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INSTITUTE FOR DEFENSE ANALYSES

Assessment of DoD Enterprise Resource Planning Business Systems

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Executive Summary

Background

The DoD enterprise is a unique business model. Its annual budget is equal to the 17th largest economy in the world. Its size, diversity of many interconnected businesses, and a mission that requires its personnel to train and fight and offer humanitarian assistance anywhere in the world on an immediate and contingency basis make finding a comparable business model in industry impossible. The Department's business of achieving its missions equates to an economy more than a commercial business.

Designed to transform business operations, Enterprise Resource Planning (ERP) systems are enabling technologies composed of integrated modules that make up the core engine of transaction processing. Their effectiveness depends on the ability and willingness of an organization to change its behavior and its processes. These principles and success factors have been learned over the past 20 years, as commercial-off–the-shelf (COTS) software has become the primary enabler for meeting business transformation expectations.

The Study

DoD has identified key systems that are essential to its efforts to transform business operations. As of December 2009, DoD had invested over $5.8 billion in ERPs and will invest additional billions before the ERPs are fully implemented. Most of these programs are over budget, behind schedule, and have not met performance expectations. The House Armed Services Committee (HASC) "directed the Secretary of Defense to have an outside company or other entity conduct an independent analysis of DoD financial IT systems and submit the findings to the congressional defense committees within 180 days after the date of the enactment of this Act. This assessment should determine if there are overlaps in capabilities currently in development, and how well these programs are able to adhere to cost and schedule. This assessment should include service programs, as well as any program being developed by the defense agencies.[1]" In response to this request, the DoD tasked the Institute for Defense Analyses (IDA) to: (1) determine the status of the ERPs, (2) investigate capability overlaps, (3) analyze cost and schedule overruns; and (4) provide recommendations on the DoD business system investment strategy and propose possible corrective action.

[1] U.S. Congress. House of Representatives. Committee on Armed Services. *National Defense Authorization Act for Fiscal Year 2010*. 111th Cong., 2010.

Senior Defense leaders are increasingly aware that the economic environment demands that the DoD move from "defense readiness at any cost" to "defense readiness at the best value." While DoD sees the potential of ERPs to lead to a clean financial audit, the issues affecting successful fielding of IT capabilities and a clean financial audit go beyond system acquisition. Therefore, this comprehensive study addresses aspects of policy, organization, training, personnel, and leadership. During the study, the following questions were considered from the enterprise, operational, and financial/transactional viewpoints:

- What is the level of congruency organizationally and financially between the DoD enterprise and large commercial firms with like global footprints?
- What has to happen for the current ERPs to be successful components of the overall IT investment strategy?
- To what degree is there overlap in capabilities, and is there benefit to some redundancy in capabilities?
- How do current policy (e.g., the Chief Financial Officers Act of 1990[2] (CFO Act)), briefings, and audits affect programs?
- To what degree should the voice of the users prevail when making decisions about operational systems?
- To what degree is DoD realizing the full capabilities of ERP investments made at service components and Other Defense Agencies (ODA)?
- What progress has been made towards achieving a clean audit opinion?
- As a result of investments to date in DoD, what general progress has been made towards more streamlined and efficient operations?

Principal Findings

IDA is not confident that DoD's current ERP implementation strategy will deliver the expected capabilities on time and within budget.

At the DoD enterprise level apparent capability overlaps reflect different capabilities at the operational or transactional level to support specific business operations and missions of the Department. At the Service and Agency overlapping missions could equate to capability overlap, but consolidating these capability overlaps into the DoD enterprise could break the overall business process within a Service or Agency.

There is confusion about the connection between ERPs and auditability. The Services are using ERPs as the primary enabler for business modernization and financial improvement. They expect ERPs to provide enforcement of referential integrity across all dependent data elements, transactional traceability, visibility of key information (budget execution, assets), improved

[2] Pub. L. No. 101-576, 104 Stat. 2838 (November 15, 1990).

operational controls and cost accounting, minimal manual intervention for reconciliation, and seamless business process execution across and between functional stovepipes. However, this is not the way the systems are being implemented.

Incentives to achieve expectations are not aligned with how DoD budgets and allocates resources to programs. For instance, a program manager with the courage to recommend changing a program's course (e.g., pausing, streamlining, or cancelling a program) must continue to meet cost and schedule thresholds or funding will be lost. A program manager who is forthcoming is not necessarily rewarded.

The commercial business goals of making a profit, remaining solvent, and limiting risk/liability, and the implicit tax strategies (valuation and depreciation) are inconsistent with the DoD business model. DoD and its components have a higher congruency with "Defense as an economy" rather than "Defense as a Commercial Business" which has profound implications regarding the value of comprehensive commercial-style financial statements. Because the federal government answers to taxpayers, not shareholders, as its primary stakeholders, the existence and completeness of DoD assets are important business indicators AND valuable to DoD operations. A cost accounting approach would be more meaningful to DoD.

The Department's new Chief Management Officer (CMO) construct for business operations may provide the top-level support needed to break through the organizational friction points caused by the functional stovepipes in the DoD enterprise. DoD has made progress in many business areas, including improper payments, instituting internal controls, and vendor compliance. However, consistent and sustainable enterprise-wide gains must still be achieved.

Principal Recommendations

DoD and Congress need to assess the DoD business model[3], gain an appreciation of how it differs from a corporate business model, and apply the appropriate information technology solution(s) for the DoD business model. Furthermore, the financial representation of DoD's business must take into account these differences.

DoD should stop the pursuit of comprehensive financial statement audits. Instead, audit readiness with a specific focus on the Statement of Budgetary Resources (SBR) should be accomplished. Furthermore, all other audit readiness activities should be evaluated as to their operational value before resources are expended. For example, asset visibility, existence, and completeness are critically important from compliance and operational perspectives and are therefore high value activities. The accounting of costs should be the primary focus of the Department.

Where there is no significant deployed user base of any Service-level ERP, DoD should curtail the deployment of the ERP in FY12 and beyond, pending a thorough review of the

[3] Headquarters, operational, and supporting organizations and how these organizations meet the objectives of a federal defense agency. Understand what success means for these organizations.

organizational environment in which the ERP will operate, clear definition of the problem the ERP is attempting to solve, determination of the alignment with ERP capabilities, and development of an implementable data strategy.

DoD should define a way forward based upon solutions at a level in the organization where a single accountable leader has the span of control to define, implement, and execute the end-to-end business processes the IT investment is intended to support. In doing so, DoD should:

- Obtain a clear understanding of today's business problems – taking into account improvements and changes (e.g., policy, deployments of other IT investments) that still process *outside* the ERP program.
- Recognize organizational constraints—both mission and political—and demand verification of activities that are geared towards high performance, not just high compliance.
- Initiate an objective assessment of what the ERP programs can realistically deliver.
- Create an open environment where decisions to cancel programs have incentives congruent to decisions to continue programs. When a program manager recommends changing a program's course (e.g., pausing, streamlining, or cancelling a program), program leadership should consider re-allocation of funds.
- Implement IT solutions that address the entire Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities (DOTMLPF) spectrum, not just one particular component at the expense of another.
- Establish an environment beyond leadership and demand an era of stewardship as the baseline for managing the Department's IT investments. That is, an investment must have a common purpose that achieves an outcome beyond just one department.

All oversight and reviews of MAIS business programs should be coordinated and streamlined through the OSD and Military Departments (MilDep) Deputy CMOs using the Investment Review Boards in accordance with the Business Capability Lifecycle[4].

- The MilDep DCMOs should provide the business portfolio view and collective position of the Service to the OSD DCMO. The MilDep DCMOs must also serve as the Chief Collaboration Officers between their MilDep and sister Services to ensure best practices are leveraged and the best of DoD's IT investments are brought forward for the benefit of the whole Department.

- The MilDep DCMOs should be empowered with the authority and responsibility for establishing the strategy and execution of business modernization for their Department. This should include the systems and ancillary resources associated with these programs.

[4] USD (AT&L) memo of 15 Nov 2010, Interim Acquisition Guidance for Defense Business Systems (DBS).

Table of Contents

1. Introduction 1
2. ERP Fundamentals and the DoD Approach 5
3. Leadership, Stewardship, and Governance 13
4. Organizational Alignment 17
5. People and Culture 23
6. Architecture, Processes, and Systems 27
7. Metrics 33
8. Principal Findings and Conclusions 36

Appendices ..... CD (Enclosed)

List of Figures

Figure 1. DoD Business Mission Area 7
Figure 2. The Complexity of DoD business information flows – simplified 8
Figure 3. Procure to Pay 9
Figure 4. DCMO balancing competing priorities 21

List of Tables

Table 1. Major Financial and Logistic ERP Systems within the DoD 11

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1. Introduction

1.1 House Committee on Armed Services (HASC) Request

The House Committee on Armed Services (HASC) is concerned about the Department of Defense's (DoD's) continued lack of progress in implementing sound information technology (IT) systems for business management in general, and financial management in particular. DoD systems for financial and contract management and business system modernization have been on the Government Accountability Office (GAO) high-risk list for nearly fifteen years. As long as the Department lacks effective financial management systems, it will not be able to achieve the level of transparency required to receive a clean audit opinion. Implicit is the expectation that increasing financial transparency and moving towards an unqualified audit opinion will allow the Department to invest additional resources in higher priorities.

1.2 Background

DoD has identified key Enterprise Resource Planning ERP systems, as essential to its efforts to transform its business operations. As of December 2009, DoD had invested over $5.8 billion in ERPs and will invest additional billions before the ERPs are fully implemented. Most of these programs are over cost, behind schedule, and/or have not met performance expectations.

- Significant changes that coincided with the development of this report signaled an increased focus on fiscal responsibility including:
- In early August 2010, Secretary of Defense Robert Gates called for high impact efficiencies in the Department, including the disestablishment of a Combatant Command (COCOM), a defense agency, and an OSD organization.
- The potential competition for funding had expanded beyond the traditional DoD weapon system comparisons to include health care, consumer protection, and anticipated energy initiatives.
- A newly formed Debt Commission made recommendations indicating that all debt reduction options, including cuts in the DoD's budget, are being considered as a way to reduce government spending.
- Three days before the Debt Commission released its recommendations, the November 2010 election changed leadership in the House of Representatives.

1.3 The Pursuit of a Clean Audit Opinion

Congress has made several attempts in legislation (the Chief Financial Officer Act, the Government Performance and Results Act, the Clinger-Cohen Act, and various National Defense Authorization Acts) to improve government or DoD business operations, increase performance information visibility, and achieve clean audit opinions. The Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005[5] directed the establishment of a Business Enterprise Architecture (BEA), "which shall be sufficiently defined to effectively guide, constrain, and permit implementation of interoperable defense business system solutions and consistent with the policies and procedures established by the Director of the Office of Management and Budget."

In 2005 the DoD Comptroller established the DoD Financial Improvement and Audit Readiness (FIAR) Plan to manage DoD-wide financial improvement efforts and to integrate those efforts with the Department's enterprise transformation activities. The May 2010 FIAR Plan Status Report states that the Component ERPs are "necessary" to obtain and sustain an unqualified opinion on their Statement of Budgetary Resources (SBR), which is the current focus of the DoD Comptroller's auditability efforts.

DoD has identified nine ERP systems as essential to transform business operations. As of December 2009, DoD had invested over $5.8 billion in ERP systems and will invest additional billions before the ERPs are fully implemented. Most of these programs are over cost, behind schedule, and/or have not met performance expectations.

1.4 Study Scope

Successful fielding of complex ERP systems and the attainment of a clean financial audit requires actions that go well beyond acquisition of a system. Therefore, this study takes a comprehensive perspective, addressing additional aspects of Doctrine, Organization, Training, Materiel, Leadership and Education Personnel, and Facilities (DOTMLPF). During the study, the following questions were considered from the enterprise, operational, and financial/transactional viewpoints:

- What is the level of congruency organizationally and financially between the DoD enterprise and large commercial firms with like global footprints?
- What has to happen for the current ERPs to be successful components of the overall IT investment strategy?
- To what degree is there overlap in capabilities, and is there benefit to some redundancy in capabilities?

[5] Pub. L. 108-375, div. A, title III, § 332(c), Oct. 28, 2004, 118 Stat. 1851.

- How do current policy (e.g., the Chief Financial Officers Act of 1990[6] (CFO Act)), briefings, and audits affect programs?
- To what degree should the voice of the users prevail when making decisions about operational systems?
- To what degree is DoD realizing the full capabilities of ERP investments made at service components and Other Defense Agencies (ODA)?
- What progress has been made towards achieving a clean audit opinion?
- As a result of investments to date in DoD, what general progress has been made towards more streamlined and efficient operations?

1.5 IDA's Role and Methodology

In its report on the National Defense Authorization Act for Fiscal Year 2010[7] (NDAA 2010), the Committee directed the Secretary of Defense to have an outside company or other entity conduct an independent analysis of DoD financial IT systems and submit its findings within 180 days of the enactment of NDAA 2010.[8] The HASC launched this study to determine the status of Enterprise Resource Planning (ERP) system efforts, to investigate capability overlaps, to analyze cost and schedule overruns, and to provide recommendations and possible corrective actions.

Although DoD had initiated earlier action to respond to the Congressional request, further analysis was warranted to fully satisfy this request. As a result, IDA was tasked to independently evaluate the progress of the Department with regard to:

- Realizing the full capabilities of ERP investments at service components and Other Defense Agencies (ODA), such as the Defense Logistics Agency (DLA);
- Progress towards achieving a clean audit opinion; and
- General progress towards a more streamlined and efficient operations as a result of investments made to date.

To accomplish the objectives described above, IDA:

1. Identified, collected, and reviewed relevant business systems documentation, including DoD, Service, and Defense Agency strategic and operational policies and plans; acquisition-related documentation; financial and budget data; enterprise and program architectures; external studies and reports; and other related information.
2. Conducted interviews with OSD, Defense Agency, and Service senior leadership in acquisition, budget, and finance, military department Chief Management Officers

[6] Pub. L. No. 101-576, 104 Stat. 2838 (November 15, 1990).

[7] National Defense Authorization Act for Fiscal Year 2010, Pub. L. 111-84, Oct. 28, 2009, 123 Stat. 2190.

[8] H. Rept. 111-166, p. 375, June 18, 2009.

(CMOs), and program management personnel. IDA used the Assessment Framework described in Appendix G to facilitate the organization of the information.

3. Reviewed and analyzed historical and planned cost and schedule data, capabilities, performance, financial and budget information, and future planning for major ERPs, including the Navy ERP, Defense Enterprise Accounting and Management System (DEAMS), Expeditionary Combat Support System (ECSS), General Fund Enterprise Business System (GFEBS), Logistics Modernization Program (LMP), and Defense Agency Initiative (DAI). IDA assessed the underlying causes of cost overruns, the organizational structure used for ERP strategic and operational decision-making, acquisition-related and architectural material, including the Business Enterprise Architecture (BEA), and auditability requirements and planning.
4. Analyzed the maturity and effectiveness of the ERPs and ancillary systems implemented by the Air Force, Army, Navy, Defense Finance and Accounting Service, TRICARE and Defense Logistics Agency.
5. Studied the ERP implementations of some companies with global footprints.
6. Based on the review and analysis of the documentation, interviews, and analysis, developed findings, conclusions, and recommendations for the following issue areas relevant to the assessment of ERP implementation:
    - Leadership, Stewardship, and Governance
    - Organizational Alignment
    - People and Culture
    - Architecture, Processes, and Systems
    - Metrics

Drawing from the issue area analyses, this report concludes with principal conclusions and recommendations.

The specifics of the analysis found in the appendices were the basis for most of the conclusions and recommendations.

2. ERP Fundamentals and the DoD Approach

The findings in this document depend upon an understanding of certain key principles of application software implementation, including what, at a minimum, is required to implement ERP successfully in any organization, including DoD. These principles and success factors have been learned over the past 20 years, as commercial-off–the-shelf (COTS) software has become the primary enabler of business transformation in both industry and the Department.

The configuration and behavior of software systems reflect existing organizational and execution characteristics and constraints. Software systems are not intrinsically strategic; ERP is an enabling technology, a set of integrated modules that make up the core engine of transaction processing. An ERP cannot and should not be used as a forcing function; rather, the ability and willingness of an organization to change its behavior and its processes is a prerequisite for successful ERP implementation.

The interviews conducted (See Appendix I) confirmed the literature regarding the critical success factors for implementing ERP systems. Successful implementation of an ERP, meaning that benefits and operational improvements are realized to the planned extent, is contingent upon such fundamental foundations as:

- Sustained involvement of senior leadership with authority over and accountability for the definition and execution of all end-to-end processes impacted by the ERP.
- Leadership willingness and ability to make hard decisions relative to proceeding or not proceeding with an implementation based on program performance.
- Strong integrated governance that includes representation of and participation by all impacted stakeholders. The representatives must have the authority to make decisions that are binding on the communities they represent. Decisions must be made rapidly and the effectiveness of the governance must be actively measured and reported.
- An organizational operating model (structure and process) aligned to the design of the ERP with minimal requirements to cross-organizational boundaries and which execute components of a process outside of the ERP, thus breaking the inherent integration of the ERP.
- A strategy and approach that address the root cause (not just the symptoms) of the problems being solved and the measurable operational improvement to be gained by solving them.

- Personnel with the requisite skill set and experience necessary to define and execute an ERP implementation (e.g., source selection, contracting, vendor management, change management, technical oversight).
- Defined metrics for operational improvement to be gained, supported by a baseline describing existing business performance.
- Accurate, consistent, and authoritative data.

To succeed, ERP implementations must balance these fundamental principles and foundations with those organizational constraints that cannot be changed and the constraints of the design of the selected ERP software.

2.1 DoD Strategy for Business Modernization and Financial Improvement

According to the 2010 FIAR plan, the Department's financial improvement goal is to become an auditable enterprise by focusing on improvements to business and financial processes, controls, systems, and data to achieve accurate, reliable, and timely financial information for decision makers, validated by successful financial statement audits.

DoD's overarching strategy is to first achieve auditability at the Component level. Specifically, the individual Component financial improvement plans, viewed collectively, comprise the Department's FIAR plan. The Service and Agency ERPs are an important and necessary component of their current approach to achieving, obtaining, and sustaining an unqualified opinion for either full financial statements or the SBR.

OSD provides the focal point for Business Modernization by taking DoD enterprise perspective and using the only organizational construct it has ownership of—the OSD Principal Staff Assistants (PSAs) who lead the various functional stovepipes[9] and the Deputy Chief Management Officer (DCMO). This perspective views the entire department as a single enterprise. Within that view, each Service and Defense Agency—and possibly other components such as Combatant Commands—are also seen as being part of the DoD enterprise.

ERP software typically organizes transactions into end-to-end processes across multiple business units and supporting organizations within an enterprise. DoD views these end-to-end processes as a way to overcome the deleterious effects of the functional stovepipes by describing an enterprise as the Service or Agency implementing the ERP. Typical ERP processes include:

- Acquire-to-Retire
- Budget-to-Report
- Concept-to-Product
- Cost Management

[9] Non-operational staff roles are colloquially described within DoD as functional stovepipes.

- Deployment-to-Redeployment/Retrograde
- Environmental Liabilities
- Hire-to-Retire
- Market-to-Prospect
- Order-to-Cash
- Plan-to-Stock – Inventory Management
- Procure-to-Pay
- Proposal-to-Reward
- Prospect-to-Order
- Service Request-to-Resolution
- Service-to-Satisfaction

Figure 1 illustrates how OSD sees the end-to-end processes, Service ERP strategy, and OSD stovepipes interrelating. In this view, the Department appears to be a single enterprise with uniform processes across all components. The whole appears simple and manageable. The difficulty is that while transactions happen across multiple stovepipes, each stovepipe (the set of processes within DoD itself or within a Service or Defense Agency) controls what data it passes on to the others—there is no real federation across multiple ERP implementations—without appropriate attention to aligning the interfaces. This approach cannot produce a coherent system across the DoD enterprise.

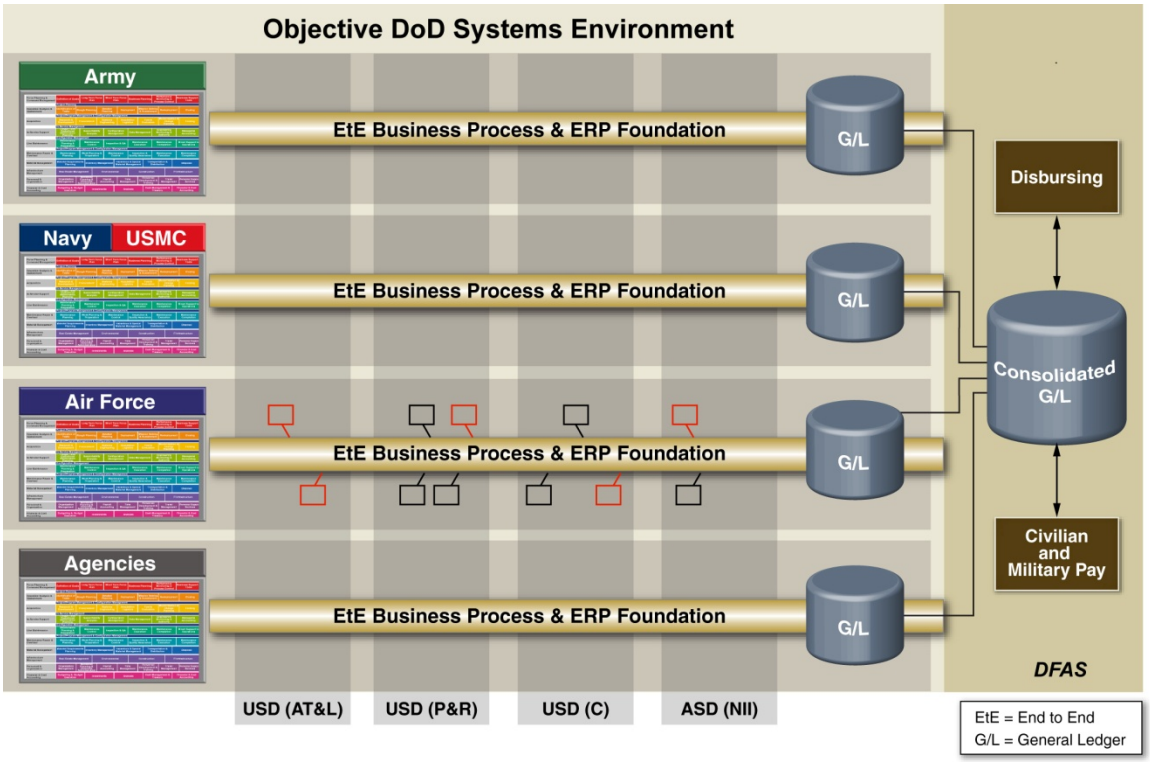

Figure 1. DoD Business Mission Area

Figure 2, however, shows the information flows more realistically and demonstrates that no one Service, Agency, or even OSD, controls the end-to-end processes. To meet mission requirements, given the organizational structure of DoD, business information often travels across multiple organizational boundaries and multiple ERPs.

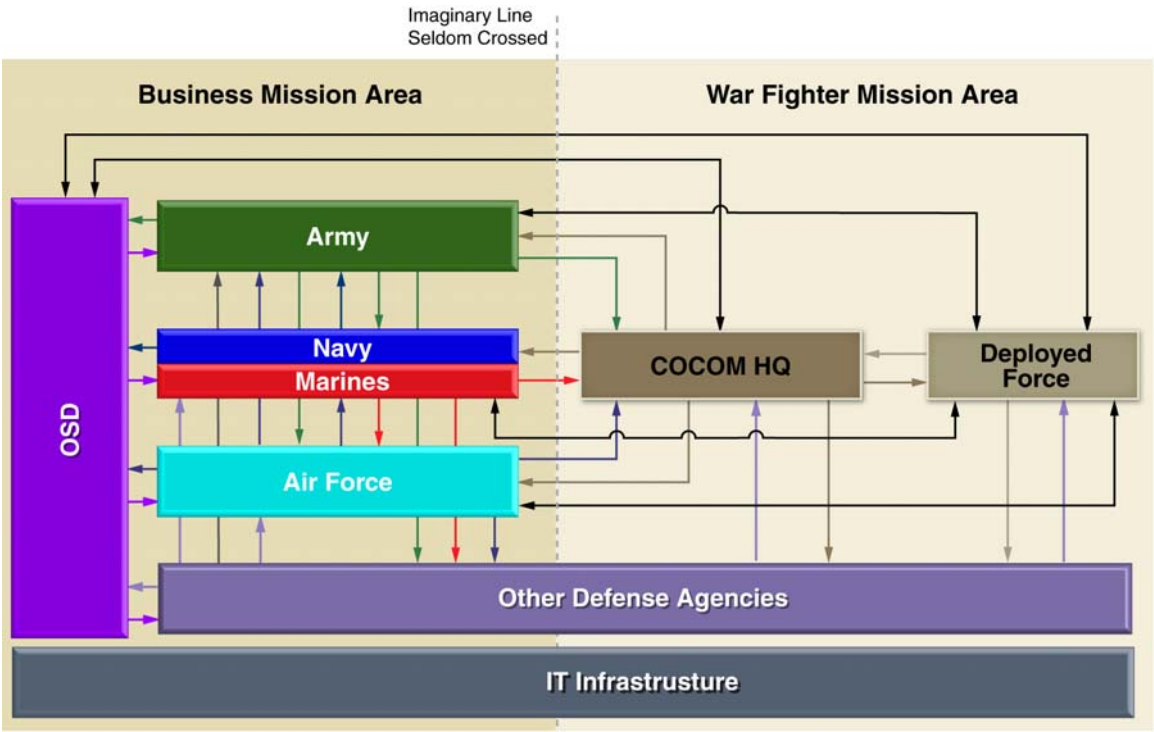

Figure 2. The Complexity of DoD Business Information Flows – Simplified

As an example, consider the end-to-end process for Procure-to-Pay. The information flows, systems, and organizations involved are depicted in Figure 3. DoD's strategy has the core ERPs allowing other organizational systems to receive and take control of the data, process that data, and then return the resulting processed data back to the originating ERP.

