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U.S. GOVERNMENT
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113th Congress
2nd Session

COMMITTEE PRINT

S. PRT.
113–27

THE AIR FORCE'S EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS): A Cautionary Tale on the Need for Business Process Reengineering and Complying with Acquisition Best Practices

STAFF REPORT

PREPARED BY THE

PERMANENT SUBCOMMITTEE ON INVESTIGATIONS

OF THE

COMMITTEE ON HOMELAND SECURITY AND GOVERNMENTAL AFFAIRS
UNITED STATES SENATE

ONE HUNDRED THIRTEENTH CONGRESS

SECOND SESSION

JULY 7, 2014

Available via the World Wide Web: http://www.fdsys.gov

Printed for the use of the
Committee on Homeland Security and Governmental Affairs

U.S. GOVERNMENT PRINTING OFFICE

89–869 PDF WASHINGTON : 2014

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
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THE AIR FORCE'S EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS): A Cautionary Tale on the Need for Business Process Reengineering And Complying with Acquisition Best Practices

I. EXECUTIVE SUMMARY

The Air Force failed in its procurement of the Expeditionary Combat Support System (ECSS) between 2004 and 2012, because it lacked a clear objective and the organizational will to implement changes to its internal business processes vital to integrating ECSS into the organization. In so doing, the Air Force violated many crucial guidelines and best practices for information technology acquisition. Similar procurement programs such as the Defense Enterprise Accounting and Management System (DEAMS) are still in progress and are encountering many of the same problems as ECSS. Given the importance of programs such as these to the Department of Defense (DOD) and its overall efforts to transform how it does business, the Air Force and other military departments and defense agencies must not repeat the costly mistakes made in the attempted ECSS procurement.

Prior to ECSS's inception, the Air Force did not adequately plan for its acquisition. Instead, the Air Force had only an idea of what capability it wanted ECSS to deliver: a new, fully-integrated logistics system that would replace an unspecified number of older, unconnected logistics systems. Achieving that objective proved elusive for many reasons, including, significantly, that during the implementation of ECSS, the Air Force resisted institutional changes necessary for success. The result of ECSS's failure was a waste of $1.1 billion in taxpayer money, a loss of eight years of effort, the same old inadequate logistics system far inferior to the promise of ECSS, and a major setback to the Air Force's attempt to transform how it does business.

a. The Air Force's Failure to Adhere to Business Process Reengineering Guidelines Throughout ECSS's Acquisition

ECSS's failure resulted, in large measure, from the Air Force's systemic deviation from widely-endorsed organizational guidelines. Those guidelines, which comprise a set of management principles called business process reengineering (BPR),[1] are mandated by several

[1] U.S. DoD, DEPUTY CHIEF MANAGEMENT OFFICER, INTERIM GUIDANCE FOR THE IMPLEMENTATION OF SECTION 1072 OF THE FISCAL YEAR 2010 NATIONAL DEFENSE AUTHORIZATION ACT—BUSINESS PROCESS REENGINEERING (Apr. 1, 2010), http://www.acq.osd.mil/ie/bei/pm/ref-library/general/implmt_s_1072_fy10.pdf. BPR is a logical

legislative and internal DOD directives and are designed to ensure a successful and seamless transition from old methods to new, more efficient ways of doing business.[2] BPR has proven effective in the private sector, allowing Fortune 500 companies to successfully institute large-scale changes within their businesses, including changes arising from the merger or acquisition of other businesses.[3] During the procurement of ECSS, the Air Force continually and systematically failed to adhere to BPR guidelines, causing major problems that crippled the program.

The Subcommittee's review focused on three significant contributors to the Air Force's failure to carry out the ECSS acquisition process consistent with BPR principles:

- Cultural resistance to change within the Air Force;
- Lack of leadership to implement needed changes; and
- Inadequate mitigation of identified risks at the outset of the procurement.

i. Cultural Resistance to Change within the Air Force

The first major failure to adhere to BPR guidelines centered on the Air Force's cultural resistance to change. This culture encompassed users who refused to accommodate new ways of performing their day-to-day tasks. The Air Force selected Computer Sciences Corporation (CSC)[4] to incorporate new logistics software from Oracle[5] into the Air Force's operations. However, Air Force personnel resisted proposed changes and were not willing to alter their existing business processes in order for ECSS to succeed.[6]

The Air Force originally chose to buy a commercial logistics software program for ECSS because commercial software already reflected proven techniques and the Air Force thought it would reduce the need to customize the software.[7] Indeed, commercial best practices

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methodology for assessing process weaknesses, identifying gaps and implementing opportunities to streamline and improve these processes and create a solid foundation for success in changes to Doctrine, Organization, Training, Materiel, Leadership, Personnel, and Facilities (DOTMLPF). *Id.*

[2] U.S. DEP'T OF DEFENSE, DEPUTY CHIEF MANAGEMENT OFFICE, DOD BUSINESS PROCESS REENGINEERING ASSESSMENT GUIDANCE 4 (2012), http://dcmo.defense.gov/products-and-services/business-process-reengineering/Revised%20BPR%20Assessment%20Guidance%209-28-12.pdf.

[3] Vector Study, *Business Process Reengineering*, http://vectorstudy.com/management-theories/business-process-reengineering, 9 (last visited Mar. 7, 2014).

[4] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) ACQUISITION INCIDENT REVIEW (AIR) TEAM FINAL REPORT 39 (2013), PSI-USAF-06-000055.

[5] *Id.* at 66, PSI-USAF-06-000082.

[6] *Id.* at 39, 199, 221, PSI-USAF-06-000215, -000237.

[7] U.S. DEP'T OF THE AIR FORCE, REQUEST FOR QUOTE (RFQ) FUNCTIONAL REQUIREMENTS DOCUMENT APPENDIX C, ATTACHMENT 2 TO THE EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) SYSTEM INTEGRATOR (SI) ACQUISITION RFQ 1 (2005), PSI-USAF-01-001875.

were built into the system to ensure logistics issues were handled as efficiently as possible. According to CSC, when the company proposed changes to Air Force business processes to reflect these commercial best practices, however, the Air Force resisted and asked CSC to alter the commercial software to conform to the Air Force's existing practices.[8] The Subcommittee investigation found that this cultural resistance to change on the part of the Air Force contributed to years of delay and massive cost overruns.

ii. Lack of Leadership to Implement Needed Changes

The Subcommittee investigation found that the Air Force's failure to adhere to commercial best practices reflected a lack of leadership within the Air Force, a violation of another key BPR tenet. Specific leadership challenges included a lack of ownership by the Air Force in regard to the ECSS program, a significant turnover rate of senior leaders during the program's life cycle, and a poor organizational structure that was unable to force needed changes.

Despite initial enthusiasm for a "transformational" logistics program that would make the Air Force more efficient and effective, according to CSC, there was no champion for the program within senior Air Force leadership who oversaw ECSS's implementation from inception to completion.[9] High turnover also contributed to a loss of institutional knowledge. According to CSC, turnover of acquisition personnel continued throughout ECSS's life cycle and new personnel did not have an understanding of ECSS's design elements due to a lack of training. That, according to CSC, resulted in a slower decision-making process.[10] Additionally, Air Force leadership did not adequately train personnel to efficiently use the new logistics system.[11] This lack of high-level Air Force leadership contributed to ECSS program executives agreeing to more and more costly software changes while failing to make crucial changes to how the workforce did business.

iii. Inadequate Mitigation of Risks Identified at the Outset of the Procurement

The Air Force identified cultural resistance to change and lack of leadership as potential problems in 2004, when it carried out risk management analyses for ECSS as mandated by defense acquisition regulations.[12] The Air Force's risk mitigation strategy was woefully

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[8] CSC CORPORATION, A SUMMARY OF ERP EXPERIENCES AND LESSONS LEARNED FROM ECSS 15 (Apr. 2013), PSI-CSC-01-000028 & ECSS Cong. Briefing PPT – Root Causes Slide.
[9] CSC CORPORATION, A SUMMARY OF ERP EXPERIENCES AND LESSONS LEARNED FROM ECSS 15 (Apr. 2013), PSI-CSC-01-000064.
[10] *Id.* at 39, PSI-CSC-01-000050.
[11] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) ACQUISITION INCIDENT REVIEW (AIR) TEAM FINAL REPORT 220 (2013), PSI-USAF-06-000236.
[12] *Id.* at 224-228, PSI-USAF-06-000240.

inadequate, however, contributing to the termination of the ECSS program. ECSS's outcome might have been different if the Air Force had promptly mitigated these risks from the outset.

Moreover, had the Air Force been mindful early on of what business processes it needed to change to properly implement the large commercial off-the shelf (COTS) business system, costly delays could possibly have been avoided or at least greatly mitigated.[13] If the Air Force had obtained buy-in from lower level Air Force personnel and appropriately enforced the overall ECSS concept from day one, the cultural resistance that led to so many expensive changes to the software might equally have been avoided. Finally, if senior officers of the Air Force had a clear understanding of what the Air Force needed from the outset and had kept in place consistent leadership who could make the needed institutional changes, ECSS might not have foundered when problems arose.

b. BPR Failures Not Confined Only to ECSS Program

The Air Force's inability to adhere to BPR guidelines, which crippled the ECSS procurement, appears prevalent in other defense logistics platforms called enterprise resource planning (ERP) systems. ERP systems integrate commercial software into existing software applications and are key to the DOD's efforts to do business more efficiently and become fully auditable.[14]

For example, the Defense Enterprise Accounting and Management System (DEAMS), an ERP system intended to modernize Air Force accounting practices, has encountered cost overruns and delays. Currently, DEAMS is behind schedule and over-budget by $1.7 billion and, on top of that, is not fully operational.[15] The Air Force has

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[13] CSC CORPORATION, A SUMMARY OF ERP EXPERIENCES AND LESSONS LEARNED FROM ECSS 22 (Apr. 2013), PSI-CSC-01-000035; U.S. Air Force Briefing to Cong. Dec. 3, 2012; CARNEGIE MELLON SOFTWARE ENGINEERING INSTITUTE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) INDEPENDENT TECHNICAL ASSESSMENT (ITA) OUTBRIEF 6 (June 18, 2008). CSC anticipated an integrated COTS product suite which included Government Furnished Equipment (GFE). The Oracle Product Suite, procured prior to the System Integrator selection during the acquisition, included three separate "shrink-wrapped" products (IFS, Oracle, Click Commerce) that, in reality, were not integrated. Consequently, the anticipated GFE was not available causing CSC to make assumptions about the interface data while progressing through the Business Area Blueprinting phase. The System Integrator could not, however, enter their Implementation phase until the logical data model could be finalized. This issue was surfaced and tracked beginning in June 2007, but remained unresolved until CSC could not enter their Implementation phase in late 2008. The 'Way Ahead' review and decision process was implemented that included a COTs product trade off assessment in December 2008 and ultimately resulted in a contract modification with a revised release and pilot schedule which brought the issue to conclusion.

[14] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM SYSTEMS INTEGRATOR ACQUISITION REQUEST FOR QUOTE 9 (2005), ECSFA8770-05-Q-0022.

[15] U.S. DEP'T OF DEFENSE, DOD INSPECTOR GENERAL, DODIG-2012-111, ENTERPRISE RESOURCE PLANNING SYSTEMS SCHEDULE DELAYS AND REENGINEERING WEAKNESSES INCREASE RISKS TO DOD'S AUDITABILITY GOALS 5-7 (2012).

requested many changes in the commercial software for DEAMS, but once again has not provided adequate training for lower-level personnel, suggesting that the Air Force has not yet remedied the BPR shortcomings exhibited in the ECSS procurement.[16] As in the case of ECSS, many areas of potential risk for DEAMS were identified early on in the acquisition lifecycle and continue to give rise to concern.[17]

Better oversight within the DOD, is needed to ensure that all of the DOD, the military departments, and the defense agencies follow BPR best practices.[18] BPR compliance and risk management requirements must be taken seriously by the Air Force to prevent future failures in DEAMS. As the Air Force's intended procurement and integration of ECSS have taught, not doing so can have disastrous consequences.

c. A Disregard for Acquisition Best Practices

It is axiomatic that "starting off right" is vital to defense acquisition programs to succeed. Three interrelated ways in which programs must start off right are sound requirements-setting ("what is it that I really need"); reliable risk assessments ("how difficult will it be for me to procure what I really need"); and reliable initial cost-estimating ("how much will it cost me to procure what I need"). If any of these elements is deficient the prospects that the agency will fail to procure what it needs on time, on budget and with required capability significantly increase.

From the outset, the Air Force did not follow acquisition best practices in properly defining stable requirements and complying with a single governance structure. ECSS's overall acquisition strategy was insufficiently defined and even the Air Force's original solicitation for

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[16] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) ACQUISITION INCIDENT REVIEW (AIR) TEAM FINAL REPORT 220 (2013), PSI-USAF-06-000236; U.S. DEP'T OF DEFENSE, DOD OPERATIONAL TEST AND EVALUATION, FISCAL YEAR 2013 ANNUAL REPORT 270 (2013), *available* at http://www.dote.osd.mil/pub/reports/FY2013/pdf/af/2013deams.pdf.

[17] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-13-311, MAJOR AUTOMATED INFORMATION SYSTEMS: SELECTED DEFENSE PROGRAMS NEED TO IMPLEMENT KEY ACQUISITION PRACTICES (Mar. 2013).

