An Integrated Approach to Enterprise Architecture and Business Process Management at the USMEPCOM

A Thesis

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MASTERS THESIS APPROVAL FORM

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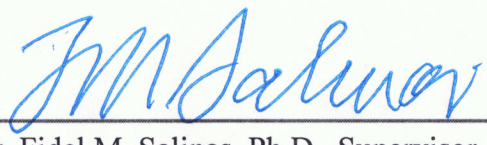

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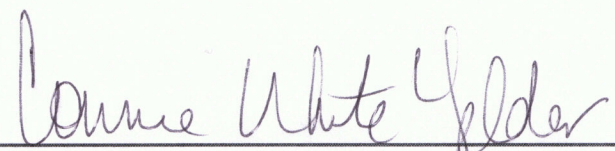

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Abstract

The USMEPCOM is the principal military accessions organization for the Department of Defense (DoD), charged with the joining of enlisted personnel into military service. Within the last two years, USMEPCOM has, under DoD mandate, stood up two independent programs – the Command Enterprise Architecture Program and the Business Process Management Program. The USMEPCOM has a current need to provide effective processes for its mission areas while maintaining compliance to all DoD laws, regulations, and policies. These factors have led to an accessions business operating environment that is inherently inefficient and difficult to understand. With increasing demands from the Office of the Secretary of Defense (OSD) to reduce military spending, and a DoD Strategic Management Plan that calls for reengineered business processes that allow cross-functional synergy, the USMEPCOM is researching effective and efficient options to reduce expenditures and prepare for possible budget reductions. The researchers hypothesized that collaboration between the USMEPCOM Enterprise Architecture and Business Process Management programs would enhance inter-program performance at the USMEPCOM. The research shows there is an opportunity to gain synergy by strategic integration of the two programs by pinpointing the overlapping process capabilities that minimize costs and improve the business operating environment.

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As globalization takes root in the United States and technology changes the way the world interacts, the military, too, is changing the way it operates. The increase in global connectivity has made the Department of Defense (DoD) and its' various agencies take notice. This is particularly true for the United States Military Entrance Processing Command (USMEPCOM).

In 1999, Hicks proposed that globalization would affect the DoD in two profound ways – it would alter the DoD supporting industrial base and require a reengineering of DoD acquisition and business practices; and it would necessitate the reshaping of the DoD technological environment. He qualified that prediction by stating that "within just a few years, virtually all DoD business operations, and many critical military functions" (e.g., human resources), would be conducted over the Internet and World Wide Web (1999). The traditional industrial base which supported in-house development of equipment and services by military developers is now all but gone. More and more the DoD must rely on a support base that is increasingly international in scope, often borderless, and commercial (Hicks, 1999). Instant worldwide communication is the current norm. Personnel joining military service expect the same level of communication from the Military.

Increased global connectivity has prompted the worldwide movement of business operating environments to the Internet, requiring reengineered business processes. In the DoD, increasing defense costs have prompted business operating environment improvements. The DoD seeks to reduce costs while improving the services it provides.

The current DoD Strategic Management Plan calls for a need to reduce stovepipes. This requires reengineered business processes to allow for cross-functional processes that can gain from a synergy of cross-functional efforts (Department of Defense, 2012, p. 10).

Enterprise Architectures are becoming highly important as agencies struggle to combine enterprise business processes with rapidly evolving information technologies. The USMEPCOM understands this necessity and seeks to provide effective processes for its' mission areas through an effective Enterprise Architecture (EA) mapped to business processes, and ultimately to strategic objectives. The End to End (E2E) business flow optimizations that are promoted by the Office of the Deputy Chief Management Officer (ODCMO) require Enterprise Architecture and Business Process Management to be successful (Department of Defense, 2010, p. 2). Analysis of EA and Business Process Management (BPM) programs within the USMEPCOM could provide areas of synergy, thereby pinpointing possible areas that could reduce expenditures.

USMEPCOM

The Military Entrance Processing Command (MEPCOM) was created on July 1, 1976 as part of United States Army Recruiting Command (USAREC). The MEPCOM was created as a response to allegations from Congress and the Department of Defense (DoD) of improper recruiting practices by military recruiters. Its creation was thus to improve the quality of military accessions by managing the Armed Forces Examining and Entrance Station (AFEES) field activities that evaluate the applicants for military service. On October 1, 1979, the MEPCOM was renamed the United States Military Entrance Processing Command and became its own DoD Command reporting to the Army Deputy

Chief of Staff for Personnel. On January 1, 1982, the AFEES was renamed as Military Entrance Processing Station (MEPS) (Parker, 2008, pp. 12-17).

The USMEPCOM is charged with the military mission of accessions, or the joining of personnel into military service, and has the key human resources screening role for the Armed Services. The mission includes evaluating applicants for aptitude, medical, and moral character (Department of Defense, 2005, p. 8).

Military recruiting commands of all Services scout for prospective recruits and bring them to one of the 65 MEPS nationwide, under the direction of the USMEPCOM Headquarters (HQ) in North Chicago, Illinois, as seen in Figure 1.

Figure 1. The USMEPCOM HQ. The USMEPCOM HQ building in North Chicago, Illinois.

Upon scheduling a MEPS visit, a recruiter's prospect becomes an applicant for military service. The applicants are evaluated for aptitude, medical, and moral character along with quality checks to determine their eligibility for military occupations. These eligibility criteria are measured against documented military standards to determine eligibility. Those found to meet eligibility requirements are offered an employment contract from a Military Service component, enlisted into Military Service, and shipped out to a training base. Military members of Active and Reserve components of the Army,

Navy, Marines, Air Force, and Coast Guard are processed at the MEPS. Personnel in the National Guard and Reserves will typically not ship to a training base. They will return home and await orders from their specific Service component. The military training bases are the consumers of qualified applicants and their associated eligibility information collected during the enlistment process (Department of Defense, 2011, p. 2-5).

The armed services vocational aptitude battery.

The Armed Services Vocational Aptitude Battery (ASVAB) is given to applicants at the MEPS or at a remote Military Entrance Test (MET) site. High school students can also take a high school version of the test at their local high schools. The different test delivery methods are designed to provide ease of access and convenience to both the recruiters and the applicants interested in military service. The tests are used to determine eligibility for specific military occupations (Department of Defense, 2005, p. 2-4).

Military medical examinations.

Medical examinations are given to ensure each applicant meets the documented standards for the military Service they are interested in joining. Each Service component has somewhat differing medical eligibility constraints that must be measured and evaluated. Some military occupations have additional medical entrance requirements that must be met when applying for one of these more restrictive positions. Some shortfalls in eligibility may be waived by the respective military Service recruiting Medical Waiver Board (Department of Defense, 2011, p. 14-15).

Moral character for military service.

The applicant's moral character is verified using local and national law enforcement resources to determine if there is any criminal history that would negatively affect employment eligibility. If there are any legal issues to adjudicate, these issues will be undertaken by the military recruiting Service (Department of Defense, 2011, p. 24).

Additional service factors.