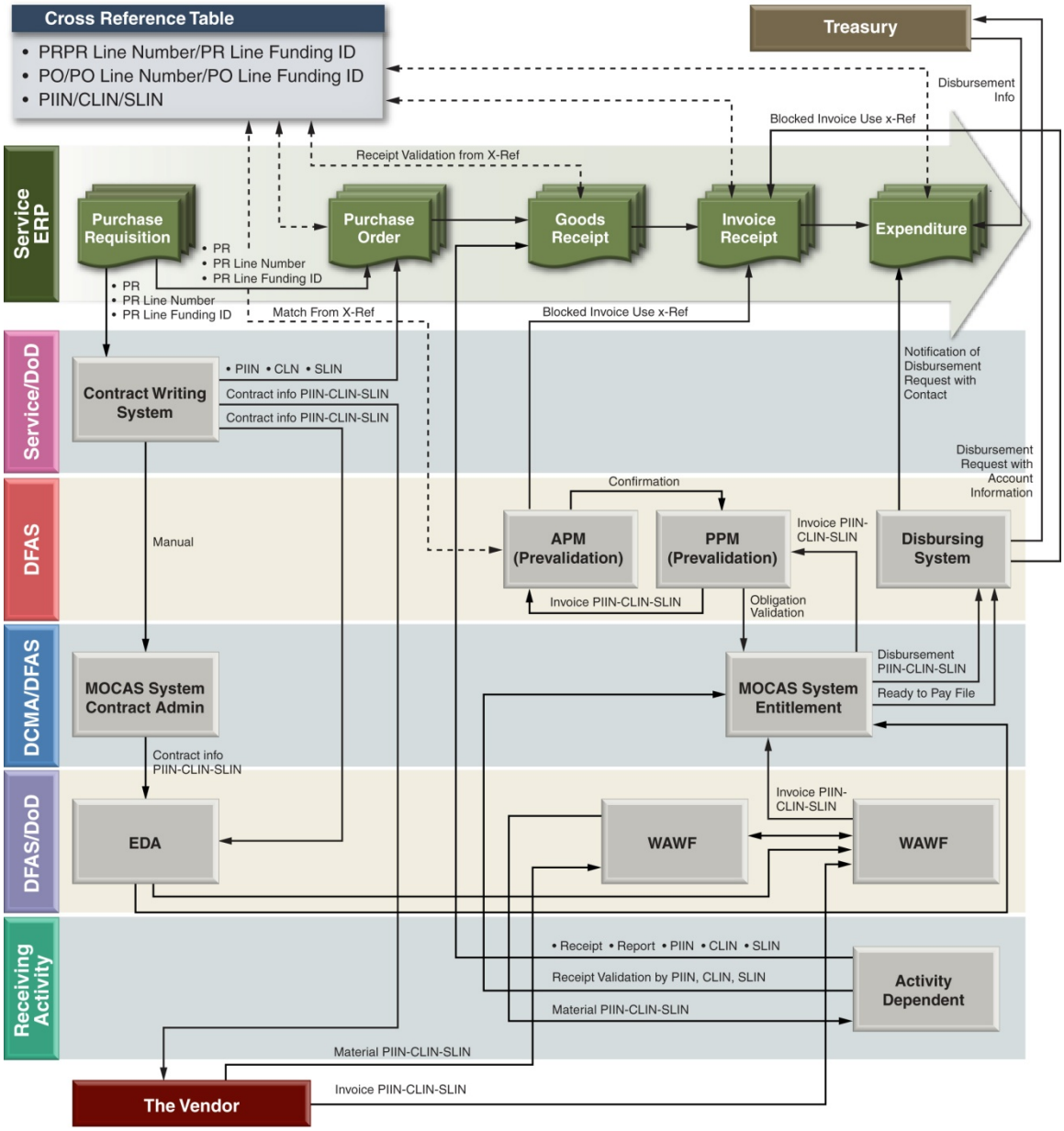

Figure 3. Procure to Pay

If a Service member assigned to a COCOM places an order for some materiel, that order will be placed through the ERP system of the Service that is the Executive Agent for the COCOM (the ordering Service member may or may not belong to the Executive Agent Service). The primary principle underlying DoD financial modernization is that regardless of which Service receives it, the order will follow the process in Figure 3. However, because each Service has a slightly different process for Procure-to-Pay (because each Service has a different mission, culture, history, etc.), Figure 3 does not actually depict any Service process—and it also does not show the intersecting end-to-end processes that deliver the ordered item. It is probable that DLA, which has its own ERP system, will provide the materiel (which means it will have been

procured through DLA processes that differ from those of the Executive Agent Service) and USTRANSCOM will provide some or all of the transportation for the order. Some of that transportation may be via commercial carriers whose services were procured and paid for using yet another ERP system and another somewhat different version of the Procure-to-Pay process. This process requires an understanding that the end-to-end processes exist in the War Fighter Mission Area as much as the Business Mission Area; thus the reference to crossing the imaginary line in Figure 2.

2.2 Component Strategies for Business Modernization and Financial Improvement

The Services and Defense Agencies are using ERP as the primary enabler for business modernization and financial improvement. The following quotations from the March 2010 Congressional Report describe their views of how they are using ERP to meet their business transformation goals:

Army

"The Army is on an incremental path to an integrated architecture and interoperable systems for its general ledger accounting system (GFEBS) and its national and tactical logistics systems (LMP and GCSS-A[10]), thus giving the Army improved visibility of its financial and logistics assets. These are long-standing priorities for Congress, DoD and the Army."

Navy

"…[T]he Navy Enterprise Resource Planning (ERP) software, a key steppingstone to naval operations in a transformed business environment, was deployed at two of the Navy's four major acquisition commands (the Naval Air Systems Command and the Naval Supply Center). The major acquisition commands are the largest business concerns in the Navy. When fully implemented across the systems commands, Navy ERP will be the sole financial system managing more than half of the Navy's total obligations."

Air Force

"…[T]he Air Force has worked to reduce transactional activities, establish transparent processes and consolidate functions while providing increased capabilities to the Warfighter. This is being achieved through the utilization of Enterprise Resource Planning (ERP) systems, such as the Defense Enterprise Accounting and Management System (DEAMS) and Expeditionary Combat Support System (ECSS)."

DLA

[10] Global Combat Support System – Army

"DLA currently employs its Enterprise Business System (EBS) across much of its supply mission area. As DLA's Enterprise Resource Planning (ERP) platform, EBS modernized and refined the agency's ability to manage the supply chain effectively and efficiently. EBS uses the ERP approach to manage seven of its eight supply chains and facilitate over 22,000 users operating in 28 countries worldwide."

The Service or Agency, associated ERP Program, Vendor selected by the Agency, and the primary focus of the ERP are shown in the Table 1.

Table 1. Major Financial and Logistic ERP Systems within the DoD

Major Financial and Logistic ERP Systems within DoD			
Service/Agency	**Program**	**Vendor**	**Primary Focus**
Army	GFEBS	SAP	Financial
	GCSS-Army	SAP	Logistics
	LMP	SAP	Logistics
Navy	Navy ERP	SAP	Financial and Logistics
USMC	GCSS-MC	Oracle	Logistics
Air Force	ECSS	Oracle	Logistics
	DEAMS	Oracle	Financial
DLA	EBS	SAP	Logistics
Other Defense Agencies	DAI	Oracle	Financial

The MilDep and Defense Agencies chose to use ERP systems because of the expectation of the benefits such as:

- Seamless integration across and between functional domains and business processes such as "Procure-to-Pay" and "Acquire-to-Retire," which, at a minimum, cross both logistics and financial domains
- Enforcement of referential integrity across all dependent data elements
- Transaction traceability and integrity
- Typical business processes proven across thousands of implementations
- Visibility of key information required for the effective and efficient management of the enterprise (For example: progress of budget execution, asset visibility)
- Improved operational control of the enterprise
- Best practice internal controls

- Cost accounting (which does not consistently exist in DoD)
- Minimal manual intervention for reconciliation

2.3 Study Structure

The following sections summarize IDA's findings, conclusions, and recommendations relevant to ERP implementations within the DOD for the following areas:

- Leadership, Stewardship, and Governance
- Organizational Alignment
- People and Culture
- Architecture, Processes, and Systems
- Metrics

Detailed data, analyses and other supporting information are contained in the Appendices.

3. Leadership, Stewardship, and Governance

Commander's Intent and a Common Purpose are essential components of effective leadership, stewardship and governance.

3.1 Findings

3.1.1 The functional governance structures at both the DoD and Service levels are generally ineffective.

The ERP programs of the Department are characterized by weaknesses in the functional governance structures that are required to achieve the level of organizational and business process change as well as maintain the discipline required to avoid customization of the ERP that drives cost and schedule growth.

The span of organizations impacted by the implementation of an ERP at the Service enterprise level requires crossing many organizational boundaries within the Services and the Department. In most cases, the implementing functional sponsor who chairs the senior executive body is equal or lower in rank than the owners of the impacted functional domains such as logistics and human resources, or the commanders of impacted top-level operational commands (MAJCOMS, MACOMS, ECHELON II). Governance challenges include lack of empowerment of individuals at lower levels to make decisions that are binding on their leadership and lack of metrics to ensure that the governance processes are effective.

3.1.2 Senior leadership must have authority at the enterprise level for business modernization because it demands implementation and accountability of enterprise-level solutions.

The efforts of the Department to achieve auditability are typically sponsored by the person responsible for financial management in each of the Service secretariats. This level of sponsorship would be appropriate if the requirements for achieving auditability were entirely under the control of a senior leader at this level. However, to achieve auditability, internal controls must be addressed within the non-financial aspects of the end-to-end business processes. An example is the requirement for controls to ensure the accuracy of depot and installation supply inventories.

Further, the Department's choice to use ERP systems as the IT enablers in support of these auditability efforts requires that all aspects of the end-to-end business process be part of the same effort. The span of control required of the sponsor is well beyond that of the leaders of the

financial domains. For example, many of the business and financial improvement initiatives require integration and engagement across and between the Service operational commanders, Agencies, and COCOMs. In addition, functions such as contracting, finance, and procurement to global distribution and combat supply are included. Therefore, it requires a sponsor with the authority and accountability to effect the required business change across many organizations, stakeholders, business processes, legacy systems and data sources to be successful.

This implies a need for sponsorship by someone at or above the level of Service Under Secretary of Defense. This is consistent with the experience of industry where enterprise ERP implementations are characterized by executive sponsorship from the Chief Operating Officer and Chief Technology Officer. These positions are analogous to the Service Secretary in authority.

The formal roles of OSD PSAs and Service Secretariats have evolved from policy-making and oversight to deep involvement in defining and executing detailed processes. This change began with the Financial Management Enterprise Architecture (FMEA) program but became exacerbated over time as an unintended consequence of the establishment of the Business Transformation Agency (BTA).

The functional community has decoupled many business activities from mission activities creating stovepipes rather than integrated business and mission processes. This evolution stems from the need for specific information at the enterprise and HQ levels that historically has not been available, accurate, consistent, timely, nor, in many cases, trusted. As a result many leaders believe that, in order to obtain and trust the information, they had to have a hand in controlling the source of the data, the processes that produce the data, and the systems that enable it. The overly prescriptive processes contained in the current BEA evidence this. Instead of focusing on issuing data standards in support of enterprise information needs, the functional communities have chosen to meet the need through control of the data via ownership of enterprise-level ERP solutions. As a result of this ownership, the stovepipe owner is now dictating the details of process execution across all of the operating units with the assumption that it is efficient for all units to do business exactly the same way, regardless of mission and the authorities of the operational commanders.

3.2 Conclusions and Recommendations

Top-down leadership without substitution of subordinates is a key success factor. The most senior person initiating a change must personally champion the change. If the key leader does not have the time or the will to follow through on a specific commitment and obligation made regarding an initiative proclaimed important, then the initiative should be abandoned. This includes oversight bodies such as the Defense Business Systems Management Council (DBSMC) and Investment Review Boards (IRB). If the IRB is in fact the decision-making body, the DBSMC is redundant; there seems to be no cross-functional decision maker. Redundancies like this are distractions and siphon off expensive resources for no gain to the Department.

3.2.1 Multiple and redundant governing bodies at the OSD and Service levels create a lack of trust, confusion, lack of unity of effort, increased resource requirements, and distraction from execution.

There must be less concern for individual power. Authorities must be more readily combined among DoD leaders towards a common purpose for the common good of the Department. Trust of people and the need for open collaboration when creating the highest impact and lowest cost solutions possible, should be a top business imperative of the Department

Lack of trust is evident throughout the DoD Enterprise. Oversight is often conducted by unqualified individuals or oversight groups that provide untimely and unusable analysis. The lack of trust by leadership and oversight bodies is causing valuable and limited resources to be spent on proving *vice* accomplishing program objectives. This creates a downward spiral of program managers forced to be liaisons rather than the focal points for program execution. It results in distractions and failures causing less trust, more oversight, and an additional drain on resources.

Defining and executing detailed processes by the OSD PSAs and Service Secretariats sub-optimizes the Departments and communicates a level of distrust in the organization.

Lack of inclusion of those most affected by key decisions should be viewed with great concern and suspicion.

Commanders' intent must be communicated at key inflection points including milestones and budget driven changes. High impact and low cost solutions should be rewarded, especially if the solution is the result of cross collaboration of the Service Departments. Being clever and innovative should trump spending[11].

[11] http://www.news.com.au/technology/smartphones/us-soldier-develops-iphone-app-to-target-the-taliban/story-fn5sd1vk-1225994565838)

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4. Organizational Alignment

The organizational construct of the DoD is both complex and constrained. Specific findings, conclusions, and recommendations are presented below.

4.1 Findings

The organizational constructs and operating models required to accomplish the business of the DoD have a much higher order of complexity than any commercial business. In fiscal year 2009, DoD reported that it had over $947 billion in disbursements, $1.8 trillion in assets, and approximately 3.2 million military and civilian personnel—including active and reserve components. DoD's 2009 budget would rank it as the 17th largest economy in the world based on GDP, according to the CIA World Fact Book. Operations span a wide range of organizations, including the MilDep and their respective major commands and functional activities, defense agencies and field activities, and combatant commands that are responsible for military operations for specific geographic regions or theaters of operation (e.g., CENTCOM, PACOM, or SOUTHCOM) or for particular areas of responsibility (e.g., STRATCOM or TRANSCOM). To execute its business operations, the Department performs interrelated and interdependent business functions including financial management, acquisition and contract management, logistics (e.g., supply chain management), and human resource management.

The Department and Services are not designed for business efficiency. They are organized and optimized for execution of their warfighting mission. Further, compromises in the organizational design are deliberately included to ensure civilian control of the military, which increases business inefficiency. To effect civilian control, significant power has been vested in non-operational staff roles (stovepipes) such as financial management and logistics. For example, the OSD Principal Staff Assistants (PSAs) and the Secretariat staffs are assigned significant oversight responsibility over the activities of operational commands, which would not be considered an efficient construct in industry because it inevitably dilutes accountability and blurs roles and responsibilities.

Like the Department, each of the Services is responsible for many different but interrelated and interdependent operations. The Army, for example, runs multiple levels of depots, various supply chains, hospitals, school houses, construction, design, water treatment, energy generation, humanitarian aid, courtrooms, foreign aid, recruiting, family support activities, acquisition of weapon systems, and actual warfighting activities.

These organizational constructs have caused the fragmented, inconsistent, and redundant business environment that exists today, characterized by:

- Disconnected and fragmented business processes distributed across multiple organizations within and outside of the Service
- Diffuse accountability and authority for overall process definition and execution with no single person or entity (Service or other DoD) responsible for the efficiency and effectiveness of any end-to-end process at the Service level
- Complex cross-organizational interdependencies;

Service organizations are designed to accommodate the need for on-demand warfighting mission requirements, to train and equip forces, and to comply with laws, regulations, policy, and OSD guidance. Furthermore, they are constrained by highly change-resistant cultures shaped by mission and history and the lack of leverage to overcome this resistance (e.g., ability to fire or reassign people who are obstacles to change).

The ability to achieve the goals of business modernization, and specifically financial visibility and auditability, requires acknowledging these differences and operating accordingly.

DoD's dissimilarity to a commercial business goes beyond size and scale. Commercial businesses are motivated by:

- Making a profit
- Remaining solvent
- Limiting risk and liability
- The implications of taxes (valuation, depreciation)

These have limited applicability to the business model of the DoD. Therefore, DoD financial statements must take these differences into account.

Profit is certainly not a driving factor for DoD operations. Mission success is the most important goal. As to the other business motivators:

- Solvency is not an issue.
- DoD has a skewed catastrophic risk profile that no commercial business can tolerate.
- DoD is self-insured for risk including loss of life, environmental clean-up, and obviously war.
- There are no profit or tax avoidance incentives to drive consideration of issues like depreciation.

DoD cannot, nor should it, change its current operating model to one that is more like a business. Therefore, any strategies and approaches to business modernization and financial improvement must provide solutions and benefits within these constraints.

Solving deep-rooted business problems within a single Service is a false sense of economy. Moreover, a few enterprise-wide solutions, scoped across the breadth and depth of functional stovepipes, do not work.

When responsibility and authority are separated, hidden cross-organizational interdependencies result in no clear accountability.

One of the outcomes of the Goldwater-Nichols reorganization of the Department was to clearly separate accountability for requirements definition from the acquisition programs that are put in place to meet those requirements. While there were, and remain, valid reasons for doing this, how this is accomplished is fundamentally in conflict with the methodologies that have been developed for successfully fielding COTS ERP systems. ERP programs in industry seamlessly blend the development of requirements, configuration of the ERP, design and creation of Report, Interface, Conversion, and Enhancement (RICE) objects, training, execution of change management, site survey, site preparation, data conversion and rollout under the control of a single program manager. The Department's approach separates these dependent activities under discrete leadership and without the day-to-day participation of a single accountable leader who can quickly make decisions across all these elements of a program. The result is much slower decision making than encountered in industry programs. This a contributing factor to the excessive size, high cost, and lack of success in the fielding of the ERP programs.

The COCOMs (who are the customer) have the responsibility for executing military operations. They rely on the outputs of the Service operational commanders (trained and equipped forces) and the Defense Agencies (products and services). The execution of military operations and their support activities generate financial transactions. However, the executing organizations have no accountability for and are not measured on their contribution to complying with legislative mandates such as attaining an unqualified audit opinion on their financial statements, the priority of the functional financial community. The functional community has not made the case for why the COCOMs, Service Operational Commanders, and the support agencies should prioritize business modernization, financial improvement, and business process efficiency over the business of Defense Readiness and, as stated previously in this study, they should not.

4.2 Conclusions and Recommendations

Responsibility must be directly aligned with authority. This single point ensures a direct line and understanding of where specific accountability for performance lies. A leader must have a direct line of control and authority over decisions for which he has responsibility.

4.2.1 The Department’s goal of a clean audit for the enterprise appears to have elevated auditability to a level similar in priority to warfighting. The priorities of leadership throughout the organization (staffs and operational commanders) have not been re-aligned to balance the priorities of these goals and we are not convinced they should be.

Failure to align goals and priorities will result in uneven progress toward an unpredictable destination at an uncertain pace. Conversely, aligned goals and priorities result in maximum progress toward a unified goal in a predictable timeframe. To overcome this lack of alignment,

the Services are using enterprise level ERP to attempt to force a unity of effort and outcome. But because ERP cannot be the forcing function, predictably, the Services fracture their efforts and systems.

4.2.2 Given the complexity and diversity of each Service at the enterprise level, it is infeasible to have a seamless end-to-end business process with a single-owner with full authority and accountability to define, implement and execute the process.

At the Service enterprise level, the only leaders with the authority and accountability to force concurrence on process, requirements and authoritative data are the Secretary, the Under Secretary, Service Chief, or the Vice Chief. They would have to make this their number one priority with engagement on a day-to-day basis. Past experience in DoD has shown that attempts to delegate this authority have not been successful.

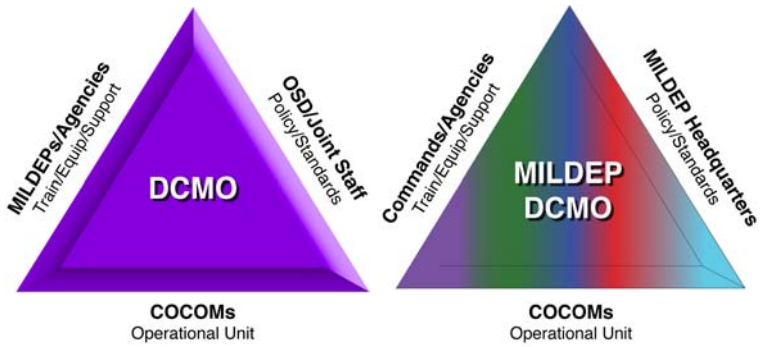
ERP cannot be implemented in an environment where wide concurrence is required unless there is a person who has the authority and willingness to quickly resolve conflicts in a manner binding on all participants. The level at which a leader can be identified with the authority and accountability to do this defines the level in the organization at which ERP can be successfully implemented. ERP systems are not designed to be implemented via consensus alone—they require at least a benevolent dictatorship.

4.2.3 The Services' choice to implement ERPs without making substantial organizational and business process changes, combined with DoD mandated direction to utilize portions of the legacy environment, has resulted in programs with unmitigated levels of risk to cost, schedule and performance.

Complexity is manifested in the number of users, organizational boundaries to be crossed, system interfaces, processes, stakeholders' geographic locations, volume of data, program office size, level of resistance to change and fit of the ERP to the business requirements. With this level of complexity, accurate prediction of cost, schedule, and performance is impossible.

A critical success factor in the implementation and fielding of COTS systems is the willingness of an organization to embrace the change necessary to adopt the tool without customization. The Department of Defense and the Services are noted for their cultural resistance to change and therefore are ill suited to COTS on an enterprise-wide scale.

The DCMOs must become trusted agents, acting as honest brokers between the competing interests of the staffs in their roles as policy makers and oversight and those charged with executing the warfighting support mission of the Services. Figure 4 depicts the DoD and Military Department DCMOs and the organizations whose priorities they must balance to ensure DoD is efficient and effective in its warfighting mission first along with its accountability to the taxpayer.



The Military Department DCMOs should perform this function between the competing interests within the Services while the DoD DCMO should perform a parallel role within the OSD staffs and among the Military Department DCMOs

Figure 4. DCMO Balancing Competing Priorities

The Military Department DCMOs should provide the business portfolio view and collective position of their Services. They should be qualified to sufficiently represent the Services' position at a fairly detailed level to the OSD DCMO. The Military Department DCMOs must also be the Chief Collaboration Officers between their Departments and sister Services, to ensure best practices are leveraged and the best of the DoD is brought forward for the benefit of the whole DoD.

The Military Department DCMOs should have the authority commensurate with the responsibility for the strategy and execution of business modernization for their Departments and Services. This should include the systems and ancillary resources associated with these programs.

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5. People and Culture

The strengths and consequences of the attributes native to the DoD personnel and culture are presented in the findings, conclusions, and recommendations below.

5.1 Findings

Sheer will and the "can-do" professionalism of DoD personnel can be a detriment to the very department they serve when assessing the state of IT investments.

5.1.1 Discussion is sometimes confused with dissent. A risk-averse or hyper-chain-of-command mindset discourages subordinates from revealing factual, but contrary information that may be important to a decision. This "can-do" attitude can convey a false sense of progress.

The historic command-and-control approach of the military has led to a cultural reluctance to push back on the decisions of superiors by subordinates even when the subordinate has a fact-based case for doing so. Conversely, some leaders do not appreciate the courage required for having decisions questioned by subordinates. The culture does not encourage delegation of authority to make binding decisions at the minimum level possible. This results in slow decision-making and decisions being revisited. Both of these factors drive cost and schedule growth in the implementation of the ERP systems. This has also led to ineffective and overly formalized delivery of information through an extensive control hierarchy. The status of a given program becomes more and more positive and less and less accurate as it makes its way through the hierarchy until, by the time it reaches senior leaders, there are no problems. The result of this is that, when bad news finally reaches leaders, their trade-space for making meaningful changes in direction is limited or non-existent.

Program managers are unable to deliver a completely factual version of their status to leadership if it contains any element that could be considered significantly negative. To do so is perceived as weakness in execution even though the root causes may be out of the control of the program manager. Program managers fear that an honest delivery of program status will result in cancellation. As a result of this, leadership is unable to be effective in removing obstacles to program success.

5.1.2 The vested interest in keeping programs on cost and schedule at the expense of performance delays the realization that you "can't get there from here." Cost and schedule are highly visible measures, but program performance is not visible until the program reaches the test phase or is in a production environment. This

perpetuates the continuation of investment in poorly executing programs. It takes courage to say "no" and cancel a program.

Few are willing or incentivized to stop poorly performing programs. In many cases there are disincentives for stopping, including the political costs associated with recognizing that sunk costs have realized little or no value. Problems within the ERP programs are largely known and privately recognized. However, implementing anything other than marginal changes in direction without encountering institutional barriers—such as acquisition policy, federal acquisition regulations, and budget process—is limited.