[18] U.S. DEP'T OF DEFENSE, GUIDANCE FOR THE IMPLEMENTATION OF SECTION 1072 – BUSINESS PROCESS REENGINEERING (2011), *available* at http://www.prim.osd.mil/Documents/Cap_InvMan-BPRGuidance30Apr2011.pdf According to the DOD: "If a program is conducting a modernization on an existing defense business system, the BPR activities described in the BPR Assessment Form should be related to the specific modernization occurring. However, the necessary context and background about the overall defense business system should be provided to make the modernization effort and its associated BPR activities easily understood. Programs in the beginning stages of their development or modernization lifecycles that have not completed all of the key BPR tenets described in Chapter 2 should fully explain, in the relevant BPR Assessment Form questions, why specific BPR tenets have yet to be completed and plans to complete them. The Assessment process will be sensitive and responsive to these situations, but it is important for programs to be able to demonstrate they have begun BPR upfront and early in their lifecycle and have plans to complete the remaining tenets of BPR."

bids to provide commercial software for ECSS was vague and incomplete in key areas. For example, early on, the Air Force failed to distinguish between "integrated" and "integratable" software in the solicitation.[19] The Air Force wanted an *integrated* software suite—one where all the pieces already worked together in a finished product—so that it could begin the process of replacing its old systems. But, the Air Force's software solicitation did not make that requirement clear leading to three *integratable* software components being supplied and accepted, despite that the various pieces did not yet work together as a finished integrated product.[20]

Coupled with the Air Force's resistance to change, discussed above, this disregard for utilizing acquisition best practices contributed to two years of failed attempts to integrate the various software pieces.[21] The Subcommittee investigation found that had the Air Force adhered to BPR guidelines and adequately defined stable software requirements in the initial solicitation, it could have avoided the costly delays.

d. Overview of Subcommittee Investigation

On December 4, 2012, Senators Carl Levin and John McCain, in their capacities as chairman and ranking member, respectively, of the Senate Armed Services Committee (SASC), sent a letter to then-Secretary of Defense Leon Panetta requesting information about the Air Force's cancellation of ECSS. On February 27, 2013, in their capacities as chairman and ranking member, respectively, of the Senate Permanent Subcommittee on Investigations ("the Subcommittee"), Senators Levin and McCain sent a letter to Lieutenant General Charles Davis of the Air Force requesting additional information about the ECSS procurement. In March 2013, the Senators received responsive document productions from the Air Force.

In April 2013, at the request of Senator McCain, the Subcommittee formally initiated a bipartisan investigation into the ECSS procurement. The investigation sought to discover: (1) whether Air Force leadership followed BPR guidelines mandated by Congress in the ECSS program; and (2) what practices relative to the ECSS procurement should be avoided in similar current and future programs.

Over the course of the investigation, the Subcommittee collected thousands of documents and received extensive briefings from Air Force

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[19] CARNEGIE MELLON SOFTWARE ENGINEERING INSTITUTE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) INDEPENDENT TECHNICAL ASSESSMENT (ITA) OUTBRIEF 6-7, 12-14, (June 18, 2008); ECSS Meeting Minutes for Integrated Management Team (Oct. 31, 2007), PSI-CSC-02-000124.

[20] CARNEGIE MELLON SOFTWARE ENGINEERING INSTITUTE, *supra* note 19, at 6, 7, 44; CSC CORPORATION, A SUMMARY OF ERP EXPERIENCES AND LESSONS LEARNED FROM ECSS 10, 22 (Apr. 2013), PSI-CSC-01-000035.

[21] Subcommittee interview of CSC (May 2, 2013).

personnel, as well as executives from Oracle Corporation (Oracle) and Computer Science Corporation (CSC). Those sources provide the basis for this report. All parties, including Air Force, CSC, and Oracle officials cooperated fully with the Subcommittee's investigation.

This report contains an analysis of how the failure to implement BPR was a significant factor in ECSS's ultimate demise, including root causes and errors in the Air Force's strategy to procure ECSS. This report is not, however, an exhaustive analysis of all the root causes of ECSS's failure. Subsections of the report detail the specific BPR failures discussed above as well as the negative impact that a lack of BPR can have on the acquisition of future ERP systems. Finally, it includes recommendations for current and future information technology acquisitions.

II. FINDINGS OF FACT

In 2004, the Air Force initiated the Expeditionary Combat Support System (ECSS) program to transform how it manages its global logistics and supply chain network in support of its operations worldwide. To do this, the Air Force would have to overhaul or retire hundreds of legacy computer systems. Eight years later in 2012, however, the Secretary of Defense cancelled ECSS after the Air Force had spent over $1 billion of taxpayer funds on the program—without it fielding any usable capability. In fact, at the time of the cancellation, ECSS would have cost an additional $1 billion to yield only 25 percent of the capability the Air Force originally sought. To date, the Air Force is still unable to confirm how many legacy systems would have been phased-out by implementing ECSS. And, after the Department of Defense (DOD) cancelled the ECSS program, Air Force personnel reverted to using the legacy systems that the ECSS program was supposed to replace and continues to use those outdated systems today.

Based on the Subcommittee's investigation, this report concludes that this case is one of the most egregious examples of mismanagement in recent memory at the Department of Defense (DOD). In support of this conclusion, this report makes the following findings of fact:

1. **The Air Force Failed to Adhere to Congressionally-Directed "Business Process Reengineering" Principles Throughout the ECSS Program.**[22] Business process reengineering (BPR) is a management strategy that is designed to guide organizations through large-scale changes that are intended to make them more efficient. Despite repeated Congressional directives to utilize BPR principles when procuring large information technology (IT) business systems, the Air Force failed to do so throughout the ECSS program, resulting in cost overruns; scheduling delays; and, ultimately, program termination. While ECSS was meant to help the Air

[22] Section 1072 of the National Defense Authorization Act (NDAA) for Fiscal Year 20101 introduced new requirements into the Department's investment review process stipulating defense business system (DBS) modernizations may not be certified to obligate funds in excess of $1 million without a determination of whether appropriate business process reengineering (BPR) had been completed. Section 1072 integrated this requirement into the Department's Investment Review Board / Defense Business Council (IRB / DBC) and Defense Business Systems Management Committee (DBSMC) governance framework and required BPR determinations be made by the Department of Defense (DoD) Deputy Chief Management Officer (DCMO) or one of the Military Department Chief Management Officers (CMO) depending on which Component's business processes the DBS modernization supports. Section 901 of the National Defense Authorization Act for Fiscal Year 20122 modified the BPR requirements of the Department's investment review process by stipulating that funds available to the DoD, whether appropriated or non-appropriated, may not be obligated for DBSs in excess of $1 million over the period of the current future-years defense program, referred throughout this document as covered DBSs, until the Pre-Certification Authority (PCA) has determined that appropriate BPR had been undertaken.

Force revolutionize how it does business, its business processes, which needed to be redesigned to accommodate the integration of such a large commercial off-the-shelf business system like ECSS, were effectively "too big to change." Indeed, the Air Force's effort to procure ECSS was, in this regard, fundamentally disjointed and ineffectual.

Specifically, this investigation found that the Air Force failed to properly implement BPR principles in the following important ways:

a. **Failure to Overcome Cultural Resistance to Change Business Processes Among Air Force Personnel.** Air Force and CSC failed to clearly communicate the long-term objectives and benefits of the new ECSS program to Air Force end-users. This lack of communication with the end-users, combined with a poorly-implemented training regimen, exacerbated the cultural resistance to changing business processes among Air Force personnel who had much more familiarity and comfort with older legacy systems. Without buy-in and acceptance from end-users, ECSS lacked substantial support from within the Air Force to accept the integration of ECSS as a more efficient, better alternative to the existing legacy systems.[23]

b. **Lack of Program Leadership.** The Air Force lacked strong, continuous leadership, as called for by BPR. During the eight years that the Air Force tried to implement ECSS, this program had six program managers and five program executive officers, which led to communication gaps and a loss of institutional knowledge about ECSS's progression through the acquisition process. Additionally, according to CSC, the Air Force permitted contractor staff to make program decisions, which could not always represent the Air Force's views in the decision-making process.[24] According to CSC, this ultimately led to additional requirements and scheduling delays. Without the necessary leadership from senior Air Force officials, integrating ECSS into the organization against the resistance to these changes by end-users, proved impossible.

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[23] CSC CORPORATION, A SUMMARY OF ERP EXPERIENCES AND LESSONS LEARNED FROM ECSS 10, 26 (Apr. 2013), PSI-CSC-01-000039.
[24] *Id.* at 14-15, PSI-CSC-01-000027; U.S. Air Force Briefing to Cong. (Dec. 3, 2012).

c. **ECSS Program Management's Inadequate Mitigation of Identified Risks.** BPR guidelines recommend organizations regularly identify and mitigate risks when making large-scale operational changes. The Air Force initially identified a number of risks associated with the ECSS program, including lack of cultural acceptance of new business processes by Air Force personnel, as well as undefined program requirements, which meant that the Air Force did not establish a stable set of objectives throughout ECSS's lifecycle. The Air Force did not effectively address those risks. Ultimately, many of the risks identified at the program's inception came to fruition and ultimately contributed to ECSS's failure.

d. **Breakdown of Acquisition Best Practices.** The Air Force's failure to clearly define program requirements and effectively communicate program objectives, both BPR tenets, deviated from acquisition best practices, causing massive cost overruns and scheduling delays. Best practices also dictate the use of a single governance structure, which defines the acquisition process and compliance requirements for program management. But, the Air Force followed two different governance schemes, the Department of Defense Instruction (DODI) 5000.2, traditionally used for all acquisition programs, and the Business Capabilities Lifecycle (BCL), a new structure that had been designed specifically for defense business system acquisition efforts. Complying with these two different DOD schemes resulted in redundancy and confusion.

2. **The Air Force Identified a Path to Success but Failed To Properly Execute it.** In 2006, the Air Force crafted a strategy for successfully procuring ECSS, which included following a number of BPR and acquisition best practices. The Air Force strategy called for the ECSS program to:

   a. Forego any modifications to the commercial software;
   b. Conduct significant testing and evaluation;
   c. Establish a structured governance model to ensure leadership visibility and accountability; and
   d. Adhere sufficiently to "change management" guidelines.

However, in contrast to the 2006 strategy, upon ECSS's termination in 2012, the Air Force found that the ECSS program:

a. Customized the commercial software;
b. Did not properly test software integration;
c. Was directed by the DOD to adhere to multiple governance models; and
d. Did not follow "change management" guidelines.

3. **Existing Enterprise Resource Planning Systems Risk Failure.** Enterprise-wide, DOD is trying to improve how it does business by utilizing enterprise resource planning (ERP) systems like ECSS. ERP systems are business information technology (IT) platforms that integrate commercial software into existing software applications. Currently, several DOD ERP systems undergoing program integration are experiencing difficulties similar to those that eventually led to the termination of ECSS. For example, the Defense Enterprise Accounting and Management System (DEAMS), the Navy ERP, and the Common Aviation Command and Control System (CAC2S) have all failed to adhere to crucial BPR guidelines and acquisition best practices, resulting in substantial cost overruns and scheduling delays. If the lessons from the ECSS failure are not heeded, those programs (and other sufficiently similar programs) may be at high risk of failure.

III. RECOMMENDATIONS

The Subcommittee investigation found that if the Air Force had followed business process reengineering (BPR) best practices, the chances for success of the ECSS program would have dramatically increased. In addition to proper BPR planning, aggressive BPR assessments conducted consistently in connection with key decision points throughout ECSS's acquisition lifecycle would have given the Air Force and Office of the Secretary of Defense (OSD) a sufficient understanding of the "BPR risk" the program faced and provided an opportunity to develop and implement a responsive risk-mitigation and execution plan. With this in mind, this report makes the following recommendations:

1. **Improve ERP Systems Outcomes by Initiating BPR Assessments Earlier in the Acquisition Process:** Internal DOD policy should be changed to integrate BPR assessments earlier in the DOD's process for acquiring business systems, in particular, enterprise resource planning (ERP) systems. That process could, for example, begin when the service components and defense agencies identify a capability gap and implement BPR assessments at that early stage rather than later in the acquisition process when addressing BPR problems may be cost-prohibitive, if not impossible.

2. **Improve Oversight to Ensure DOD has a Sufficient Understanding of the Existing Business Processes To Be Changed:** Internal DOD policy should be improved to ensure that, when procuring business systems, service components or defense agencies sufficiently understand early in the acquisition lifecycle of the business system to what extent their existing "As-Is" business processes must change to support the integration of that system's commercial software.

3. **Ensure Sound Budget Decision Making by Integrating the Investment Review Boards (IRB) at the Beginning of the Budget Process:** Internal DOD policy should be changed so that investment review boards, which help the Deputy Chief Management Officer (DCMO) make sure that military departments and defense agencies apply BPR properly when they procure business systems, focus on the programming and budgeting phases of these systems in addition to the execution phase. This would help the DCMO to make sure that budget requests in connection with these systems are aligned with BPR objectives and overall investment decisions.

4. **Reduce Duplicative Reporting Requirements by Utilizing a Single Governance Structure for the Acquisition of ERP Systems:** Internal DOD policy should be changed to prevent multiple governance structures for the acquisition of future ERP systems. Doing so would help alleviate duplicative reporting requirements for program offices. The Subcommittee understands that the Under Secretary of Defense for Acquisition, Technology, and Logistics [USD (AT&L)] is addressing or will address this concern in future acquisition policy updates of the DOD Instruction 5000 series.

5. **Improve Accountability of Personnel by Aligning the Tenure of Program Executives with Key Acquisition Decision Points:** Internal DOD policy should be changed to align the tenure of program managers with key decision points throughout the process by which the DOD procures business systems. Doing so would help empower program managers to make management decisions that are better calculated to lead to the delivery of needed capability; better incentivize them to do so; minimize the loss of institutional knowledge that may be vital to managing these procurement programs effectively; and help ensure that these program managers can be held accountable for those decisions. Key decision points could include "milestone" decisions in the defense acquisition system or seminal design reviews.

6. **Better Resource Verifications of Self-Reporting BPR Certification from Program Offices:** Internal DOD policy should be changed to better resource the DCMO's review of BPR certifications for the largest business system acquisitions. Doing so would provide better oversight of the self-reporting system in place to verify that BPR is being properly implemented by program executives.