The applicant's age, national citizenship, and dependency status are reviewed as eligibility factors. Applicants must not exceed Service age restrictions, have appropriate citizenship status, and not have a burdensome dependency situation in order to join the military (Department of Defense, 2005, p. 5).

Evaluating eligibility.

The MEPS provides a service to evaluate how an applicant measures up to established military Service standards, this is why it is referred to as an eligibility determination (Department of Defense, 2005, p. 6). Ultimately the decision to enlist an applicant is made by the individual military recruiting Service. Once an eligibility determination is made, the MEPS employees continue the process of reviewing the employment contract and providing the oath of enlistment. The newly sworn-in military member then is shipped off to their first duty station. The new member is now in the care of the military training base where the individual will spend a number of weeks being trained in military culture, practices, skills, and procedures as they enter their new occupation.

Strategic planning and transformation.

In 1995, the USMEPCOM wrote its first strategic plan. The strategic plan was facilitated by the Program Analysis and Evaluation Directorate and approved by the Commander. In 2002, the Command reviewed its key mission areas with an aim to improve the business processes. By 2003, the USMEPCOM began to follow the Army's leadership in transformation to attain better and faster capabilities to process applicants. In 2008, applicants were able to use a biometrics based Electronic-Security (E-Security) software application to capture fingerprints which allows applying digital signatures to enlistment documents. That fall, the USMEPCOM Commander, Colonel Mariano C. Campos Jr., decided to establish a transformation office by restructuring the Program Analysis and Evaluation Directorate into the Office of Strategic Planning and Transformation (OSP&T). This new office was made responsible for strategic planning, business transformation, change management, and business transformation. After 12 years of using the legacy United States MEPCOM Integrated Resource System (USMIRS) applicant processing system, the Command was preparing to engage in a new acquisition system program. The USMEPCOM needed to develop follow-on Information Technology (IT) systems that were more process and cost efficient.

A key part of establishing an acquisition program is to evaluate the business processes and perform a Business Process Re-engineering (BPR) effort to establish an optimized way-ahead (Parker, 2009, p. 6-7). The OSP&T was the office to support this effort.

Recently, the OSP&T has been renamed as Strategic Planning and Transformation (SPT) Directorate. The SPT Directorate now faces a need to develop

programs and establish processes to help the Command transform with a focus on business process improvement, enterprise architecture compliance, and efficiency of operations. Two enabling elements in the SPT Directorate were the hiring of an Enterprise Architect and a Business Process Manager to support the development and establishment of their respective programs. The evolution of the USMEPCOM SPT Directorate is outlined in Figure 2.

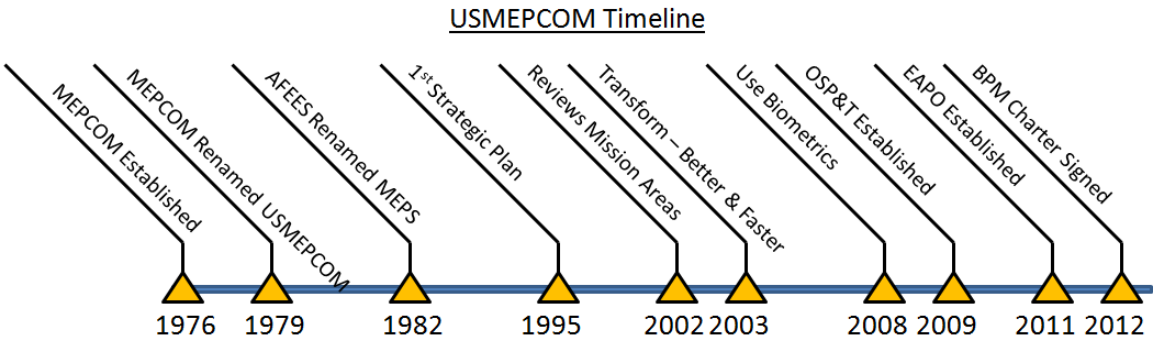

Figure 2. USMEPCOM Timeline. The USMEPCOM timeline shows historical milestones in the Command's evolution and pinpoints when both the USMEPCOM EA and BPM Programs were created.

The current state of organizational capability includes a Command Enterprise Architecture Program along with an emerging Business Process Management Program. Further review highlighted the need to coordinate the efforts between these two fledgling programs. Such coordination can easily create increased synergy between the two programs by sharing common product development and, when appropriate, making the most of limited human resources, thereby reducing overall costs.

Delimitations

This study will be limited to the theory of establishing an EA and a BPM program at the USMEPCOM; actual data is non-existent for these new programs. A large emphasis will be placed on the Enterprise Architecture Management Maturity Framework (EAMMF) and Business Process Maturity Model (BPMM) maturity models for EA and BPM respectively. These standards of practice will be used to find intersections between the two disciplines from a theoretical approach at integration. No actual integration data will be collected.

This study will not have access to the USMEPCOM staff due to approval schedule limitations for release of information. The study will rely on published documents to evaluate the EA and BPM programs ability to integrate into a synergistic collaboration of effort. Two documents that will be used are the EA program charter and the BPM program charter. Other USMEPCOM documents may also be used.

This research project is not an enterprise architecture project. It is rather a study of the intersection of the maturity frameworks associated with EA and BPM. The extent of the use of the Department of Defense Architecture Framework (DoDAF) will be limited to EA methods, which will be used to show the intersections of the EA program and BPM Program. The intersections of EA core elements, as defined in the EAMMF, will be modeled in select viewpoints representing the BPM Process Areas as defined by the BPMM. This is in alignment with the H_0 hypothesis.

Constraints for the operational activities defined as intersecting between EA and BPM Programs were not considered to reduce the scope of this research. The constraints include laws, regulations, and policies that may limit the intersecting activities.

Because time is limited and we will not be able to study all facets of program integration. This study will select some areas of interest once integration data has been collected by conducting a qualitative review of intersections. The remaining areas of integration may be reviewed in future studies.

Problem Statement

The USMEPCOM is establishing an integrated program of BPM and EA. This thesis addresses the need to evaluate, correlate, and apply the best practices in these disciplines to enhance the efficiency and effectiveness of program implementation over the next three to five years.

Hypothesis

H_0: Collaboration between EA and BPM programs will enhance inter-program performance at the USMEPCOM.

H_a: Collaboration between EA and BPM programs will not enhance inter-program performance at the USMEPCOM.

The integration of EA and BPM may provide a synergistic cost savings that will allow the Command to provide improved understanding of its business processes while reducing the costs and improving quality to run two DoD mandated programs.

Summary

Increased global connectivity has prompted the worldwide movement of business operating environments to the Internet, requiring reengineered business processes. EAs are becoming highly important as agencies struggle to combine enterprise business processes with rapidly evolving information technologies. The USMEPCOM

understands this necessity and seeks to provide effective processes for its' mission areas through an efficiently managed EA program mapped to a business process management program. These programs will ultimately provide the tools to align DoD laws, regulations, and policies (LRP) to efficient processes and procedures.