5.1.3 There is a lack of trust between Congress, OSD, the Component staffs, and the operational commands that drives excessive oversight by GAO, the DoD IG, Components, and OSD staffs. It is distracting to programs.

A circular situation exists where lack of trust drives excessive oversight, which in turn negatively impacts program execution. Mutual trust further erodes and oversight increases once more. Program managers spend most of their time managing the oversight instead of running their programs. Despite the findings of all of these oversight bodies, the problems of the ERP programs persist without major changes in direction or program cancellation. Program Managers describe the oversight of the ERP programs as excessive, burdensome, and destroying more value than it creates for the Department, the warfighter, and the taxpayer.

Oversight activities are not consistent. For example, senior leaders and managers of programs said that certain IT-focused personnel from GAO were generally better prepared and more open minded in their approach. The IG was not as qualified on basic details and notably behind the power curve in terms of current status of the programs they were assessing. This lack of awareness required program personnel to divert from program priorities to bring oversight personnel up to speed.

Oversight does not cause the problems a program encounters, nor is it responsible for the cultural imperative to only forward good news. Multiple and redundant oversight is a direct result of our fractured system of government, diffuse accountability and responsibility, and is a RESPONSE to the well-known culture that calls for only passing the boss good news. The oversight problem emerges because we have, in the first instance, drawn the boundaries around the ERP too vastly.

5.1.4 DoD views business modernization and financial improvement problems as IT system problems not operational problems. DoD is trying to solve business modernization and financial improvement problems that span the entire Doctrine, organization, training, materiel, leadership and education, personnel and facilities (DOTMLPF) spectrum, including auditability, by focusing primarily on systems.

DoD and the Services do not appear to understand the full scope of the problem they are trying to solve. Many senior leaders interviewed believe that ERP can be used to force the changes that are required to create an environment where auditability can realistically be achieved.

These required changes include components of policy, process, organizational structure, personnel, and training. These changes cannot realistically be made within just an acquisition program. Industry and DoD experience to date have proven that fundamental changes must be made prior to and then enabled by an ERP program or other IT enabler.

5.1.5 There is a widespread and erroneous assumption that the enabling technology can be used to force business process and organizational change.

The Services are depending upon the ERP software to force changes in organizational behavior and in business processes in direct contradiction to the proven approaches of industry. Industry and DoD have proven that changes to organization and business process are an outcome of extensive change management activities that are largely a precursor to the ERP implementation. While ERP software provides a library of best practice business processes, it is not a strategic organizational change management tool that can force their implementation.

5.2 Conclusions and Recommendations

DoD leadership must recalibrate personnel to accept that quitting or strategically pausing to reassess direction or value can translate to a win for the Department. Leaders should be as open-minded to those who have the courage to say "no" or "no more" as they are to those who say "can do."

Government personnel providing oversight for ERP systems must be as knowledgeable about their implementation as the contractor or system integrator. Absence of this level of expertise has a negative and lasting effect on the ability of the DoD to fulfill its fiduciary responsibility to the American public.

Redundant layers of oversight and subsequent audits and briefings are distracting, costly, and detrimental to program performance. The Military Department DCMOs in conjunction with the OSD DCMO, should conduct an immediate assessment of the multiple internal and external briefing activities and make solid recommendations to reduce these briefings to the most optimal balance between oversight and execution efficiency. This will demand tremendous collaboration, coordination, and reduction of governing bodies, but it is critical to the successful and timely fielding of business systems.

The Congress, OSD and the Service or Component all burden the programs and their sponsors with reporting requirements and excessive oversight that does not add value in achieving the needed capabilities for the Department. Much of the oversight is duplicative or overlapping, for example where Service or Component oversight reviews and comments are followed by identical reviews by OSD staff. Similarly IG, OMB, GAO, Service audit agencies, and others perform reviews that are not coordinated and result in multiple redundant, and potentially conflicting, data calls.

The Department's processes for requirements definition and acquisition (JCIDS and DoD 5000 Series policies) do not align well to the needs of the acquisition of COTS business systems and have driven them away from implementing the methodologies and approaches to implementation and fielding that have proven successful in industry.

6. Architecture, Processes, and Systems

Compliance must be balanced with performance. Our findings, conclusions and recommendations are presented below.

6.1 Findings

6.1.1 The Services have taken fully integrated ERPs and forced them into their highly fragmented organizational and management construct, business processes, legacy systems and data sources at the Service enterprise level.

In most cases, the Services are implementing ERP at the enterprise level, which requires them to cross many internal and external organizational boundaries that are outside the span of control of any single functional sponsor. This creates an environment where the person in charge typically does not have authority or the accountability over all of the impacted organizations and stakeholders, the business process, legacy systems, and data sources. The consequence of this is the need to break apart the inherent integration within ERP systems and then rebuild it using interfaces and customizations to accommodate the fragmented organizational process, legacy system, and data landscape.

In reality, the integrity of the ERP implementations in the Department are compromised as a result of the Department and Service-mandated integration with legacy systems. The reasons for the persistence of legacy systems are complex and cover a wide range of reasons such as: immutable business process requirements not found in industry e.g., Special Ops/Intel troops operating covertly), resistance to change, lack of authority of the functional sponsor to implement the business process changes required, and inadequate understanding of the capabilities of the ERP. The inherent integration of the ERP is the fundamental value proposition for using an ERP's *FULL* capability and the cornerstone of its ability to support auditability goals.

6.1.2 ERP does not equal Auditability

There is confusion about the connection between the ERP and auditability. The Services are using the ERP as the primary enabler for business modernization and financial improvement because it is perceived that the ERP provides:

- Enforcement of referential integrity across all dependent data elements
- Transactional traceability
- Visibility of key information (budget execution, assets)

- Improved operational controls
- Cost accounting
- Minimal manual intervention for reconciliation
- Seamless business process execution across and between functional stovepipes

However, this is not the way the systems are being implemented.

6.1.3 There is overlap in capability that the ERP software can provide. However, this should not be confused with the necessary business processes that are driven by the unique aspects of the missions of each Service.

A given ERP software package might be capable of supporting each Service enterprise end-to-end, and capabilities may completely overlap at the highest level. While these systems are automating the operational activities that comprise similar high-level end-to-end processes, they differ in configuration at the detailed level, given the mission needs of the Component they support. Just as one sees overlapping capabilities across the Component enterprise systems, there are overlaps in functionality between Component and DoD enterprise systems. In most cases, these specific or unique business rules are in place for very good reasons. For example, the operating model for the Army is different from that of the Marine Corps, driven by differences in mission.

6.1.4 There are processes within the Department that simply have no analog in industry or even in other Governments. This explains the persistence of many legacy systems in the target environment.

An invalid premise underpinning the use of ERP software is that it has the capability to meet all of the needs of the Department or that they can be met by some combination of customization and change of business process and policy. The default premise of the DoD assumes standardization is good across the board without testing whether the standardization adds value to achieve the mission or is worth the cost and effort to achieve.

For example, certain capabilities of the Mechanization of Contract Administration System (MOCAS) are not easily available in the ERPs. These capabilities include the entitlement of complex payments on cost-plus contracts. Other mandated systems include Standard Procurement System (SPS), Wide Area Work-flow (WAWF), and an array of disbursing systems. An even more dramatic example was the DIMHRS program, where the demands of statutory requirements not encountered in the private sector drove extensive customization supporting hundreds of entitlements and pay types, promotion boards, and strength management and contributed to the eventual demise of that program. The Department should implement an ERP for what it is designed for and interface only where the ERP is not designed to perform the function.

6.1.5 The Services' ERP programs are unprecedented in terms of size and complexity as measured by combinations of the following parameters: number of users, size of program office, number of discrete organizations involved and organizational boundaries crossed, number of geographic locations, number of ledger accounts, number of stock keeping units (SKUs), number of asset records, and other key indicators.

When considered together, these factors represent size and complexity never encountered in industry and well past the point where the technology is proven to scale. Further, the program size as a factor in feasibility or success of the program transcends questions of technical scalability. There is a significant correlation between increasing size of the program team and failure rate in industry [Dr. Dobbs 2010 Survey of IT Program Success Factors.] In ERP implementations, the effort required to gain consensus on many issues, including requirements, is a significant driver of cost and schedule, and the number of people involved in the Services' ERP programs is an order of magnitude larger than any example from industry. These factors introduce high levels of uncertainty and risk into the cost and schedule estimates for the ERP programs.

Despite the shortcomings identified during this assessment, some of the Services' ERP programs are being fielded and have replaced legacy systems, particularly in logistics and operations. Therefore the notion of totally abandoning the ERPs cannot easily be accomplished without significant disruption to various operations within the Services and is without merit.

The problems of addressing the entire spectrum of DOTMLPF required to actually achieve modernization and financial improvements are so complex that senior leaders in the Department are tempted to act as though technical choices alone can solve the problems. Moreover, IT enablers alone cannot be a forcing function for organizational and business process change. Rather, the willingness and ability of senior leadership to make these changes is the critical constraint that must be overcome to make a technical solution feasible.

6.2 Conclusions and Recommendations

New procurement costs for the enterprise must be balanced against costs to sustain and maintain legacy systems including fielded ERPs that are operational and have a significant user base. The enterprise-level architecture needs to be the backbone for interoperability and portfolio management, and communicate the strategy.

6.2.1 ERPs simply enable the Services to execute the auditable business process efficiently and effectively. The reality is that even if all the ERPs were fielded tomorrow, auditability would not be achieved.

Today, progress towards auditability or clean financial statements is largely being measured by the Department's ability to implement and field their large financial ERPs. Auditability and the ability to produce clean financial statements should be the natural by-product of a high-

performing organization. End-states such as full traceability and transaction integrity are automatically achieved when organizational structure, people behavior, business processes and rules (within internal controls), policy, and technology, are integrated and measured to ensure successful outcomes. Technology and ERP systems simply enable the Service or the Department to efficiently and effectively execute the auditable business process.

DoD should strive to enable the full use of capabilities of the ERPs by actively phasing out the requirements to go outside the ERP (e.g., financial transactions such as accounts payable and accounts receivable as contained in WAWF, various DFAS interfaces) and spending monies to shut down interfaces to systems that no longer offer unique functionality and absorbing these transactions into the ERP.

The Department cannot be reasonably compared to a commercial business, even a large one with a global footprint. The DoD is more accurately compared to an economy, with all the attendant complexity. The Department and the Services need to craft a strategy that recognizes this complexity and align its IT strategies accordingly. This strategy should address, at a minimum:

- The reality of the new budget environment.
- The continued use or expansion of current (legacy) systems where there is a large and satisfied user community and the cutover of the new ERP is delayed or not meeting performance expectations.
- If an ERP is delayed or still immature, incentivize the Services to use the functionality of an ERP that is already functional in other Departments or Agencies.

The Business Enterprise Architecture (BEA) should be a repository for standards (particularly data standards) not prescriptive of process. The BEA must describe the target vision as a critical first step to serve as a basis for the system's concept of operations (CONOPS)

The BEA should be integrated with other data repositories, such as the OMB Exhibits and the DoD IT Portfolio Repository (DITPR), to provide a master set of capabilities, activities, and processes that support the business mission area and the business of the Department. See Appendix E for further discussion.

The federated BEA should provide the blueprint for the individual systems' data, including:

- Standard organizational building blocks of the Department
- Processes, the unique process requirements of the organizational units that execute them, the process maturity, and the placement of ERP and other systems
- Mapping of capabilities, activities, and processes to the organizational units that execute them
- Architecture standards, such as application of the BPMN
- Recommended comprehensive, quantitative performance metrics

- guidance on key architecture steps, such as how to record business events as triggers and outcomes in the architecture

A more complete discussion of the Architecture can be found in Appendix E with architecture artifacts in Appendix J (accompany CD).

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7. Metrics

7.1 Findings

Positive incentives to change behavior have to impact people directly; that is, incentives must align with the results desired. Currently there is a negative consequence if a system owner or program manager does not spend the entire budget allocated to a particular program within a certain period of time. The goal must be to incentivize rewards with tight congruence within a family (or portfolio) of IT investments to fulfill a common purpose. See appendix D for further discussion on performance measures.

7.1.1 There is an absence of comprehensive metrics baselining the current business operating environment and quantifying desired outcomes. The consequence is the inability to prove progress toward achieving business improvements leading to auditability.

Defining the overall day-to-day operational state of business is not comprehensive in the Services. There are individual metrics, such as interest paid, that define the performance of segments of the overall business process. For example, prompt pay is easily understood and easy to measure. Auditability is not a one-to-one linear concept and is, therefore, difficult to measure. This drives behaviors that lead to undesirable conditions such as unmatched disbursements.

7.2 Conclusions and Recommendations

Our interviews indicate that Department reports are produced and the box is checked, but there is little confidence that performance metrics (or the data) are realistic. Compliance aspects and deadlines are met but often an authentic ground-truth understanding of program performance is not.

7.2.1 Compliance with law and policy is being used as the primary metric of program progress. This is a false indicator.

DoD relies upon compliance with OSD acquisition policy, the BEA, and attainment of acquisition milestones and budget executed as the indicators of program progress. None of these is a reliable measure of progress towards the delivery of usable capability supporting the larger goals of business modernization and financial improvement.

Checklist compliance (cost, schedule) should not be a substitute for high performance.

The Department should require functional proponents of business systems and programs, such as the ERPs, to develop a consolidated, detailed business case with a compelling, unimpeachable justification for selecting and implementing a proposed solution.

A detailed root cause analysis of the problem the proponent is trying to solve and a discrete set of measurable operational outcomes (improvements or new capability) derived from an existing baseline should support the business case.

This business case would help the functional proponent and oversight authorities ensure progress, keep outcomes in alignment, and validate the need, approach, cost and benefits to justify continued funding and support. Business Case Analyses (BCAs) provide the ability to prevent scope and requirements growth, as all proposed changes must be looked at in terms of impact on the original purpose of the program. Equally, BCAs provide leverage to stop programs that no longer meet the intended need or to show that the original problem no longer exists or has changed enough to require a new BCA and potentially a different solution.

System integrators cannot be the main source of information on a business case for an ERP. They are not the business owners or customers and likely have a conflict of interest.

7.2.2 There is an assumption that compliance is adequate to ensure program execution and performance of the delivered capability in the operating environment.

When considering favorable or adverse actions regarding the current ERP programs, the success or failure of such programs should consider:

- Benefit to users
- Number of users now (and in the near future)
- Legacy system costs
- All labor costs (including military, civilian) associated with the legacy systems (e.g., manual intervention)
- Voice and satisfaction of the current customers
- Operational viability
- Risk of continuing or quitting

The already sunk cost of the systems, while troublesome, should not be the primary reason for continuing an ERP or program. It is a false sense of economy.

The assessment and validation of these metrics should be reviewed by a board of peers related to, but outside of the Department assessed. For example, a board with the PMs from Army, Air Force, Department of Homeland Security (DHS), Federal Trade Commission (FTC), and others would review the Navy ERPs. The participants from outside the DoD would be Departments or agencies that have endured similar challenges and have a holistic and fairly reasonable point of view.

8. Principal Findings and Conclusions

Attaining the goal of making the Department an auditable enterprise is a wicked problem.

8.1 The IDA team is not confident that DoD's current ERP implementation strategy will deliver the expected capabilities on time and within budget.

The term *wicked problem* is used to describe problems in social planning that are difficult or impossible to solve. Achieving a solution is impossible or nearly so, and this is not easily recognized because of incomplete, contradictory, and changing requirements. Further, the existence of complex interdependencies often leads to a situation where attempting to solve one aspect of a wicked problem reveals or creates other problems.

The problem of achieving auditability in the Department meets most or all of the ten characteristics of wicked problems described by Rittel and Webber's (1973)[12] formulation of wicked problems.

The commercial business goals of making a profit, remaining solvent, and limiting risk/liability, and the implicit tax strategies (valuation and depreciation) are inconsistent with the DoD business model. This leads to the conclusion that the Department as a whole and the MilDep have a higher congruency with "Defense as an economy" rather than "Defense as a commercial business."

This has profound implications regarding the value of comprehensive commercial-style financial statements (e.g., valuation of military equipment). The federal government answers to taxpayers, not shareholders, as its primary stakeholders. For example, tax incentive-based approaches regarding valuation and depreciation of assets have minimal operational value to DoD managers and operators. However, existence and completeness of said assets are important business indicators AND valuable to the operations of the DoD. A more meaningful accounting of the DoD would be a cost accounting approach.

As for capability overlaps, the Services and Agencies have different missions. At the DoD enterprise level apparent capability overlaps reflect different capabilities at the operational or

[12] Rittel, Horst, and Melvin Webber; "Dilemmas in a General Theory of Planning," pp. 155–169, Policy Sciences, Vol. 4, Elsevier Scientific Publishing Company, Inc., Amsterdam, 1973. [Reprinted in N. Cross (ed.), Developments in Design Methodology, J. Wiley & Sons, Chichester, 1984, pp. 135–144.], http://www.uctc.net/mwebber/Rittel+Webber+Dilemmas+General_Theory_of_Planning.pdf.

transactional level to support specific business operations and missions of the Department. At the Service and Agency overlapping missions could equate to capability overlap, but consolidating these capability overlaps into the DoD enterprise could break the overall business process within a Service or Agency.

Each of the Service ERPs is implementing a different subset of the Service's business processes. However, the subsets have not been selected based upon the natural design of the ERP and, in general, the functionality addresses a small fragmented portion of the business process across multiple chains of command, rather than addressing a large contiguous portion of the business process across a single chain of command. For example, DLA implemented its ERP for a single chain of command, while GFEBS is scoped to a narrow portion of the accounting functions of the General Fund for all MACOMs in the Army. This is different from running the entire business operations of a single MACOM such as Forces Command, which would conform to the inherent design of the ERP and make it less of a wicked problem.

Additionally, transactions are not contained within a single ERP but happen across multiple organizations; each organization (the set of processes within DoD itself or of a Service or Defense Agency) controls what data it passes on to the others—there is no real federation across multiple ERP implementations—without appropriate attention to aligning the interfaces. This approach cannot produce a coherent system across the DoD enterprise.

The Department's new Chief Management Officer (CMO) construct for business operations may provide the top-level support needed to break through the organizational friction points caused by the functional stovepipes in the overall DoD enterprise. The DoD has made progress in many business areas, including improper payments, instituting internal controls, and vendor compliance. However, consistent and sustainable enterprise-wide gains must still be achieved.

8.2 Overarching Recommendations

The commercial business goals of making a profit, remaining solvent, and limiting risk/liability, and the implicit tax strategies (valuation and depreciation) are inconsistent with the DoD business model. DoD and Congress need to assess the DoD business model[13], understand how it differs from a corporate business model, and apply the appropriate information technology solution(s) for the DoD business model. Furthermore, the financial representation of DoD's business must take into account these differences.

The DoD should stop the pursuit of comprehensive financial statement audits. Instead, audit readiness with a specific focus on the Statement of Budgetary Resources (SBR) should be accomplished. Furthermore, all other audit readiness activities should be evaluated as to their

[13] Headquarters, operational, and supporting organizations and how these organizations meet the objectives of a federal defense agency. Understand what success means for these organizations.

operational value before resources are expended. For example, asset visibility, existence, and completeness are critically important from compliance and operational perspectives and are therefore high value activities. The accounting of costs should be the primary focus of the Department.

Where there is no significant deployed user base of an Service-level ERP, the DoD should curtail the deployment of the ERP in FY12 and beyond, pending a thorough review of the organizational environment in which the ERP will operate, clear definition of the problem the ERP is attempting to solve, determination of the alignment with ERP capabilities, and development of an implementable data strategy.

Furthermore, the DoD should define a way forward based upon solutions at a level in the organization **where a single accountable leader has the span of control** to define, implement, and execute the end-to-end business processes the IT investment is intended to support. In doing so, DoD should:

- Obtain a clear understanding of today's business problems – taking into account improvements and changes (e.g., policy, deployments of other IT investments) that may have been made to processes outside the ERP program since its inception.
- Recognize organizational constraints—both mission and political—and demand verification of activities that are geared towards performance, not just compliance.
- Initiate an objective assessment of what the ERP programs can realistically deliver.
- Create an open environment where leaders are equally rewarded for program cancellations and for continuing programs. If a program manager has the courage to recommend changing a program's course (e.g., pausing, streamlining, or cancelling a program), careful consideration should be given to including program leadership in decisions regarding how funding not yet expended should be re-allocated.
- Implement IT solutions that address the entire DOTMLPF spectrum, not just one particular component at the expense of another.
- Establish an environment beyond leadership and demand an era of stewardship as the baseline for managing the Department's IT investments.

All oversight and reviews of MAIS business programs should be coordinated and streamlined through the OSD and MilDep DCMOs using the IRBs and in accordance with the Business Capability Lifecycle[14].

- The MilDep DCMOs should provide the business portfolio view and collective position of the Service to the OSD DCMO. The MilDep DCMOs must also serve as the Chief Collaboration Officers between their MilDep and sister Services to

[14] USD (AT&L) memo of 15 Nov 2010, Interim Acquisition Guidance for Defense Business Systems (DBS)

ensure best practices are leveraged and the best of the DoD's IT investments are brought forward for the benefit of the whole DoD.

- The MilDep DCMOs should be empowered with the authority and responsibility for establishing the strategy and execution of business modernization for their Department. This should include the systems and ancillary resources associated with these programs.

Assessment of DoD Enterprise Resource Planning Business Systems

Appendices

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Table of Contents

Appendix A. ERP and DoD Business Systems A-1
Appendix B. ERP: Efficiencies Realized and Unrealized across Cost and Time B-1
Appendix C. Capability and Assessments C-1
Appendix D. Performance Measures D-1
Appendix E. Architecture E-1
Appendix F. Acquisition and Contracting F-1
Appendix G. Assessment Framework G-1
Appendix H. Sources of Data H-1
Appendix I. List of Interviewees I-1
Appendix J. Architectural Products J-1
Appendix K. Acronyms K-1

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List of Figures

Figure B-1. ERP Acquisition Costs (BY11 $M) B-5
Figure B-2. GFEBS Acquisition Costs (BY11 $M) B-5
Figure B-3. GCSS-Army Acquisition Costs (BY11 $M) B-6
Figure B-4. DEAMS-AF Acquisition Costs (BY11 $M) B-6
Figure B-5. DIHMRS Acquisition Costs (BY11 $M) B-7
Figure C-1. Capabilities by Organizational Unit C-4
Figure E-1. Enterprise Organizational Building Blocks E-2
Figure E-2. A Model for Correlating Organizations, Processes, and Systems E-8

List of Tables

Table B-1. ERP cost increase over time B-3
Table C-1. BEA Capabilities C-1
Table C-2. BEA System Functions C-5
Table C-3. BEA Processes C-9
Table G-1. Assessment Framework G-2

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Appendix A. ERP and DoD Business Systems

A.1. Why ERP?

Enterprise Resource Planning (ERP) systems are large, commercial-off-the-shelf (COTS) packages that are designed to contain the primary components of the business operations of an organization. The primary value proposition for implementing ERP systems is that most aspects of a business can be managed as an integrated solution. This makes it possible to avoid many of the most intractable problems that plague organizations such as:

- Multiple, conflicting representations of the same data becomes a single version of the "truth;"
- Inefficient business processes that evolved over time optimized to individual parts of the business and not the larger enterprise;
- Expensive and error prone integration of stand-alone software packages requiring extensive manual intervention and reconciliation; and
- Lack of visibility to senior managers of the current state of the organization's business operations in order to make important decisions.

ERP systems contain leading practice representations of business processes that have, in most cases, been tested in large numbers of organizations. The business processes in an ERP may be configured in many variations in order to allow them to suit a large number of organizations and industries. Both SAP and Oracle ERP systems have underlying, pre-defined sets of capabilities/activities and processes. SAP in particular provides 'Solution Maps' including some that are tailored for the Department of Defense. Processes are configurable so that tasks/steps can be added to or removed from a process. Configuring an SAP or Oracle system requires knowledge of:

1) The organization's processes,
2) The process as implemented in the COTS/ERP,
3) An understanding of the difference,
4) And, most importantly the differences that are tolerable.

The typical way to deal with the 'intolerable' elements of the process is to customize through RICE (Report, Interface, Conversion, and Enhancement) objects. Interface, conversion and enhancements must be carefully evaluated and prioritized as they can be particularly costly and in some cases not feasible.

A.1.1. Necessary Conditions for Successfully Using ERP

When industry began using integrated software solutions in the 1980s, many organizations attempted to adapt the software to their specific businesses processes through customization. Few of these efforts were successful and most were failures. It became apparent that in order to successfully use COTS solutions, organizations had to accept minimal or no customization of the software.

If an organization accepts minimum customization as a major premise, the inevitable next hurdle is that the organization fielding a COTS solution must change their business operations to align to the capability of the ERP. To build congruency between what the software will allow and the construct of the business as it exists in the present state, often extensive changes are required including processes, job roles and responsibilities, and organizational structures. Throughout this change a senior executive level sponsorship is a factor critical to success.

Industry implementations indicate that large-scale enterprise-level ERP implementations are only successful when they have active and engaged sponsorship from a senior executive. This usually means the level of CEO or COO (for example, IBM's business transformation was led by Lou Gerstner and his deputy in the 1990s) or someone who has broad authority to make changes to the business processes and accountability for the success of the program. Engaged sponsorship in this context means that the senior champion has the authority and willingness to exercise the authority to enforce all necessary changes to the business required for successful fielding of the software.