IV. BACKGROUND

a. An Overview of Business Process Reengineering

Business process reengineering (BPR), or business process redesigning, is a management approach to guide organizations making massive operational changes.[25] Many private sector businesses, including Fortune 500 companies as diverse as FedEx, Ford, and Taco Bell, have used BPR to implement significant institutional changes in information technology (IT) projects to cut operational costs.[26] More broadly, BPR was conceived to help large organizations introduce radical innovations and quantum leaps into how an organization does business with the goal to operate more efficiently in furtherance of the organization's mission. BPR has a number of principles that are required when redesigning how an organization operates.[27] One professional has condensed these principles into four broad steps for effectively introducing large-scale changes to an existing process within an organization:

1. Understanding the current processes (commonly referred to in business literature as the "As-Is" process);
2. Inventing new processes (commonly referred to as the "To-Be" process) in consultation with key stakeholders such as managers and users;
3. Constructing the new processes in a systematic fashion; and
4. Integrating the new processes into the organization through effective communication and leadership.[28]

b. BPR and its Importance to the Acquisition of Large Business Information Technology (IT) Systems

Congress has recognized the benefits of using BPR guidelines, mandating that the Department of Defense (DOD) apply BPR to institute large-scale IT business transformation within the DOD, the military departments, and the defense agencies. In the Clinger-Cohen Act of 1996, followed by the National Defense Authorization Act (NDAA) for Fiscal Years 2005, 2010, and 2012, Congress mandated that defense IT

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[25] U.S. DEP'T OF THE AIR FORCE, ACQUISITION STRATEGY REPORT (ASR) EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) 5-6 (2004), PSI-USAF-01-000109.
[26] W. J. Kettinger and V. Grover, *Towards and Theory of Business Process Change Management*, 12 J. MGMT. INFORMATION SYSTEMS 1, 9-30 (1995).
[27] J. SATYANARAYANA, BUSINESS PROCESS RE-ENGINEERING & GOVERNMENT PROCESS RE-ENGINEERING 4 (2011), *available* at http://siteresources.worldbank.org/INTEGOVERNMENT/Resources/GPRJS5Nov06.ppt.
[28] *Id.* at 23.

procurements over $1 million follow BPR guidelines in order to receive program approval and further funding.[29]

Compliance with BPR guidelines on DOD programs is measured using a standard set of thirteen assessment questions for program managers.[30] ECSS completed these assessments, which were certified by the Air Force, on a regular basis.[31] One question, for example, is, "[h]ave you completed an 'As-Is' map of the current process that illustrates the specific business need that requires change?"[32] The intent behind such a question is to provide evidence that adequate thought has been given about what needs to be changed prior to implementing any new program.

Another example from the assessment questions shows the common-sense philosophy behind BPR: "Have you completed a 'To-Be' map of the target process that illustrates the improvements to the 'As-Is' process that this effort will generate?"[33] That assessment question has the evident purpose of ensuring that the organization has thought through what it wants its reorganization to accomplish.

Despite Congressional requirements, DOD leadership has failed to effectively employ logical BPR principles throughout the acquisition and integration process of large IT programs, particularly business systems. Over many years, defense IT programs were designed to modernize and merge dated and inefficient business systems within the DOD. Thus, it would seem appropriate to apply the holistic management approaches of BPR in order to institute comprehensive changes. But, according to the Government Accountability Office (GAO), BPR principles have only been applied in 41 percent of the 1,200 applicable systems.[34] The DOD's failure to utilize BPR guidelines for IT programs has ultimately led to scheduling delays, cost overruns, and, in the case of the Expeditionary Combat Support System (ECSS), program termination. In so doing, it has subjected the DOD's critical effort of increasing efficiency through reforming how it does

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[29] U.S. GOV'T ACCOUNTABILITY OFF., GAO-13-557, DOD BUSINESS SYSTEMS MODERNIZATION FURTHER ACTIONS NEEDED TO ADDRESS CHALLENGES AND IMPROVE ACCOUNTABILITY 36 (May 2013).

[30] U.S. DEP'T OF DEFENSE, DEPUTY CHIEF MANAGEMENT OFFICE, DOD BUSINESS PROCESS REENGINEERING ASSESSMENT GUIDANCE (2012), *available* at http://dcmo.defense.gov/products-and-services/business-process-reengineering/Revised%20BPR%20Assessment%20Guidance%209-28-12.pdf.

[31] DOD BUSINESS PROCESS REENGINEERING ASSESSMENT FORM (2010), PSI-USAF-08-000040 – 000042 and DOD BUSINESS PROCESS REENGINEERING ASSESSMENT RESULTS (2010), PSI-USAF-08-000054.

[32] U.S. DEP'T OF DEFENSE, *supra* note 30, at 11.

[33] *Id.* at 13 (2012).

[34] U.S. GOV'T ACCOUNTABILITY OFF., GAO-13-557, DOD BUSINESS SYSTEMS MODERNIZATION FURTHER ACTIONS NEEDED TO ADDRESS CHALLENGES AND IMPROVE ACCOUNTABILITY 36 (May 2013).

business[35] to the risk of failure. To amplify the importance of business transformation, in 2012, then Secretary of Defense Panetta issued an order requiring all DOD components and agencies to be audit ready by September 30, 2014, which was three years earlier than the original Congressional mandate.[36]

c. The DOD's Use of Enterprise Resource Planning (ERP) Systems

Enterprise resource planning (ERP) systems[37] are used to manage operations such as tracking inventory, predicting future supply requirements, and handling accounting functions.[38] Because private sector best practices are built into commercial ERP systems, organizations that adopt commercial ERP systems can dramatically improve their operations and operate more efficiently. Successful adoption, however, can require major institutional changes in organizations that do not already conform to best practices. Business Process Reengineering (BPR), the methodology intended to smoothly integrate major changes into operations, can be essential to introducing and managing the changes needed to make commercial ERP systems successful.

The successful integration of commercial ERP systems into the defense enterprise is critical to the DOD's plan to transform how it does business.[39] The DOD intends to use ERP systems to replace over 500 existing business systems, which could save taxpayers hundreds of millions of dollars annually.[40] As of 2012, however, all major DOD ERP programs had exceeded original cost and schedule estimates by

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[35] Press Release, U.S. DEP'T OF DEFENSE, Secretary of Defense Provides Guidance for Improved Operational Efficiencies (June 4, 2010) (Release No: 461-10), *available* at http://www.defense.gov/releases/release.aspx?releaseid=13582.

[36] Memorandum from the Secretary of Defense on Improving Financial Information and Achieving Audit Readiness to the Secretaries of the Military Departments; Chairman of the Joint Chiefs of Staff; Under Secretaries of Defense; Deputy Chief Management Officer; Commanders of the Combatant Commands; Director, Cost Assessment and Program Evaluation; Director, Operational Test and Evaluation; General Counsel of the Department of Defense; Inspector General of the Department of Defense; Assistant Secretaries of Defense; Department of Defense Chief Information Officer; Assistants to the Secretary of Defense; Director, Administration and Management; Director, Net Assessment; Director of the Defense Agencies; Directors of the DOD Field Activities (Oct. 13, 2011), *available* at http://www.asmconline.org/wp-content/uploads/2011/10/SD-Audit-Memo-13-Oct.pdf.

[37] An ERP attempts to integrate all departments and functions across a company onto a single computer system that can serve all those different departments' particular needs.

[38] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-12-177T, DOD FINANCIAL MANAGEMENT CHALLENGES IN THE IMPLEMENTATION OF BUSINESS SYSTEMS COULD IMPACT AUDIT READINESS EFFORTS (OCT. 2011).

[39] *Financial Management and Business Transformation at the Department of Defense: Hearing Before the S. Subcomm. on Readiness and Management of the S. Comm. on Armed Services*, 112 Cong. 2 (2012).

[40] U.S GOV'T ACCOUNTABILITY OFFICE, GAO-12-177T, *supra* note 38.

more than 30 percent.[41] And troublingly, according to the DOD Inspector General, the DOD's ERP projects continue to fail to adhere to BPR guidelines.[42]

d. The Air Force's Development of ERP Systems

For decades, the Air Force lacked an integrated and coordinated software suite for its global logistics and supply-chain management systems. Instead, hundreds of outdated computer programs, called "legacy systems," have operated independently of each other leading to inefficient processes and costly maintenance. The Air Force noted that some of these legacy systems needed "life support"[43] and turned to ERP systems as a solution to this problem.

In 2001, the Air Force initiated the Global Combat Support System-Air Force (GCSS-AF) program to be the foundation for modernizing the way the Air Force does business. The goal of the GCSS-AF plan was to consolidate these independent legacy systems into a more centralized, cohesive system.[44] As part of the GCSS-AF program, the Air Force launched two additional ERP systems—ECSS and the Defense Enterprise Accounting and Management System (DEAMS) —which were intended to manage logistics and general fund accounting, respectively.[45] Although the Air Force cancelled the ECSS program in 2012, both GCSS-AF and DEAMS remain active and Congress has continued to fund them.

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[41] U.S. DEP'T OF THE AIR FORCE, COTS INTEGRATION ESTIMATION: ENTERPRISE RESOURCE PLANNING SYSTEMS, DR. WILSON ROSA AND JAMES BILBRO, MAR. 6, 2012).
[42] INSPECTOR GENERAL, U.S. DEP'T OF DEFENSE, DODIG-2012-111, ENTERPRISE RESOURCE PLANNING SYSTEMS SCHEDULE DELAYS AND REENGINEERING WEAKNESSES INCREASE RISKS TO DOD'S AUDITABILITY GOALS (2012).
[43] Subcomm. interview of Air Force (May 30, 2013), U.S. DEP'T OF THE AIR FORCE, ANALYSIS OF ALTERNATIVES (AOA) ECSS POSITION UPDATE, APRIL 27, 2010, PSI-USAF-03-000276.
[44] U.S. DEP'T OF THE AIR FORCE, RDT&E Budget Item Justification: PB 2013 Air Force, Exhibit R-2 (Feb. 2012).
[45] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-08-866, AIR FORCE'S CURRENT APPROACH INCREASES RISK THAT ASSET VISIBILITY GOALS AND TRANSFORMATION PRIORITIES WILL NOT BE ACHIEVED (Aug. 2008).

V. EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS): FLAWED FROM CONCEPTION

a. The Air Force's Initial Concept for the ECSS Program

The Air Force started the Expeditionary Combat Support System (ECSS) program in 2004, with the goal of obtaining a single, unified logistics and supply-chain management system that would allow the Air Force to track all of its physical assets from airplanes to fuel to spare parts, world-wide. The Air Force chose to build its new logistics platform with commercial off-the-shelf (COTS)[46] software on an "enterprise resource planning" (ERP) system.[47] In order to leverage the ERP's commercial configuration, the Air Force needed to transform its business processes to enable the ERP's integration within its current business infrastructure. Specifically, ECSS would transform Air Force business processes such as modernizing the organization's ability to create purchase orders, manage equipment maintenance, and update software.[48]

The ECSS program was established through two separate contracts. The first, a contract with Oracle Corporation, was to supply the COTS software. The second, with Computer Sciences Corporation (CSC), was to integrate the COTS software into the existing Air Force infrastructure. In its March 2005 solicitation, the Air Force requested an "integrated product solution." The Air Force solicitation stated that it wanted to obtain "COTS software [that is] truly 'off the shelf': unmodified and available to anyone." Oracle was awarded the software contract in October 2005, and provided the Air Force with three stand-alone *integratable* COTS software components that were "truly off the shelf." Oracle also provided the Air Force the tools to put the three components together into a single software "suite," which would "[require] a Systems Integrator (SI) to integrate the functions of the three [components]." Essentially, this meant the various new software pieces did not initially work together as a finished product and required additional integration to work as intended.[49]

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[46] A COTS product is usually a computer hardware or software product tailored for specific uses and made available to the general public. Such products are designed to be readily available and user friendly. A typical example of a COTS product is Microsoft Office or antivirus software. A COTS product is generally any product available off-the-shelf and not requiring custom development before installation.

[47] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) SYSTEMS INTEGRATOR (SI) ACQUISITION REQUEST FOR QUOTE (RFQ) 1 (Dec. 16, 2005), PSI-USAF-01-001574.

[48] U.S. DEP'T OF THE AIR FORCE, CONTRACT DATA REQUIREMENTS LIST (CDRL) (June 28, 2011), PSI-USAF-01-002746.

[49] CARNEGIE MELLON SOFTWARE ENGINEERING INSTITUTE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) INDEPENDENT TECHNICAL ASSESSMENT (ITA) OUTBRIEF (June 18, 2008).

In December 2005, the Air Force issued its solicitation for a systems integrator (SI), which, according to Carnegie Mellon's Software Engineering Institute, portrayed the three separate Oracle COTS software components, as a single, already-integrated COTS product which was to be provided to the winning bidder as government funded equipment (GFE).[50] Confusion about the software suite plagued ECSS, contributing significantly to program delays. Not only was time and effort dedicated to integrating the three separate software components into a single integrated solution but there were disagreements about who was responsible for that integration.[51] While CSC claimed in its bid to have expertise with Oracle products, the company has said that it assumed, that the products it would receive from the Air Force would already be integrated.[52] Among the root causes of the integration-related delay was the Air Force's failure to clearly understand and communicate program requirements.

After these integration problems were resolved in 2009, the program encountered additional setbacks resulting in cost overruns and missed acquisition milestones. These costly delays, which can be attributed to, among other things, the Air Force's failure to implement business process reengineering (BPR), ultimately led to the cancellation of the ECSS program in 2012 at a cost to taxpayers of over $1 billion without delivering *any* of the capabilities that the Air Force actually needed.

b. The Failed Implementation of BPR

The ECSS program was designed to progress in two phases: (1) procure the appropriate software with commercial configuration and (2) integrate that software with the Air Force's existing infrastructure to create the desired unified logistics management system.[53] Unfortunately, because of a systematic failure to adhere to BPR guidelines, the Air Force encountered major delays and cost overruns in both phases of the procurement.[54] The Subcommittee investigation focused on three key failures by the Air Force to adhere to BPR guidelines:

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[50] Government Furnished Equipment (GFE) is property that is acquired directly by the government and then made available to the contractor for use, https://acc.dau.mil/CommunityBrowser.aspx?id=247024.

[51] CARNEGIE MELLON SOFTWARE ENGINEERING INSTITUTE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) INDEPENDENT TECHNICAL ASSESSMENT (ITA) OUTBRIEF (June 18, 2008).

[52] CSC CORPORATION, A SUMMARY OF ERP EXPERIENCES AND LESSONS LEARNED FROM ECSS (Apr. 2013), PSI-CSC-01-000035.

[53] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) ACQUISITION INCIDENT REVIEW (AIR) TEAM FINAL REPORT 21 (2013), PSI-USAF-06-000037.

[54] CSC CORPORATION, *supra* note 51, PSI-CSC-01-000029. According to CSC, the ECSS business transformation effort was "very disjointed and less efficient than the process it had replaced, defeating the purpose of an ERP transformation altogether."