Literature Review

Enterprise Architecture (EA) is fundamentally concerned with identifying common or shared assets, such as strategies, business processes, investments, data, systems, or technologies (Executive Office of the President of the United States, 2007). This is the definition and representation of a high-level view of the enterprise's business processes and IT systems, their interrelationships, and the extent to which these processes and systems are shared by different parts of the enterprise (Tamm et al., 2011).

The conceptual foundation of EA dates back to the mid-1980s when John Zachman, widely recognized as a leader in the field of enterprise architecture, identified the need to use a logical construction blueprint for defining and controlling the integration of systems and their components (United States Government Accountability Office, 2010). Based on this, Zachman developed his "framework" (Appendix B) for defining and capturing an architecture (2010).

Although EA began with John Zachman's work in the 1980s, the Federal Government did not take notice until the 1990s. In the mid-1990s, the Army began its move toward integrated systems. This began in 1996, with Executive Order 13011, *Federal Information Technology*, which established the Chief Information Officers (CIO) Council as the principal interagency forum for improving practices in the design, modernization, use, sharing, and performance of Federal information resources (The Chief Information Officers Council, 1999). The executive order sought to integrate provisions of the earlier Clinger-Cohen Act of 1996 that assigned the CIOs with the

responsibility to develop Information Technology Architectures (ITAs) within federal agencies (1999).

The Clinger-Cohen Act of 1996 recognized the need for federal agencies to improve the way they select and manage IT resources (Department of Defense, 2009). It stated, "information technology architecture, with respect to an executive agency, means an integrated framework for evolving or maintaining IT and acquiring new IT to achieve the agency's strategic goals and information resources management goals" (2009). CIOs were assigned the responsibility for "developing, maintaining, and facilitating the implementation of a sound and integrated IT architecture for the executive agency" (2009).

Architecture Frameworks

Federal enterprise architecture framework.

In 1999, the CIO Council published the Federal Enterprise Architecture Framework (FEAF) (The Chief Information Officers Council, 1999). The CIO Council used the Clinger-Cohen Act of 1996 and the Office of Management and Budget (OMB) Circular-*A-130*, *Management of Federal Information Resources,* as a basis for creating the FEAF (1999). The OMB Circular-*A-130* established policy for the management of Federal information resources and called for the use of EA to support capital planning and investment control processes. It also included implementation principles and guidelines for creating and maintaining EAs (Department of Defense, 2009). The FEAF was to serve as a reference point to facilitate the "efficient and effective coordination of common business processes, information flows, systems, and investments among Federal

Agencies and other Government Agencies" (The Chief Information Officers Council, 1999). The Council hoped that in time, government processes and systems would operate seamlessly in an enterprise architecture that provided models and standards that would identify and define the information services used throughout the Government (1999). It was this FEAF, the basic structure of which can be seen Figure 3, which would be the basis for all Agency requirements going forward.

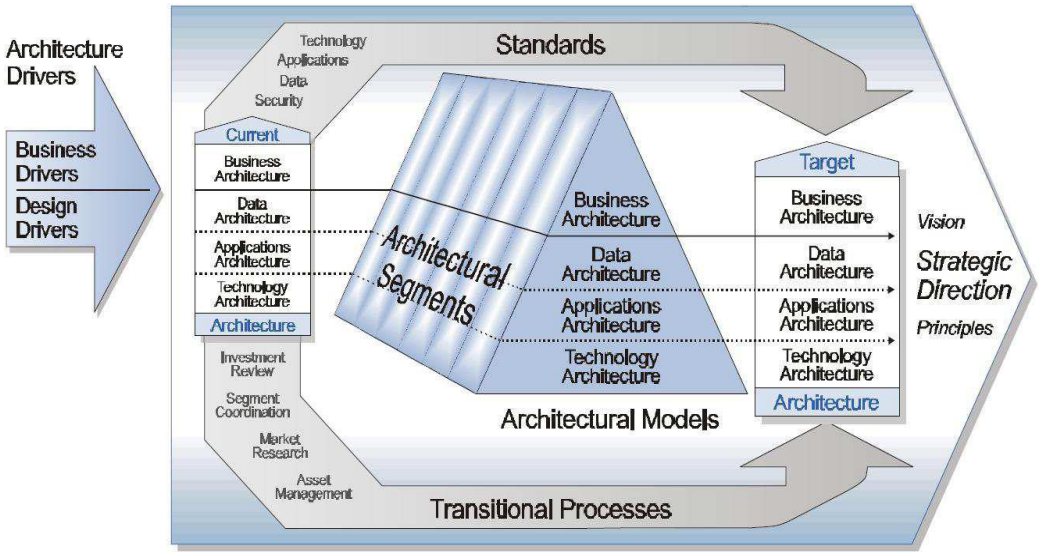

Figure 3. Federal Enterprise Architecture Framework Structure. This structure depicts a current and target architecture with respective business, data, application, and technology architectures. These architectures are supported with corresponding models guided by transitional processes and constrained by standards (The Chief Information Officers Council, 1999).

The FEAF is broken down into three Federal Enterprise Architecture (FEA) levels – enterprise, segment, and solutions architectures – each with different perspectives, according to detail and concerns (Executive Office of the President of the United States,

2007). While EA deals with commonalities, segment architectures define simple roadmaps for core mission areas, business services, or enterprise services by driving business management to deliver superior products (2007). Solution architecture further defines IT assets (applications or components) to automate and improve business functions (2007). The relationship among the three segments can be seen Figure 4.

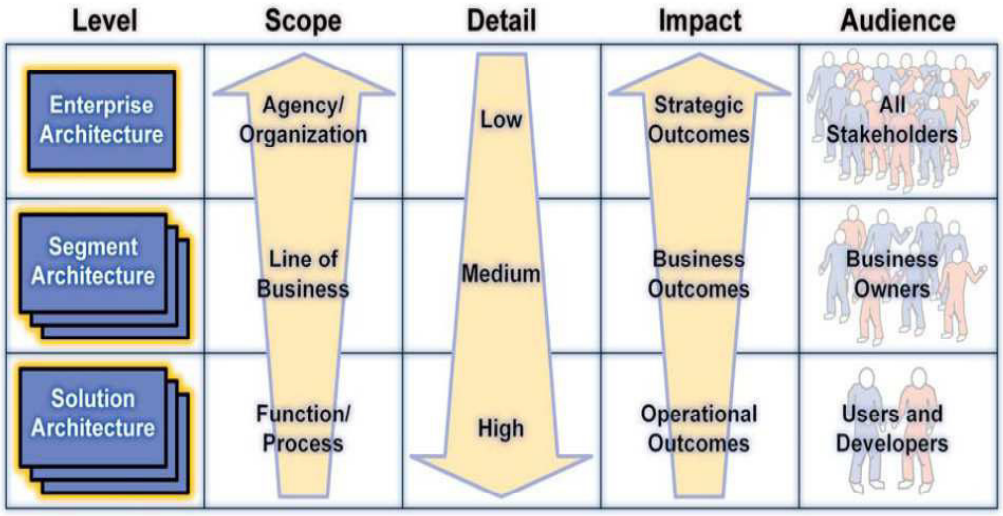

Figure 4. Architectural Levels and Attributes. This figure illustrates the relationships between enterprise architecture, segment architecture and solution architecture (Executive Office of the President of the United States, 2007).