Supporting ERP implementation is a significant component of the sponsor's job requiring engagement on a weekly or even daily basis. Attendance at a monthly or quarterly steering committee meeting is not sufficient. If a sponsor meeting these criteria at the enterprise level is not possible, scoping the implementation to a smaller operating unit of the business where that level of sponsorship can be achieved can still have an successful ERP. For example, if it is impractical to have the Undersecretary or the Vice Chief acting in the sponsor role for a Service, then scoping an ERP to a major command and having that commander be the sponsor is a viable alternative. The needs of the enterprise would then have to be met through the enforcement of enterprise data standards and roll-up of data from several ERP systems.

A.2. ERP Global Single Instance

Industry experience has proven that it is almost impossible to field a global single instance of ERP software to a very large organization (Fortune 500). Several programs that have tried to do so have achieved notoriety for the challenges that they faced, perhaps most notably Hershey and DuPont. In Fortune 500 companies, most have fielded multiple ERPs or multiple instance of an ERP where each business unit has an instance of

the ERP. Many of the companies that took this approach are now beginning to consolidate these into fewer ERPs where there is a business case to do so

A.3. History of ERP Not Meeting Expectations

The challenges the Services have faced in implementing ERP are similar to those that industry has faced. Statistics show that many or even most ERP programs in industry are challenged, showing cost and schedule growth or failure to achieve many of the benefits anticipated in their business cases. Industry, however, benefits from much clearer lines of accountability, business metrics (profit and loss) and real limitations on how much the budget for a program can expand. These factors ensure that industry faces up to its challenges and failures early in the process resulting in major course corrections when necessary or early program termination.

A.4. Quick Look at Service ERPs

The following sections are a synopsis of the major Service ERP systems by Service and then acquisition program.

A.4.1 Army ERP Acquisition Programs

a) Programs and Status

- GFEBS: partially fielded
- GCSS-Army: in operational testing
- LMP: approaching full operating capability

All three of these Army programs are based on different versions of SAP.

b) Key Foundational Issues

The original strategy of GFEBS was to capture all detailed transactions from the source systems that generated them and to become the system of record for all of those transactions. This strategy did not account for the fact that:

- Transaction volume across interfaces between GFEBS and both GCSS-Army and LMP would require scalability beyond predictions and the level of reconciliation and manual intervention required to ensure transaction integrity would not be feasible
- Three-way match of orders, receipts and payments required for auditablilty would be fragmented across multiple systems and unlikely to be achieved
- Design choices between GCSS-Army, LMP and GFEBS would make it impossible to achieve cost accounting goals (activity based costing) consistently

- Despite GFEBS nominal status as system of record for all accounting transactions, the underlying source systems could still modify the originating transactions

GCSS-Army and LMP were both conceived as logistics systems and their original designs did not address many of the factors required to achieve auditability.

GCSS-Army is implemented utilizing the Defense Force Public Security (DFPS) capability of SAP while LMP and GFEBS are not.

c) How the Issues Have Been Addressed

The Army was required by the milestone decision authority at the GFEBS and GCSS-Army MS B decisions to create an ERP strategy to address the issues discussed above. The outcome was a decision to re-scope both GFEBS and GCSS-Army allowing GCSS-Army to manage all tactical logistics general fund transactions using a design based upon the GFEBS blueprint. GCSS-Army would operate a subsidiary ledger and post summaries of the GFEBS. GCSS-Army became the target system of record for general fund transactions generated by the execution of tactical logistics in the Army.

LMP was not re-scoped at that time and problems such as transaction integrity across system boundaries and ability to implement the three-way match remain. LMP is now intended to be the Army's system of record for the Working Capital Fund and a major source of General Fund transactions although it was not initially intended to be a complete accounting system. It will likely require a major upgrade or re-implementation of LMP to allow it to fully achieve its current role in Army financial improvement. A significant complication is the unusual ownership rights the Computer Science Corporation (CSC) has for the intellectual property of the LMP system.

The Army is currently working on a new ERP strategy at the request of the Combined IRB for Acquisition; however it is unclear how this can be meaningfully achieved given the lack of an overarching Army strategy for the business modernization that includes financial improvement and auditability.

IDA is unaware of any effort that has been done to correct the limitations that the existing ERP design will place on the Army's ability to implement activity based costing and other cost accounting capability.

A.4.2 Air Force ERP Acquisition Programs

a) Programs and Status

- DEAMS - partially fielded to USTRANSCOM at Scott AFB, post MS-A for larger AF
- ECSS - post MS B

DEAMS and ECSS are based on ORACLE eBusiness suite.

b) Key Foundational Issues

DEAMS original strategy was to capture all detailed transactions from the source systems that generated them and become the system of record for all of those transactions. This strategy did not account for the fact that:

- Transaction volume across interfaces between DEAMS and ECSS would be of a larger scale than predicted and the level of reconciliation and manual intervention required to ensure transaction integrity would not be feasible
- The three-way match required for auditability (orders, receipts and payments) would be at risk because of fragmentation across multiple systems

DEAMS was originally constrained by a directive to operate in such a way as to allow the legacy systems to remain the systems of record until the ERP was proven to be effective and to "do no harm" in interfacing to legacy systems, meaning that no modifications to persisting legacy systems were allowed. The ERP was required to only use existing legacy interfaces. These constraints caused the violation of two of the fundamental leading practices of ERP implementation, namely to severely limit the number of customizations, such as RICE objects, and to re-engineer business processes rather than modifying the ERP to reflect existing business processes.

ECSS was conceived as a logistics system and was originally only intended to implement functionality to address the working capital fund. It was intended that that ECSS would interface with DEAMS for all general fund transactions.

ECSS was initially intended to be a combination of three COTS products, ORACLE R12 eBusiness suite, IFS and Click. It became apparent, approximately a year into the blueprinting process, that the combination of products was not as integrated as represented by the vendors and would not meet the needs of the Air Force without a significant change in direction.

ECSS currently claims to be the largest ERP program in history. The program currently has close to 1000 staff members. ECSS has experienced execution challenges as a result of the sheer size of the program.

Both DEAMS and ECSS have suffered from a lack of effective cross-functional governance and a cumbersome acquisition governance chain.

Both ECSS and DEAMS have reported that they are unable to meet the statutory requirements for time-certain development.

c) How the Issues Have Been Addressed

The Army decision to re-scope both GFEBS and GCSS-Army to allow GCSS-Army to manage all tactical logistics general fund transactions using a design based upon the GFEBS blueprint led to a similar strategy for DEAMS and ECSS. The details of how this will be accomplished and the precise scope of what aspects of financial management each program will implement remain unclear below the level of executive briefings.

The ECSS program was restructured and the IFS and Click product components of the software suite abandoned in favor of the upgraded Oracle R12 eBusiness suite and a commitment from Oracle Corporation to provide the necessary complex maintenance capability in a future release. The program was restructured from three to four releases to facilitate this transition. The most important capability, flight-line maintenance, is deferred to the fourth and final release.

ECSS remains an immense ERP program and, if it works, will be far larger than any ever-attempted in Industry. There is no history of success for ERP programs this large and many data points for failure when it has been attempted. After more than 5 years and in excess of $500 million expended, the program has yet to declare a baseline for cost and schedule.

The Air Force has realigned the acquisition reporting chains for both ECSS and DEAMS, naming General Officers as Program Executive Officers (PEO) for each program. In the case of ECSS, the PEO and Program Manager responsibilities are combined.

A.4.3 Navy ERP Acquisition Programs

a) Programs and Status

- Navy ERP is fielded to NAVAIR, SPAWAR and NAVSUP systems commands, currently rolling out to NAVSEA
- Navy ERP is based on SAP

b) Key Foundational Issues

The original vision of the Navy ERP was a logistics system that would manage all of the Navy's logistics operations both afloat and ashore. The Navy ERP program has evolved into more of a financial system than a logistics system. The current scope of the Navy ERP includes only financial management and supply for the four Navy System Commands listed above.

The Navy ERP, like all of the other Service ERPs, is fragmented by the mandate to use several external systems. In the case of Navy ERP, significant problems arose in attempting to implement the 3-way match of order, receipt and payment. This was a result of inconsistencies between how accounting data was represented and preserved in

moving between Navy ERP and the Standard Procurement System (SPS), Wide Area Work Flow (WAWF), Accounting Prevalidation Module (APVM), Mechanization of Contract Administration System (MOCAS) and other external systems.

The result was large numbers of unmatched disbursements and a significant level of manual intervention and reconciliation required.

c) How the Issues Have Been Addressed

The Navy ERP resorted to custom automation and several other workarounds in order to achieve acceptable levels of performance in executing the procure-to-pay process. It remains unclear that the auditability goals of the Navy can be fully achieved until the system is used to implement the process from end to end, without compromising the integration through the use of external DoD Enterprise systems.

The Navy removed intermediate level maintenance capability from the scope of the program which required it to report a breach of performance to Congress under the MAIS statutory requirements.

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Appendix B. ERP: Efficiencies Realized and Unrealized across Cost and Time

ERP software solutions vary in implementation but have a similar goal-to optimize business process efficiency through automation and integration. In the fifty or so years that computers have been available to the commercial world, businesses have automated more and more of their procedures. While early computers introduced shortly after World War II were mainly used to compute mathematical and statistical solutions, serious commercial use began in the late 1950s for financial management in banks and insurance companies. In the early 1960s, the first computerized airline reservation systems were developed. At about the same time, computers were beginning to be used for designing manufactured goods and by the mid-1960s were being proposed to control manufacturing processes. By the mid-1970s, computer aided design and manufacturing (CAD/CAM) was routine. The 1970s also saw the first computerization of personnel management as well as integrated suites of Billing, Inventory Control, Accounts Receivable, & Sales Analysis (BICARSA) applications for construction, distribution, and manufacturing.

The precursors in the manufacturing world to the present-day ERP systems were originally know as Materials Requirements Planning (MRP) and subsequently as Manufacturing Resource Planning (MRP II) systems. These systems attempted to gain efficiencies in manufacturing by reducing order lead times while maintaining minimal inventory and maximizing equipment utilization. MRP II systems also integrated financials so that invoices for materials ordered could be paid and receipts for manufactured goods could be tracked. This convergence presaged the eventual goal of bringing all aspects of a business under integrated control to eliminate redundancies and errors in data entry, storage, and manipulation.

It was not until the 1990s that business software suites began to integrate personnel functions, payroll, customer contact, sales management, and shipping into the purchasing, inventory, production, and distribution programs of the 1980s. Further innovations began in the year 2000 with internet-enabled functions and e-commerce being added to the capabilities of ERP suites.

Today's ERP systems are designed to integrate all automatable aspects of an enterprise, and even coordinate information exchange among an enterprise's suppliers and customers. Although such seamless integration is theoretically feasible, in practice there are many stumbling blocks to successful ERP implementation. The biggest hurdle for organizations is managing the conversion from existing practices and records to the

integrated functions enabled by the adopted ERP system. It is typical for an organization to have multiple records of what amounts to the same information. For example, individual personnel can be recorded in a payroll system, a telephone list, a travel system, an achievement tracking system, a promotion system, and a management hierarchy, as well as within project and task assignments; a single part on a shelf can be identified by the process that acquires it, by a cross-reference system that shows substitutes, and also by the manufacturing or repair processes that may require it.

When an organization brings in an ERP system, it faces a considerable challenge to merge and cleanse its many redundant, and often inconsistent, records. This restriction on data can cause perturbations of procedures. For example, a manager who customarily provides employee reviews as qualitative prose may have to adapt to the new career tracking system that requires rank ordering in order to allocate payroll raises. When properly implemented, ERP systems offer the ability to continuously monitor the financial picture of an enterprise, not only from invoices and receivables, but also from capital assets, depreciation, and liabilities, even across geographic regions and international monetary systems. This makes an organization auditable, simplifies tax filings, and facilitates adherence to generally accepted accounting principles (GAAP).

Each enterprise must decide upon the scope of its intended implementation because there is no fixed limit to the facets of an enterprise that can be captured by an ERP system. ERP software vendors sell modules of function that capture different aspects of a business's procedures, and the user must decide not only which modules are appropriate but also how deep the adoption must be to achieve an acceptable return on investment. If certain existing procedures are too costly to change or replace, can the ERP system be adequately tailored to co-exist with them? Companies known as system integrators have become the purveyors and implementers for ERP software packages.

Since it is generally not possible to simply license ERP modules and begin to use them verbatim, system integrators are hired to examine an organization's existing procedures and to determine how many can be adjusted to suit the ERP, and how many are immutable and will instead require modifications or extensions to the ERP. It takes considerable will on the part of an adopting organization to abandon legacy processes that are not compatible with the new way of doing business, but the alternative is additional expense to build and maintain the bridges between legacy data and the new software.

These bridge programs are known as RICE objects, for the reports, interfaces, conversions, and extensions that may be needed to mesh the old and new worlds of an adopting enterprise. It is reasonable to compromise on a small number of RICE objects to serve as the scaffolding to enable the ERP software to achieve its results. However, because of the separate maintenance required to keep RICE objects up-to-date with changes—not only to the outside world, but also to upgrades within the ERP product--

there are diminishing returns for the cost effectiveness of adopting ERP with each additional RICE object. An organization that decides to implement more than a few dozen RICE objects may be surprised by the difficulties that ensue.

B.1. Overall ERP Implementation Cost in the DoD

As in the commercial world, ERP efforts in the DoD vary greatly in scope and cost but all must achieve the same basic milestones to be successful: organizational buy-in, defined relationship to legacy systems and processes, rationalization and conversion of data, and transition. ERP implementations and ERP-like developments in DoD range from the modest Global Exchange (GEX) system that normalizes business data across communities, at a continuing sustainment cost of $4M/yr, to GCSS-Army and ECSS-Air Force, for which each planning development costs $200-300M/yr for the foreseeable future. The past nine budgets (FY2003-FY2011) show the numbers of DoD ERP system developments doubling (7 to 14) but with average total budgets for each increasing over that period from $100M to $645M. Existing programs have grown and new, larger programs have been added since 2003. The net effect is that DoD is now spending $1.3B per year on ERP development, and over the FYDP the total DoD expenditure budgeted for ERP systems has increased more than ten-fold from $700M to $9B, as shown in Table B-1.

Table B-1. ERP Cost Increase Over Time

	#Sys	AvSys $M	$M/Sys/Yr	$M/Yr	Total $B
FY03	7	103	13	90	0.7
FY04	7	401	50	351	2.8
FY05	9	494	62	555	4.4
FY06	12	516	64	774	6.2
FY07	13	470	67	872	6.1
FY08	13	572	72	930	7.4
FY09	14	528	66	923	7.4
FY10	13	733	105	1,362	9.5
FY11	14	645	92	1,289	9.0

While the perceived procurement costs of these systems has increased to an average of over $600M, with the highest cost systems adding over $1.5B each to the FYDP, there may still be a positive return on these investments. Corporate investments in large ERP

implementations routinely top $1B. However, corporate environments do not face many of the unusual impediments found within DoD. Moreover, the return on industry investments in the form of reduced process costs, lower inventories, faster turns, and higher market agility, are visible and directly benefit a corporate bottom line. The DoD environment, in contrast, is not as well suited to ERP tools and the profitability incentives are not comparable. Although Congress has long demanded that the Services achieve auditability, the main mission of the MILDEPS is defense, which relies more on logistics than accounting. ERP vendors and system integrators who have experience with commercial environments find that the tools are not designed for the DoD environment, and a great deal of effort has been expended both on the part of system integrators and tool vendors to force these marriages.

The FYDP budget does not give a full picture of the development cost of these systems, and many of the larger ERP implementation programs will not produce results that will justify their cost. Indeed, many have spent-and-will continue to spend-millions or even billions with little tangible benefit evidenced or resulting in a cancellation (e.g., DIMHRS). To date, the best ERP example implementations in the DoD are of limited scope in both number of organizations and in function while the larger, overarching implementations remain in doubt (ECSS, GCSS-Army, and Navy ERP).

IDA estimates of the cost of implementing large-scale ERP in DoD environments (personnel, financial, and logistics) have been forced to provide exceptionally wide error bounds due to the extreme uncertainties. A broad set of factors including legislation, culture, priorities, mission, continuity, motivation, and DoD adoption of commercial approaches to management is fraught with complexity, special cases, exceptions, incompatibilities, and limitations that makes estimation virtually open-ended. Even the best-case estimates of cost, estimates that assume that organizations can agree on data definitions, ownership, business processes, and priorities, hover around $1 billion for a DoD organization (service arm or agency). The probability of failing to achieve conformity, and therefore of exceeding those estimates, is high.

Figures B-1 through B-5 show various ERP systems cost growth over time.

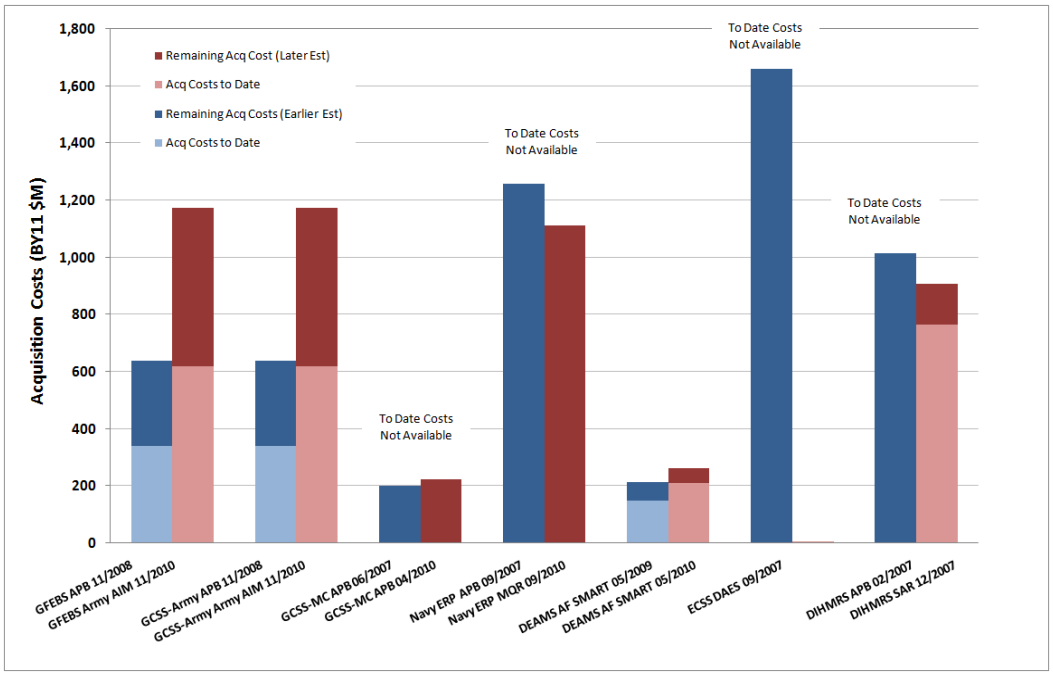

Figure B-1. ERP Acquisition Costs (BY11 $M)

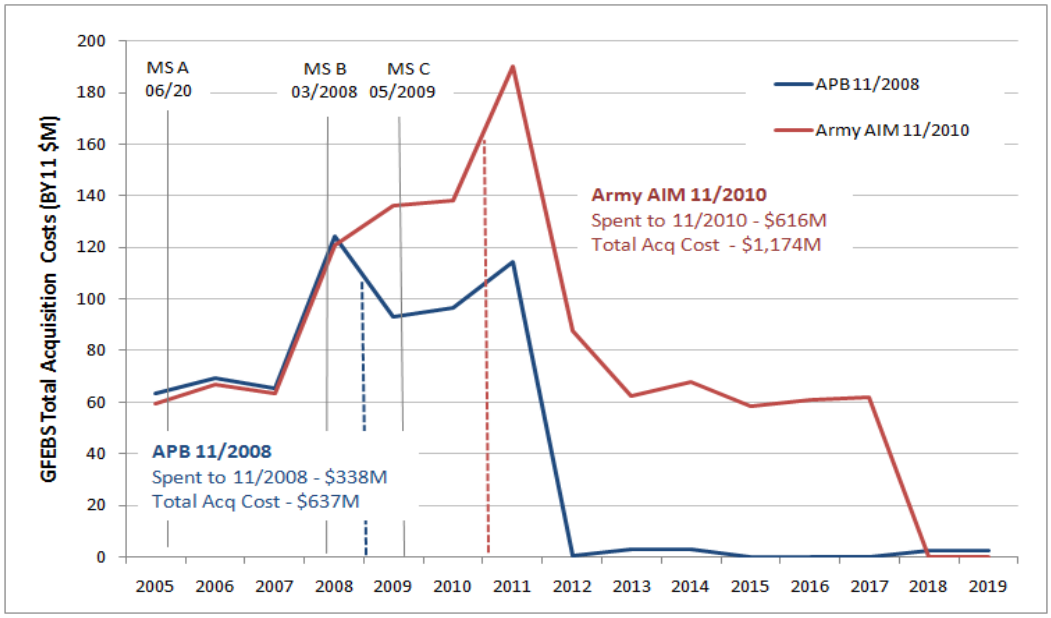

Figure B-2. GFEBS Acquisition Costs (BY11 $M)

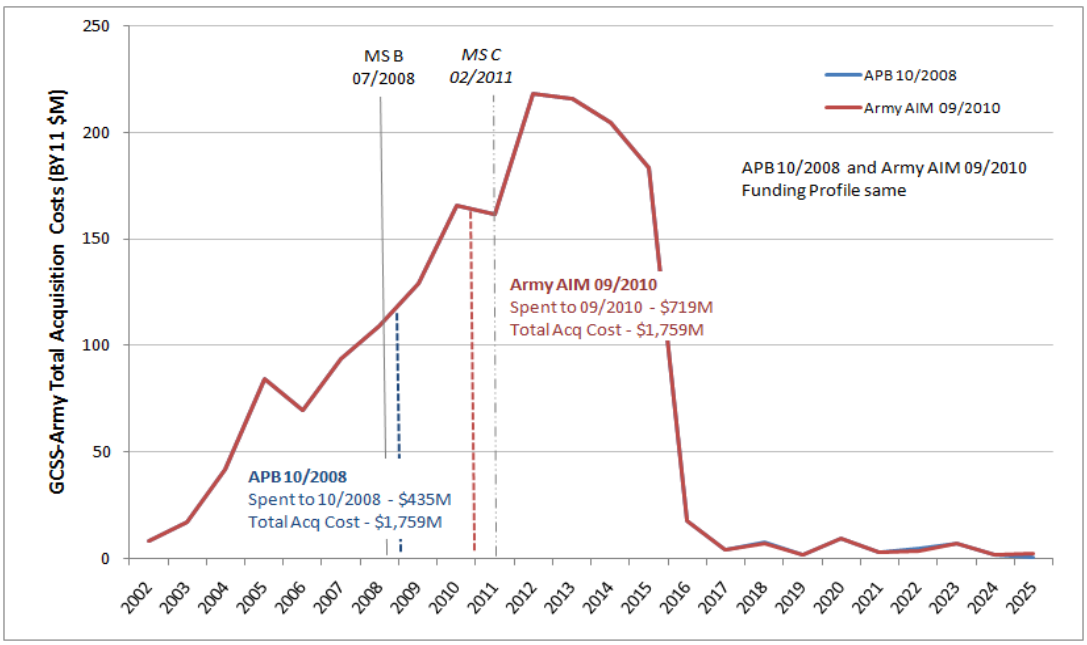

Figure B-3. GCSS-Army Acquisition Costs (BY11 $M)

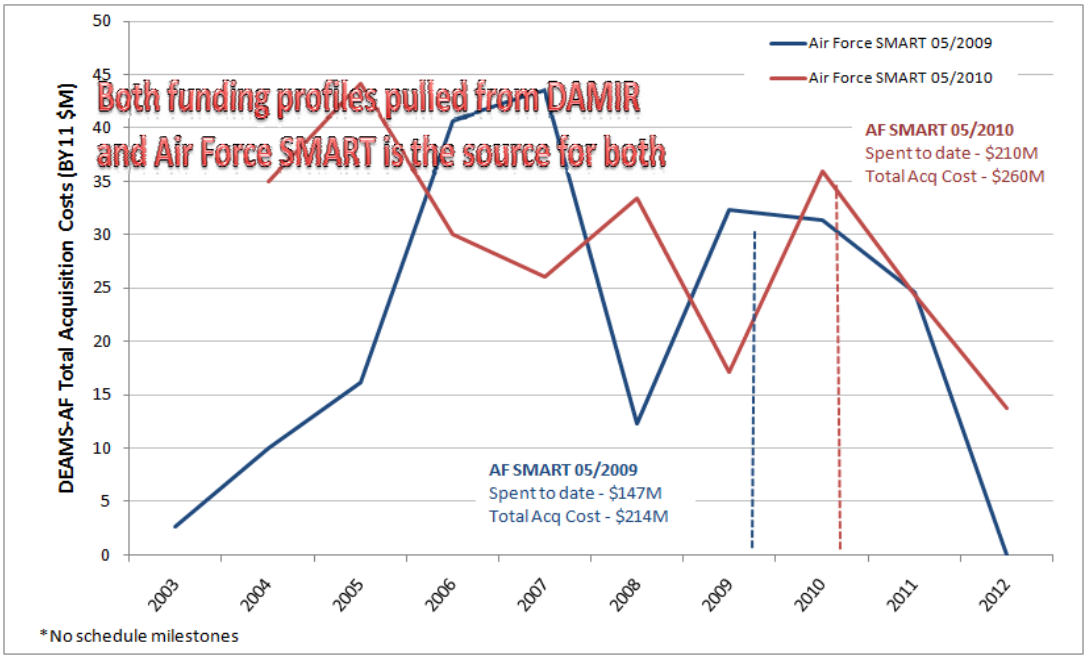

Figure B-4. DEAMS-AF Acquisition Costs (BY11 $M)

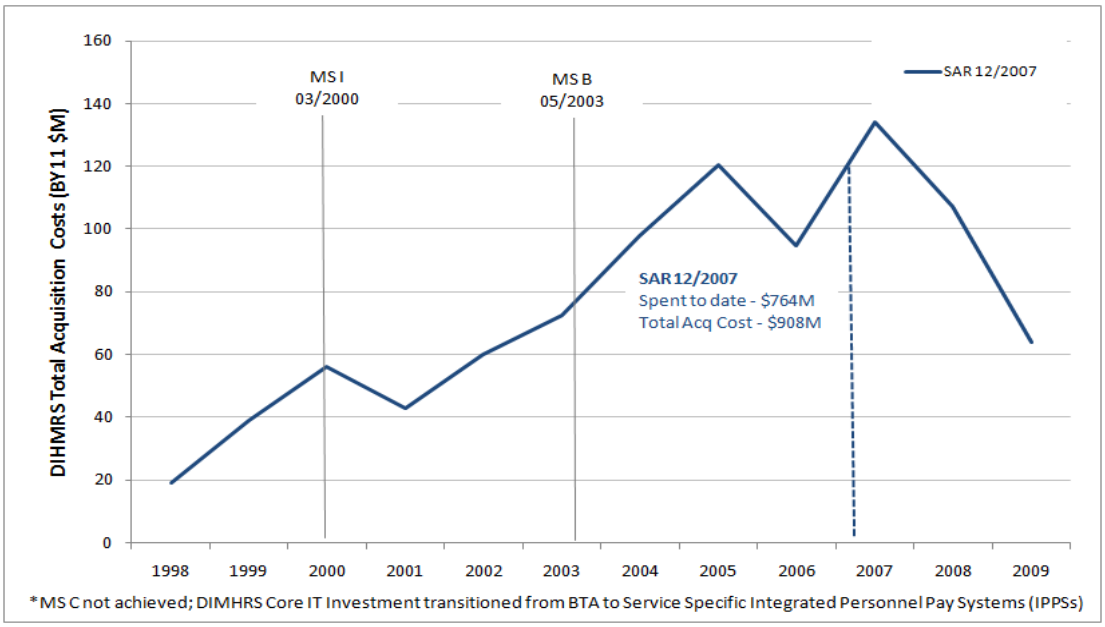

Figure B-5. DIHMRS Acquisition Costs (BY11 $M)

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Appendix C. Capability and Assessments

The overlap in capabilities across the ERP systems was analyzed by a review of the DoD IT Portfolio Repository (DITPR) reports for each of the ERP systems listed in the following tables. The DITPR reports contained tables with:

Capabilities

System functions

Processes

The capabilities listed for each ERP in the DITPR are the same as the high-level activities in the Business Enterprise Architecture (BEA) activity model. In other words, the Components considered the high-level activities to be equal to capabilities for the purpose of the DITPR. The lower-level and more granular BEA operational activities were mapped to the newly created capabilities, so, in effect, the lower-level operational activities are a decomposition of each capability. Each capability therefore has a set of activities that may be performed in order to accomplish the capability.