1. The inability to overcome resistance among Air Force personnel who would be using ECSS to change their business processes[55];
2. The lack of strong, continuous leadership to implement needed process-changes, which led to numerous, costly efforts to customize the commercial software. Such customization made it impossible for ECSS to provide the capability the Air Force originally needed[56]; and
3. ECSS program leadership did not sufficiently mitigate these and other risks identified early in the project. The failure to mitigate these risks demonstrates poor planning by the Air Force and doomed ECSS to failure.[57]

i. ECSS Program Management Failed to Overcome Cultural Resistance to Change

"Fear of Change! Change does not come easy for many people."
-End-User Comment in ECSS Stakeholder Assessment Report from 2009

When a business organization, for whatever reason, tries to change its business processes to become more efficient and maintain competiveness, its relevant workforce —often content doing business as usual because that's how it's always been done—may resist instituting such changes.[58] One fundamental BPR tenet, however, accounts for such resistance and identifies a course of action to overcome that challenge. Through effective communication and a conscious effort to get buy-in throughout the organization's relevant workforce, from upper-level management to the lowest ranks of end-users, resistance during the design of a new process can be mitigated.[59] However, such buy-in was never achieved in the case of ECSS.[60]

For decades, the Air Force utilized hundreds of disconnected "legacy" computer systems to accomplish its logistics mission world-wide. Prior to ECSS, these were the systems Air Force personnel used and grew familiar with.[61] While ECSS offered significant logistical improvements, Air Force personnel were so accustomed to those

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[55] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) ACQUISITION INCIDENT REVIEW (AIR) TEAM FINAL REPORT 221 (2013), PSI-USAF-06-000237.
[56] *Id.* at 202, PSI-USAF-06-000218.
[57] CSC CORPORATION, A SUMMARY OF ERP EXPERIENCES AND LESSONS LEARNED FROM ECSS 23-24 (Apr. 2013), PSI-CSC-01-000036.
[58] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) ACQUISITION INCIDENT REVIEW (AIR) TEAM FINAL REPORT 188 (2013), PSI-USAF-06-000204.
[59] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO/AIMD-10.1.15, BUSINESS PROCESS REENGINEERING ASSESSMENT GUIDE (1997).
[60] U.S. DEP'T OF THE AIR FORCE, *supra* note 58, at 221, PSI-USAF-06-000237.
[61] *Id.* at 26, 27, PSI-USAF-06-000042.

outdated systems that they resisted the transformation envisioned by the program.[62] Had the Air Force better addressed this cultural resistance to change, Air Force personnel may have been more receptive to the new program. Changing the culture of how the Air Force does business should have been a top priority for Air Force leadership. As the Air Force later stated, "ECSS was trying to accomplish the dual task of developing a disruptive technology and obtaining buy-in from people fearful of what that disruptive technology would do to them personally."[63]

With over 250,000 users potentially affected by ECSS, the Air Force was aware that a potential risk area included its personnel resisting the transition to a new system.[64] Yet, it was unable to develop an effective plan to overcome that resistance. In accordance with BPR's guidelines, the Air Force requested training plans be developed by CSC to teach leadership and end-users about the benefits of transitioning to ECSS and its expected improvements to long-term operations.[65] In an effort to gauge user-feedback on the effectiveness of the training plans, CSC developed surveys to sample those who participated.

Like other failed aspects of ECSS, the surveys suggest the training plans lacked proper planning and execution, which led one end-user to characterize the training as useless and confusing. Survey respondents also criticized the lack of effective training opportunities relating to ECSS.[66] This only strengthened the resistance to change by Air Force personnel. An August 2009 survey noted that many of the respondents did not feel well-informed about the implementation plan for ECSS. The following comments from three user-surveys illustrate this frustration:

> *"Communication about ECSS is usually a bunch of generalizations, and fairly condescending without enough specifics to give anyone a warm fuzzy about the ECSS team. I haven't heard*

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[62] *Id.* at 26, 27, 221, PSI-USAF-06-000237.
[63] *Id.* at 223, PSI-USAF-06-000239.
[64] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM, INSTRUCTIONS TO VENDORS, ATTACHMENT 1, REQUEST FOR QUOTE (2005), PSI-USAF-01-001839.
[65] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) ACQUISITION INCIDENT REVIEW (AIR) TEAM FINAL REPORT 220 (2013), PSI-USAF-06-000236; U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM, SYSTEM INTEGRATOR ACQUISITION REQUEST FOR QUOTE (2005), Task Descriptions: Appendix A, Attachment 2, FA8770-05-Q-0022, Document Number: ECSS-RFQSOOTD-05007-1.0; COMPUTER SCIENCES CORPORATION, EFFECTIVENESS SURVEY FROM NOVEMBER 2010, PSI-CSC-04-000084 AND COMPUTER SCIENCES CORPORATION, ORGANIZATIONAL CHANGE MANAGEMENT PLAN (May2007), PSI-USAF-02-044409.
[66] COMPUTER SCIENCES CORPORATION, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS): CAC OCM EFFECTIVENESS SURVEY (May 2010); CSC, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS): CAC OCM EFFECTIVENESS SURVEY (Nov. 2010); CSC, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS): ORGANIZATIONAL EFFECTIVENESS SURVEY (Aug. 2010).

anything from the ECSS team that tells me what the real issues are."

"I am unaware of the specific plans to train people to use ECSS to do their jobs."

"Have heard ECSS will change policies and processes, but aren't really seeing many actual examples of what is changing."[67]

An April 2011 survey found that only 37.7 percent of participating ECSS end-users felt informed about how they would utilize ECSS to do their daily jobs better.[68]

As the Air Force planned to procure ECSS, it identified "organizational change management" as an essential component for CSC to integrate ECSS successfully.[69] CSC's "organizational change management plan" outlined how changes to the Air Force's internal business processes would be accepted (or rejected) for ECSS's integration. This plan's implementation required, first and foremost, a commitment from end-users to transition from some of their legacy systems to the new ECSS system. To obtain that buy-in, this proposed plan called for effective communication among all levels of Air Force leadership.[70] But, as ECSS progressed, the plan failed to yield significant cultural change and acceptance of the ECSS program by end-users. In response, both the Air Force and CSC changed or added requirements at least 15 times from 2008 to 2011, to work around or reverse resistance to the program and, ultimately, salvage ECSS. The total cost of changing or adding such requirements alone was around $85 million.[71] The Air Force and CSC's hope that changes to its operational requirements, and associated engineering change orders, could alleviate Air Force personnel's resistance to altering their business processes was fatally flawed in concept and impossible to execute.

The Air Force's "too big to change" outlook reflected by its approach runs counter to BPR principles that guide large business organizations on how to transform themselves to become more

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[67] COMPUTER SCIENCES CORPORATION, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS): CAC OCM EFFECTIVENESS SURVEY (Nov. 2010).

[68] COMPUTER SCIENCES CORPORATION, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS): ORGANIZATIONAL EFFECTIVENESS SURVEY (Apr. 2011).

[69] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM, SYSTEM INTEGRATOR ACQUISITION REQUEST FOR QUOTE (2005), PSI-USAF-01-001584.

[70] COMPUTER SCIENCES CORPORATION, ORGANIZATIONAL CHANGE MANAGEMENT PLAN (May2007), PSI-USAF-02-044365.

[71] U.S. DEP'T OF THE AIR FORCE, ECSS SYSTEM INTEGRATOR REVISED CLIN & PAYMENT STRUCTURE 13-16 (2011); U.S. DEP'T OF THE AIR FORCE, REQUEST FOR QUOTE (RFQ) INTRODUCTION TO THE EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) SYSTEM INTEGRATOR (SI) ACQUISITION RFQ 1 (2005), PSI-USAF-01-001574. This figure was derived by adding all change management and organization change management line items from the Air Force CLIN and Payment Structure from 2011. Change management was an original requirement in the Air Force's RFQ to industry.

efficient.[72] Had the Air Force conducted a thorough internal assessment of "BPR risk" before it started the program and followed BPR principles throughout ECSS's lifecycle, the Subcommittee investigation found that the Air Force could have mitigated much of the institutional resistance to change within the Air Force and might have saved years of effort and over a billion dollars in taxpayer funds. Ultimately, even the Air Force admitted that it did not understand the full extent to which its internal business process needed to be redesigned to successfully integrate ECSS into its enterprise.[73] If the "too big to change" culture is not corrected, future efforts by the DOD to transform large business systems to become more efficient and transparent may be destined to fail, just as ECSS did.

ii. The Air Force Lacked Strong Leadership for Needed Changes

"You mean this is happening two years from now when none of the people at this table will be here?"

-End-User Survey Comment from 2010

"I don't think Senior leaders know how processes will change; they just know they must change—that is the biggest frustration with ECSS implementation."

-End-User Survey Comment from 2011

Like the Air Force and CSC, the Subcommittee investigation identified a lack of leadership as a root cause of why ECSS failed. The Air Force lacked a high-level executive with the influence and authority to bring about cultural change among outdated processes and practices throughout the department. Instead, lower-level personnel were assigned to manage ECSS.[74] While it would have apparently been unprecedented for the Air Force to have assigned a high-level general officer to manage the "small team of ten to twenty people" that made up the ECSS team, the Air Force itself concluded in an after action review that such an assignment would have been a good idea, given the importance of ECSS to the service.[75]

Another contributing factor to the lack of leadership by the Air Force in implementing ECSS included the continuous change of program management personnel. This led to unnecessary delays, communication gaps and a loss of institutional knowledge. As shown in Figure 1, in the eight years the program was active, there were six

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[72] Subcomm. interview of the Air Force (May 30, 2013).
[73] U.S. DEP'T OF THE AIR FORCE, ECSS IRB (May 20, 2010) PSI-USAF-06-000042 - 44, PSI-USAF-01-000817, PSI-USAF-06-000201.
[74] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) ACQUISITION INCIDENT REVIEW (AIR) TEAM FINAL REPORT 198 (2013), PSI-USAF-06-000214.
[75] *Id.* at 224, PSI-USAF-06-000240.

program managers (PMs) and five program executive officers (PEOs).[76] Program management transitioned in and out of ECSS at particularly untimely points in the "milestone process" when key acquisition decisions were in the balance. Thus, program managers who made key management decisions – rightly or wrongly – were constantly transitioned out of the ECSS program leaving other key decisions or their consequences to new personnel with less familiarity with, and historical knowledge of, the ECSS program.

For example, the Air Force rotated a new PM into the ECSS program just one month before the critical DOD "Milestone A" approval point, leaving him in that position for only ten months, while the program spanned over eight years (see Figure 1).[77]

[76] *Id.* at 27, PSI-USAF-06-000043.
[77] *Id.* at 25-26, PSI-USAF-06-000041.

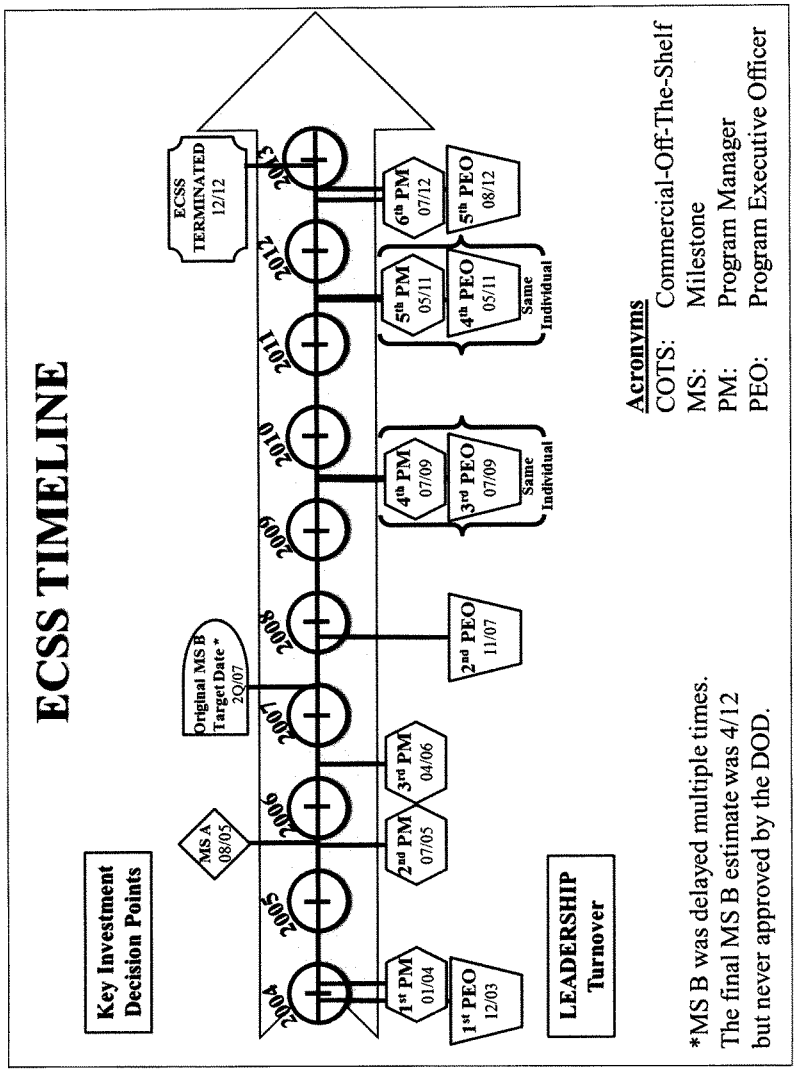

Figure 1

Milestone decisions set specific requirements to ensure a program is developing properly. Consistent with DOD Instruction 5000.2, which guides programs through the acquisition process, the 2005 DOD approval of Milestone A allowed ECSS to continue to the "technology development" phase.[78] But, ECSS did not subsequently complete this

[78] U.S. DEP'T OF DEFENSE, INSTR. 5000.2, OPERATION OF DEFENSE ACQUISITION SYSTEM (May 12, 2003), *available* at

phase. Air Force leadership instead opted to use this time to further define ECSS's operational requirements.[79] This failure by Air Force leadership demonstrates that ECSS's acquisition strategy was flawed because program requirements should have been sufficiently stable prior to Milestone A. Further, the Air Force claimed that no technology development was needed because the commercial software was already properly developed and should be approved for additional investments.[80] But, without having done the requisite BPR, the AF should have been more mindful of the possible need for costly future customizations before proceeding in the defense acquisition system.

After ECSS achieved Milestone A, Air Force program executives conducted a "preliminary design review" (PDR). Generally, PDR is conducted to ensure that the system's preliminary design meets system specifications within acceptable risk, cost, and schedule to a degree necessary to continue with the acquisition process. PDR in ECSS was approved in August 2008 and was integral to developing the more detailed "critical design review" (CDR) to ensure that the program was ready for-large-scale integration.[81] But, since the Air Force had little or no continuity in senior management, the institutional knowledge gained from the PDR, including any changes made to the original software design or potential software capabilities, may have been lost. The fact that the ECSS program had three different PMs and three PEOs during this critical period was also not conducive to sound program management.