Reference models.

The FEA is built using reference models that develop a common taxonomy and ontology of IT resources (Executive Office of the President of the United States, 2007). The FEA consists of a set of interrelated "reference models" designed to facilitate cross-agency analysis (Executive Office of the President of the United States, 2007). OMB Federal Enterprise Architecture Reference Models (FEA RM) facilitate "cross-agency analysis and the identification of duplicative investments, gaps, and opportunities for

collaboration within and across agencies" (Executive Office of the President of the United States, 2007, p. 5). Reference model alignment, as shown in Figure 5 ensures that important elements of the FEA are described in a common and consistent way (2007).

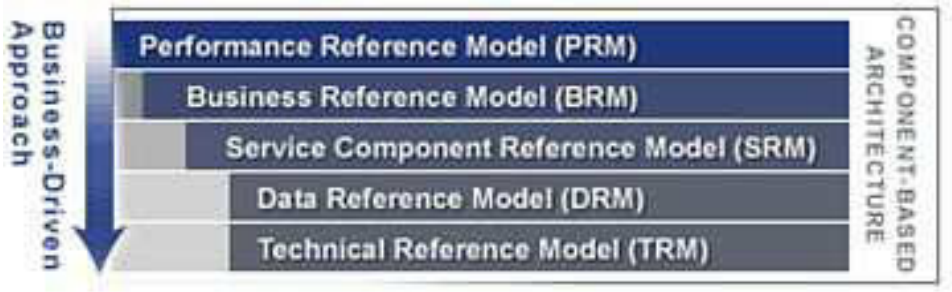

Figure 5. Federal Enterprise Architecture. Illustrates how a business-driven approach and a component-based architecture are aligned across the different types of reference models (Executive Office of the President of the United States, 2007).

There are five recognized types of FEA reference models - Performance Reference Models (PRM), Business Reference Models (BRM), Service Component Reference Models (SRM), Data Reference Models (DRM), and Technical Reference Models (TRM) (Executive Office of the President of the United States, 2007). The use of reference models allows IT portfolios to be better managed and leveraged throughout the federal government. As architectures are business-driven (aligned with Government strategic plans), proactive and collaborative across the federal government, they improve effectiveness and efficiency of government information resources (2007). The PRM and BRM are of particular interest for the USMEPCOM and this study.

The PRM is a framework for performance measurement that allows agencies to better manage the business of government at a strategic level (Executive Office of the President of the United States, 2007). The PRM establishes a common language by

which agency EAs can describe the outputs and measures used to achieve program and business objectives (2007). The PRM structure, shown in Figure 6, is designed to clearly express a line-of-sight, or the cause–and-effect relationship between inputs and outputs, which in turn reflect how value is created (2007). In simpler terms, the PRM outlines the inputs that are used to create outputs, which impact outcomes (2007).

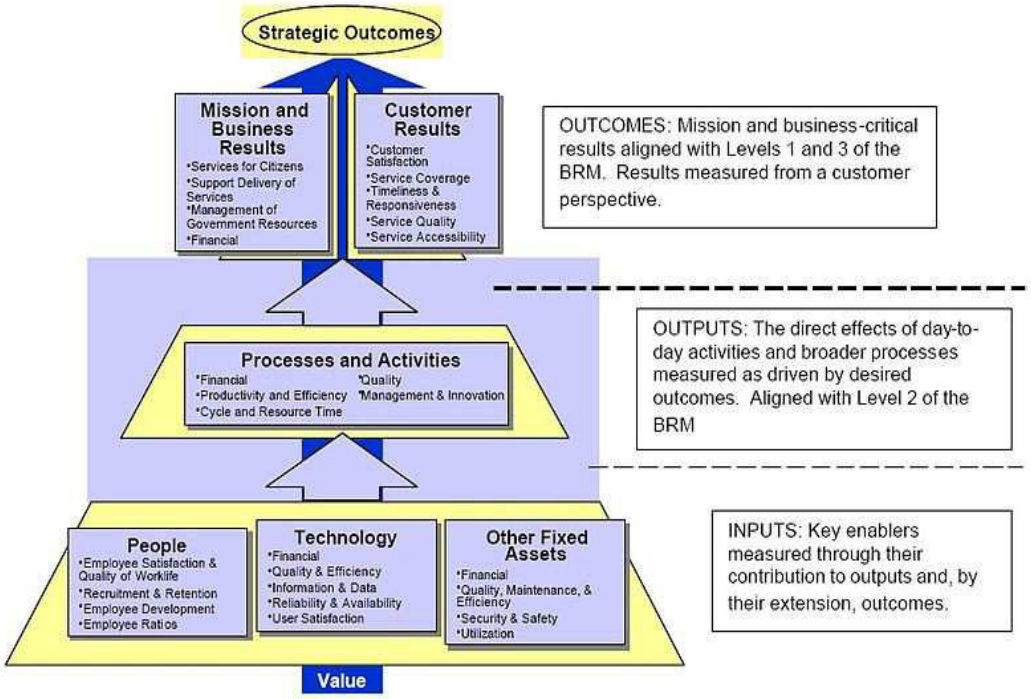

Figure 6. Performance Reference Model. This model articulates the linkage between internal business components and the achievement of business and customer-centric outputs (Executive Office of the President of the United States, 2007). The model facilitates resource-allocation decisions based on comparative determinations of which programs and organizations are more efficient and effective (2007).

The BRM provides a framework facilitating a functional (rather than organizational) view of the federal government's Lines of Business (LoB) independent of

the agencies, bureaus and offices performing them, as seen Figure 7 (Executive Office of the President of the United States, 2007). The BRM promotes agency collaboration and serves as the underlying foundation for the FEA and E-Government (E-Gov) strategies (2007). The E-Government Act of 2002 calls for the development of EA to aid in enhancing the management and promotion of electronic government services and processes (Department of Defense, 2009).