The overlap in capabilities for each ERP is graphically depicted in table form in Table C-1. This table depicts the capabilities in the rows, and the systems that have that capability in the columns. The shaded cells indicate that the system in that column has the capability. The table also shows the total number of capabilities for each system.

Table C-1. BEA Capabilities

BEA Capabilities (32 of 36 implemented by these ERP systems)	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
FinancialReporting									
ManageGeneralLedger									
ManageFinancialAssetsandLiabilities									
ManagePayment									
ManageReceiptandAcceptance									

BEA Capabilities (32 of 36 implemented by these ERP systems)	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
CollectandDisburse									
ManagerialAccounting									
PerformAssetAccountability									
DisposeorReturnPropertyandMateriel									
PerformBuildandMakeandMaintenanceandSustainment									
ManageSourcing									
ForecastPlanProgramBudgetandFundsDistributionandControl									
RealPropertyInventory									
DeliverPropertyandForces									
ManageRequest									
EnvironmentalLiabilitiesIdentificationandValuation									
ConductProgramManagement									
ManageAcquisitionOversightIntegration									
AccountingandFinance									
CorporateManagementandSupport									
Program/BudgetandPerformance									
ContractSupportIntegration									
NetCentric									
FacilitiesSupport									
Supply									
HazardousMaterialsProcessControlsandInformationManagement									
ProgramBudgetandFinance									
RealPropertyAcceptance									
CapabilityTitleBEPStakeholder									

BEA Capabilities (32 of 36 implemented by these ERP systems)	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
ManageSupplierNetworks									
Contracting									
ManageOrganization									
Grand Total	**19**	**1**	**5**	**14**	**20**	**16**	**8**	**10**	**5**

At a capability level, it appears there is a significant amount of overlap, but as mentioned previously, the capabilities are a composition of smaller and more granular operational activities, functions and processes. So, although there is overlap at the capability level, the process or function being applied at the more granular level should reflect the unique business processes of the Service or Agency and would not necessarily reflect unnecessary redundancy. See Tables C-3 and C-4 for BEA functions vs. systems and BEA Processes and also see Table G-1 for the Assessment Framework.

Figure C-1 represents the DoD capabilities in the context of the organizational units/groups that have or provide the capability. The current BEA does not document which people (org) execute processes and what tools they use, so IDA used the NYC EA Framework (NEAF) to create the context needed to do an overlap evaluation of the capabilities. This simple mapping of organizational units to the processes they execute and the systems used in executing the processes (people, processes, and tools) could be implemented in either DITPR or the BEA to highlight the cross-organizational (NOT IT) systems issues that need to be addressed. This mapping could also help to identify who has Command and Control over all the affected organizations and who can/should enforce standards of performance for a given process or function (once determined that the standard is desirable based on an organization's unique requirements).

Figure C-1. Capabilities by Organizational Unit

Table C-2. BEA System Functions

BEA SYSTEM FUNCTIONS *DEAMS/ECSS have no System Functions listed*	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	Navy-ERP	GCSS-MC
ManageBusinessEnterpriseReporting										
ManageData										
MaintainGeneralLedger										
ManageFunds										
ManageObligations										
ManageLiabilities										
ManageReceivables										
ManageCollections										
ManageCommitments										
ManageBilling										
ManageScheduledPayments										
ManageProcurementInformation										
ManageReceiptandAcceptance										
PrepareCertifiedBusinessPartnerPayment										
ManageRequirement										
ManageAgreementandContractandOrder										
ManageDisbursements										
ManageBuyerorSellerRegistrationInformation										
ManageFederalTechnicalData										
ForecastCash										
GeneratePaymentNotification										
ManageElectronicCatalogandOrdering										
ManageInvestments										
ManageSolicitation										

BEA SYSTEM FUNCTIONS ***DEAMS/ECSS have no System Functions listed***	**BEIS**	**DAI**	**EBS**	**DEAMS**	**ECSS**	**GCSS-Army**	**GFEBS**	**LMP**	**Navy-ERP**	**GCSS-MC**
ManageSupplierEligibility										
ManageContractAward										
GetAllCurrentContracts										
ManageQualityControl										
DeliverInformationProduct										
IdentifyReturnRequirement										
ExecuteReturnSchedule										
PerformBuildandMakeandMaintenanceand Sustainment										
PlanReturn										
ManageandTrackIssues										
DistributeProducts										
ManageDisposal										
ManageFinancialInformationStructure										
ProcessReturnedMateriel/Asset										
ManageCost										
PerformAssetAccountability										
ManageAssetRecord										
ManageAssetValuation										
CalculateSupplyChainEntitlement										
CreateReturnPlan										
ProcessOrderReturn										
ProvideOrderStatus										
PlanMaterielResources										
IdentifyResourceforActivities										

BEA SYSTEM FUNCTIONS ***DEAMS/ECSS have no System Functions listed***	**BEIS**	**DAI**	**EBS**	**DEAMS**	**ECSS**	**GCSS-Army**	**GFEBS**	**LMP**	**Navy-ERP**	**GCSS-MC**
CreateMaterielResourcePlan										
ExecuteMaterielResourceSchedule										
IdentifyMaterielRequirement										
AggregateSpendData										
ManageApportionmentandAllocation										
FormulateProgramandBudget										
RecordInspection										
ProcessShipments										
RecordReceipt										
EstablishTransportationMovementRequirement										
ExecuteTransportationSchedule										
Package/Handle/TransportMaterial/Personnel										
TrackTransportationStatus										
AcceptMateriel/PersonnelforTransportation										
CollectTransferDatafromExternalSource										
PerformBenefitsManagement										
ManageMissionSupportRequirements										
RecordTransportationFulfillment										
ProcessQualityofLifeBenefit										
PerformReporting										
PlanLogisticsServices										
ManageSupplierRepresentationandCertification										
ManageDelinquentDebt										
IdentifyReturnResource										
RetrieveItemStatusandAvailability										

BEA SYSTEM FUNCTIONS ***DEAMS/ECSS have no System Functions listed***	**BEIS**	**DAI**	**EBS**	**DEAMS**	**ECSS**	**GCSS-Army**	**GFEBS**	**LMP**	**Navy-ERP**	**GCSS-MC**
FunctionTitleBEPStakeholder										
PerformCross-CuttingAnalysisandReporting										
DevelopLogisticsStrategicPlan										
DevelopIntegratedLogisticsPlan										
AssessDemand										
ManageandDevelopPlanCriteria										
AssessCapacity										
PerformDataChecks										
PerformProgramAnalysis										
RecordIssuance										
CreateTransportationPlan										
IdentifyTransportationResource										
PlanDistribution										
Grand Total	**3**	**27**	**1**	**0**	**0**	**69**	**32**	**40**	**16**	**29**

Table C-3. BEA Processes

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
PostGeneralLedgerTransactions										
PerformFinancialReporting										
PosttoGeneralLedger										
CaptureProFormaEntries										
RequestGeneralLedgerCorrectingProForma Entries										
GenerateGeneralLedgerTransactions										
AnalyzeUnapprovedTrialBalance										
AnalyzeDraftPeriodEndorOnDemandFinancial Statement										
ApproveTrialBalance										
CreateNotificationforSourceofIncomplete Financial Information										
PrepareFinalPeriodEndorOnDemandFinancial Statement										
RequestCollectandAnalyzeNarrativeandorFoot noteInformation										
CreateDraftPeriodEndorOnDemandFinancial Statement										
CreateFinancialStatementLevelAdjustment										
DocumentIdentifiedCorrections										
CoordinateDraftPeriodEndorOnDemand FinancialStatementtoAuditFunction										
PerformRequiredFinancialStatement Eliminations										
SendStatementsofAccountabilityor TransactionsorTrialBalancetoTreasury										
ConfirmGeneralLedgerClosingProForma Entries										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
ConfirmGeneralLedgerCorrectingProForma Entries										
RequestGeneralLedgerClosingProForma Entries										
ProcessTitleBEPStakeholder										
ReceiveandValidateRequestforBilling										
MaintainAccountsPayableBalance										
UpdateReceivableInformation										
Collect										
VerifyFundsAvailability										
EstablishAccountsPayable										
MaintainAccruedLiabilityBalance										
CaptureFinancialTransactionReport										
CertifyFunds										
PrepareInitialTrialBalance										
EstablishCustomerInformation										
PrepareReimbursableBill										
EstablishFundsControl										
EstablishReceivable										
SendNotificationofBillingtoAccounts Receivable Process										
ValidateCustomerInformation										
VerifyAssetorExpensePostingAccounts										
CreateWriteOffPackage										
ManageLiabilities										
SchedulePayment										
ReceiveAccountsPayableSupporting Documentation										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
ManageExecutionFundAccount										
RecordandManageReceivable										
ProcessCollectionVoucherandDeposit										
MonitorPayment										
PerformCollectionandDisbursement										
CalculateSupplyChainEntitlement										
ReconcileDisbursements										
PreparePaidDisbursementVoucher										
ManageExecutionwithTreasury										
EvaluateLiabilityInformation										
GenerateAccruedPayrollLiabilityProForma Entries										
GenerateContingencyAccruedLiability ProForma Entries										
GenerateFinalUnapprovedTrialBalance										
ConfirmBilling										
CreateAnomalyExplanation										
GenerateOffsettingLiabilityorReceivable ProFormaEntries										
GeneratePrePaymentProFormaEntries										
GenerateProFormaEntriesforAccountsPayable										
GenerateProFormaEntriesforAdjustmentsto UndeliveredOrders										
GenerateProFormaEntriesforBilledCollection										
SendRequestforBill										
CalculateAssociatedRevenue										
CaptureCollectionInformation										
GenerateProFormaEntriesforPostCancel Payment										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
GenerateProFormaEntriesforPreviously UnidentifiedBilledCollection										
GenerateProFormaEntriesforPreviously UnidentifiedRevenueCollection										
DetermineBillingRequirements										
GenerateProFormaEntriesforPreviously UnidentifiedUnbilledCollection										
GenerateProFormaEntriesforUnbilled Collection										
Re-CalculateNewAccountsPayableBalance										
GenerateProFormaEntriesforUnidentified Collection										
ApplyAccountsPayableOffset										
GenerateReceivableProFormaEntries										
GenerateUnearnedRevenueAccruedLiability ProFormaEntries										
EvaluatePayableRequestInformation										
IssueCreditMemo										
LiquidateOutstandingAccountsReceivable Balance										
LiquidateOutstandingLiabilityBalance										
ConvertUnitedStatesDollarEquivalentto Foreign Equivalent										
GenerateProFormaEntriesforCancellationofan AccruedLiability										
GenerateProFormaEntriesforClearingAccount										
GenerateProFormaEntriesforRevenue Collections										
ConfirmInterfundBilling										
InvestigateAnomalies										
EstablishContractHoldback										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
ValidateReceiptInformation										
ApplyCollection										
GenerateProFormaEntriesforContract Holdback										
ValidateOtherReceiptsInformation										
CancelPayable										
CalculateAdjustmenttoUndeliveredOrders										
CompareOutstandingAccountsReceivable Balance										
ReceiveAdjustmentforDeliveredOrdersand AccountsPayable										
AnalyzeUnidentifiedCollectionInput										
GenerateDisbursementProFormaEntries										
ReceiveOtherReceipts										
GenerateProFormaEntriesforPreviously UnidentifiedClearingAccount										
ReceiveDebitVouchers										
ValidateReimbursableReceiptInformation										
AnalyzeAuditComments										
ReceiveCollectionReceipts										
RejectRequestforBilling										
PrepareAdviceofCollection										
ValidateCashPaymentReceipts										
ValidateRefundReceiptInformation										
MatchtoOutstandingLiabilityBalance										
GenerateOffsettingReceivableLiability ProForma Entries										
PrepareCertifiedBusinessPartnerPayment										
ReconcileDeposits										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
InterpretTreasuryConfirmationData										
ValidateCancelPaymentRequestInformation										
ReconcileReceiptAccountLedger										
CancelPayment										
AnalyzeAnomaly										
CaptureTreasuryConfirmationData										
GenerateCorrectingProFormaEntries										
GenerateProFormaEntriesforAdvance Received Collection										
CreateElectronicFundTransferFile										
ManageScheduledPayments										
GenerateProFormaEntriesforDepositAccount										
ResearchAdviceofCollectionInformation										
ValidateReadytoPayFileInformation										
ReceiveCashPaymentReceipts										
ReconcileProgramInformation										
ResearchDebitVoucherInformation										
CreateWireTransferFile										
DistributePayment										
ManageReturnedPayments										
MatchCheckNumbertotheVoucher										
ReceiveGoodsandServices										
PerformInspectionandTestingandVerification for OtherGoodsandServices										
FinalizeAcceptanceforOtherGoodsandServices										
PerformAcceptanceProceduresforOtherGoods andServices										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
AcceptGoodsandServices										
MatchObligatingDocumentAcceptanceand PaymentRequest										
FileDiscrepancyReport										
FileDiscrepancyReportforOtherGoodsand Services										
PerformCostAnalysis										
PerformInspectionandTestingandVerification										
MatchPaymentRequestandObligating Document										
AcknowledgeGoodsTenderedandServices Rendered										
FinalizeAcceptance										
PerformAcceptanceProcedures										
ReceiveAuditReport										
MatchFundingStatus										
EstablishCIPandorWIPAccount										
CreateCIPandorWIPAccount										
AnalyzeSpendInformation										
ValidateAccountStructure										
AcknowledgeOtherGoodsandServices										
MatchAcceptanceandObligatingDocument										
GenerateComponentDebtProFormaEntries										
GenerateInterfundBilling										
ReviewFundingRequest										
GenerateProFormaEntriesforPreviously UnidentifiedRefundofanAdvance										
GenerateCapitalLeaseLiabilityProForma Entries										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
CompareResultstoPerformanceMeasurement Criteria										
CaptureCostInformation										
AnalyzeProposedAuditAdjustment										
AcceptApprovedIntragovernmentalOrder										
ConfirmReceiptofOperationandMaintenance Information										
DefineandValidateAssetDataRelationships										
DefineandValidateAssetDataStructure										
DefineAssetDataElements										
PopulateAssetDataElements										
AssignandGenerateUniqueIdentification										
ReceiveProjectEvidence										
RequestAdditionalSupportingCollection Information										
PerformQualityAssuranceonAggregated Information										
GenerateSubsidyAccruedLiabilityProForma Entries										
ProcessAccruedSeveranceLiabilityInformation										
ProcessFundedPayrollandBenefitsInformation CivilianandMilitary										
ReviewReprogrammingRequirements										
DetermineReprogrammingActions										
RequestCorrectingProFormaEntries										
GenerateProFormaEntriesforUndeposited Account										
GenerateProFormaEntriesforInvestment Collection										
AcceptSignedAgreement										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
GenerateCustodialLiabilityProFormaEntries										
IssueCancelPaymentNotice										
RelieveCIPandorWIPAccount										
AssociateProjectIdentificationtoAppropriate WIPAccount										
ConductInspectionalkthroughExamination andVerificationofSyWstemOperation										
GenerateProFormaEntriesforDonation										
ConfirmReceiptofAcquisitionInformation										
CreateManagementRepresentations										
RecordCIPandorWIPFinancialTransactions										
AssembleCertifiedFinancialStatementPackage										
PerformReprogrammingandTransfers										
DetermineIfCIPandorWIPAccountisRequired										
UpdateCIPandorWIPAccount										
GenerateProFormaEntriesforPreviously UnidentifiedInvestmentCollection										
DetermineOtherValuationMethods										
CertifyDiscrepancies										
ReviewandCertifyFinancialStatement										
MonitorContractorOrder										
CloseoutContractorOrder										
DisseminateTreasuryCollectionConfirmation Data										
ApplyTrendingTechniques										
RespondtoDraftAgreement										
DocumentResultsofReconciliation										
IdentifyAgreement										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
ConfirmContractorOrderPhysicallyComplete										
ReturnCancelPaymentRequest										
ArchiveOrder										
DetermineFinalCosts										
DisseminateTreasuryDisbursementConfirmation Data										
ReconcileUndisbursedExpenditureAccount Ledger										
MonitorAgreement										
ReleaseApprovedandorCertifiedFinancial Statements										
ReleaseFinancialStatements										
PopulateCostPerformanceModel										
DefineCostPerformanceModel										
ProcessRequirement										
NotifyCustomerCannotFulfillRequest										
ProcessCashPayment										
VerifyInformation										
CollectSpendInformation										
ManageFinancialManagementPolicy										
IdentifyCapitalLeaseAssetAccountInvolved										
DistributeProgramandFundingDocument										
DocumentModelResults										
ApplyAnomalyDetectionCriteriatoData										
PerformInternalReviewofModelResults										
ReviewForecastAnalysisRequest										
AllocatetoModelElement										
ExecuteAcceptanceTransactions										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
ProcessAuthorizedPersonnelandBenefits Liability Information										
ProcessFundedandUnfundedLeave Information										
SubmitApportionmentRequesttoOMB										
AssociateProjectIdentificationtoAppropriate CIPAccount										
PrepareDepositTicketandAdviceofCollection										
ApplyChanges										
PrepareDoDApportionmentRequestfor Submission										
ConfirmReimbursableBill										
RequestContinuingResolutionActEstimates										
IdentifyInspectionandVerificationParticipants										
AnalyzeApportionment										
PrepareReportforCongressionalReview										
PrepareRequirementsforSubmissiontoOMB										
FormalizeContinuingResolutionActBaseline										
ManageBaselineforReprogramming										
ReviewAdditionalContinuingResolution Amount Request										
AnalyzeAppropriationandGeneralProvisions										
CaptureContinuingResolutionAdjusted Amount										
ManageReportofPrograms										
IncorporateChanges										
CaptureContinuingResolutionActEstimate										
IdentifyAcceptingOfficials										
ReviewRequestforReportofPrograms										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
AddVouchertoCollectionVoucherControlLog										
ExecuteContinuingResolution										
SubmitAdditionalAuthorityRequesttoOMB										
SubmitApprovedRequesttoTreasury										
RejectReadytoPayFileInformation										
CalculateAmountAvailable										
InterpretOMBBulletin										
GenerateProFormaEntriesforPreviously UnidentifiedUndepositedAccount										
CollaboratewithCustomerToDetermine Requirements										
DetermineModelType										
CollectandAnalyzeRequirement										
CompareRequirementsToExistingModels										
AssessDataRequirements										
CharacterizeData										
RequestNewDataElement										
DefineCriteriaforDetectingAnomalies										
ReviewAnalyticalResultsWithCustomer										
DetailtheRemainingModelFramework										
DefineHighLevelCostObjects										
DefineResponsibilitySegment										
UpdateCostPerformanceModel										
ValidateConformityWithStandards										
MonitorContractorOrderPerformance										
GenerateActionPlan										
ReceiveAdditionalSupportingCollection Information										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
RecordTimeandAttendance										
DevelopResponsetoCongressionalDecision										
IncorporateComments										
GenerateDisbursementInTransitProForma Entries										
LiquidateOutstandingPenaltyAdministrative Fees andInterestBalance										
RejectAccountsReceivable										
PrepareScheduleofCancelledChecks										
PrepareTransferRequirementsforSubmission to OMB										
CoordinateTransferRequirementswithOMB										
MaintainAccountsReceivableBalanceand Information										
SettheScopeoftheAnalysis										
MonitorandImproveProcess										
ProcessIntraGovernmentalPaymentand Collection										
CoordinateReprogrammingRequirements withOMB										
PublishAnalyticalResults										
PublishBaseforProgramming										
CalculateAllowanceforLossonAccounts Receivable										
LiquidateOutstandingPrincipalBalance										
AnalyzeDeniedRequests										
Re-CalculateOutstandingPenalty Administrative FeesandInterestBalance										
ReferEligibleDebtstoTreasury										
ReviewTransferRequirements										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
Re-CalculateOutstandingPrincipalBalance										
SelectExistingModel										
SelectTrendingTechniques										
SendBillingDocumenttoCustomer										
MaintainAccountsReceivableBalances										
ReviewOutstandingPrincipalBalance										
Re-CalculateReceivable										
UpdateReceivableAmount										
ProcessIntra-GovernmentalPayment andCollection										
Disburse										
AnalyzeReceivableRequest										
CaptureReceivableRequestInformation										
GenerateProFormaEntriesforaRefundofAn Advance										
CalculateInterest										
ReviewOutstandingPenaltyBalance										
LiquidatePenaltyBalance										
Re-CalculateAdministrativeBalance										
CalculatePenalty										
Re-CalculatePenaltyBalance										
GenerateDemandforPayment										
ReviewOutstandingDebtandOffsetRequest										
SendDemandForPaymenttoCustomer										
LiquidateAdministrativeBalance										
Re-CalculateInterestBalance										
CalculateAdministrativeFees										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
CalculateAging										
CalculateAllowanceforLossonPublicReceivable										
ReviewOutstandingInterestBalance										
SendDemandLetter										
LiquidateInterestBalance										
RejectAccountsReceivableRequest										
EvaluateWhetherFurtherInvestigationIs Warranted										
EvaluateReport										
IdentifyAppropriationLineItemAmount										
RefertoLegal										
LiquidatePrincipalBalance										
Re-CalculatePrincipalBalance										
NotifyManageDelinquentDebt										
ReclassifyContractHoldbacktoAccounts Payable										
RefertoTreasuryforCollection										
DetermineIfReceivableCanBeOffset										
GenerateDisbursementIn-TransitProFormaEntries										
GenerateDunning										
CreateCheckPrintFile										
DisburseCash										
GenerateProFormEntriesforPreviously UnidentifiedDepositAccountCollection										
MaintainAssetInformation										
ConductPhysicalInventory										
CreateInitialAssetRecord										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
UpdateAssetRecord										
ManageSalesandProcurement										
AggregateInitialAssetInformation										
DevelopandUpdateWorkOrder										
DisposePropertyorMateriel										
AggregateAssetInventoryCountResults										
AuthorizeWorkOrder										
ExecuteContract										
ExecuteSourcingStrategy										
AdministertheContract										
DeveloporModifyContractorOrder										
CompareForecastToActualPerformance										
ReviewAssetInventoryCountResults										
ArchiveAssetRecord										
ValidateAssetDataElements										
PerformAssetAccountability										
PerformAssetValuation										
CountAssets										
PerformRootCauseAnalysisandReform Inventory ControlProcedures										
ApproveAssetInventoryCountInformation										
ConfirmReceiptofRegulatoryCompliance Information										
ProcessandSubmitValidatedEvidence										
IdentifyPropertyandMaterielforReturnor Disposal										
ScheduleReturnorDisposal										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
PerformBuildandMakeandMaintenanceand Sustainment										
AuthorizeReturnorDisposal										
PrepareDetailedScopeandCurrentWorking Estimate										
UpdateMilitaryEquipmentValuation										
CalculateBalanceComponentDebtHousing										
PrepositionWithdrawal										
RequestDesignApprovalPerMilestone										
DefineandRecordDiscrepancies										
ReviewCongressionalAction										
ConsolidateDiscrepancies										
TrackDeferralAccounts										
NegotiateOfferinCompromiseorProtest										
ConfirmReceiptofGraphicInformation										
GenerateEnvironmentalAccruedLiability ProForma Entries										
ClassifyEnvironmentalLiability										
IncorporateCongressionalFeedback										
ReviewProposedDeferrals										
ScheduleInspectionsandVerifications										
ClassifyWork										
InterpretCongressionalAction										
CalculateNetIncreaseorDecrease										
RejectEnvironmentalLiabilityInformation										
DefineWork										
ExecuteRescissionCancellationandDeferrals										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
RelieveMilitaryEquipmentValuation										
GenerateReconciledDraftReport										
DevelopSourcingStrategy										
DeveloporRefineSourcingPlan										
AwardContractorAcknowledgeOrderorIssue Modification										
NegotiateorReviseIntragovernmentalOrder										
InitiateProcurementChangeRequest										
EstablishSourcingVehiclewithGovernment Sources										
IdentifyandReserveSupplyChainResources										
ManageInboundandOutboundShipments										
TransportMaterielandForces										
AssembleandMarshalForces										
CollectProgramInformation										
ReceiveandPrioritizeRequirements										
ManageTravel										
SignAgreementwithGovernmentRequester										
CoordinatewithSupplier										
RespondtoSolicitation										
ConductMarketResearch										
CollaborativelyDeveloporModifyAgreement with GovernmentSupplier										
DetermineResourceImplications										
ProcessContractClauses										
DetermineRouteandCarriers										
StageContractorOrder										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
ConsolidateProgramChangeProposal										
ImplementESOHSolution										
DeveloporCollectEnvironmentalLiability Documentation										
CompileIssueBooks										
ExecuteApportionmentandAllocateFunds										
WithdrawFunds										
ReviewRescissionRequirements										
ExecuteRealPropertyAcceptanceTransactions										
ForecastDemand										
ExecuteContractCloseout										
CalculatePaymentAdjustments										
PrepareDoD'sInitialPresident'sBudget Submission										
AdministerAssignmentAction										
PerformBudgeting										
EstablishEffectiveandPostingDateofChange										
CollectBudgetInformation										
ExecuteProgram										
UpdateChartofAccountsandSFISAttributeand ProFormaEntriesandCalendar										
UpdateAnomalyDetectionCriteria										
ConductResearch										
ReviewOutstandingAdministrativeBalance										
ImproveAndValidateAssumptions										
AccumulatetoModelElement										
ReviewModelResultsWithCustomer										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
ConsolidateandInterpretResults										
PerformPhysicalAssetAccountability										
FileRealPropertyDiscrepancyReport										
PerformRealPropertyInspectionsand Verifications										
CoordinatewithComponents										
VerifyCommissioningRequirements										
GenerateDeferralReport										
AcknowledgeRealPropertyServicesRendered										
ConfirmReceiptofUniformRelocationsAct Information										
DetermineRe-apportionment										
GenerateDraftBaselineReport										
VerifyTitleSearch										
PrepareRequirementsforSubmissionto Congress										
IncorporateFeedback										
ReceiveDesignApprovalResponse										
GenerateDraftProgramReport										
GenerateDraftRebaselineReport										
AnalyzeAnomalies										
EstimateTimeandCostofCorrectiveActions										
VerifyAccuracyandCompletenessof Environmental Liability										
DevelopProposedRescissionLanguage										
CreateProgramandFundingDocument										
PerformConstructionRestoration Modernization										
IdentifySpread										