The Air Force's next step in the acquisition process was to achieve Milestone B approval from the DOD, which was originally scheduled for the 2nd Quarter of 2007. To achieve Milestone B and proceed to the "System Development & Demonstration" phase, ECSS would have needed to successfully demonstrate its developed technology and outline specific program requirements.[82] As ECSS's software was still being customized and program requirements were not defined, the Air Force delayed Milestone B at least seven times. These Milestone B delays spanned over four years, which encompassed the tenure of three different PMs and three PEOs, as seen in Figure 1.[83] The Subcommittee investigation found that this misalignment of program executives with key decision points in the acquisition process, along with their frequent turnover, contributed to these delays and made it

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http://www.carlisle.army.mil/dime/documents/JPLD_AY08_Lsn%207_Reading%203_DoDI%205000-2.pdf.

[79] U.S. DEP'T OF THE AIR FORCE, Systems Engineering Plan (SEP) (Includes Technology Development Strategy) 24 (2005), PSI-USAD-07-000782.

[80] *Id.*, PSI-USAD-07-000782.

[81] U.S. DEP'T OF THE AIR FORCE, ECSS Program Timeline: FY05-13 1, PSI-USAF-06-000315.

[82] U.S. DEP'T OF DEFENSE, INSTR. 5000.2, *supra* note 78.

[83] Response from Dep't of the Air Force to S. Armed Services Comm. and Permanent Subcomm. on Investigations in Response to Inquiry on ECSS, Question and Ans. 1 ECSS Leadership Grid (November 13, 2013), PSI-USAF-08-0000001.

difficult for the Air Force to hold a particular program executive accountable for the failure to achieve Milestone B.

The high turnover among Air Force managers also contributed to poor communication between CSC and the Air Force. For instance, CSC expected the Air Force to be responsible for communicating with the personnel who operated the long-used "legacy" information systems ECSS was intended to replace.[84] Because leadership within the program office turned over so frequently, however, communication between program leadership and legacy system operators often broke down. That communications failure left legacy system users at many installations with a poor understanding of what ECSS was, how it worked, and what it was intended to do.[85] For reasons such as these, oversight by the Office of the Secretary of Defense (OSD) and, in particular, the Deputy Chief Management Officer (DCMO), is vital to ensuring that the military departments' institutional bias towards the status quo is overcome and that their efforts to procure large business systems such as ECSS are supported by sound BPR.[86]

This leadership turnover contributed to a significant number of costly and time-consuming customizations to ECSS. For example, rather than modify and improve the existing business processes such as creating contracts and generating delivery orders, Air Force leadership ignored BPR guidelines and, instead, customized ECSS software capabilities to accommodate existing, outdated policies and procedures.[87] BPR best practices dictate such customization should be kept to a minimum.[88] CSC also recommended the Air Force adopt a simplified commercial "best practice" for certain accounting measures. The Air Force cited that the communication with legacy systems and regulatory requirements as reasons for not moving forward with this best practice.[89] The business process change was ultimately abandoned.

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[84] ECSS Meeting Minutes for Systems Integrator Way Ahead SOO Meeting (Mar. 11, 2009), PSI-CSC-02-000379 and Carnegie Mellon Software Engineering Institute, Expeditionary Combat Support System (ECSS) Independent Technical Assessment (ITA) Outbrief 31 (June 18, 2008).

[85] U.S. DEP'T OF THE AIR FORCE, STAKEHOLDER MAJCOM AND INSTALLATION ASSESSMENT REPORT (June, 27, 2007), PSI-CSC-04-000812.

[86] U.S. DEP'T OF DEFENSE, DEPUTY CHIEF MANAGEMENT OFFICE, DOD BUSINESS PROCESS REENGINEERING ASSESSMENT GUIDANCE 4 (2012), *available* at http://dcmo.defense.gov/products-and-services/business-process-reengineering/.

[87] Letter from Computer Sciences Corporation to S. Armed Services Comm. on Expeditionary Combat Support System in response to Question 25-b (Jan. 18, 2014).

[88] Letter from Dep't of the Air Force to S. Armed Services Comm. and Permanent Subcomm. on Investigations in Response to Inquiry on ECSS (July 16, 2013), PSI-USAF-06-000379; Fiona Fui-Hoon Nah ET AL., CRITICAL FACTORS FOR SUCCESSFUL IMPLEMENTATION OF ENTERPRISE SYSTEMS, Lau Business Process Management Journal, Vol. 7 No. 3, 2001 MCB University Press, 285, 293.

[89] Letter from Dep't of the Air Force to S. Armed Services Comm. and Permanent Subcomm. on Investigations in Response to Inquiry on ECSS (July 16, 2013), PSI-USAF-06-000380-381.

Even after multiple requests, the Air Force, to date, has not been able to say how much this and other specific customizations increased program's costs. However, according to documents the Air Force did provide, there were over 150 modifications to the original ECSS contract, amounting to approximately $527 million obligated to program costs. These modifications included, among other things, program management, software blueprinting, logistics financials, and detail design.[90]

The Air Force now acknowledges that programs like ECSS need committed, key leadership who remain with programs "for a reasonable amount of time" – at least through critical periods in the defense acquisition system.[91]

iii. ECSS Program Management's Failure to Mitigate Identified Risks

Internal risk assessments, as early as 2004 and 2005, identified many of the problems that eventually led to the failure of the ECSS program. In 2008, the Government Accountability Office (GAO) found, however, that ECSS program management did not know what risk management efforts were occurring within the program.[92] Without an understanding of what analysis was being done, much less what problems were being identified, ECSS's program managers were not fully aware of potential risks that it needed to mitigate.[93] The Subcommittee investigation focused on three crucial risk-areas that the Air Force identified in its early internal risk assessments but failed to effectively mitigate including:

1. Cultural acceptance of ECSS among users who previously worked on legacy systems who may not accept ECSS;
2. Stable program requirements were lacking; and
3. Selecting a systems integrator before all technical and support requirements were known.[94]

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[90] Letter from Dep't of the Air Force to S. Armed Services Comm. and Permanent Subcomm. on Investigations in Response to Inquiry on ECSS, Question and Ans. 10 (Mar. 8, 2013), PSI-USAF-02-014410.

[91] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) ACQUISITION INCIDENT REVIEW (AIR) TEAM FINAL REPORT 235 (2013). The original SI contract was awarded to CSC in Sept. 2006. Upon award, a protest was filed with the Government Accountability Office (GAO) to overturn the award. The cited figure includes over $8 million to adjust the schedule and contract price due to the bid protest. GAO denied the protest in Mar. 2007.

[92] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-08-866, AIR FORCE'S CURRENT APPROACH INCREASES RISK THAT ASSET VISIBILITY GOALS AND TRANSFORMATION PRIORITIES WILL NOT BE ACHIEVED 6 (Aug. 2008).

[93] *Id.*

[94] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) RISK SUMMARY 3, 10, 11 (Oct. 8, 2004).

At the time they were written, the Air Force's own assessments suggested that, for these risks to be mitigated, the level and quality of communication between the Air Force and CSC needed to improve. And yet, that did not happen.

In 2004, the Air Force identified cultural acceptance of ECSS among users as a moderate risk that could cause the program to incur cost overruns and schedule delays. One year later, in a 2005 risk assessment, the Air Force again identified cultural acceptance as a moderate risk. But, in the 2005 report, there was no indication that the Air Force had followed the 2004 report's recommendations to mitigate this risk.[95] The 2005 assessment further suggested that if both the end-users and management did not buy into the ECSS concept and implementation, it would prove difficult for the system to ever function properly.[96] Given the harsh comments elicited from end-users and leaders who attended the ECSS training sessions in later years, it is clear that the Air Force failed to adequately address the previously identified risk fact of "cultural acceptance" by Air Force personnel.

In initial risk assessments, the Air Force also found that the operational requirements for ECSS were not clearly defined. The prospect of "evolving requirements" was considered a high risk that would increase costs and cause scheduling delays.[97] After termination, the Air Force found that this risk was never addressed and served as a contributing cause of the program's failure.[98]

In 2004, the Air Force identified as a risk that the original solicitation for bids for companies interested in securing the systems integrator contract had incomplete details and unstable program requirements.[99] Despite identifying this risk early on, however, technical requirements for ECSS as well as the capabilities of the existing legacy systems were still unknown when the Air Force issued the solicitation. In lieu of identifying ECSS-specific technical requirements, the Air Force used technical requirements from previous programs to derive ECSS's technical requirements.[100] Given ECSS's

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[95] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) RISK SUMMARY (Mar. 21, 2005).
[96] *Id.*
[97] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) RISK SUMMARY (Oct. 8, 2004).
[98] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) ACQUISITION INCIDENT REVIEW (AIR) TEAM FINAL REPORT 25 (2013); Letter from Dep't of the Air Force to S. Armed Services Comm. and Permanent Subcomm. on Investigations in Response to Inquiry on ECSS, Question and Ans. 9 (June 19, 2013), PSI-USAF-05-00004.
[99] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) RISK SUMMARY (Oct. 8, 2004); U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) ACQUISITION INCIDENT REVIEW (AIR) TEAM FINAL REPORT 26 (2013) PSI-USAF-06-000042.
[100] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) RISK SUMMARY (Oct. 8, 2004).

intended scope and the extent to which business processes supporting legacy systems needed to be considerably redesigned, merely deriving technical requirements from previous programs violated BPR guidelines that require thoroughly planning-out new processes before replacing old ones.[101]

c. The Air Force's Disregard For Acquisition Best Practices

The Air Force not only failed to implement BPR guidelines but also disregarded acquisition best practices. This, too, contributed to ECSS's failure. Specifically, the Air Force failed to define crucial program requirements, which left program executives without a clear roadmap for procuring ECSS.[102] Also, the Air Force subjected the program to several governance structures, which made it difficult for the program's managers to effectively comply with applicable DOD acquisition policies and other oversight requirements. This caused undue confusion and delay.[103] By disregarding acquisition best practices in these areas and others, the Air Force effectively put ECSS on a path to fail early in its lifecycle.

i. Undefined Program Requirements

Originally, the Air Force conceived of ECSS as providing "transformational" capability, that is, in a single generation, almost completely changing (and improving) how it managed logistics.[104] Even in the private sector, such capability, if fielded, would have been state-of-the-art. Yet, shortly after the program began, the Air Force's acquisition strategy for ECSS deteriorated as Air Force program management failed to structure ECSS and execute it in accordance with acquisition best practices.

BPR guidelines require large defense business system program offices to map out the current legacy systems and business processes that need to be changed or retired and then generate a new plan that would improve and transform the shortcomings of the old ones. These plans are called the "As-Is" and "To-Be" process maps, respectively, and are

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[101] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-AIMD-10.1.15, BUSINESS PROCESS REENGINEERING ASSESSMENT GUIDE (May 1997) and J. SATYANARAYANA, BUSINESS PROCESS RE-ENGINEERING & GOVERNMENT PROCESS RE-ENGINEERING 23 (2011), *available* at http://siteresources.worldbank.org/INTEGOVERNMENT/Resources/GPRJS5Nov06.ppt.

[102] Letter from Dep't of the Air Force to S. Armed Services Comm. and Permanent Subcomm. on Investigations in Response to Inquiry on ECSS, Question and Ans. 7 (July 16, 2013), PSI-USAF-06-000376; U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) ACQUISITION INCIDENT REVIEW (AIR) TEAM FINAL REPORT 25 (2013).

[103] COMPUTER SCIENCES CORPORATION, A SUMMARY OF LESSONS LEARNED FROM EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) 19 (Apr. 17, 2013), PSI-CSC-01-000032.

[104] U.S. DEP'T OF THE AIR FORCE, SYSTEMS REQUIREMENTS DOCUMENT ATTACHMENT 3 TO THE EXPEDITIONARY COMBAT SUPPORT SYSTEM SYSTEMS INTEGRATOR ACQUISITION REQUEST FOR QUOTE (2005), PSI-USAF-01-002048.

critical to business transformation efforts starting off right. Although crucial to BPR, ECSS failed to develop the required "As-Is" map, and therefore could not properly create the "To-Be" map of what ECSS would become once complete. In order to create the "As-Is" map, the Air Force would have needed a thorough understanding of its legacy systems. But, the legacy systems used by the Air Force were and are so extensive that, to date, the Air Force does not know the exact number of legacy systems that exist. In fact, an Air Force review later referred to the collection of legacy system data as "too hard," "a mess," and "not going there."[105] Without these vital process maps, there would have been no way for corrections or improvements to be made to the new system because the existing problems were never even identified.

Additionally, at ECSS's inception, the Air Force did not properly define the product lifecycle management requirements, which account for long-term engineering of logistics systems.[106] Indeed, not having a clear sense of that requirement undermined what the Air Force actually needed ECSS to accomplish. Such incomplete data not only deviated from acquisition best practices but also BPR guidelines, which similarly direct operational requirements to be as defined and stable as possible. But, since such requirements were not properly defined at the outset, the Air Force had to add and remove capabilities throughout ECSS's lifecycle.[107] This caused the scope of CSC's contract to change multiple times, which in turn caused excessive schedule delays and cost growth, which debilitated the program.

According to a third-party consulting firm that reviewed ECSS's requirements in 2008, many of the "defined" requirements were "complex" and "improperly structured."[108] In addition, the requirements were considered ambiguous and were not in line with the technical capabilities ECSS was intended to perform.[109] This posed challenges to Air Force personnel responsible for verifying these requirements as they were essentially undefined. For example, the review offered three instances where requirements for ECSS were "incomplete," which included "Project Management," "Quality Management," "Human Resources." It is important to note that both "Project Management" and

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[105] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) ACQUISITION INCIDENT REVIEW (AIR) TEAM FINAL REPORT 187 (2013), PSI-USAF-06-000203.
[106] Letter from Dep't of the Air Force to S. Armed Services Investigations Subcomm. in Response to Inquiry on ECSS, Question and Ans. 7 (July 16, 2013), PSI-USAF-06-000376.
[107] In response to then-Secretary of Defense Panetta's directive to have the Statement of Budgetary Resources (SBR) audit-ready by Sept. 30, 2014, the Air Force attempted to change ECSS'S scope to assist in meeting that directive.
[108] GLOBAL ANALYTIC INFORMATION TECHNOLOGY SERVICES, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) IV&V HEALTH CHECK REPORT (2008), PSI-USAF-07-000338.
[109] *Id.*, PSI-USAF-07-000338.