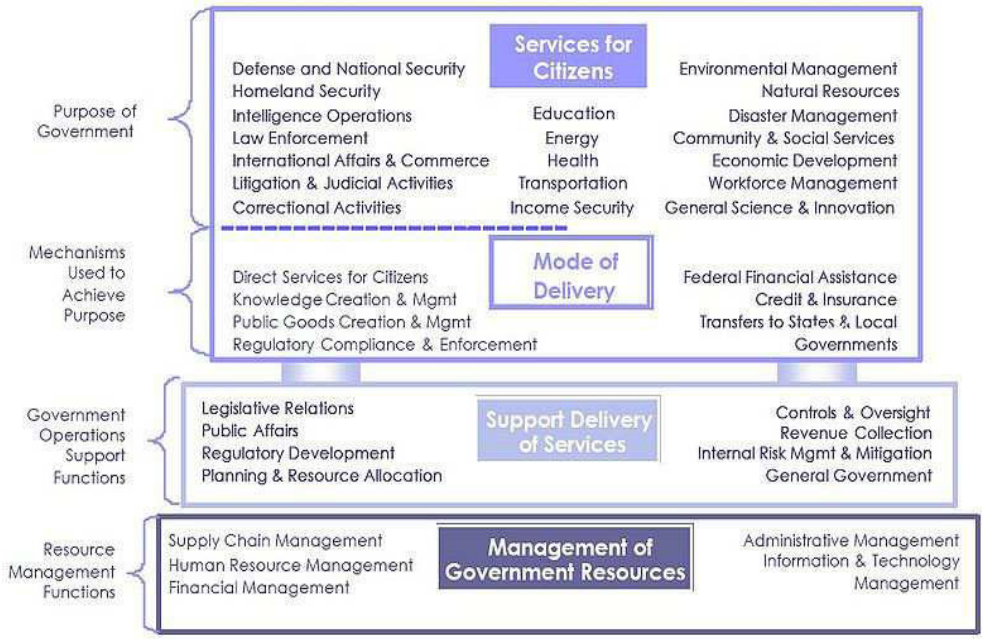

Figure 7. Business Reference Model. This model describes the federal government around common business areas instead of through a stove-piped, agency-by-agency view (Executive Office of the President of the United States, 2007).

However, the BRM provides true utility as a model only when agencies effectively use it (2007). The BRM will do little to help accomplish the E-Gov strategic goals if it is not incorporated into business-focused enterprise architectures and the management processes of federal agencies (Executive Office of the President of the

United States, 2007). The USMEPCOM is conducting research to determine how the internal BRM processes can properly support integration of EA and BPM when used in conjunction.

Department of defense architecture framework.

While the Federal Government was developing the FEAF, the DoD was developing the DoDAF. The DoD Enterprise Architecture Reference Models are aligned with the FEA RM (Department of Defense, 2009). As a result of the Clinger-Cohen Act, the DoD created the Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) Architecture Framework v1.0 (Department of Defense, 2007). In 2003, the C4ISR Architecture Framework v1.0 was restructured into the DoDAF v1.0, to broaden applicability of the architecture tenets and practices to all Mission Areas outside of C4ISR (2007). Since then, the DoDAF has been rewritten twice to incorporate increasing complexity. The timeline of this restructuring can be seen in shown in Figure 8. It should be noted that the DoDAF is still evolving. DoDAF v2.02 is the current version (Department of Defense, 2007).

Today, the DoDAF v2.02 stands as the primary guide for developing, representing, understanding, and ensuring compliance with the law for DoD architectures (Department of Defense, 2009). As a Command under the Secretary of Defense, the USMEPCOM uses the DoDAF as the framework to develop, analyze, and maintain its

EA models.

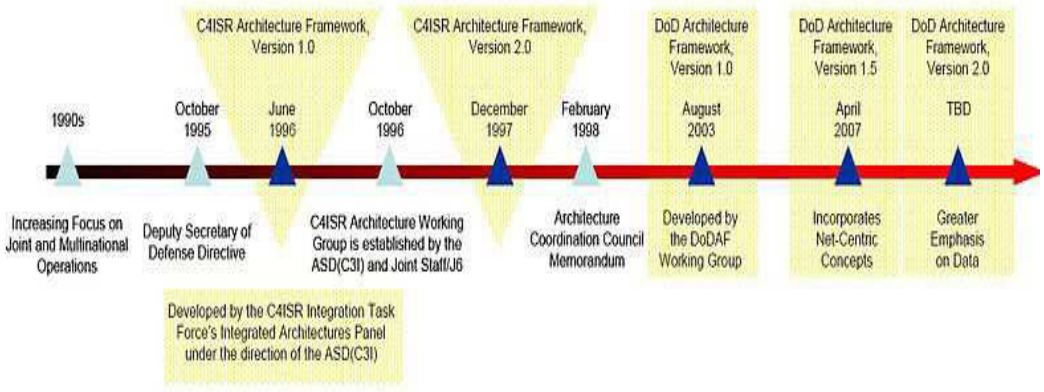

Figure 8. Evolution of DoDAF Framework. This depicts the evolution of the DoDAF from the mid-1990s through the DoDAF v2.0

Over time, and as experience with architecture has grown within the Department of Defense, it has become obvious that there are two types of architectures: 1) the *Program Level or Solutions Architecture* - this architecture has been required, defined, and supported by major Departmental processes for solution evaluation, interoperability, and resource allocation and is the most traditional; and 2) the *Enterprise Architecture* - provides a roadmap for change as well as a context and reference for how and where programs fit within a larger 'enterprise' picture (Department of Defense, 2009). The new DoDAF v2.02 "supports the development and use of both solution architectures and enterprise wide architectures" (2009).

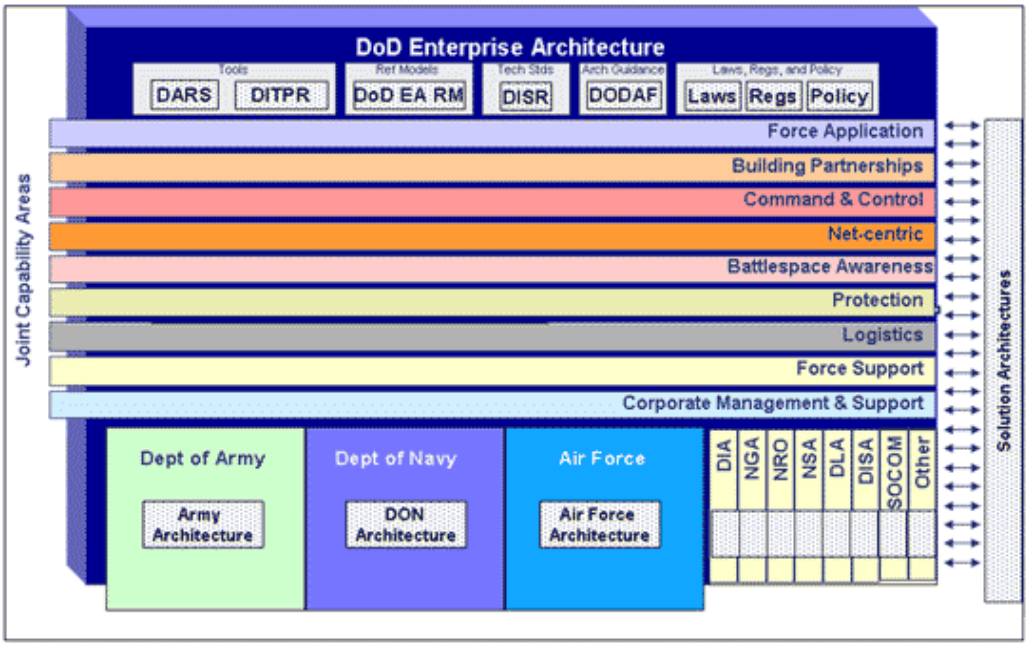

Figure 9. DoD Enterprise Architecture. The DoD EA provides a strategy that enables the organization to support its current operations while serving as the roadmap for transitioning to its target environment (Department of Defense Chief Information Officer, n.d.).

