagreed with the LM/JPO status assessment. Per its report, although the program has recently acknowledged some schedule pressure and began referencing **July 31, 2017**, as the end of SDD flight test, that date is unrealistic as well. Instead, the program will **likely not finish Block 3F development and flight testing prior to January 2018**.

As stated in last week’s report, the actual “completion date” of Block 3F was April 2018. However, most of the open deficiencies, as of November 2019, were identified during Block 3. Clearly, the independent assessment by DOT&E is more credible than the Program’s assessments.

My letter to Sen. McCain on Jan. 21, 2015, subject: “Cost Controls on the F-35 and Need for Acquisition Reform of EVM, described deficiencies in Block 2B software problems. These deficiencies were not fixed before the completion or release of Block 2B. Instead, some of the intended capabilities or functionality were deferred to subsequent blocks. This chronic cycle creates a growing technical debt. An excerpt from the letter follows.

“As you know, Dr. Michael Gilmore, just issued the “DOT&E FY2014 Annual Report.” ... He also reported **deficiencies in the Block 2B software** in fusion, radar, passive sensors, identification friend-or-foe and electro-optical targeting.”

Thus, problems regarding deferred functionality pre-date LM’s use of C2D2/Agile methods. Unfortunately, LM’s use of the new methods has failed to provide “**timely, affordable** incremental warfighting capability improvements.”

DOD-Wide EVM Issues and Acquisition Reform

The 2015 letter to Sen. McCain also covered DOD-wide issues and federal-wide issues regarding EVM. EVM is a program management tool used to produce contractually required cost and schedule status reports. It has been ineffective. The regulatory requirements for EVM should be revised.

I first proposed acquisition reform legislation to HASC Chairman Ike Skelton in a letter dated March 28, 2010. DOD’s Report to Congress, Excerpts follow.

The DOD report to the HASC and SASC, *DOD Earned Value Management: Performance, Oversight, and Governance*, stated that contractors “keep EVM metrics favorable and problems hidden.” The deficiency in DFARS and ANSI/EIA-748 enables contractors to report metrics that are more favorable than actual conditions and to defer reporting of real problems.

For example, a contractor that bases earned value primarily on the quantity of work completed could report that the program is on schedule based on the quantity of drawings or software code completed, or tests executed, even though it has not met planned technical achievement. Also, the deficiency in DFARS and EVMS enables a contractor to base earned value for rework on the quantity of design changes instead of reporting net progress towards a plan for meeting specified technical requirements.

Skelton marked up the NDAA for FY 2011 to include my recommendations. Sections 864 a, b, and c required DOD to:

- Review acquisition guidance, including DoD Instruction 5000.02, to “consider whether measures of quality and technical performance should be included in any EVM system.
- Submit a report to the Armed Services Committees by Sept. 27, 2011.

Although my collaboration with Sen. McCain did not result in legislation, he sent me a letter of appreciation on March 15, 2015. He said that “Our focus of effort for this Congress will be to improve accountability and arrest the growth in cost and schedule” and he stressed the need to “reform the DOD acquisition process.”

Ten years have passed since Chairman Skelton received my letter. However, there have been no reforms to fix EVM. Contractors are not required to base EV on measures of quality and technical performance. I am asking you to take oversight and legislative actions to make it happen.

2007/2008 DCMA and GAO Reports Debunk Credibility of F-35 EVM Cost and Schedule Status Reports

A DCMA EVMS Compliance Report published in November 2007 found that LM **misrepresented “the actual condition of cost and schedule status”** of the F35 SDD program. LM “misapplied (Management Reserve (MR)) budgets to open, internal, discrete work packages in order to prevent the cost performance index (CPI) from worsening.” DCMA concluded that the purpose was to improve the CPIs

of various [Work Breakdown Structure] elements.” Later, I will discuss the relationship between award fee and improved cost performance.

A March 2008 GAO report stated that the “DCMA [report] found that [LM] was using MR funds to **alter its own and subcontractor performance levels and cost overruns.**”

The GAO report also discussed the adverse impact that the reduction of MR had on the balance of the program. Per the report, “by mid-2007, the development program had completed one-half of the amount of work scheduled but had expended two-thirds of the budget. MR had shrunk to about \$400 million, less than one-half the amount officials believed necessary to complete the final 6 years of development. At the same time, the program faced significant manufacturing and software integration challenges, costly flight testing, and \$950 million in other known cost risks. The plan to recapitalize MR at the expense of test assets is risky **with potential major impacts down the road on costs, performance requirements, and fielding.**”

So, we see that F-35 program status, estimates, and assertions have lacked credibility since 2007. Per Matt. 24:4, “*Take heed that no one deceives you. Many false prophets will rise up and deceive many.*”

Whistleblower Lawsuit: Alleged Fraud and Conspiracy Regarding F-35 Cost Performance and Award Fees

Although award fees were not discussed by GAO and DCMA, I alleged that LM’s misrepresentation of the actual condition of cost status led to its receipt of undeserved award fees. I submitted these charges to the GAO Fraudnet and Sen. McCain in 2011. The case was referred to the DOD IG then to DOJ.