"Quality Management" [110] were considered "building blocks" for the foundation of ECSS.[111]

Ironically, in 2004, the Air Force had acknowledged that if technical requirements were left undefined, ECSS would not support forward operating conditions.[112] Yet in 2008, as previously discussed, that same third-party consulting firm found that many of ECSS's program requirements remained undefined, thus leaving risk in this area unaddressed.[113] After the program's termination, the Air Force admitted that requirements for ECSS were left undefined, and that capabilities were frequently removed throughout the program's lifecycle.[114] According to the Air Force, it failed to properly define ECSS program requirements because it lacked sufficient understanding of how the existing legacy systems worked.[115]

ii. Multiple Governance Structures Led to Confusion and Duplication

Early in the ECSS program, the Air Force identified the need for a strong governance structure so that problems arising from its attempt to procure ECSS, such as systems-level integration, could be addressed in a timely manner.[116] Furthermore, strong governance is also necessary for effective change management—keeping those operational requirements that were defined early in the program from changing excessively.[117] Ironically, while two governance structures were in place to keep these operational requirements from changing, the Air Force failed to actually define the operational requirements at the outset of ECSS.

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[110] *Id.* Project Management "is the first step in the process of accomplishing work. This step helps ensure delivery of quality product to the customer with seamless integration and cutover of existing systems." Quality Management is "a valuable resource to both program management and upper management and can provide visibility into the health of the program by identifying and reporting concerns and risks prior to them becoming critical. Without Quality Management auditing processes, reviewing work products, participating in process improvement activities, attending meetings, and reporting findings, the program will continue with issues being raised only when they are critical and beyond the control and management of the functional area."
[111] *Id.*, PSI-USAF-07-000338.
[112] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) RISK SUMMARY 5 (Oct. 8, 2004).
[113] GLOBAL ANALYTIC INFORMATION TECHNOLOGY SERVICES, *supra* note 108, PSI-USAF-07-000359.
[114] Letter from Dep't of the Air Force S. Armed Services Comm. and Permanent Subcomm. on Investigations in Response to Inquiry on ECSS, Ans. 26 (May 30, 2013), PSI-USAF-06-000384.
[115] Letter from Dep't of the Air Force to S. Armed Services Comm. and Permanent Subcomm. on Investigations in Response to Inquiry on ECSS, Ans. 7 (July 16, 2013), PSI-USAF-06-000376.
[116] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) RISK SUMMARY (Oct. 08 2004).
[117] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) 20 MAY IRB FOLLOW-UP REVIEW (JUNE 17, 2010), PSI-USAF-01-001161.

According to CSC, however, there was confusion as to which governance structure the Air Force was utilizing.[118] From 2004 to 2007, the Air Force followed the governance structure that was prescribed in the Department of Defense Instruction (DODI) 5000.2 guidelines.[119] The DODI 5000.2 was primarily designed for the acquisition of major weapons systems, which differs significantly from that of a business system. The DOD, however, saw a need to deploy new business capabilities faster through a more streamlined governance structure for the acquisition of large IT systems. In 2007, the DOD issued initial guidance for such a structure, called the Business Capabilities Lifecycle (BCL).[120] BCL was to be used for the acquisition of large business systems. But, unlike the DODI, it would deploy program capabilities to the field incrementally instead of all at once. In June 2007, the DOD decided to use ECSS as a test case for BCL.[121]

It is important to note that BCL was not used in lieu of the DODI 5000.2, but in addition to it, which required the ECSS program office to comply with two sets of reporting requirements. While the reporting formats were different for the two governance structures, some of the information required by BCL and DODI 5000.2 was similar. Both governance structures mandated that, for example, ECSS program executives justify on the basis of operational requirement why the program was needed and what the desired outcome of the program would be. Under BCL, this information was reported on the "business case" document, while under the DODI this information was disclosed in two separate documents, the initial capabilities document and capabilities development document.

According to the Air Force, there was no unified leadership to oversee compliance with both structures. Instead, one set of personnel were in charge of determining whether compliance with BCL was met while a different set of personnel were required to determine whether compliance with DODI 5000.2 was met.[122] Without sufficient guidance

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[118] COMPUTER SCIENCES CORPORATION, A SUMMARY OF LESSONS LEARNED FROM EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) 19 (Apr. 17, 2013), PSI-CSC-01-000032.
[119] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) ACQUISITION INCIDENT REVIEW (AIR) TEAM FINAL REPORT 46,88 (2013), PSI-USAF-06-000062; THE GOV'T ACCOUNTABILITY OFFICE, GAO-07-538, BUSINESS SYSTEMS MODERNIZATION: DOD NEEDS TO FULLY DEFINE POLICIES AND PROCEDURES FOR INSTITUTIONALLY MANAGING INVESTMENTS (2007), *available* at http://www.gao.gov/assets/270/260542.pdf.
[120] Memorandum from Under Secretary of Defense to the Secretaries of the Military Departments; Chairman of the Joint Chiefs of Staff; Under Secretaries of Defense; Assistant Secretaries of Defense; General Counsel of the Department of Defense; Director, Operational Test and Evaluation; Inspector General of the Department of Defense; Assistant to the Secretary of Defense; Director, Administration and Management; Director, Program Analysis and Evaluation; Director, Net Assessment; Directors of the Defense Agencies; Directors of the DOD Field Activities (July 18, 2007) (on file with author).
[121] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) ACQUISITION INCIDENT REVIEW (AIR) TEAM FINAL REPORT 88 (2013), PSI-USAF-06-000104.
[122] *Id.* at 206, PSI-USAF-06-000222.

on how to reconcile these analytical requirements to oversee these efforts, program personnel assisting in compiling this information were, at times, duplicating each other's work. And, rather than pursue the underlying requirements as a crucial analysis needed for sound program management, the Air Force addressed them as a paperwork formality. This caused delays, slowing the decision-making process as more time was required to complete governance requirements instead of managing the program.[123] According to the Air Force, program executives spent crucial time "feeding the governance monster" by completing nonessential tasks that "just didn't matter to the success of the program."[124] Additionally, the Air Force was instructed to use the BCL governance structure even though it was not fully developed and many of its requirements were not complete until 2011.[125]

By being subjected, during important parts of its acquisition lifecycle, to two sets of governance regimes, and incomplete BCL compliance metrics, ECSS never fully benefited from effective governance.

d. ECSS's Failure Leaves the Air Force No Closer to Business Transformation

"It seems that the plan is constantly changing and not well defined. ECSS is not progressing as advertised and appears to be over priced and behind schedule. A lot of effort with no results...A $1.2B waste..."
-2009 Survey on Effectiveness Comment

The serial BPR failures that led to the termination of the ECSS program must serve as a lesson for the DOD going forward. But, beyond lessons on what not to do, ECSS ultimately yielded very little utility to the Air Force. None of ECSS's intended operational capabilities were ever fielded.[126] Even after the Air Force spent over $1 billion of taxpayer money, the Air Force reported ECSS would require an additional $1 billion to yield just 25 percent of the originally intended capability.

The three organizations that were partners in the ECSS program—the Air Force, CSC and Oracle—maintain markedly different views of what (if any) capability the Air Force gained after ECSS's cancellation. Oracle contends that instead of serving as the foundation for the ECSS system, its commercial software was reconfigured for use with the existing legacy systems after the program was terminated.[127] However, deploying related software in connection with several of the Air Force's

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[123] *Id.* at 217, PSI-USAF-06-000233.
[124] *Id.*, PSI-USAF-06-000233.
[125] *Id.* at 39, PSI-USAF-06-000055.
[126] Round 4 Questions for 30 May mtg. PSI-USAF-06-000372.
[127] Subcomm. interview of Oracle (Feb. 20, 2013).

hundreds of legacy systems is a far cry from leveraging ECSS to achieve the efficiencies that the Air Force originally needed.

By contrast, CSC argues that it provided a number of capabilities the Air Force can utilize to build new ERP systems in the future.[128] CSC engaged in a great deal of planning throughout the ECSS program and developed several technical solutions that it claims the Air Force could use in the future to help develop and implement a successful ERP system.[129] However, those elements have not been clearly laid-out or quantified, and have yet to lead to any discernible efficiencies in how the Air Force manages logistics or its associated supply chain.

While the CSC blueprint for the ECSS ERP might prove to be valuable if the Air Force develops ERP systems in the future, there seems to be little tangible capability that the Air Force has now that it did not have before it started the billion dollar ECSS program. CSC may believe that tangible benefits were delivered to the Air Force, but according to the Air Force, "no useable ECSS capability has been fielded" and all users were forced to revert back to the same outdated legacy systems.[130] In any case, the return on investment realized in this program inescapably led the Subcommittee investigation to the conclusion that this case is one of the most egregious examples of mismanagement by the DOD in recent memory.

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[128] COMPUTER SCIENCES CORPORATION, RESPONSE TO INFORMATION REQUEST 5 (May 24, 2013), PSI-CSC-01-000009.
[129] *Id.*, PSI-CSC-01-000009.
[130] Letter from Dep't of the Air Force to S. Armed Services Investigations Subcomm. in Response to Inquiry on ECSS (July 16, 2013), PSI-USAF-06-000372.

VI. DEFENSE ENTERPRISE ACCOUNTING AND MANAGEMENT SYSTEM (DEAMS) AND OTHER ERPS THAT PARALLEL ECSS'S BPR FAILURES

The failure of the ECSS program exposed many flaws associated with the DOD's attempt to implement other enterprise resource planning (ERP) systems, in particular, the Air Force's disregard for business process reengineering (BPR) guidelines and best acquisition practices, crippled the ECSS program and ultimately led to the program's termination. Similar problems pervade the acquisition of current and future ERP systems, including the Defense Enterprise Account and Management System (DEAMS), Navy ERP,[131] and Common Aviation Command and Control System (CAC2S).[132]

ECSS's failure should remind program executives that in order for business transformation efforts to start-off right, program offices must possess a thorough understanding of the legacy system environment. Currently, the DOD seems to have a systemic problem as program executives for each of these ERP systems have failed to properly understand exactly what the overarching requirement is for a given system, how the legacy environment needs to be changed for integration of the new system, and how the new system will integrate to fulfill the requirement. DOD's business transformation efforts hinge on the success of ERP systems. Given that fact, it is important that DOD internalize the lessons of ECSS's failure. Unfortunately, that has yet to happen as mistakes that led to ECSS's failure are being repeated with other ERP systems. If not remedied, billions more in taxpayer dollars will be wasted on poorly planned business transformation efforts.

As part of the Air Force's goal to create a more centralized and cohesive logistics platform, the Air Force began the procurement of two

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[131] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-12-565R, NAVY ENTERPRISE RESOURCE PLANNING SYSTEM (NAVY ERP) 10 (Mar. 2012) (The Navy ERP program began in July 2003 and was scheduled to be fully deployed to 71,000 end-users by fiscal year 2011. The Navy ERP, which also uses commercial software, is intended to replace 96 legacy systems and streamline business processes by integrating financial, workforce, inventory, and supply chain management into a single business system).

[132] U.S. DEP'T OF THE NAVY, COMMON AVIATION COMMAND AND CONTROL SYSTEM (CAC2S) 7 (May 29, 2009), *available* at (https://www.neco.navy.mil/synopsis_file/M6785409R6061Industry_day_28_May_(FINAL).pdf (The Common Aviation Command and Control System (CAC2S) is another ERP program the Navy is developing to consolidate existing legacy systems into a single system. CAC2S is intended to coordinate operations and facilitate communications between aviation forces and ground control); U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-13-311, MAJOR AUTOMATED INFORMATION SYSTEMS: SELECTED DEFENSE PROGRAMS NEED TO IMPLEMENT KEY ACQUISITION PRACTICES 139 (Mar. 2013), *available* at http://www.dote.osd.mil/pub/reports/fy2012/pdf/other/2012DOTEAnnualReport.pdf pg. 139 (Utilizing commercial software, CAC2S is intended to replace twelve outdated legacy systems in an attempt to completely transform and modernize existing command and control communication equipment in tactical vehicles, helicopters, airplanes, amphibious ships, and landing crafts but is not scheduled to be completely operational by the end of fiscal year. 2018).

ERP systems: ECSS in 2004 and DEAMS in 2003.[133] Upon the completion of both programs, ECSS would have provided comprehensive logistics information on all of the Air Force's physical assets, while DEAMS would transform the Air Force's financial management system and provide updated accounting capabilities, such as cost accounting and billing, for the entire Air Force.[134] Utilizing commercial off-the-shelf (COTS) financial software provided by Oracle, DEAMS was intended to replace eight outdated legacy systems vital to controlling the Air Force's finances.[135] When fully deployed, it is intended to be used by 30,000 Air Force personnel in 179 locations.[136]

Although ECSS was terminated, DEAMS continues to be an active Air Force program. As of September 2013, the Air Force had received about $427 million for DEAMS and has been approved by DOD for approximately $1.6 billion more.[137] Many of DEAMS's ongoing problems are similar to those encountered in the failed ECSS acquisition and appear to share an important root cause – failure to effectively implement BPR best practices. BPR requires businesses to effectively map out the current legacy systems and business processes that need to be changed or retired and then generate a new plan that would improve

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[133] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-12-177T, DOD FINANCIAL MANAGEMENT: CHALLENGES IN THE IMPLEMENTATION OF BUSINESS SYSTEMS COULD IMPACT AUDIT READINESS EFFORTS 5 (Oct. 2011), *available* at http://armedservices.house.gov/index.cfm/files/serve?File_id=0ef6aaf8-1675-4f2e-8477-04da46f66d4b.

[134] *Id.*; U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-08-866, AIR FORCE'S CURRENT APPROACH INCREASES RISK THAT ASSET VISIBILITY GOALS AND TRANSFORMATION PRIORITIES WILL NOT BE ACHIEVED 12 (Aug. 2008).

[135] U.S. DEP'T OF DEFENSE, DOD INSPECTOR GENERAL, DODIG-2012-111, AN UNRELIABLE CHART OF ACCOUNTS AFFECTED AUDIBILITY OF DEFENSE ENTERPRISE ACCOUNTING AND MANAGEMENT SYSTEM FINANCIAL DATA 4 (July 13, 2012).

[136] *Id.*; U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-12-134, DOD FINANCIAL MANAGEMENT: IMPLEMENTATION WEAKNESSES IN ARMY AND AIR FORCE BUSINESS SYSTEMS COULD JEOPARDIZE DOD'S AUDITABILITY GOALS 14 (Feb. 2012); U.S. DEP'T OF DEFENSE, DOD OPERATIONAL TEST AND EVALUATION, FISCAL YEAR 2012 ANNUAL REPORT (2012), *Available at* http://www.dote.osd.mil/pub/reports/fy2012/pdf/af/2012deams.pdf (According to AFOTEC, DEAMS did not adequately perform budget analysis and planning and decision analysis, leaving many users to rely on the old, outdated legacy systems to generate these analyses. Slowed business processes could slow decision-making processes leading to high costs and a less capable and prepared Air Force).