The DoDAF v2.0 focuses on the use of architecture throughout the various tiers of the DoD EA outlined in Figure 9, as they relate to operational and transformational decision-making processes (Department of Defense, 2009). The DoDAF v2.0 states that "architecture scoping must facilitate alignment with, and support the decision-making process and ultimately mission outcomes and objectives" as characterized in Figure 10 (Department of Defense, 2009, p. 12).

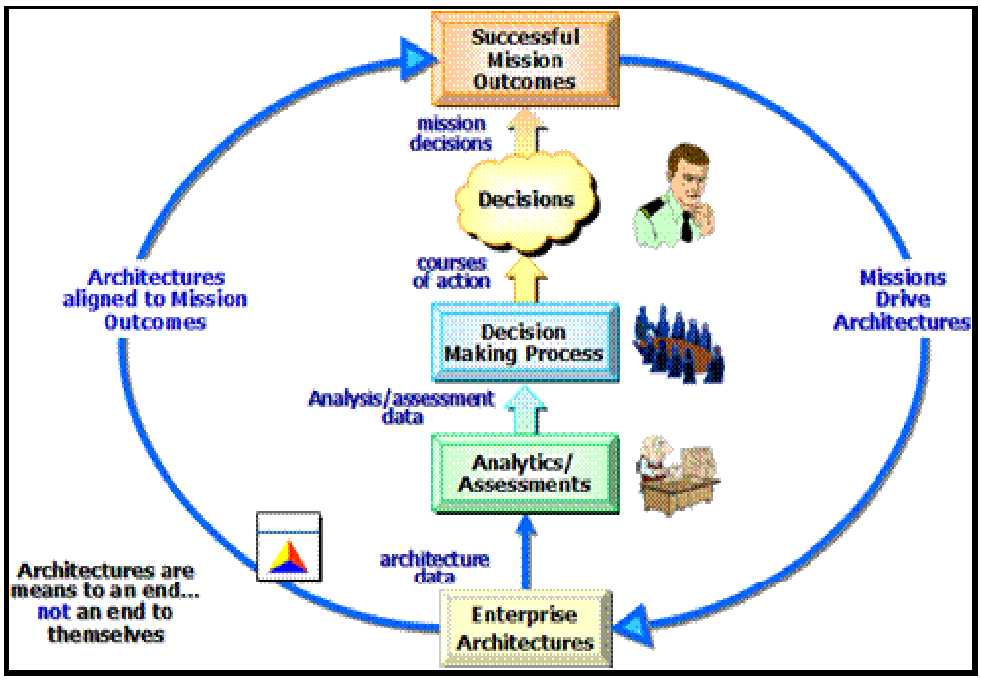

Figure 10. Mission Outcomes Supported by Architectures. The development of architectures supports the management decision process by facilitating the ability to determine and/or validate mission outcome (Department of Defense, 2009).

The DoDAF v2.0 further states:

> Architectural data and supporting views, created from organizing raw data into useful information, and collected into a useful viewpoint, should enable domain experts, program managers, and decision makers to utilize the architecture to locate, identify, and resolve definitions, properties, facts, constraints, inferences, and issues, both within and across architectural boundaries that are redundant, conflicting, missing, and/or obsolete. (Department of Defense, 2009, p. 12)

Integrated architectures are the key to DoDAF Architecture development. It is this integration that allows one, integrated architecture to support multiple tasks and analyses. The DoD Instruction 4630.8, defines an integrated architecture as " an

architecture consisting of multiple views or perspectives (operational view, systems view, and technical standards view) facilitating integration and promoting interoperability across capabilities and among related integrated architectures" (Department of Defense, 2004, p. 52). The term *integrated*, in this case, is defined as the data required in more than one instance in architectural views that are commonly understood across those views (Department of Defense Chief Information Officer, n.d.). The DoD creates integrated architectures through a six step process, seen in Figure 11, that provides visual renderings of the underlying architectural data and conveys information of interest needed by specific user communities or decision makers (n.d.).

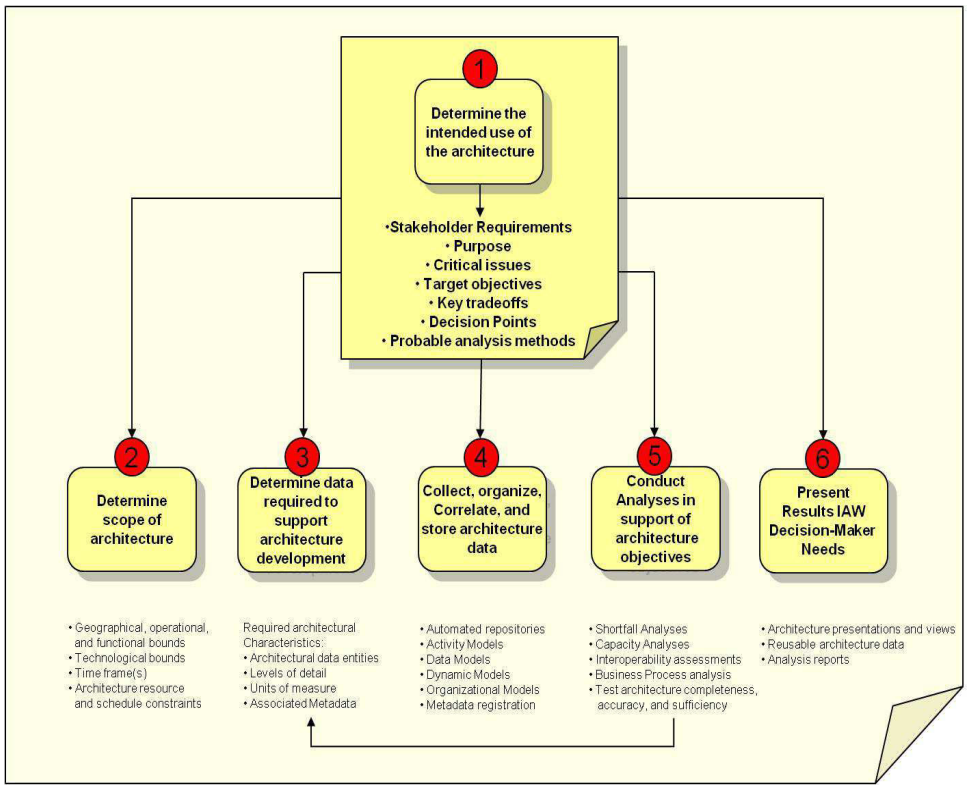

Figure 11. 6-Step Architecture Development Process. This data-centric approach ensures agreement between views while ensuring that all essential data relationships are captured to support a wide variety of analysis tasks (Department of Defense Chief

Information Officer, n.d.).

DoDAF artifacts.

The current DoDAF has 52 different visual renderings that can be used to model integrated architectures (see Appendix C), grouped into eight different viewpoints. The viewpoints are comprised of

- All Viewpoint (AV),
- Capability Viewpoint (CV),
- Data and Information Viewpoint (DIV),
- Operational Viewpoint (OV),
- Project Viewpoint (PV),
- Services Viewpoint (SvcV),
- Standard Viewpoint (StdV), and
- Systems Viewpoint (SV) (Department of Defense Chief Information Officer, n.d.).