BEA Processes	BEIS	DAI	EBS	DEAMS	ECSS	GCSS-Army	GFEBS	LMP	NAVY-ERP	GCSS-MC
UpdateProgramandFundsInformation										
PerformInstallationsSupport										
AggregateRealPropertyManagement Information										
ConfirmProofofTraining										
ScheduleClosingorSigningwithProvider										
ValidateReportingDocumentation										
EstablishandUpdateValuationConventions										
NotifyAcceptingOfficials										
VerifyEnvironmentalLiabilitySummary Documentation										
CompleteReviewandApproveFinalDesign Solution										
ApplyPaymentInstructions										
DetermineAvailabilityofRequiredData										
ProcessApprovedRequirement										
GenerateForecast										
ReviewModelwithCustomer										
ReCalculatePrincipalBalance										
Grand Total	**22**	**300**	**0**	**165**	**316**	**97**	**341**	**176**	**148**	**33**

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Appendix D. Performance Measures

Performance management is required for all levels of DoD activities. The performance management requirements for the business systems are intended to ultimately show strategic alignment to the Quadrennial Defense Review (QDR) goals and objectives. In turn, alignment to operational goals and objectives-external and internal performance goals and objectives on the program level-can then be achieved. Each level must determine the most meaningful type of measures to accurately track and report performance. For example, at the strategic level, responsibility for reporting compliance with internal controls and with strategic goals and objectives requires different metrics than at the operational level, which requires metrics for the scope of the operational unit only. Similarly, the program level requires identification and tracking of performance metrics for program/contract milestones and mission performance, including a description of baseline, target, and quantitative measurement indicators.

In the case of performance management for financial management, the strategic level requires the Executive responsible to adhere to the OMB guidance for ensuring that internal controls are in existence and are followed in a consistent and comprehensive manner. The OMB guidance checklists and similar reporting requirements comprise the metrics that ensure controls are effective. At the strategic level, there are several reports that include financial management performance goals and objectives and that map performance to the QDR. For example, the DoD Performance Report and DoD Performance Budget Plan, as well as the DoD Budget Request and other budget-related documents. The metrics for strategic goals and objectives need unique high-level performance metrics to ensure progress is being made at the strategic level.

At the operational level, financial management performance metrics are more specifically tied to the people, processes, and technology that would lead to a clean audit. The metrics for auditability include the level of training and knowledge of the personnel; the ability to collect and post accurate and complete data in the correct accounts, and the capability of systems to automate and generate accurate reports from the data. Each organization at the operational level does not necessarily have the same processes, or therefore the same performance metrics, but needs to design and develop systems and metrics to reflect their mission needs for financial management. The organizational performance metrics may be derived from a standard or custom financial audit checklist to cover all financial areas. For the Enterprise level, the question is how the processes and technology of the individual organizations with different data, processes, and technology

may or may not be adequately merged, with effective metrics to measure success, in an overall financial management system that will result in a clean audit for the enterprise.

At the program or project level, very discreet performance metrics may be identified, tracked, and reported for financial management and, specifically, for auditability purposes. This level should have metrics tied to accepted accounting practices and standards and unique valuation methods for operating units, as well as metrics for personnel training and expertise, adequacy of processes, and system performance.

The following describes and provides the status of the major performance management mechanisms currently in force for DoD for the Enterprise, Operational, and Transactional Views.

D.1. Enterprise View

D.1.1. Office of Management and Budget Internal Controls

OMB A-123 lists nine statutory requirements documents for internal controls related to financial reporting, including the Chief Financial Officers (CFO) Act and the Federal Financial Management Improvement Act of 1996 (FFMIA). Compliance with the CFO Act and the FFMIA is specifically noted by the majority of ERP initiatives in their submissions to the OMB Exhibit 300. The ERPs also state compliance with the Business Enterprise Architecture (BEA). The Federal Managers Financial Integrity Act of 1982 (FMFIA), though not listed by the initiatives as a compliance requirement, includes a requirement for DoD to provide a Statement of Assurance that the agency has reasonable assurance that controls are achieving the intended objectives, and materiel weaknesses and corrective action plans are reported. This Statement of Assurance is required as part of the annual Performance and Accountability Report (PAR) required by OMB.

D.1.2. DoD Performance Reports and Plans

The Quadrennial Defense Review (QDR) sets the strategic goals and objectives for the DoD. The DoD Budget Request Overview; DoD Performance Report, DoD Performance Budget Plan, DoD Strategic Management Plan, Agency Financial Report (AFR)/Performance and Accountability report (PAR), Program Assessment Rating Tool (PART), and Annual Management Reports (AMR), are all mechanisms to document and track program performance at a strategic level. In addition, the intent of the BEA is to provide a repository for common processes, data, and describe other common elements, including performance. The OMB EA Assessment (that is now in hold status) also required segment owners to report performance from the strategic, segment, and investment level as a way to ensure alignment of program goals with strategic goals. All of these reports are intended to meet the requirements for internal controls as described in the OMB A-123.

The following describes the DoD reports and plans, and the current status:

1. FY 2011 Budget Request Overview of Feb 2010[1] includes Section 7, Performance Improvement. This section describes the content of the FY 2009 DoD Performance Report and the FY 2011 DoD Performance Budget Plan that relates to strategic objectives and specific performance targets.

2. FY 2009 DoD Performance Report[2] is included as part of the FY 2011 Budget Request Overview. The Report identifies performance targets aligned with QDR strategic goals and objectives, including Strategic Goal 4: Integrate Business Operations. Goal 4.2U aims to "strengthen financial management activities."

3. FY 2011 Performance Budget Plan[3] is included as part of the FY 2011 Budget Request Overview and is required per statutory provisions of the Government Performance and Results Act (GPRA) of 1993. The Plan has revised performance targets based on the President's High Priority Performance Goals (HPPG) and the DoD Strategic Management Plan. One of the HPPGs goals is to "increase the audit readiness of individual DoD Components." The following performance measures, under the responsibility of the USD (C/CFO), are included (with other financial-related measurement indicators) to meet annual and long-term performance goals for financial management:

- Percentage of audit-ready assets (deleted for FY 2011 by request of the USD Comptroller)
- Percentage of audit ready liabilities (deleted for FY 2011 by request of the USD Comptroller)
- Percentage of DoD Statement of Budgetary Resources (SBR) Appropriations received, validated (target of 100% reviewed, verified, and approved as audit-ready by FY 2013. The target for FY 2011 is 80%.)
- Percentage of DoD SBR validated (target of 100% validated as audit-ready by FY 2017. The target for FY 2011 is 14%.)

In addition, Goal 4.2U includes the following measure under responsibility of the DCMO:

- Percentage of enterprise level business services deployed within 18 months of the capability business cases approval (target of 80% deployed within 18 months by FY 2012. The target for FY 2011 is 50%.)

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[1] DoD Fiscal Year 2011 Budget Request, February 2010, OSD/CFO.

[2] FY2009 DoD Performance Report.

[3] FY2011 DoD Performance Budget Plan.

4. DoD Strategic Management Plan (SMP): The July 2009 SMP states that an annual review led by the DCMO/CMO develops a set of integrated business priorities that address key performance measures. The main output of this review is the SMP that also provides input to the Performance Budget and Report as part of the DoD budget submission. The performance framework described in the SMP includes several steps, including: plan, set targets, cascade measures, align processes, assess and report, and correct.

This 2009 version of the SMP includes some top priorities developed by the Army, Navy, and Air Force CMOs, but the Army is the only Component that specifically notes ERP-related priorities: re-engineering business processes to improve performance and providing integrated supply chain support. Although the SMP describes it's framework in a way that should result in effective performance metrics, the July 2009 version does not have comprehensive priorities or related performance metrics on either the Enterprise or Component level. The 2010 SMP is currently in development and should be released soon. The 2010 SMP is planned to include more concrete performance metrics and alignments between the strategic level, the BEA, and Business Process Re-engineering (BPR).

5. Financial Improvement and Audit Readiness (FIAR), May 2010: Lists specific performance goals, objectives and related metrics. Recently, there has been an increased and joint emphasis by the DCMO and the OSD(C) focused on the SBR.

6. Agency Financial Report (AFR)/Performance and Accountability report (PAR), November 2009: The performance metrics in the AFR are based on the QDR 2006 goals and objectives. The QDR 2010 has since been released; therefore, the performance metrics in the AFR are no longer current. For FY 2009, DoD chose to produce the DoD Agency Financial Report (AFR) as an alternative to the PAR. The Agency Financial Report (AFR) for FY 2009 includes three components: the AFR, that provides executive-level information on the Department's history, mission, organization, key performance activities, analysis of the financial statements, controls and legal compliance; the Annual Performance Report (APR), that is included in the Congressional Budget Justification and will provide the detailed performance information and description of results by performance measures; and the Summary of Performance and Financial Information, that will summarize the Department's financial and performance information. The AFR was published on November 16, 2009. The APR and the Summary of Performance and Financial Information were planned to be published in February 2010 but have not yet been released (or at least not posted on DCMO website).

The November 2009 AFR includes a Statement of Assurance, signed by Deputy Secretary of Defense William J. Lynn states that the Department used OMB A-123, Appendix A, "Management's Responsibility for Internal Controls" to assess internal controls over financial reporting per the objectives of the Federal Managers' Financial

Integrity Act (FMFIA). The evaluation determined that "reasonable assurance cannot be made that internal controls over financial reporting are effective as of June 30, 2009."[4] Also, the evaluation concluded that, as of November 2009, "the Department's financial systems are not in substantial compliance with the Federal Financial Management Improvement Act (FFMIA)." The Statement further says some broad initiatives including program and senior management responsibility to internal management controls and a focus on responsible planning to resolve financial reporting and materiel weaknesses is ongoing. According to the Statement, the FIAR initiative and systems modernization efforts as reflected in the ETP demonstrate measured progress. The DoD FY 2009 Performance Report and the FY 2011 DoD Performance Budget Plan are included in the FY 2011 Budget Request published in February 2010. Note: The AFR has not been updated for QDR 2010 and does not include the DoD Summary of Performance and Financial Information that was planned for release in February 2010.

7. Program Assessment Rating Tool (PART). The PART assesses a limited number of initiatives; the ERPs are not currently being assessed.

8. The BEA is discussed in detail in Appendix E.

9. The OMB IT Dashboard is a tool for monitoring IT projects. The OMB IT Dashboard includes the same performance metrics and tracking information that Components submit for the Exhibit 300s. It is lacking in usefulness from the performance perspective for the same reasons as the Exhibit 300s, as discussed below in the Transactional View section.

In addition, the DoD Information Technology (IT) Budget Estimates in the FY 2011 President's Budget Request[5] includes the Selected Capital Investments Report with information about each major ERP initiative. This information primarily includes cost milestones/schedules, and funding accomplishments but does not include specific performance metrics or measures.

Most of these strategic level reports have goals and objectives that are at too high a level to be effective except to show broad alignment with QDR goals. For example, there are some performance metrics in the FY 2011 Budget Request Overview of February 2010, Exhibit A, for Strategic Goal 4, "Integrate Business Operations," as measures for Enterprise-level goals, but no metrics that can measure the effectiveness of the steps to accomplish the strategic goal.

There is also no consistency between the strategic goals in the FY 2011 DoD Performance Report and in the DoD Performance Budget Plan (as described in the FY 2011 Budget Request Overview, Exhibit A) or in the Component goals listed in the DoD

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[4] DoD Agency Financial Report for Fiscal Year 2009, November 16, 2009.

[5] FY 2011, President's Budget Report, DoD Information Technology Budget Estimates, Selected Capital Investments Report, OSD (NII), DASD-R, Resource, Program Budget Office, Mar 2010.

Strategic Management Plan. Also, the FY 2009 AFR is outdated and does not include the planned (February 2010) performance-related documents it promises on the DCMO website. It is unknown whether the Performance Improvement Section 7 in the FY 2011 Budget Request Overview is intended to encompass the DoD Performance Report and the DoD Performance Budget Plan or if there are separate documents for those.

D.2. Operational View

The following description of the current status of the operational view is limited to the performance metrics noted in the Enterprise Transition Plan (ETP) for the Business Enterprise Priorities (BEPs) that represent the functional or core business missions.

The FY 2010 ETP was released in December 2009 and includes six BEPs. The BEPs are Personnel Visibility, Acquisition Visibility, Common Supplier Engagement, Materiel Visibility, Real Property Accountability, and Financial Visibility. There are performance metrics for each area by BEP, Program, and Initiative via charts for each performance metric to show progress by year. As an example, the Business Enterprise Information Services Family of Systems (BEIS FoS) section describes the BEIS FoS and also has a chart for SFIS compliance growth by percentage for FY 2009 and FY 2010 including the baseline, actual, and target goals. There is also a Budget Chart for BEIS FoS by millions of dollars for 2008, 2009, and 2010.

The March 2009 Report on Defense Business Operations to the Congressional Defense Committees in the Financial Visibility/Financial Reporting section, states that "progress in financial reporting is measured by the percentage of Defense assets reported using standardized financial reporting. The goal for this measure is 100%. The measure is derived by taking the sum of all the assets and dividing it by the sum of the assets that use the Business Enterprise Information Services Family of Systems (BEIS FoS) - compliant budgetary reporting process. The percentage of accounting assets that are reporting using standard codes provides a clear indicator of progress toward Enterprise standardization."

In reviewing Section 6, Key Milestone Summary of the March 2009 Report, the list of milestones are all program milestones, not true mission performance milestones; in fact, the performance metric for measuring the percentage of Defense assets using SFIS is not included. Moreover, no other true performance metrics or related baseline, target, and actual results exist for other BES areas. None of the milestones in the Key Milestone Summary are clearly linked to the strategic goals and objectives as described in the individual BEP sections of the Report.

The March 2010 Report on Defense Business Operations to the Congressional Defense Committees in the Financial Management section does not include any performance metrics for BEIS (FoS) as in the 2009 Report but does summarize goals and objectives. As in the 2009 Report, the Key Milestones Summary only includes program milestones,

not mission performance metrics or related baseline, target, and actual results; nor does the Key Milestones Summary include any clear linkages to goals and objectives listed in the Financial Management section. As mentioned above, the FY 2010 ETP does have charts with performance metrics, baseline, target, and actual results.

There is a statement in the March 2010 Report that "Effective this year, financial improvement and audit readiness efforts within the FIAR Plan emphasize improvement in processes that directly relate to financial information most useful to the Department's leaders and managers." Also, "A more robust internal control environment has been implemented via the DoD-wide Manager's Internal Control Program (under standards provided by OMB Circular A-123). It supports improved financial stewardship through stronger internal controls that reduce opportunities for waste, fraud, and abuse while identifying and maximizing efficiencies and cost savings. Efforts to strengthen internal controls over financial reporting continue as part of the overall FIAR effort."

Overall, the segment level performance metrics for the BEPS, whether listed in the ETP or in the 2009 or 2010 Report on Defense Business Operations to the Congressional Defense Committees, are limited and are not clearly mapped to strategic goals and objectives. The performance metrics do not appear to be a primary focus for the BEPs, at least not with the same focus as the program milestones. There are efforts to improve financial management auditability and internal controls through the FIAR effort, as noted in the FY 2010 Report on Defense Business Operations. The FIAR does include specific performance metrics that may serve as BEP performance metrics for financial management as well, at least in the area of financial management.

D.3. Transactional View

The OMB Exhibit 300s includes a section called, "Performance Information" for the Components to note the specific measurement indicator (or metric) for each investment and the baseline, target, and the actual status of the metric by Measurement Area. The Measurement Areas and sub-functions are derived from the Federal Enterprise Architecture Consolidated Reference Model (FEA CRM).

The performance metrics submitted by Components for the Exhibit 300s, an OMB A-11 requirement for major investments, have been suspect since inception of the requirement. The Components and program personnel who submit the performance metrics for their investments may lack knowledge in regard to how to identify, measure, and track performance or may not have a clear understanding of how the metrics are used by OMB. Also, when systems are in development status, the metrics selected may not be relevant for when the system is actually fielded.

Other issues are that the wrong kinds of metrics (such as contract data versus quantitative, measurable metrics) are submitted or metrics are not consistent from year to

year and therefore are not valuable to measure progress or trends. In addition, in the case of the OMB Exhibit 300, a minimum of only one metric for each of four measurement areas over several years is required. These measurement areas are Mission/Business Results, Customer Results, Process & Activities, and Technology, based on the Federal Enterprise Architecture Consolidated Reference Model (FEA CRM)[6]. The performance metrics as required by OMB in the Exhibit 300s have not been well understood by the programs, therefore, in many cases, are neither appropriate, quantitative, or comprehensive, leading to a lack of credibility about their usefulness. Even if effective metrics are identified and tracked, the minimal set of metrics required is not adequate to measure progress or improvements.

In summary, performance improvements and related outcomes, rather than just outputs, have been rightly promoted as a way to justify budgets for new and ongoing programs by showing concrete progress. The reality is that the measures/metrics that have been reported to date in the various reporting documents have generally been either too high level with not enough detail, or the wrong kind of metrics (such as contract data versus quantitative, measurable metrics), or are not consistent from year to year (therefore not valuable to measure progress); therefore leading to a lack of credibility about their usefulness. The ability to measure actual or projected performance is limited because the performance metrics used are generally not comprehensive, are geared to a specific functional area, and/or are at too high a level to be an effective metric.

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[6] Committee on Armed Services, House of Representatives. Assessment of Defense Information Technology Systems for Financial Management, *National Defense Authorization Act for Fiscal Year 2010*.

Appendix E. Architecture

This Appendix presents a discussion about the need for an Operational Concept to describe the target state and to serve as a foundation for the architecture going forward. In particular, the need for an operational concept and architecture that focus on the basics: the Department of Defense as a collection of organizations where each organizational unit has its own people, with potentially unique processes, and tools (technology); all of which contribute to a high degree of operational efficiency and a clean audit opinion. It also presents findings and recommendations about the Business Enterprise Architecture (BEA), how it is serving the needs of the Department in relation to the ERPs, and recommendations for improvement.

The inefficiencies associated with each organization having its own processes and tools is a well known problem. The problem is rooted in processes variation and lack of common terminology. It is therefore critical to understand and document the vision for the target state in an Operational Concept which acknowledges when and where processes can be made common and where unique processes are indicated. In addition, development of architecture that documents people/processes/tools and architecture that documents more granular views of the enterprise are tools for helping large enterprises become high-performing organizations that enable the identification of sharing opportunities. The resulting understanding of the variations and an agreement to share common processes, coupled with a vision for a more efficient target state, are necessary for transformation and business optimization.

E.1. Target State

From an executive point of view, the target state (environment) includes ‘people,’ ‘processes,’ and ‘tools’ (an architecture) which are based on a vision formed from the current operational concept, the issues associated with the current operational concept, and from an understanding of other (alternative) operational concepts and/or business models. The primary purpose of the BEA continues to be the elimination of financial management related material weaknesses and specifically to provide the Department with a set of blueprints that facilitate their ability to acquire a clean audit opinion. However, the BEA does not provide a vision of the target state, nor does it provide an operational concept for the target state and a clear and concise statement about how the BEA will fulfill its primary purpose.

Early releases of the BEA launched by the BMMP contained a vision and concept of operations based on the Porter Value Chain model. It is now the Department's role and responsibility (a leadership role and responsibility) to establish (or re-establish) the vision and operational concept and drive the PPBE to launch a set of investments that are based on an improved BEA which will eliminate material weaknesses and lead to a clean audit opinion in a reasonable timeframe. Note: Elements of the vision and operational concept are part of this report and graphical depictions are included in the accompanying CD.

E.2. Operational Concept

A clear vision of the target state is essential for an actionable Operational Concept for DoD business operations. There are business/operating models and terms that can be applied to develop an Operational Concept and establish the clarity required to move forward. The model and terms permit the right amount of capability overlap, encourage the creation of shared services, and set the stage for ongoing auditability.

An example of an appropriate business model is the Porter Value Chain Model and the concept/term is *Business Operating Units* (BOU) or simply *Operating Unit*. An operating unit is an organizational unit within an enterprise that holds assets, liabilities, and reporting responsibility for both. If embraced, the BOU concept can lead to an arrangement of one ERP system per operating unit, where the ERP is acting as a system of systems backbone with a SFIS compliant general ledger or a summary ledger. The ERP-based backbone would act as an integrating platform for selective integration of other strategic and mission critical systems.

To realize this Operational Concept, the department can identify the operating units, identify the non-operating units (NOU) found within each operating unit, and then document systems used by the operating and non-operating units. Figure E-2 compares the attributes of operating and non-operating units. The model presented in Figure E-2 can be used to document this information.

Operating Unit	Non-operating Unit
1. Holds and is responsible for; assets, liabilities, and the accounting of both	1. Does not hold assets. liabilities, but does have reporting responsibilities
2. Horizontal	2. Vertical
3. Non-integral	3. Integral
4. Is an enterprise	4. Part of the enterprise
5. Has its' own ledger	5. Uses company ledger
6. Comprised of Non-operating units	6. May have more granular Non-operating units
7. May be broken down into smaller operating units (Recursive)	7. Supports the enterprise and the need of the 'Operating Units'

Figure E-1. Enterprise Organizational Building Blocks

Non-operating units and the processes they execute are potential shared services; collectively, the operating and non-operating units are the organizational building blocks of the enterprise. These units, their arrangement, the processes they execute, and the systems used must be part of the Department's BEA. The model depicted in Figure E-2 enables the BEA to capture process maturity information. This is not a theoretical maturity rating; rather it is the maturity of a process as executed by a particular organization using a particular process and system. With this information, the Department can compare and contrast the performance of one organizational unit and its performance with a particular process against that of another organizational unit.