My False Claims Act (FCA) lawsuit was initiated in 2012. It included three charges of fraud and conspiracy. However, the third charge is most relevant to the DOT&E assessment, as follows.

Third, by covering up their cost overruns, presenting a misleadingly rosy picture of their performance on measures of cost control, and setting performance goals which they knew all along they would not be able to meet, **LMC and NGC were able to secure larger profits in the form of higher performance-based Award Fees than were warranted based on their actual contract performance.**

The defense pleaded that my FCA case should be dismissed because “The **essential allegations of Relator’s award fee fraud claims – that Defendants violated EVMS rules by improperly deploying Management Reserve to falsely improve their cost performance measures and thereby received higher award fees than otherwise would have been the case – were publicly disclosed** (by DCMA and GAO) long before Relator filed this lawsuit.”

In 2017, the Federal Appeals Court agreed with the defense’s argument and the decision of the lower court. It concluded “that the DCMA and GAO reports allege facts that make a potentially fraudulent scheme readily identifiable...The public disclosures must therefore provide ““specific details about the fraudulent scheme and the types of actors involved in it sufficient to ‘set the government on the trail of the fraud.””

The case was dismissed on procedural grounds (prior disclosure by DCMA and GAO) so the evidence was never presented to a jury.

Congressional Oversight, including Recommended GAO Study

In a letter to Sen. Harris, dated Sept. 22, 2019, I discussed the DOD-wide problems and cited a report by the Council of Defense and Space Industry Associations (CODSIA) which warned that incentivizing contractors based on performance data could promote “*poor behavior.*”

I also recommended that the GAO conduct a study of F-35 award and incentive fees, as follows.

Conduct a study of the incentive or award fees most recently paid on the F-35 Lightning II JSF...contract.

(2) ELEMENTS.—The study

(1) shall include an assessment of the following

(A) the extent to which the Department has established award or incentive fee criteria that are based on the verification, on a timely basis, of the quality and technical maturity of the features and functions of the product being developed and tested and that the Department has defined and documented technical performance objectives such as technical performance measures, progress against requirements, and exit criteria of life-cycle phases.

(B) the extent to which the prime contractors have reported schedule performance in their contract performance reports for the most current incentive or award fee period that is based on verified, objective measures of technical performance.

(C) the extent to which the prime contractors have been paid award or incentive fees, in the most recent period, that is based on verified technical and schedule performance

(D) the extent to which the prime contractor has reported schedule performance that includes verified objective measures of technical performance for development of Block 4 software and the Automatic Logistics Information System (ALIS).

Recommended Actions Now

Considering the recent DOT&E assessment, it is requested that you exercise your oversight responsibility to initiate a similar request to GAO and conduct hearings.

By finally addressing the problems identified by DCMA, GAO, and DOT&E, DOD can develop acquisition processes and regulatory or contract requirements that should be applied both to Agile and traditional (aka “waterfall”) methods. Acquisition reforms should have the following objectives:

1. Deter contractors from submitting deceptive cost and schedule status reports.
2. Receive cost and schedule status reports from contractors that are based on valid, objective measures of software technical, schedule, and cost performance.
3. Base award or incentive fees on verified, objective measures of technical, schedule, and cost performance.
4. Be applicable to software development and to the complete weapon system.

The appeals court found that there was enough information about the alleged fraud to “set the government on the trail of the fraud.” So, I had requested Sen. Harris to ask the following “burning questions”:

1. Why did the government not follow the “trail of the fraud” after receiving the DCMA report in 2007? It did not act until I notified the GAO Fraudnet and Sen. McCain.
2. Why did the government continue to pay award fees after receiving the DCMA report in 2007?

3. Why did the government not follow the trail of the fraud after the appeals court affirmed the decision of the district court?
4. Why not investigate the alleged fraud now to deter future “poor behavior” (CODSIA’s candid admission) that will result in undeserved fees?
5. Sen. Ernst’s “Make ‘em Squeal” page says:” Iowans sent me to Congress with a specific mission: cut wasteful spending and make Washington squeal.” Even though the alleged, fraudulent actions took place many years ago, I believe that the same greedy, culture exists now. Certainly, the statutes and acquisition regulations, that enable bogus bonuses, have not changed. So why not “Make ‘em Squeal” now to:
 - a. Shame the actors
 - b. Deter future deception and fraud
 - c. Justify real acquisition reform.
6. Why not claw back \$100 M? (of allegedly, fraudulently earned award fees)

I also hope that you will take up the mantle of Chairmen Skelton and McCain. Consider becoming champions of acquisition reform. Also, follow the trail to fraud that I paved as a whistleblower.

Notes:

The cited letters may be downloaded from www.pb-ev.com , “Acquisition Reform” tab. More information and court documents about the FCA lawsuit are at the “F-35 Whistleblower Case” tab.

Yours truly,



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