However, most developers rarely use every model to define their architectures. The models are designed to support *fit-for-purpose* use, thus can be used in multiple configurations and customizations as suits the need of the organization. Integration at all levels, as shown in Figure 12 is crucial.

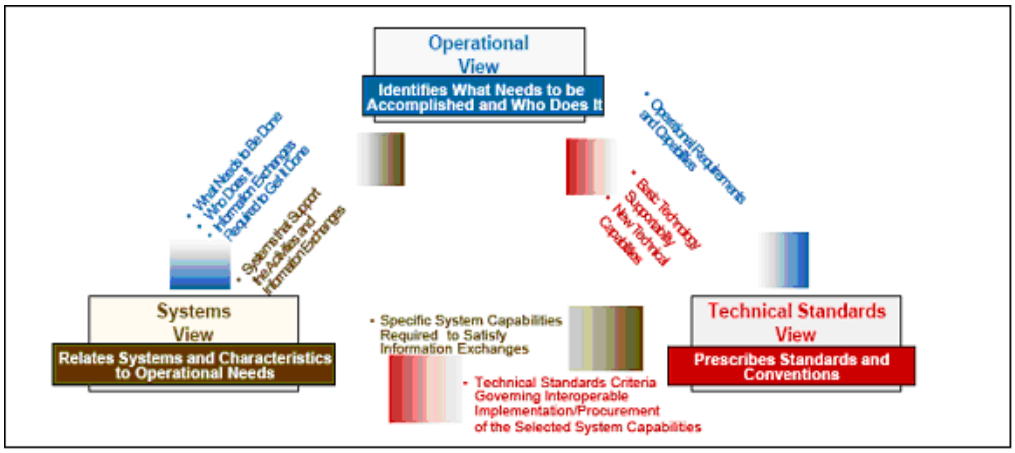

Figure 12. Relationships among DoDAF views. Operational, Systems, and Technical viewpoints should integrate at various levels of abstraction (Widney, 2006).

It is important to remember that the DoDAF was designed to provide the means of abstracting essential information from the underlying complexity and presenting it in a way that maintains coherence and consistency (Department of Defense Chief Information Officer, n.d.). The DoDAF v2.02 states:

> One of the principal objectives is to present this information in a way that is understandable to the many stakeholder communities involved in developing, delivering, and sustaining capabilities in support of the stakeholder's mission. It does so by dividing the problem space into manageable pieces, according to the stakeholder's viewpoint. (Department of Defense Chief Information Officer, n.d., pp. 138-139)

The stakeholder's viewpoint, in this instance the USMEPCOM, prescribes, at a minimum,

- Overview and Summary Information (AV-1),
- Integrated Dictionary (AV-2),

- High-Level Operational Concept Graphic (OV-1),
- Operational Resource Flow Description (OV-2),
- Operational Resource Flow Matrix (OV-3),
- Operational Activity Decomposition Tree (OV-5a),
- Operational Activity Model (OV-5b), and
- Capability Dependencies Model (CV-4).

These operational viewpoints will serve as the basis of our research and should supply the USMEPCOM with a good foundation with which to build their EA.

Most developers start their architectures by creating an AV-1 and an OV-1 as a complimentary pair. These two viewpoints will serve as an executive summary of the Architectural Description (Department of Defense Chief Information Officer, n.d.). The AV-1 provides summary information concerning *who*, *what, where, when, why,* and *how* of the plan and describes a project's visions, goals, objectives, plans, activities, events, conditions, measures, effects (Outcomes), and produced objects (n.d.). The AV-1 is often started first, with the OV-1 maturing as other models are created. The AV-1 will also evolve as the architecture matures into a final overview.

The OV-1 is the pictorial representation of the written content of the AV-1 (Department of Defense Chief Information Officer, n.d.). It provides a graphical depiction of what the architecture is about and an idea of the organizations and operations involved (n.d.). The main purpose of an OV-1 is "to provide a quick, high-level description of what the architecture is supposed to do, and how it is supposed to do it," to the organizations decision-maker (n.d., p. 1).

Although the OV-1 is often started early in EA development, it cannot be completed until the OV-2 has been created. The OV-2 is used to define capability requirements within an operational context and express a capability boundary (Department of Defense Chief Information Officer, n.d.). The OV-2 defines the logical pattern of resources, be it information, funding, personnel, or materiel flows (n.d.). The OV-2 indicates the key players and the interactions or Needlines (NL) necessary to conduct the corresponding operational activities of the OV-5a or OV-5b (n.d.).

The OV-5a and the OV-5b describe Operational Activities (OA) (or capabilities) that are normally conducted in the course of achieving a mission or a business goal; input and output flows between activities, and activities that are outside the scope (Department of Defense Chief Information Officer, n.d.). The OV-5a helps provide an overall picture of the activities involved and a quick reference for navigating the OV-5b via task decomposition. The OAs decomposed in the OV-5a provide a "quick reference for navigating" the OV-5b (n.d.). The OV-5b models the relationships or dependencies among the activities, resources exchanged between activities, and external interchanges (n.d.). The OV-5b also shows the mechanisms used to complete the activity effort.

The OV-3 is started after the OV-2 and the OV-5b. The OV-3 identifies resource elements and relevant attributes and associates the exchange to the OV-5b producing and consuming OAs to the OV-2 NLs that the resource flow satisfies (Department of Defense Chief Information Officer, n.d.). In short, the OV-3 identifies the resource transfers and Information Exchanges (IE) that are necessary to support operations to achieve a specific operational task, and should be integrated seamlessly into the OV-2 and OV-5b.

The AV-2 is most often completed in parallel with the various other viewpoints. The AV-2 serves as the integrated dictionary for an organization's suite of DoDAF products. The AV-2 explains the terms and abbreviations used in building the architecture and, as necessary, submit them for review and inclusion into authoritative vocabularies (e.g. DoD Information Technology Standards and Profile Registry (DISR) service categories) developed by pertinent Community of Interests (COI) (Department of Defense Chief Information Officer, n.d.).

Business Process Management

The DoDAF v2.0 seeks to provide the "flexibility to develop both Fit-for-Purpose Views (User-tailored Views) and views from DoDAF-described Models to maximize the capability for decision-making at all levels" (Department of Defense, 2009). To be effective, decision-making should be mapped to business initiatives. For many years, the DoD has been struggling to connect their business initiatives to the technologies that help realize their mission (ZapThink, 2011). This can be done via BPM, thus there is an urgent movement towards including BPM in architecture development.

BPM refers to the best practice management principle that helps companies sustain competitive advantage (Hung, 2006). It is similar to Total Quality Management (TQM) in that it continually implements best practice management principles, strategies, and technologies, to increase global competition (2006). BPM is often regarded as a "must" if a company wishes to be competitive, as it helps align corporate strategy to business execution, as shown in Figure 13. Furthermore, conducting appropriate BPR early and upfront throughout a defense business system's acquisition or modernization lifecycle is critical to success and helps "rationalize its defense business systems

portfolio, improve its use of performance management, control scope changes, and reduce the cost of fielding business capability" (Office of the Deputy Chief Management Officer, 2011, p. 13). The Fiscal Year (FY) 2010 National Defense Authorization Act (NDAA) introduced new requirements stipulating "defense business system modernizations may not be certified to obligate funds in excess of $1 million without a determination having been made on whether or not appropriate Business Process Reengineering had been completed" (Office of the Deputy Chief Management Officer, n.d.).