Leveraging incremental progress and repeating those accomplishments across the Department is essential and should be rewarded. For example, the Department should rally resources (practitioners) around the Marine Corps Statement Budgetary Resources (SBR) initiative to assure its success and to ensure that it serves as a model (M-Field) for other Components and Defense Agencies to do the same. The Marine Corps work could then serve as a model and a set of requirements for the processes and the systems that automate the processes. This would be an example of a smaller scale initiative being leveraged to repeat a similar accomplishment in a larger component of the enterprise.

E.3. Business Enterprise Architecture

The overarching purpose of the BEA is to address the Department's inability to acquire an unqualified audit opinion. "As long as the Department lacks an effective financial management system, the level of transparency required to receive a clean audit opinion will remain non-existent. By increasing financial transparency and moving towards a clean audit opinion, the Department will free additional resources that might be invested into other priorities." The BEA should be a major facilitator to satisfy this goal by providing DoD users, and specifically ERPs, with the framework and building blocks necessary to describe common processes, tools, and terminology. The BEA must improve the content and coordination of its data in order to fulfill this purpose and to become a sought after resource rather than just a checkmark in the programs list of compliance requirements. The following findings and recommendations are a result of the IDA review of the BEA in its current state.

E.4. Near-Term Architectural Findings and Recommendations

The current financial and business systems architecture is based on the premise that the DoD is an enterprise of enterprises; however, the BEA does not provide a holistic view of the enterprise nor does it document how the constituent enterprises are to operate together. The definition of the target state documented in an Operational Concept is the first step to provide the framework from which the remainder of the architecture can

unfold. The following set of findings and recommendations detail specific, concrete, and actionable findings that the Department can begin to address immediately:

E.4.1. Finding: Individually and collectively, the architectures do not provide a holistic view of the target state

Numerous parties and independent reviewers recommended that the Department take a federated approach but this led to architecture disconnects and a fragmented federation. IDA found that in this federation of architectures there is no depiction and no data that describe the real structure of the enterprise and no evidence of closed-loop systems, which are critical to managing performance and establishing financial audit ability.

Recommendations:

- Establish a graphical depiction of the target state in an Operational Concept that is based on well-defined terms and a business model like the Porter Value Chain Model and that respects the enterprise/organizational structure.
- Assure that the graphical depiction is accomplished using the architecture tool and using real architecture artifacts (like organization) that can be used to create the mapping depicted in Figure E-1.

E.4.2. Finding: The BEA does not support and compliment the FIAR plan

The FIAR plan contains a list of budgetary resources by reporting entity. This information and a complementary list of the systems that hold those resources should be in the BEA.

Recommendations:

- Capture the list of reporting entities in the FIAR plan and insert them into the BEA as organizational units.
- Configure the architecture so that budgetary resources can be recorded for an organizational unit.
- Configure the architecture so that an organizational unit can contain a list of systems used by that organizational unit.
- Configure the settings notebook of a system so that the budgetary resources held by that system can be recorded in the settings notebook of the system.
- Establish an agreement with the owners of the FIAR plan to use the BEA as the authoritative source of this information.
- The BEA should document what information has to flow between organizations and what SBR scenarios should be developed to show how the scenarios manifest themselves in the straw man processes.

E.4.3. Finding: BEA does not provide guidance on the application of ERP systems like SAP and Oracle

Processes and Activities provided by SAP are documented in SAP Solution Maps. Organizations/programs within the DoD may not be familiar with the SAP Solution Composer and rely on systems integrators (SI) to provide this material. The BEA can be the source and a means of communications on the activities and processes that are available in SAP and Oracle and can provide an understanding of the coverage and relationship between the activities and processes provided by the ERP and their counterparts in the BEA.

Recommendation:

- Put information like the SAP and Oracle processes and activities, their names, and descriptions into the BEA. Map to the BEA processes and activities. This should expedite the learning process and reduce costs.

E.4.4 Finding: The ERP Architectures have varying degrees of maturity and are not useful in managing the acquisition and qualification of COTS

The DoD needs to do a better job at following the DoD Architecture Framework (DoDAF) and using a Common Architecture Capability (CAC) that includes a common architecture toolset used by all Components and all Programs.

Recommendation:

- Create and use style guides for the development of BPMN based process models. The style guide would probably include specifications such as:
    - All processes must have ‘entry points’ or ‘triggers’ in the form of BPMN Events
    - All processes must have ‘outcomes’ also in the form of BPMN Events
    - All data objects must be attached to associated business events when/where appropriate

E.4.5 Finding: The BEA does not contain solution level details

The BEA documents capabilities but does not contain a set of blueprints and architecture detail for each capability. For each capability, there should be capability architecture details including variance issued and the justification for the variance. Leveraging best artifacts is preferred over creating new.

Recommendations:

- Establish primitives, patterns, and style guides as recommended by the DoD and issue BEA compliance to those programs that have used the agreed-to primitives and patterns and have followed the style guide. The American Institute of

Architects promulgates standards for building architecture, and architects follow those standards because first responders need blueprints that they can recognize and use in the field when lives are at stake. Similarly, an SI needs blueprints that show how processes are translated into workflows that are automated/executed by a BPML-compliant workflow engine.

- Require that all programs provide the DCMO with architecture in System Architect XML format and import the architecture into the BEA or into the companion System Architect Encyclopedias
- Establish a DoD-wide architecture capability and tool environment that all Components and Defense Agencies can use. Enforce the standards and capture the blueprints/documentation/artifacts that were reviewed.
- If variances are issued to a program, clearly show in the architecture the preferred process and the variant. That is, require 'as-builts' terminology.

E.4.6. Finding: BEA lacks key information

There is more organizational information about the Department in Wikipedia than one can find in the BEA. There are 'capabilities' that Components include in the DITPR reports for the ERPs that are not captured in the BEA. For example, the ERP capability overlap was analyzed from DITPR reports, not the BEA. Also, the data is generally inconsistent between several reporting sources: the BTA.mil/BEA website and the DITPR. Further, the data had to be copied from pdf files and worked into spreadsheets.

Recommendations:

- Populate the BEA with people, processes, and tools information and DOTMLPF. Start with enterprise, communities, organizational units (operating and non-operating) that comprise the enterprise and communities, and all the business systems (not just enterprise systems).
- Establish an interface between BEA and the DITPR so that the BEA can subscribe to information it needs.
- Include the OV-4 to represent the organizational units (people) that comprise the Department: OSD, Components (MILDEPS), Defense Agencies (each with a distinct mission), COMMANDS, COCOMS, and FORCES. These are the organizational building blocks of the Department.
- The BEA does not fully inform the Department whether the processes are fully automated and where the gaps in automation are because only a partial list of systems is created.

E4.7. Finding: The BEA is not the source of process details and requirements

The BEA OV-5 is the authoritative source of well-defined activities and processes, but should leverage and "pull through" leading practices or best examples from MILDEPs. For example, the Army recorded approximately 105 additional financial management

related processes that cannot be found in the BEA. The processes appear to be valid and appear to be applicable to other Components. If this is true then these processes should become part of the BEA.

Recommendations:

- Provide process detail-like business events within the department that trigger or are the outcome of a particular process.
- Document the data that accompanies a trigger or outcome.
- Document the data as the business people know it; not in relational form, but in human/book form.
- Document model routes through the process from trigger to outcome; do this for SAP and Oracle processes out-of-the-box and show how/where/why they vary from the COTS process.
- Provide these variations in the form of requirements back to SAP and Oracle for inclusion in future releases.
- Identify processes that are fully automated and where the gaps in automation are by creating comprehensive list of systems with the processes they deliver.
- Collaborate with Components to ensure processes applicable in the enterprise environment are included in the BEA.
- Provide straw man process models to communicate and educate both within the Components and within the SI community. Straw man processes (developed using the preferred style guide) would cut ERP program costs in three respects: money spent on as-is and documenting how processes are performed by the Commands and money spent educating the SIs.

E.4.8. Finding: The BEA does not identify the people (organizations) that execute processes and does not contain a mapping of the systems to the processes and organizations

The BEA identifies 15 end-to-end business flows and 490 processes that are critical to business operations but does not map people, processes and systems. Creating a set of end-to-end processes that are, in theory, organizationally agnostic is analogous to ignoring the fundamental difference between a COMMAND and COMPONENT. Implicit in this approach is the assertions that all commands, components and defense agencies operate exactly the same way.

Recommendations:

- Map the organizations, processes, and systems to address the differences and similarities in their operating models. A model for such a mapping is presented in Figure E-8, A Model for Correlating Organizations, Processes, and Systems.

- Note that processes may and normally should vary for organizations except at the higher level. The higher-level processes described in the BEA may pertain to all organizations but the organizations may perform different types of processes/functions within the set of related processes and with different types of personnel. All Components, Commands, COCOMS, and Deployed Forces do not and cannot operate the same way based on their organizational and mission requirements.

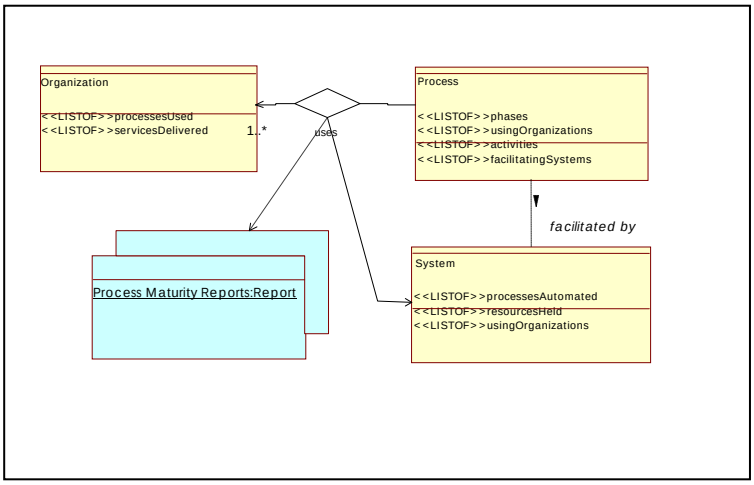

Figure E-2. A Model for Correlating Organizations, Processes, and Systems

E.4.9. Finding: The BEA is not the source of terms

The Department's Chief Architect envisions the BEA as a source of terms and the processes as a context for terms but there are no apparent plans to enable the creation of terms in the architecture.

Recommendations:

- Modify System Architecture to support the creation of terms and enable the creation of an AV-2 diagram where the terms can be presented like a glossary to prospective implementers of a process.
- Enable System Architect to generate the AV-2 spreadsheet as proposed by the Chief Architect."[7]

E.4.10. Finding: The BEA does not provide a concrete and intuitive taxonomy/model

The BEA assumes that DoDAF is comprehensive but it does not include an adequate model for business operations.

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[7] Wisnosky, Dennis. *Architecture in Support of Business Operations*, June 3, 2009.

Recommendation:

- Create a model and taxonomy (triple stores) that support the needs of the Department and work to model business operations.
    - **Enterprise** comprised of other **Enterprises** or
    - **Operating Units** supported by **Non-operating unit** either of which have/provision
    - **Capability** comprised of
    - **Services** delivered through the execution of
    - **Processes** which may have **Phases** and are comprised of
    - **Activities** broken down into
    - **Task** guided by
    - **Method** having
    - **Steps**

E.4.11. Finding: DoD processes do not conform to the architecture steps

Ensure the Business Capability Lifecycle Process **(**BCLP) supports the architecture methodology and ensure that the aforementioned standards and style guides are applied in recording the BCLP.

- **The process/sequence <u>IS</u>:**
    - Define requirements (JCIDS)
    - Architect (DoDAF)
    - Requisition (iteratively per the EPIC)
    - Contract
    - Engineer (DOTMLPF)
    - Build
    - Inspect/Test
- **The process/sequence <u>IS</u> <u>NOT</u>:**
    - Requisition
    - Contract
    - Architecture
    - Build

Recommendations:

- Define and record the BCLP using the Business Process Modeling Notation (BPMN) and the aforementioned style guide.

- Put the process into the BEA (it is part of the business enterprise architecture).

E.4.12. Finding: DoD architects are not considered critical personnel

Architects should be contracted independently of the SI with standard/pro forma contract terms and conditions that define the architects' responsibility to provide certain architecture detail using certain standards.

Recommendation:

- Hire specialists at both the DCMO/BEA and program levels to implement the recommended BEA structure and to work with one or two model programs to get the pattern right.

E.4.13. Finding: The Business Capability Lifecycle Process does not appear to result in the creation of architecture

Unlike the JCIDS and acquisition program management processes, the BCLP does not generate architecture. The BCLP is new, but the Department can leverage existing processes, such as the Evolutionary Process for the Integration of COTS developed by the AF in 2002 in collaboration with MITRE and the Carnegie Mellon SEI.

Recommendation:

- Embrace the **Evolutionary Process for the Integration of COTS (EPIC), which** understands the need for testing early and often and the concept of converging on a solution.

E.5. Longer-Term Architectural Findings and Recommendations

E.5.1. Finding: The current architecture documents a portion of the enterprise, but it falls short in the exclusion of the Combatant Commands and deployed forces.

Recommendation:

- The target vision and architecture must be holistic in its coverage of the organization, the DOTMLPF across the enterprise, and the recording of both in the BEA.

E.5.2. Finding: The current and target architectures are lacking closed loops in the processes and systems and the recording of both in the BEA.

Closed-loop systems (and processes) are systems that allow for feedback and adjustment, such as the basic process of planning, budgeting, and monitoring actual expenditures against a budget. The BEA does not house performance measurement targets and do not show, through BPMN events, how the process responds to measures taken (actual measures). For instance, if performance measures were taken from the Exhibit 300 documents and put into the architecture in the context of the process they are associated

with, then the process can generate business events indicating that thresholds are being met or human intervention is required.

Recommendation:

- Use *scenario-driven development*, in the configuration and deployment of COTS/ERP systems. Scenario-driven development is the mechanism that makes the EPIC real and executable. Business scenarios must be defined in terms of the business events that trigger them and the events that are outcomes.

E.5.3. Finding: Architecture information is inaccessible or not understandable to leadership and management-level decision-making personnel

Recommendations:

- Use Google search and other Web technologies to make architecture more visible, accessible, understandable, and consumable. Google search tools enable the viewing and usage of the information/content developed by architects without having to know how to use architecture tools. There are also web-based technologies that preclude the need for the architect to develop graphical depictions.
- Expand on and promote the DoD Architecture Registry System to encourage architecture visibility, accessibility, and understandability.

E.5.4. Finding: DoD does not sufficiently leverage lessons learned and commercial methodologies to improve architecture systems and processes.

Recommendation:

- Leverage methodologies such as the Evolutionary Process for the Integration of COTS (EPIC). The Department needs to mobilize the right practitioners around one entity like the Marine Corps and determine what the processes (architecture) and systems need to be.

E.6. Summary

The BEA has accomplished a great deal in the last several years to contribute to DoD efficiencies and overall business transformation. Now, there are many areas in which the BEA, and specifically the use of architecture for the ERPs, could improve the way business architectures are developed and implemented even more. First and foremost is the need for a vision that will guide the Operational Concept for how the BEA should be structured in a way that will provide the building blocks for the ERPs and other enterprise systems. Also, a better understanding of organizational structure would facilitate the alignment of organizations to processes and systems that would then guide the developers to select processes and systems that are the best fit. The use of straw man process models would also show how the ERPs would work out of the box.

Other key goals that DoD should embrace to improve the BEA include to:

- Develop and use common taxonomies
- Ensure completeness and consistency of the data across diverse resources
- Identify and share common processes
- Make architecture artifacts visible, accessible, and useable

Lastly, the BEA and ERPs would benefit from leveraging the lessons learned from the last several years of ERP development in regard to the government-system integrator relationship and leveraging the commercial resources available for integrating systems more efficiently.

Appendix F. Acquisition and Contracting

The choice of which contract type is appropriate for implementing an ERP is not simple and each choice comes with risks which must be recognized and mitigated. There is no single answer to the question of which is applicable in all cases.

At one point the use of Firm Fixed Price contracts via the Enterprise Software Initiative (ESI) blanket purchase agreement (BPA) was mandated for ERP implementations. The mandate to utilize the ESI vehicles is embedded in DFARS SUBPART 208.7402. The effect of this was to force the ERP programs to consider the use of the ESI pre-competed vehicles unless they could prove best value would be achieved by the use of some other type of contract. This was implemented under PGI 208.7403 (Acquisition procedures). The theory was that this would give the Government greater buying power and leverage over price. The vehicles in place favored FFP since they were based on the GSA IT-70 commercial items schedule, which only provide for FFP variants or pure commercial T&M. While the DFARS subpart is still in place, the BPA that had been used to acquire integration services has now expired, making the issue moot for future programs unless ESI puts a new vehicle in place.

Currently, the types of contract under which the ERP programs are being acquired varies widely, but in all cases, the risks each type presents are not being effectively mitigated contributing to the cost, schedule and performance problems of the ERP programs.

F.1. Firm Fixed Price

The use of firm-fixed-price (FFP) contracts is only appropriate when requirements are stable, clearly documented and the associated risk is well understood and mitigated. These criteria are generally NOT true in the initial phases of an ERP implementation. For these reasons, vendors inflated prices to cover estimates of risk. When out of scope, changes in requirements must be accommodated the result is increased costs and missed schedule for the Government.

FFP encourages the vendors to minimize costs so they use lower-compensated staff who meet the minimum requirements to do the work. The vendor is at risk if the Government was able to deliver on its obligations under the FFP contracts and leave requirements untouched. Typically, this is not the case and vendors are able to offset part or all of their lack of performance through Engineering Change Proposals (ECPs). In addition, the way in which FFP is used limits the Government’s recourse, since rather than basing

acceptance and payment on achievement of operational capabilities or running software, they are often tied to the delivery of artifacts such as design documents. The quality is often difficult to measure in a meaningful way. This is the equivalent of accepting an aircraft by taking delivery and assessing the quality of each part and never looking at the airworthiness of the final assembled aircraft or by acceptance based upon the manuals and designs.

Under FFP, the Government loses visibility into the data that underlies the performance of the contract. Since the vendor, in theory, takes on the risk of delivering successfully, they typically are not required to give the Government transparent visibility into the resources they apply or their activities as they execute their tasks. Consequentially, the Government is unable to identify problems prior to formal presentation and acceptance of deliverables.

F.2. Cost-Plus Type and Commercial Time and Materials

The use of cost-plus or commercial style time and materials contracts provides incentives to the vendor to maximize their overall profit by increasing the level of effort associated with the execution of the contract. This places the onus on the Government to ensure that they manage the contract effectively. In particular, unless specific incentives are created, it is not in the best, short term, financial interest of the vendor to point out better or optimal ways of executing. As a result, these contracts leave the Government in the position of being the defacto system integrator, irrespective of the terms of the contract. When using contracts of this type there is a requirement for the Government to staff a team of ERP experts that can manage, monitor and direct the activities of the system integration vendor.

Another negative aspect of the use of cost-plus contracts is that, as a rule, the organizations that typically bid cost-plus type work tend to hire large pools of relatively inexpensive staff since this makes their bids competitive. While this may be an acceptable situation where the skills being acquired are “commodity” skills, it presents real challenges to ERP implementations. There is a limited and highly paid pool of highly-skilled individuals who are desirable to staff the ERP programs and they are not attracted to work for organizations who are highly incented to pay the lowest market price for a given skill level.

F.3. Use of Award and Incentive Fees

Some of the deficiencies of cost-plus and fixed price contracts can be avoided through the use of award or incentive fees. The challenge for the Department has been in designing metrics that are both meaningful in terms of describing real progress towards fielding the

required capability, not just delivering a configured ERP, and that can be objectively assessed. Award or incentive fees that are effectively at the program manager's discretion, or where the achievement of the required metrics is outside of the control of the vendor, have proven worthless. Choosing the wrong or irrelevant metrics on which to base fees drives counter-productive behavior from vendors.

F.4. Hybrid Contracting Approaches

A better approach to contracting would be to use a cost-plus type vehicle with the appropriate incentive fees for those aspects of programs that are poorly defined, or for the early phases of the program, and then to issue fixed-price tasks as work becomes better defined. Another variation of this approach would be the use of multiple award, multiple vendor vehicles where each fixed-price task order can be competed to a small pool of vendors in order to ensure price competitiveness and competitive level of effort estimates. This approach places significant demands on the Government, which must play the role of system integrator, and requires dedicated contracting resources in order to achieve the required quick turn-around on evaluating proposals and awarding task orders.

F.5. Impact of Acquisition Policy and Oversight

The interviewees in this and prior studies have described the acquisition system and oversight of its application as of little or no value, and potentially a detriment, to fielding a solution. Words used, for example, to describe the system include "onerous," "excessively burdensome," and "of no value." Despite the high levels of oversight accorded the Major Automated Information Systems (MAIS) business systems, they have all been significantly challenged programs.[8]

The acquisition system and associated oversight has not evolved to support the rapid pace of changes in the business system environment necessitated by the software refresh cycles of Commercial-off-the-Shelf (COTS) technology such as Enterprise Resource Planning (ERP) and the consequent swiftness with which business capabilities are required to come on-line.

F.6. Policy Considerations

Historically, policies for weapons programs (DoD 5000 series) and Automated Information Systems (AIS) (8000 series) were separate as it was likely understood that these "commodities" were different and therefore required a different type of oversight.

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[8] Major Automated Information Systems (MAIS), defined as a 'special interest' programs; or programs with an estimated cost, in any single year, in excess of $32M or total program costs in excess of $126M.

In 1996 the decision was made to integrate these two policies thereby incorporating AIS policy within the DoD 5000 series of weapon system policies. Under the current DoD 5000, MAIS systems are acquired using the same life-cycle development process followed by major weapon system acquisitions. In the DoD the definition of requirements is managed under a separate body of policy managed by the Joint staff under the CJCSI 3170 policy series.

The DoD 5000 series is intended to provide, at the highest level, the "framework" in which acquisition oversight occurs. The policy states that programs are allowed to tailor and flex the process requirements in response to the specific needs of any program. While in theory this is true, in practice the DoDI 5000.02 and associated "Guidebook" are executed as a rigid and prescriptive oversight methodology. This lack of flexibility forces program offices to build acquisition programs and associated implementation strategies and approaches, in a very linear "waterfall" manner. The DoD 5000 oversight framework is based on the presumption of a "waterfall" development model which promotes disciplined, linear progress through discrete, easily understandable and explainable phases that can be well defined and documented; it also provides easily identified milestone points along the way. Milestone and other decision points can easily be placed at the beginning/end of any given phase with clear criteria for allowing entrance to or exit from a phase.

A linear approach may be appropriate for hardware-oriented development, small software implementations and complex weapons systems. Its adoption for COTS based software application implementations such as ERP is not appropriate.

The "waterfall" model is only suited to software projects that exhibit stable, unchanging and well defined requirements, and where it is likely that the implementers will be able to fully predict problem areas of the system and produce a complete design in early program phases that will require little or no subsequent modification. The ERP programs within the Department have proven to be unstable with changing requirements, and given the complexities described in this analysis are highly unpredictable, especially in the areas of interfaces, data and requirements. Yet all of the ERP programs' execution models are aligned around the DoD 5000's linear waterfall model.

The DoD 5000 assumes that requirements in areas such as interfaces, data, technical performance, training and deployment, can be described at a level detailed sufficient enough to allow cost, schedule and performance to be predicted with some certainty. These assumptions cannot possibly be true for the way the Services are attempting to use ERP at the Service enterprise level. The result of programs operating under this assumption is that fatally flawed estimates are agreed to within the Services and OSD. In reality, for ERP programs on the scale the Services are attempting, detailed requirements cannot be predicted, nor can the impact of required cross-organizational integration, lack of governance, requirements changes and the unknowns around data and interface

complexity. However, the programs proceed with a perceived level of certainty that does not exist and, consequently, as the Government and the implementers quickly discover all of the true uncertainty, costs go up, schedules slip or performance is compromised to try to stay within cost and schedule estimates.

The policy driven rigidity of the separation of the functional requirements definition community from the acquisition community further exacerbates this problem.

The BTA developed the Business Capability Lifecycle (BCL) as an alternative oversight framework for the MAIS business systems. BCL unifies the requirements development, acquisition and investment review oversight processes under a single policy. One of the initial goals of the BCL design was to significantly reduce the amount and redundancy of documentation required from the programs to support OSD oversight. It is unclear at the time of writing that the final version of the policy achieved this goal of reduced documentation requirements. Another objective of BCL is to force much smaller program increments which begin the delivery of capabilities to users much sooner than under the DoD 5000. The final version of the policy was signed into policy in November 2010 via a directive type memorandum from the USD(AT&L). None of the ERP programs are yet operating under the BCL policy. Pilot BCL pilot programs, such as ECSS, ended up with an increased documentation burden as they met both BCL and DoD 5000 requirements in order to address the concerns of the oversight communities both within OSD and their own Services.