[137] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-14-152, DOD BUSINESS SYSTEMS MODERNIZATION: AIR FORCE BUSINESS SYSTEM SCHEDULE AND COST ESTIMATE (Feb. 2014) (As recently as early 2014, GAO found that the Air Force had not adopted acquisition best practices for DEAMS. For example, the GAO report found the Air Force's integrated master schedule for procuring DEAMS was "not comprehensive, well-constructed, credible, or controlled." The unreliability of the schedule calls into question the credibility of cost estimates for DEAMS, because these estimates are based on data derived from the schedule. This finding by GAO further demonstrates that the DEAMS program is not aligned with the DOD's overall efforts to modernize business processes); U.S. DEP'T OF THE AIR FORCE, AIR FORCE OPERATIONAL TEST AND EVALUATION CENTER, DEFENSE ENTERPRISE ACCOUNTING AND MANAGEMENT SYSTEM (DEAMS) (2012), *available* at http://www.dote.osd.mil/pub/reports/fy2012/pdf/af/2012deams.pdf) (According to the Air Force Operational Test and Evaluation Center (AFOTEC), however, as of 2012, many key features of DEAMS did not work and the program as a whole was "neither operationally effective nor operationally suitable.").

and transform the shortcomings of the old ones. These are called the "As-Is" and "To-Be" maps, respectively. The Air Force, to date, has failed to develop such maps for DEAMS.[138] In fact, early on, the DEAMS program office assumed that the final state of DEAMS would itself represent the "To-Be" solution – a clear misunderstanding of the purpose of developing maps prior to program implementation.[139]

Other ERP systems, including the Navy ERP program, also failed to develop these maps.[140] In Navy ERP's case, the DOD believed the maps were completed, but apparently did not verify that. As it turned out, the DOD Inspector General (DOD IG) later found that such maps never existed.[141] For future ERP system efforts, DOD leadership should review how BPR certifications are verified and if self-reporting can be relied on to determine if BPR is being properly implemented – especially among its largest, most expensive ERP systems.

As in ECSS, neither the Air Force nor the Navy executed sufficient planning before embarking on a radical change to their existing business processes, a direct contradiction of BPR guidelines. For the acquisition of future ERP systems, the DOD must ensure program executives adhere to these BPR guidelines as they are imperative to the successful

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[138] U.S. DEP'T OF DEFENSE, DOD INSPECTOR GENERAL, DODIG-2012-111, AN UNRELIABLE CHART OF ACCOUNTS AFFECTED AUDIBILITY OF DEFENSE ENTERPRISE ACCOUNTING AND MANAGEMENT SYSTEM FINANCIAL DATA 12 (July 13, 2012), *available* at .http://www.dodig.mil/audit/reports/fy12/dodig-2012-111.pdf.

[139] *Id.*

[140] *Id.* ("Navy ERP PMO stated that they did not develop 'As-Is' and 'To-Be' process maps even though they indicated on their BPR Assessment Form that these maps were developed.").

[141] *Id.* (The DODIG stated that "The objective of obtaining the 'As-Is' and 'To-Be' process maps was to determine if the DOD ERP systems documented business process maps that 'detailed what problems existed with the old business process and the subsequent corrections to those problems with the new process. During the course of our fieldwork, we requested the 'As-Is' and 'To-Be' process maps that would identify those problems and corrections and received a response that these items did not exist. We acknowledge that there may be other documentation that could be provided and examined that may show some support for business process reengineering. However, documenting the gap analysis of the 'As-Is' process to the commercial-off-the-shelf 'To-Be' process does not identify the existing problems and how the 'To-Be' process will correct those problems" By not identifying current limitations of the legacy systems (the "As-Is" map) or addressing how those issues will be resolved with the new ERP system (the "To-Be" map), there is no way for DOD to know if existing problems were corrected when transferring legacy systems to the new Navy ERP system.); U.S. DEP'T OF DEFENSE, DOD INSPECTOR GENERAL, DODIG-2012-051, NAVY ENTERPRISE RESOURCE PLANNING SYSTEM DOES NOT WORK WITH THE STANDARD FINANCIAL INFORMATION STRUCTURE AND U.S. GOVERNMENT STANDARD GENERAL LEDGER (Feb. 13, 2012), Available at http://www.dodig.mil/audit/reports/fy12/dodig-2012-051.pdf (In addition, a DOD Inspector General report concluded that Navy ERP "may not produce accurate and reliable financial information…[and] may not correct the Navy's long-standing material weaknesses." The DODIG reported that the Navy ERP did not properly follow the Standard Financial Information Structure (SFIS), which is a requirement by the DCMO that is intended to standardize financial reporting throughout DOD. According to the report, Navy officials again inaccurately completed self-assessment forms. In the forms, Navy officials stated that the Navy ERP was compliant with two elements of the SFIS compliance checklist, when in fact it was not. According to the report, the Navy did not implement these requirements into the new system and only complied with 53 percent of the outlined requirements from the 2010 SFIS.)

procurement and implementation of ERP systems. Before an ERP can be successfully procured, current capabilities of the legacy systems that need to be retired should be outlined so that ERP program leadership can correctly identify what specific capabilities the new system will replace. When program executives fail to define what legacy systems will be retired, new programs are put at risk of "requirements creep,"[142] which expands the program far beyond its original scope, therefore driving up costs and delaying the program's overall schedule. If programs start-off right with defined requirements and adequate planning regarding the understanding legacy systems, such undesirable outcomes will be less likely to occur.

BPR guidelines also recommend instituting extensive training programs for all personnel who will be affected by large-scale organizational changes.[143] In the case of the ECSS program, the Air Force failed to adequately train end-users, that is—those who would use the new system on a day-to-day basis, which led to confusion among Air Force personnel.[144] Similarly, according to a 2011 external review by a consulting firm, DEAMS end-users also reported confusion due to inadequate training. The report cited that users stated the training did not provide them with the necessary skills to perform day-to-day operations.[145] In fact, 53 percent of end-users indicated that their training did not prepare them for using DEAMS,[146] and as recently as

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[142] The tendency of the user (or developer) to add to the original mission responsibilities and/or performance requirements for a system while it is still in development, https://dap.dau.mil/glossary/Pages/2568.aspx.

[143] U.S. DEP'T OF DEFENSE, DEPUTY CHIEF MANAGEMENT OFFICE, DOD BUSINESS PROCESS REENGINEERING ASSESSMENT GUIDANCE 15 (2012), *available* at http://dcmo.defense.gov/products-and-services/business-process-reengineering/Revised%20BPR%20Assessment%20Guidance%209-28-12.pdf.

[144] *See* Section V of Report. With over 250,000 users potentially affected by ECSS, the Air Force was aware that a significant number of its personnel would resist the transition to a new system.[144] Yet, it was unable to develop an effective plan to overcome that resistance. In accordance with BPR's guidelines, the Air Force developed training plans to teach leadership and end-users about the benefits of transitioning to ECSS and its expected improvements to long-term operations. Much of the training, however, was centered on the overall program goals of ECSS, not the specific details on how it would affect end-users who would utilize ECSS'S supposed functionality on a daily basis. In an effort to gauge user-feedback on the effectiveness of the training plans, CSC developed surveys to sample those who participated. Like other failed aspects of ECSS, the surveys show the training plans lacked proper planning and execution, which led end-users to characterize the training as useless and confusing. Survey respondents also criticized the lack of effective training opportunities relating to ECSS. This only strengthened the resistance to change by Air Force personnel. An August 2009 survey noted that many of the respondents did not feel well-informed about the implementation plan for ECSS. *Id.*

[145] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-12-134, DOD FINANCIAL MANAGEMENT: IMPLEMENTATION WEAKNESS IN ARMY AND AIR FORCE BUSINESS SYSTEMS COULD JEOPARDIZE DOD'S AUDITABILITY GOALS 18 (Feb. 2012)(citing Booz/Allen/Hamilton, *Defense Enterprise Accounting and Management System (DEAMS) Spiral 2 Post-Deployment End-User Survey Report* (Fairview Heights, Ill.: Apr. 13, 2011)).

[146] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-12-134, DOD FINANCIAL MANAGEMENT: IMPLEMENTATION WEAKNESS IN ARMY AND AIR FORCE BUSINESS SYSTEMS COULD JEOPARDIZE DOD'S AUDITABILITY GOALS 15 (Feb. 2012).

December 2013, end-users still felt the training was inadequate.[147] According to the Office of the Director, Operational Test & Evaluation, these end-users outlined that the training focused on navigating the overall system, but it did not provide them with a "real understanding" of DEAMS and how it would impact their day-to-day business processes.[148] The failure to successfully execute a training program for personnel, a BPR guideline, is evident in both ECSS and DEAMS, as end-users in both cases felt unprepared and unwilling to accept the new business processes required for the successful integration of those ERP systems. Without convincing end-users that DEAMS will improve their daily work efforts, the Air Force risks the termination of another ERP system.

Similar to ECSS, the Air Force and Navy's failure to abide by BPR guidelines throughout the implementation of their respective ERP systems resulted in cost overruns, scheduling delays and decreases in capability. For DEAMS, the Air Force initially projected a total lifecycle cost of $419 million with full operational capability by fiscal year 2009.[149] But, due to scheduling delays and cost overruns, as of 2012 DEAMS's lifecycle cost had quintupled to $2.1 billion and the program will not be fully deployed until 2017.[150] The DEAMS program office conceded that these cost increases and scheduling delays stemmed directly from the program's undefined requirements and extensive customization of the commercial software, both directly attributable to failing to successfully plan for and implement BPR.[151] As to the Navy ERP system, GAO found that as of September 2012, the total cost of the Navy ERP system had increased by 31 percent, from $2 billion to $2.6 billion. That cost increase was similarly attributed, in part, to the need to add "requirements to support business process reengineering" and caused a two-year delay.[152] But, had Navy program management initially followed BPR guidelines and effectively defined program requirements early on, there may not have been a need to add requirements and increase costs.

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[147] U.S. DEP'T OF DEFENSE, DOD OPERATIONAL TEST AND EVALUATION, FISCAL YEAR 2013 ANNUAL REPORT 270 (2013), *available* at http://www.dote.osd.mil/pub/reports/FY2013/pdf/af/2013deams.pdf.

[148] U.S. DEP'T OF DEFENSE, DOD OPERATIONAL TEST AND EVALUATION, FISCAL YEAR 2013 ANNUAL REPORT 270 (2013), *available* at http://www.dote.osd.mil/pub/reports/FY2013/pdf/af/2013deams.pdf; U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM (ECSS) ACQUISITION INCIDENT REVIEW (AIR) TEAM FINAL REPORT 199, 221 (2013), PSI-USAF-06-000215 -000237.

[149] U.S. DEP'T OF DEFENSE, DOD INSPECTOR GENERAL, DODIG-2012-111, AN UNRELIABLE CHART OF ACCOUNTS AFFECTED AUDIBILITY OF DEFENSE ENTERPRISE ACCOUNTING AND MANAGEMENT SYSTEM FINANCIAL DATA 6 (July 13, 2012), *available* at http://www.dodig.mil/audit/reports/fy12/dodig-2012-111.pdf.

[150] *Id.*

[151] *Id.* at 5.

[152] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-13-311, MAJOR AUTOMATED INFORMATION SYSTEMS: SELECTED DEFENSE PROGRAMS NEED TO IMPLEMENT KEY ACQUISITION PRACTICES 77 (Mar. 2013).

Finally, CAC2S exceeded its original cost estimates by 578 percent, increasing from $347 million in August 2000 to $2.4 billion in September 2012.[153] Furthermore, CAC2S[154] is ten years behind schedule and will not achieve full deployment until September 2018.[155] These problems directly mirror the setbacks encountered in ECSS and can be attributed to the Air Force and Navy's failure to effect lasting cultural change among personnel and its inability to plan and execute a proper acquisition strategy. Without achieving these two integral requirements for successfully implementing business transformation, ERP system program executives are likely to encounter the same problems that led to ECSS's failure.

Although the Air Force continues to describe DEAMS as a program designed to establish streamlined financial standards[156] and improve data quality, basic functionality remains a problem.[157] In 2012, the GAO reported that DEAMS end-users were unable to perform ordinary day-to-day business processes such as processing travel expenses that they had easily performed by utilizing the legacy systems.[158] In addition, as of 2012, DEAMS was not able to produce the monthly accounts receivable aging report,[159] as originally intended,[160]

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[153] *Id.* at 19.

[154] *Id.* at 55, (As recently as Mar. 2013, GAO reported that the CAC2S program office was understaffed and that proper risk mitigation strategies were not in place. Sufficient staffing and proper risk mitigation strategies are pillars to successfully implementing BPR and were both, disregarded throughout ECSS'S failed implementation).

[155] *Id.* at 22.

[156] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-13-283, HIGH-RISK SERIES 134-135 (Feb. 2013) (DEAMS' failure to perform critical analyses not only threatens the overall success of the program, but it could ultimately hinder other Air Force capabilities that are dependent on DEAMS' productivity. For example, in 2010, Congress mandated that all financial statements for the DOD must be fully auditable by fiscal year 2017. "Congress codified these priorities in the National Defense Authorization Act (NDAA) for fiscal year 2010, which also mandated Sept. 30, 2017, as the date by which DOD is required to validate its financial statements as ready for audit. In 2011, the Secretary of Defense underscored the department's first priority with a directive that set an accelerated interim date of Sept. 30, 2014, for validation of one of DOD's financial statements—its SBR—as audit ready. Congress required that DOD's FIAR Plan be adapted to support this goal in the NDAA for fiscal year 2012." The Air Force intended to utilize ECSS and DEAMS to comply with this mandate. But due to the cancellation of ECSS, DEAMS and the leftover legacy systems are the only means, which the Air Force can utilize in order to adhere to this Congressional mandate. If DEAMS continues to exhibit failures as outlined above, the Air Force must rely on the legacy systems to comply with this mandate); U.S. Dep't of the Air Force, Expeditionary Combat Support System (ECSS) Acquisition Incident Review (AIR) Team Final Report (June 24, 2013), PSI-USAF-06-000376 (The Air Force, however, has admitted that its understanding of legacy systems is insufficient. If the Air Force's level of understanding is not improved and the DEAMS objectives are not achieved, the Air Force may not be able to comply with the Congressional auditability mandate.).

[157] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-12-134, DOD FINANCIAL MANAGEMENT: IMPLEMENTATION WEAKNESSES IN ARMY AND AIR FORCE BUSINESS SYSTEMS COULD JEOPARDIZE DOD'S AUDITABILITY GOALS 14-15 (Feb. 2012).

[158] *Id.* at 18.

[159] *Id.* at 13.

[160] *Id.* at 14, (According to the Office of Federal Financial Management, a financial system such as DEAMS must have the ability to generate an accounts receivable aging report which is a requirement of DOD financial management regulations).

and is not able to produce *ad hoc* query reports, which help users generate the data analysis necessary for their daily operations.[161] Instead, DEAMS end-users were forced to manually produce the accounts receivable aging report, utilizing the old, outdated legacy systems that DEAMS was intended to replace.[162] In fact, in 2011, an outside consulting firm review indicated that 48 percent of DEAMS end-users stated that their workload had actually *increased* after the partial implementation of DEAMS.[163]

If DOD managers responsible for DEAMS and these other ERP program executives had started their respective programs off right with a thorough understanding of the overall environment in which these systems would operate and used that understanding as a basis for stabilizing their operational requirements, the DOD may have avoided billions of taxpayer funds in cost overruns for programs far less capable than originally envisioned. Unless significant improvements are made to the acquisition of future ERP systems, billions in taxpayer dollars are at risk of being wasted on poorly planned programs. At the same time, the missions these ERP systems are intended to support could suffer from the DOD's failure to transform how it does business. If the DOD cannot truly commit to successfully implementing BPR guidelines, then the DOD's goal of streamlined business processes and reduced operating costs could be as enormously costly and elusive as ECSS.

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[161] *Id.* at 15, (According to the "Office of Federal Financial Management, a core financial system financial transaction must deliver an integrated ad hoc query capability to support agency access to and analysis of system maintained financial data.").
[162] *Id.*
[163] *Id.*

VII. CONCLUSION

For decades, the Department of Defense (DOD) has tried to transform how it does business by, among other things, modernizing its business systems. That modernization effort has included attempts to procure large commercial off-the-shelf (COTS) business systems called enterprise resource planning (ERP) systems. Whereas this effort was supposed to help the DOD transform itself into a more capable organization while providing savings to taxpayers from resulting efficiencies, the reality tells an altogether different story. To date, the DOD's attempts to procure many of these business systems have resulted in billions in cost overruns with disappointingly little to show for the large investments that supported them.

A contributing factor in this waste of taxpayer funds is the DOD's inability to redesign outdated and inefficient internal business processes to accommodate the integration of these large COTS systems. In other words, the DOD has failed to successfully implement "business process reengineering" (BPR). In connection with mergers and acquisitions, large businesses implement BPR successfully as they absorb smaller companies into existing business units—to maintain efficiency and competitiveness. Regrettably, however, the DOD has failed to do so, to the detriment of both service members and taxpayers.

Ultimately, ECSS was more than just a failure. It was an extraordinarily costly cautionary tale—the lessons of which must be clearly understood and aggressively leveraged by the DOD and Congress alike. If the lessons of ECSS are ignored, the DOD's overall multibillion-dollar effort to transform how it does business could instead become a colossal waste of taxpayer money.

a. The ECSS Program: An Organizational Disaster

In 2004, the Air Force envisioned ECSS as the logistics system of the future. ECSS was supposed to save billions of taxpayer dollars by streamlining hundreds of legacy logistics and supply-chain management systems worldwide.[164] But, the Air Force failed to effectively execute BPR best practices to make sure that this large-scale business systems procurement would start-off right. Coupled with a flawed acquisition strategy, this led to a breakdown in ECSS program leadership, a collapse in communication among ECSS personnel, and a failure to mitigate identified program risks.

To achieve the vision that was to be ECSS, the Air Force needed to understand what it wanted to change in the first place, namely its legacy system environment. Yet, when the Air Force began planning for ECSS,

[164] U.S. DEP'T OF THE AIR FORCE, EXPEDITIONARY COMBAT SUPPORT SYSTEM SYSTEMS INTEGRATOR ACQUISITION REQUEST FOR QUOTE (2005), PSI-USAF-01-002048.

it did not even know how many legacy systems the new system would replace. The Air Force has, on different occasions, used wildly different estimates on the number of existing legacy programs, ranging from "175 legacy systems" to "hundreds of legacy systems" to "over 900 legacy systems." To date, the Air Force still cannot provide the exact number of legacy systems ECSS would have replaced. The Air Force had even less of an understanding about how that legacy environment—particularly at the process-level—needed to be changed for ECSS to work.

As a consequence, the Air Force had to add, reduce, or remove program capabilities—effectively customizing this COTS system. That dramatically increased ECSS's costs, delayed the program's deployment, and continuously pushed the program further away from delivering required capability. The ECSS program also lacked strong leadership within the Air Force, which was desperately needed to prevent the program from careening toward disaster. The Air Force's use of six program managers for ECSS over its eight year lifecycle led to a dilution of attention and authority to enforcing BPR.

b. Similar Problems, Different ERP Systems

The failure of ECSS was not an anomaly. Currently other ERP systems, such as the Air Force's Defense Enterprise Accounting and Management System (DEAMS), Navy ERP, and Common Aviation Command and Control System (CAC2S), are exhibiting similar deficiencies, including a lack of BPR and unstable requirements. Program managers for these ERP systems appear to be repeating many of the costly mistakes made by ECSS's leadership, which may put these programs on a similar path to failure. The Government Accountability Office (GAO), the DOD Inspector General, and Congress have separately issued reports and legislation warning the DOD that it must improve how it implements BPR.

A 2011 GAO review of the Air Force's DEAMS program indicated that 48 percent of DEAMS end-users stated their workload actually *increased* as a result of the program's implementation. Where the goal of an ERP system is to increase efficiency and streamline operations, new ERP systems should not result in more work for end-users. Such outcomes only increase the resistance by end-users to accept the new program and make the necessary process-changes that are needed for full implementation. It also detracts from the DOD's overall business transformation effort. As DEAMS is behind schedule by 7.5 years (full-deployment scheduled for 2017) and over budget by $1.7 billion, the DOD must take immediate corrective actions to ensure its success.

Additional problems continue to present themselves in other ERP systems, like Navy ERP, which received funding based on incomplete BPR data provided by program executives. The DOD seems to rely too heavily on self-reporting by program offices and has in some cases failed to review the required BPR foundational documents, which are supposed to ensure the success of large defense business systems. This not only creates problems years down the line when attempting to integrate the new ERP system with legacy systems but it allows program executives to continue producing poor cost, schedule and performance outcomes without ever being held accountable for mistakes made on their watch. The DOD must enlist the right leadership that understands what must be done to ensure the success of a large business systems procurement effort and verify—at least among the largest and most expensive ERP systems—that pertinent information is factually correct and that BPR guidelines are being followed.

c. A Call for Change

Before Congress authorizes or appropriates a single dollar towards any DOD effort to procure an ERP system, the DOD should be able to answer a few questions: (1) what is this new business system supposed to accomplish and what existing capabilities will the DOD retire or update; (2) how amenable is the recipient organization or the business unit(s) (and its relevant workforce) to accepting this system; and (3) if resistance to change has been identified, what is the DOD's plan to overcome that resistance and how will it measure performance. Such an approach, which is reflected in the current statutory and regulatory BPR oversight framework, would potentially save taxpayers the agony of watching their hard-earned money wasted and better position the DOD to achieve its goals for these programs.

An October 1994 GAO report stated that the DOD seemed "to be primarily driven by cost avoidance, rather than on BPR in order to meet mission requirements."[165] Twenty years later and billions of dollars wasted, this still seems to be the case as the DOD struggles to successfully implement BPR within existing and future ERP systems. Moving forward, for those ERP systems that are currently afflicted by the causal factors that led to ECSS's failure, the DOD must do more to make sure that billions of dollars are not being wasted before taking sufficient action.

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[165] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO/NSIAD-95-28, DEFENSE MANAGEMENT-IMPEDIMENTS JEOPARDIZE LOGISTICS CORPORATE INFORMATION MANAGEMENT 20 (Oct. 1994).

APPENDIX 1: CHRONOLOGY OF MAJOR EVENTS

- **May 2005:** ECSS New Start signed

- **August 2005:** Acquisition Decision Memorandum (ADM) Signed for Milestone A (MS A)

- **October 2005:** COTS Contract Award to Oracle (Contract protested and re-established in May 2006)

- **September 2006:** SI Contract Award to CSC (Contract protested and re-established in March 2007)

- **October 2008:** Oracle Product Suite Integration Issue Reported
  - A lack of internal integration with the Product Suite (Oracle, IFS, and Click Commerce) was identified in June 2007.
  - Integration became a "regular watch item" during ECSS Program Management Reviews (PMRs).

- **September 2009:** Way-Ahead/Contract Restructure Complete
  - Oracle delivered software as mandated by RFQ. However, it did not meet the Air Force's requirements as the integration contract language was not clearly defined. This caused the program schedule and cost to be revised causing CSCs design efforts to be delayed.
  - This Contract Restructure required an amended Milestone B (MS B) decision timeline as well as an updated MS A ADM.
  - The Way-Ahead would utilize Oracle-only products in an effort to mitigate risk.
  - According to the Air Force, the Way-Ahead increased the total program cost from the original $1.6B to $2.8B and delayed Milestone B from the original date of December 2007 to May 2010.

- **December 2009:** Program Restructure Complete
  - With the restructure, the ECSS Program Manager (PM) and Program Executive Officer (PEO) roles were merged and reported directly to the Service Acquisition Executive (SAE) (Secretary of the Air Force for Acquisition (SAF/AQ)).

- **August 2010:** ADM directing Program Assessment
  - MS B delayed to November 2010

- **February 2011:** Critical Change Restructure 1 Submitted to Congress
  - ECSS failed to meet Full Deployment Decision within five years of when funds were first obligated.
  - After the critical change was approved by Congress, ECSS funding was increased by $50M to a total of $905M in order to accommodate the MS B decision by April 29, 2011.

- **April 2011:** Overarching Integrated Product Team (OIPT) Milestone B Readiness Defense Acquisition Board (DAB)
  - MS B was missed by over one year (scheduled to be complete by May 2010 as listed above).

  - The restructure from 2009 was intended to ensure the completion of Milestone B.
  - Air Force proposes to transfer core accounting improvements to DEAMS should ECSS fail.

- **July 2011:** Contract Restructure Complete and Signed

- **September 2011:** ECSS Defense Acquisition Board Recommends De-Scope
  - DAB recommends removing Pilot C from ECSS requirements and returning decision making responsibility for ECSS essential for cost control and reaching auditability.

- **October 2011:** CSC Path to Auditability Proposed
  - The Air Force took additional steps to assure audit compliance requirements. According to April 2011 DAB, ECSS was "key to auditability and cost savings."

- **February 2012:** Critical Change 2 Begins
  - When ECSS missed the target date for MS B and the Recovery Plan failed, another Critical Change occurred.

- **March 2012:** Partial CSC Contract Termination

- **April 2012:** Air Force begins ECSS Deep Dive and Way Ahead Briefings

- **September 2012:** Senior Air Force leadership determines ECSS would not meet FIAR compliance and discuss potential cancellation of ECSS.

- **October 2012:** MDA recommends ECSS program cancellation.

- **December 2012:** ADM Terminates Program
  - The termination ADM signed on December 11, 2012 directed the cancellation of all ECSS contractual activities and authorizes $2.1M to execute a smart shutdown by March 31, 2013.

- **March 2013:** ECSS Program Shutdown Complete

APPENDIX 2: GLOSSARY OF KEY TERMS

GLOSSARY OF ACRONYMS

ADM	Acquisition Decision Memorandum
AF	Air Force
AFOTEC	Air Force Operational Test and Evaluation Center
AFPD	Air Force Policy Directive
AF-IPPS	Air Force Integrated Personnel and Pay System
AIR	Acquisition Incident Report
AoA	Analysis of Alternatives
APS	Advanced Planning and Scheduling
ASR	Acquisition Strategy Report
BCL	Business Capabilities Lifecycle
BPEL	Business Process Execution Language
BPR	Business Process Reengineering
BTA	Business Transformation Agency
CCR	Critical Change Report
Clinger-Cohen Act	Information Technology Management Reform Act of 1996
CIO	Chief Information Officer
COTS	Commercial-Off-The-Shelf
CSC	Computer Science Corporation
DAB	Defense Acquisition Board
DCAPE	Director of Cost Assessment and Program Evaluation
DCMO	Deputy Chief Management Officer
DDRS	Defense Departmental Reporting System
DEAMS	Defense Enterprise Accounting And Management System
DOD	Department of Defense
DODI	Department of Defense Instruction
DTM	Directive-Type Memorandum
ECSS	Expeditionary Combat Support System
ERP	Enterprise Resource Planning
FIAR Plan	Financial Improvement Audit Readiness Plan
FY	Fiscal Year
GAIT	Global Analytic IT Services & Lighthouse Technologies Inc.
GAO	Government Accountability Office
GFE	Government-Funded Equipment
GCSS-AF	Global Combat Support System-Air Force
IG	Inspector General
IPA	Independent Public Accountant
IT	Information Technology
LogFins	Logistics Financials
LM	Logistics Manager
MAIS	Major Automated Information System
MAJCOM	Logistics Managers and Major Commands
MDA	Milestone Decision Authority
MS A	Milestone A
MS B	Milestone B
NDAA	National Defense Authorization Act
NSN	National Stock Numbers
OCM	Organizational Change Management
OCMP	Organizational Change Management Plan

OCR	Organizational Change Request
OIPT	Overarching Integrated Product Team
OPSS	Online Performance Support System
Oracle	Oracle Corporation
ORD	Operational Readiness Document
PARCA	Performance Assessments and Root Causes Analyses
PCA	Pre-Certification Authority
PCN	Process Change Notices
PEO	Program Executive Officer
PLM	Product Lifecycle Management
PM	Program Manager
PMO	Project Management Office
PMR	Program Management Reviews
PSI	Senate Permanent Subcommittee on Investigations
PWS	Performance Work Statement
RFQ	Request for Quote
SAE	Service Acquisition Executive
SAF/AQ	Secretary of the Air Force for Acquisition
SASC	Senate Armed Services Committee
SBR	Statement of Budgetary Resources
SI	System Integrator
SME	Subject Matter Expert

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