F.7. Oversight Considerations

Oversight by OSD, and in some cases at the Service level, has been consistently characterized as burdensome and non-value added, and sometimes characterized as "oversight by PowerPoint." Further, the IDA team was told repeatedly that oversight has become more about personality than fact. Opinions, background, risk tolerance and the experience of individual action officers and their principals have a significant impact on the details of the execution of the oversight process. For example, despite the specific tailoring guidance provided in policy, little or no tailoring has been allowed by the oversight community since there is a perceived personal risk for them in allowing it. A tremendous amount of documentation is created in support of any given milestone decision and numerous meetings of working integrated product teams (WIPTs) are held. The focus of these WIPTs is less about what the program is actually doing and more about what the oversight stakeholders want to see written in the documentation and to make sure the format is appropriate. This documentation is created to satisfy oversight compliance "check-lists" and is not used, by the program office, to support the actual execution of the program. Oversight focuses on the "what" the program says it intends to do or what it claims to be doing, but does little to validate actual execution of what the

program claims. A high performing organization should not be focused on just compliance.

Oversight is fragmented with each OSD stakeholder having their own perspectives on the programs shaped by their own statutory responsibilities, with little consideration given to second and third order effects of their guidance. Attempts to unify the oversight and provide a single definitive voice from OSD to the program have usually just added additional layers of bureaucracy since they have required consensus, with each stakeholder having an effective veto. The effective veto power of the stakeholders has led to unnecessary slowdown in program execution, at great expense to the programs, while the concerns of specific stakeholders are addressed.

In 2006, USD(AT&L) via the Business Transformation Agency (BTA) established the Enterprise Risk Assessment Methodology (ERAM). ERAM was established due to a recognition by the then USD (AT&L) and the DUSD (BT) that there was little data reaching OSD about actual program execution. The ERAM process has now been institutionalized in policy for MAIS business systems but the Department is largely unprepared to react to ERAM findings and unwilling to either make the difficult and unpopular decisions that will inevitably have to be made by both the acquisition and functional communities or to publicly accept the risks identified. The oversight community has not been willing to cancel programs nor make large changes in direction.

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Appendix G. Assessment Framework

G.1. Assessment Framework Methodology

An Assessment Framework provides a structured methodology that facilitates information collection and analysis of complex problems. The Framework for this study of DoD IT business systems, specifically ERPs, included identification of the DoD enterprise, operational, and financial environments and the set of key factors that affect the successful development and implementation of ERPs within those environments. The related questions in the Framework also served as the basis for further research and as an outline for the interviews IDA conducted.

The set of key factors for this Framework include the basic functions that a high performing organization must need to perform in order to oversee, manage, and implement an ERP. IDA identified key factors of governance, management, and implementation. Each of these functions are addressed in the context of the enterprise, operational, and financial environments. Each view has its own characteristics, constraints, and requirements related to the key factors.

The following were identified as key factors for the DoD Enterprise Views and for the study as shown in Table G-1.

Enterprise View

1. Commander's Intent/Policy, Vision, and Strategy
2. Technical Framework
3. Leadership/Adjudication Framework
4. Operations/Programs View
5. Requirements Management
6. Acquisition Management (Portfolio and Programs)
7. Resource Management
8. Financial View
9. Operations
10. Reporting/Risk

The Assessment Framework with candidate questions is shown below:

Table G-1. Assessment Framework

Point of View	Key Factors	Questions to Assess Capability re: the DoD Business/Financial IT Systems	Underlying Questions
Enterprise	***Commanders Intent/ Policy, Vision & Strategy***		
		What has to happen and happen well from here on out? Is there clear intent?	Within the investments already made?
		Is there a general sense that you are getting what you paid for, or have paid for so far?	1) System Integrator (SI) OCI issues; 2) Meaningful Government Oversight?; 3) Impact of outsourcing (to contractors for talent)?
		Is the DoD organized to achieve a clean audit opinion, even as a by-product of sound processes?	CMO's role--Where do we go from here? What do you need it to be?
		What is your view on Stewardship -vs.- Ownership?	What agencies within the DoD in particular and Federal (civilian agencies) in general embrace Stewardship well, including a collective sense of responsibility for better performance, management, and reporting?
		Did/Do the stakeholders have a say in the benefits they want from the business ERP's? Who do you consider your stakeholders? Who would be upset if you did not get it right from an operations point of view?	How closely connected is the business mission to the warfighting mission?
	Technical Framework		
		Is the DoD leveraging the full capabilities of the ERP investments already made? Given what you know now, do you think a custom solution would have been better per: 1) outcome, 2) cost, 3) user requirements, 4) technology insertions, 5) leveraging of legacy systems?	Is there a fear that the cost growth you have experienced in your ERP program is because the SI is presenting the magpie "shiny and new" perspective rather than an approach to fully leverage what we have; i.e., promoting wrong incentives and wrong performance measurements?
		What did preliminary pilot efforts tell us? Were the lessons actionable?	The March 2010 Congressional Report on Defense Business Operations reported that DAI reduced obligation cycle time by 97% and financial reporting by 75%; what is context on this statistic?
		Did you consult with/share performance information with other services?	1) Did you have the time?, 2) Were you compelled to by obligation (jointness)?, 3) Were there any "ah ha" moments that you learned outside your immediate agency?, 4) Was there a requirement for you (formal/informal) to consult with agencies that were developing ERPs?, 6) If you did consult, was it with contractors or other government personnel?
		How seriously were legacy systems considered for inclusion into the Enterprise standard for your agency? Why/Why not? Examples of trade off analysis?	Acquisition strategy: How were already made or buy-new decisions considered?

Point of View	Key Factors	Questions to Assess Capability re: the DoD Business/Financial IT Systems	Underlying Questions
		When you have a technical question that is strategic in nature--who do you go to?	Talent: in the government or outsourced?
		Can the DoD gov personnel make adjudication decisions independently without help from the SI or contractors? How are those decisions promulgated?	Does the Agency have the right skill sets to provide competent oversight? Does the agency consider this to be a: 1) risk, 2) priority?
		Do stakeholders have a voice in this function? Who are the stakeholders for your ERP?	Finance, Accounting, Program Managers, Logistics, Acquisition, Others?
	Leadership/ Adjudication Framework		
		What is the DoD formal authority to perform this function per CIO, CFO, program owners? If the authority is not clear, how has this impacted decision-making concerning this function? How should this issue be addressed going forward?	Will CMO have a positive impact? What do you need the CMO to do/ to be to ensure a positive impact?
		Does the DoD leadership have the right people in the right positions with the right information to perform the function?	Will CMO have a positive impact?
		Is the DoD organized appropriately to perform the function? If not, what changes are needed to address the organizational issues?	Will CMO have a positive impact?
		Do you have a sense of how DoD has made decisions on your ERP? Have you been involved in those decisions or were you informed after the fact (if at all)? What information was used in those decisions - objective data that could be supported or opinions/data that is not supported?	Confidence level? Operations versus reporting? Will the CMO position change this?
		How are decisions communicated to interested parties? Do users have a voice in these decisions? Did the COTS approach limit the voice of the users? How?	Who should have a seat at the table? Logistics, Acquisition, Programs, Users, Accounting, Finance, Budget?
Operations/ Programs	***Requirements Management***		
		What is the requirements collection/vetting process for this system? Estimate on a percentage basis the number of stakeholders in your agency consulted from: 1) financials, 2) acquisition, 3) logistics, 4) program managers?	Inclusive? How should it be done? What is preventing you from conducting business this way?
		Does the DoD have the in-house government skills to perform and provide oversight?	Do we need more technical skills on the government side of the table? Name major barriers in the way. Veteran preference for SAP skills?
		Is the DoD organized appropriately to perform the function?	Piling on, or getting "it" done. Is there a sense of a new era in DoD budgets or is the current environment temporary?

Point of View	Key Factors	Questions to Assess Capability re: the DoD Business/Financial IT Systems	Underlying Questions
		Can the DoD make adjudication decisions with regard to function or do they abdicate the decision to the SI? How are these decisions on requirements communicated?	Who is really in charge?
		In terms of outcomes expected /desired: 1) Who had the loudest voice, 2) Who was heard? 3) Is there a process to address unfilled requirements?	System Integrators, Political Appointees, Uniforms, Civilians, Field Personnel, Accountants, Program managers?
	Acquisition Management (Portfolio and programs)		
		What did the contract (type) incentivize the contractor to do?	EVMS-- compare by the number to by the outcome type oversight?
		Does the DoD have the skill sets to make procurement decisions with government personnel only?	How comfortable are you with your answer?
		Is the DoD organized to perform the function independently?	Would the old style OTRR's (Operational Test Readiness Reviews) be helpful in this regard?
		Can the DoD make adjudication decisions with regard to function? Was there a formal BCA completed for your system?	
		Were stakeholders involved in the both the estimated cost and the desired benefits of the decision to move forward?	Compelling need: 1) Time/Schedule, 2) Results - answering "the mail". Is COTS a done deal?
Financial View	***Operations***		
		If a high performing federal finance organization is defined as performing well per budget execution, appropriation accounting, bill payment, payroll, internal controls, and statutory financial reporting, how do you rank your organization now? Does leveraging your financial ERP contribute to your performance now and how to you project it will contribute five years from now?	
		A high performing financial organization is viewed as a trusted partner with program managers? Do you agree/disagree? What are the risks?	What controls do you have in place and do you know how/if they are working?
		Is the financial management system viewed broadly; i.e., in the context that various program systems feed financial information to the accounting system?	

Point of View	Key Factors	Questions to Assess Capability re: the DoD Business/Financial IT Systems	Underlying Questions
		Would you describe the relationship your financial organization has with the operations and program managers as a catalyst, coach, resource, barrier, teacher, other?	What changes have taken place in the finance organization and the agency? What new risks have been introduced?
		Are there legacy systems available to you (your community) now that you believe are fully operational and should be leveraged instead of a net new ERP system; what are the benefits/drawbacks to the system you named?	
	Reporting (Risk)		
		Improper Payments	
		Debt Collections	
		Top Down or Bottom Up in your financial organization?	How is it represented in the ERP and in current legacy systems?
		Deferred maintenance (capital investment or appropriated annually?)	Weapon Systems, highways, bridges, parks (Arlington)
		Comment on collaboration between CIO and CFO on enterprise IT investments?	What is risk of BTA going away? Is there a formal risk management program?

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Appendix H. Data Sources

The IDA team used multiple data sources and source documents to ensure a holistic perspective was taken during the analysis. It should be noted that many of the sources are incomplete and/or contain conflicting information from source to source. The list of data sources and documents included the following:

Business Enterprise Architecture (BEA) .

DoD's Financial Improvement and Audit Readiness (FIAR) Plan Status Reports— Reviewed the March 2010 and recently released November 2010 reports.

Integrated Management Information Environment (IMIE) was intended as the primary entry point for the following data sources:

- Enterprise Transition Plan/March Congressional Report to Congress
- BEA Target System Migration Report
- DAMIR System Report
- DITPR System Report
- GAO Reports
- OMB 300 Data
- Presidential Budget Report FY10 and FY11

It should be noted that gaining access to IMIE was a very onerous process and IDA did not have adequate access for most of the study period of performance. On a positive note, the use of IMIE was critical in the completion and validation of the findings in this study.

The IDA Team used the interviews and websites to obtain the data sources, including the Program Management Offices of the ERPs reviewed. The data and documentation analyzed included:

- FY 2010 Enterprise Transition Plan
- Assessment of Defense Information Technology Systems for Financial Management conducted by the Corporate Executive Board and submitted to the HASC in April, 2010
- DITPR System Reports
- GAO and DoD Inspector General Reports
- OMB 300 Data

- Other program-specific documentation, including--but not limited to--architecture artifacts, BEA Compliance reports, IRB approvals, MAIS reports, and funding information.

Enterprise Risk Assessment Methodology (ERAM) – Reviewed the detailed ERAM findings from the various assessments of the programs conducted over the last few years.

Appendix I. List of Interviewees

#	Name of Interviewee	SES/ GO	Interviewee's Organization	Title of Interviewee
1	Angwin, Bob	--	Business Transformation Agency	DAI Program Support
2	Argodale, John J.	SES	Department of the Army	Deputy Assistant Secretary of the Army for Financial Operations
3	Ashworth, Gary	--	Business Transformation Agency	Deputy PEO Finance
4	Bitz, Gregory	--	Department of the Navy	Special Assistant to the Deputy Assistant to the Secretary of the Navy (Financial Operations)
5	Boddorf, Gregory M.	SES	U.S. Army Materiel Command (AMC)	AMC Resource Manager (G-8)
6	Boyles, Stephanie S.	--	TRICARE Management Activity	Director, Enterprise Architecture, Office of the Chief Financial Officer
7	Brinkley, Paul	SES	Office of the Secretary of Defense	Deputy Under Secretary of Defense and Director of the Task Force for Business and Stability Operations
8	Bross, James	--	Army PEO EIS	Cost Analyst
9	Burden, COL Patrick W.	--	GFEBS Program Office	Project Manager
10	Burton, Johnny	--	Business Transformation Agency	Chief, Architecture and Information Management, Enterprise Planning and Investment
11	Carpenter, Valerie	--	Navy ERP	Deputy Program Manager
12	Carter, Jennifer	SES	Navy ERP	Program Manager
13	Causey, Joan A.	SES	Office of the Assistant Secretary of the Air Force for Financial Management and Comptroller	Deputy Assistant Secretary for Financial Operations

14	Chavez, Anthony	--	TRICARE Management Activity	Chief, Management Control, Office of the Chief Financial Officer
15	Coleman, Randy	--	NA	Contractor, Lead Systems Engineer - Business Transformation, Office of the Deputy Chief Management Officer
16	Comes, Scott A.	SES	Offices of the Secretary of Defense, Cost Assessment and Program Evaluation (OSD CAPE)	Deputy Director of Program Evaluation
17	DeLuca, Chris	--	Business Transformation Agency	DAI Deputy Program Manager
18	DeVincentis, Mae	SES	Defense Logistics Agency (DLA)	Vice Director
19	Easton, Mark	SES	Office of the Under Secretary of Defense (Comptroller)	Deputy Chief Financial Officer
20	Engoglia, Mary	--	GFEBS Program Office	GFEBS Liaison to PEO
21	Fanning, Eric K.	SES	Department of the Navy	Deputy Under Secretary of the Navy, Business Operations & Transformation
22	Fisher, David	--	TRICARE Management Activity	Director, Management Control and Financial Studies, Office of the Chief Financial Officer
23	Fisher, David M.	SES	Business Transformation Agency	Director
24	Fisher, Steven	SES	Office of the Under Secretary of Defense (Comptroller)	Director, Business Integration Office
25	Flanders, COL T. Patrick	--	U.S. Army, Program Executive Office, Enterprise Information Systems	Program Manger, Army Enterprise Systems Integration Program
26	Gaddy, Zack	SES (retired)	Defense Finance Accounting Service (DFAS)	Director (retired)
27	Gaur, Prashant	HQE	Business Transformation Agency	Director, Enterprise Integration

28	Gustafson, Richard “Gus”	SES	Defense Finance Accounting Service (DFAS)	Principal Deputy Director
29	McCabe, Kimberly B.	SES	Department of the Army	Deputy Director, Office of Business Transformation
30	Meyer, Timothy	--	Navy ERP	Contractor – Solutions Architect
31	Moran, BG Kenneth J.	GOFO	Expeditionary Combat Support System (ECSS)	Director
32	Morrison, Diane M.	--	Business Transformation Agency	DAI Program Manager
33	Muchmore, Lora	SES	Office of the Deputy Under Secretary of Defense (Installations and Environment)	Director, Business Enterprise Integration Directorate
34	Olgeaty, Scott E.	--	Air Force Program Executive Office , Electronic Information Systems, Enterprise Financial Systems Division (AFPEO EIS/ HIQ) [DEAMS Program Management Office]	Deputy Director, Enterprise Financial Systems Division
35	Omatsola, Karl	--	Private Sector	Contractor support to Business Transformation Agency, Enterprise Planning and Investment
36	Parker, COL Brian A.	--	AFPEO EIS/HIQ [DEAMS Program Management Office]	Director, Enterprise Financial Systems Division
37	Payton, Hank	--	Private Sector	Contractor support to Business Transformation Agency, Enterprise Planning and Investment
38	Poleo, J. Anthony “Tony”	SES	Defense Logistics Agency (DLA), Financial Operations (J-8)	Chief Financial Officer
39	Quinn, Joseph O.	SES	Office of the Under Secretary of Defense (Comptroller)	Director, Financial Improvement and Audit Readiness
40	Rayman, Liane	--	GFEBS Program Office	Budget Analyst

41	Rodgers, Philip	SES	Office of the Under Secretary of Defense for Acquisition, Technology and Logistics	Deputy Director, Acquisition Resources and Analysis
42	Rosen, Ruth	--	TRICARE Management Activity	Deputy Director, Information Management Business, Office of the Chief Financial Officer
43	Seaman, Keith E.	SES	Business Transformation Agency	Defense Business System Acquisition Executive
44	Settle, Glenna	--	GFEBS Program Office	Resource Manager
45	Shepherd, Rich	--	GFEBS Program Office	Economic Advisor
46	Spruill, Nancy	SES	Office of the Under Secretary of Defense for Acquisition, Technology and Logistics	Director, Acquisition Resources and Analysis
47	Taitano, Dennis	SES	Department of the Navy	Deputy Assistant Secretary of the Navy (Financial Operations)
48	Tillotson III, David	SES	Office of the Under Secretary of the Air Force	Director of Business Transformation and Deputy Chief Management Officer
49	Trimble, Steve	--	U.S. Army Materiel Command	Business Team Lead for Financial Management on LMP
50	Trowbridge, COL Jack	--	TRICARE Management Activity	Acting Chief Financial Officer
51	Veit, Beverly	--	Department of the Navy	Director, Finance and Accounting Systems Division
52	Watkins, James	--	Department of the Army	Director, Audit Readiness
53	Wieczorek, Erin Buechel	--	GFEBS Program Office	Congressional Affairs Specialist
54	Wise, Victoria J.	--	U.S. Army, Program Executive Office, Enterprise Information Systems (PEO EIS)	Special Projects Analyst
55	Wisnosky, Dennis E.	--	Office of the Deputy Chief Management Officer	DoD Business Mission Area Chief Technology Officer & Chief Architect

Appendix J. Architectural Products

J.1. Diagram Report from System Architect

These diagrams were developed in the course of the study (HASC Business Systems Assessment) to help the IDA assessment team in the analysis of the problems/issues and gaps; to do root cause analysis and to be unambiguous

J.2. Contents of attached CD

DOD BOP (AV-1) [0]a Background and Objective
[ACV - Common Canvas(Free Form)]

DOD BOP (AV-1) [0]b Summary and Overview
[ACV - Common Canvas(Free Form)]

DOD BOP (OV-1) [1]a Overview of the Enterprise [THE LINE]
[ACV - Common Canvas(Free Form)]

DOD BOP (OV-1) [4]a - Business Operating Units [NONE AT THE TOP]
[ACV - Common Canvas(Free Form)]

DOD BOP (OV-1) [4]b - Business Operating Units [OTHER DEFENSE AGENCIES]
[ACV - Common Canvas(Free Form)]

DOD BOP (OV-1) [4]c1 - Business Operating Units [ARMY]
[ACV - Common Canvas(Free Form)]

DOD BOP (OV-1) [4]c2 - Business Operating Units [AF]
[ACV - Common Canvas(Free Form)]

DOD BOP (OV-1) [4]c3 - Business Operating Units [NAVY]
[ACV - Common Canvas(Free Form)]

DOD BOP (OV-1) [4]c4 - Business Operating Units [MC]
[ACV - Common Canvas(Free Form)]

DOD BOP (OV-1) [4]d - Business Operating Units [COMBATANT COMMANDS]
[ACV - Common Canvas(Free Form)]

DOD BOP (OV-1) [4]e - Business Operating Units [DEPLOYED FORCES]
[ACV - Common Canvas(Free Form)]

DOD BOP (OV-3) Capability Map [ALL LEVELS OF THE ENTERPRISE] [ACV-Business]

DOD BOP (OV-6c) Structure where there was none [OV-06c Work Flow]

DOD BOP (OV-7) [1] Triple Stores [PEOPLE, PROCESSES, TOOLS] [OV-07a Class Data]

DOD BOP (OV-7) [9] Systems Portfolio and Audit-ability [OV-07e Relational Data (IDEF)]

Appendix K. Acronyms

AF	Air Force
AFB	Air Force Base
AFR	Agency Financial Report
AIS	Automated Information Systems
AMR	Annual Management Report
APR	Annual Performance Report
APVM	Accounting Prevalidation Module
BCL	Business Capability Lifecycle
BCLP	Business Capability Lifecycle Process
BEA	Business Enterprise Architecture
BEIS	Business Enterprise Information System
BEIS FoS	Business Enterprise Information Services Family of Systems
BEP	Business Enterprise Priority
BICARSA	Billing, Inventory Control, Accounts Receivable, & Sales Analysis
BMMP	Business Management Modernization Program
BOU	Business Operating Units
BPA	Blanket Purchase Agreement
BPML	Business Process Modeling Language
BPMN	Business Process Modeling Notation
BPR	Business Process Re-engineering
BTA	Business Transformation Agency
CAC	Common Architecture Capability
CAD	Computer-Aided Design
CAM	Computer-Aided Manufacturing
CFO	Chief Financial Officer
CJCSI	Chairman of the Joint Chiefs of Staff Instruction
CMO	Chief Management Officer
COTS	Commercial-off-the-shelf
CSC	Computer Science Corporation
DAI	Defense Agency Imitative
DAMIR	Defense Acquisition Management and Information Retrieval
DCMO	Deputy Chief Management Officer
DEAMS	Defense Enterprise Accounting and Management System
DFARS	Defense Federal Acquisition Regulation System
DFPS	Defense Force Public Security
DHS	Department of Homeland
DIMHRS	Defense Integrated Military Human Resources System
DISA	Defense Information Systems Agency
DITPR	DoD IT Portfolio Repository

DoD	Department of Defense
DoDAF	DoD Architecture Framework
DoDI	Department of Defense Instruction
DOTMLPF	Doctrine, organization, training, materiel, leadership and education, personnel and facilities
DUSD (BT)	Deputy Under Secretary of Defense Business Transformation
EA	Enterprise Architecture
EBS	Enterprise Business System
ECP	Engineering Change Proposals
ECSS	Expeditionary Combat Support System
EPIC	Evolutionary Process for the Integration of COTS
ERAM	Enterprise Risk Assessment Methodology
ERP	Enterprise Resource Planning
ESI	Enterprise Software Initiative
ETP	Enterprise Transition Plan
FEA CRM	Federal Enterprise Architecture Consolidated Reference Model
FFMIA	Federal Financial Management Improvement Act of 1996
FFP	Firm Fixed Price
FIAR	Financial Improvement and Audit Readiness
FMFIA	Federal Managers Financial Integrity Act of 1982
FTC	Federal Trade Commission
FYDP	Future Years Defense Program
GAAP	Generally Accepted Accounting Principles
GAO	Government Accountability Office
GCSS-Army	Global Combat Support System - Army
GCSS-MC	Global Combat Support System – Marine Corps
GEX	Global Exchange
GFEBS	General Fund Enterprise Business System
GPRA	Government Performance and Results Act
HPPG	High Priority Performance Goals
IDA	Institute for Defense Analyses
IMIE	Integrated Management Information Environment
IRB	Investment Review Board
IT	Information Technology
JCIDS	Joint Capabilities Integration and Development System
LMP	Logistics Modernization Program
MAIS	Major Automated Information System
MILDEPS	Military Departments
MOCAS	Mechanization of Contract Administration System
MRP	Materials Requirements Planning

MRP II	Manufacturing Resource Planning
MS-A	Milestone A
MS-B	Milestone B
NAVAIR	Naval Air Systems Command
NAVSEA	Naval Sea Systems Command
NAVSUP	Naval Supply Systems Command
NEAF	New York City Enterprise Architecture Framework
NOU	Non-Operating Units
OMB	Office of Management and Budget
OSD	Office of the Secretary of Defense
OV-5	Operational View - 5
PAR	Performance and Accountability Report
PART	Program Assessment Rating Tool
PEO	Program Executive Officer
PPBE	Planning Programming Budgeting and Execution
QDR	Quadrennial Defense Review
RICE	Report, Interface, Conversion, and Enhancement
SBR	Statement of Budgetary Resources
SFIS	Standard Financial Information Structure
SI	System Integrators
SMP	Strategic Management Plan
SPAWAR	Space and Naval Warfare Systems Command
SPS	Standard Procurement System
T&M	Time and Material
USD	Under Secretary of Defense
USD (AT&L)	Under Secretary of Defense Acquisition, Technology and Logistics
USD (C/CFO)	Under Secretary of Defense Comptroller/Chief Financial Officer
USTRANSCOM	United States Transportation Command
WAWF	Wide Area Work Flow
WIPT	Working Integrated Product Team
XML	Extensible Markup Language

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13. SUPPLEMENTARY NOTES

14. ABSTRACT
Senior Defense leaders are increasingly aware that the economic environment demands that the DoD move from "defense readiness at any cost" to "defense readiness at the best value." DoD has identified key systems that are essential to its efforts to transform business operations. As of December 2009, DoD had invested over $5.8 billion in ERPs and will invest additional billions before the ERPs are fully implemented. Most of these programs are over budget, behind schedule, and have not met performance expectations. Designed to transform business operations, Enterprise Resource Planning (ERP) systems are enabling technologies composed of integrated modules that make up the core engine of transaction processing. Their effectiveness depends on the ability and willingness of an organization to change its behavior and its processes. This assessment, requested by the House Armed Services Committee: identifies, analyzes, and provides recommendation to address the root causes of these underperforming systems.

15. SUBJECT TERMS
DoD Business Enterprise Resource System (ERP), Information Technology investment strategies, Defense Business Systems

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