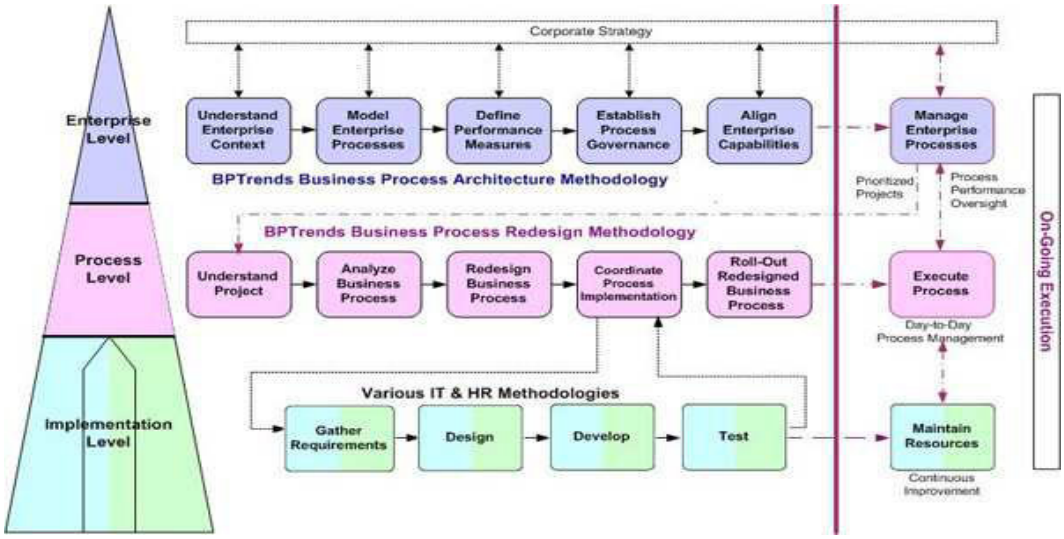

Figure 13. BPTrends Associates' BPM Methodology Framework. This Figure depicts the BPM Methodology Framework representing the enterprise, process, and implementation level of activity (BPTrends Associates, n.d.).

Aside from making the business more competitive, BPM has several advantages. The benefits of adopting BPM include:

- increased visibility and knowledge of business activities

- increased ability to identify bottlenecks
- increased identification of potential areas of optimization
- reduced lead times
- better definition of business duties and roles
- fraud prevention, auditing, and assessment of regulation compliance (Ko, 2009).

The FY05 NDAA (codified at 2222 of Title 10, United States Code, as amended) required FY Enterprise Transition Plans (ETP) henceforth, to include, among other things, "the acquisition strategy for new systems that make up the target enterprise architecture, including time-phased milestones, performance measures and a statement of the financial and non-financial resource requirements" (Office of the Deputy Chief Management Officer, 2011, p. 1). The FY2011 ETP is no exception to these requirements (2011).

Maturity Levels

Business process maturity model.

The ability to effectively manage any activity (e.g., architecture development, maintenance, and use) depends upon having meaningful measures of that activity in relation to some standard (United States Government Accountability Office, 2010). This meaningful measurement can be completed by developing a maturity model. A *maturity model* is defined as an evolutionary roadmap for implementing the vital practices from one or more domains of organizational process (Object Management Group, 2008). The five levels of BPM maturity shown in Figure 14are defined in the BPMM as designed to:

> guide an organization in evolving from poorly defined and inconsistent practices, to repeatable practices at the unit level, to standard organization-wide end-to-end business processes, to statistically managed and predictable processes, and finally to continuous process innovation and optimization. (Object Management Group, 2008, p. 10)

At maturity level 1, the practices and results of the processes are inconsistent. The processes are rarely defined or documented and the processes that are defined are rarely followed (Object Management Group, 2008). Such an organization rarely succeeds in process implementation.

At maturity level 2, there are basic planning and management processes, established management control of requirements, and all essential activities are performed to develop, prepare, deploy, operate, and support products and services (Object Management Group, 2008). At this level, executives provide the sponsorship and middle management provides coordination for process improvement (2008).

At maturity level 3, there are documented, standard processes defined at an applicable level of abstraction for developing, preparing, deploying, operating, and supporting the products and services across the organization (Object Management Group, 2008). These standard processes include the work, support, and management processes (2008).

At maturity level 4, achievable quantitative goals for performance and quality are established for end-to-end work efforts and are used as criteria in managing them (Object Management Group, 2008). These goals are based on the needs of the customers, end users, and the organization (Object Management Group, 2008).

At maturity level 5, the organization understands its critical business issues or areas of concern and sets quantitative improvement goals to address these business issues (Object Management Group, 2008). The organization's business issues, business goals, and business strategy determine the improvement goals, which are then pursued, identified, evaluated, piloted, and deployed to achieve the improvement goals (2008).

Maturity Level	Focus	Process Areas
5 Innovating	Organization's processes are continually improved	Organizational Improvement Planning Organizational Performance Alignment Defect and Problem Prevention Continuous Capability Improvement Organizational Innovative Improvement Organizational Improvement Deployment
4 Predictable	Work processes are managed quantitatively to establish predictable results	Organizational Common Asset Management Organizational Capability and Performance Management Product and Service Process Integration Quantitative Product and Service Management Quantitative Process Management
3 Standardized	Organization establishes standard processes and assets for performing the product and service work	Organizational Process Management Organizational Competency Development Organizational Resource Management Organizational Configuration Management Product and Service Business Management Product and Service Work Management Product and Service Preparation Product and Service Deployment Product and Service Operations Product and Service Support
2 Managed	Managers establish a stable work environment in their work unit	Organizational Process Leadership Organizational Business Governance Work Unit Requirements Management Work Unit Planning and Commitment Work Unit Monitoring and Control Work Unit Performance Work Unit Configuration Management Sourcing Management Process and Product Assurance
1 Initial	Individual efforts with no explicit process or organizational support	

Figure 14. BPMM Process Areas by Maturity Level. Maturity Level 1 is a designation

for organizations that have not achieved one of the higher levels of the model. Organizations achieving Maturity Level 3, 4, or 5 must also meet all the requirements associated with lower Maturity Levels beginning with Level 2 (Object Management Group, 2008).

Enterprise architecture management maturity framework.

The EAMMF allows managers to determine what steps are needed for improving architecture management (Executive Office of the President of the United States, 2007). The framework consists of three basic components: 1) hierarchical *stages* of management maturity, 2) categories of *attributes* that are critical to management success, and 3) *elements* of core EA practice (United States Government Accountability Office, 2010). These EAMMF components are interrelated, as depicted Figure 15.

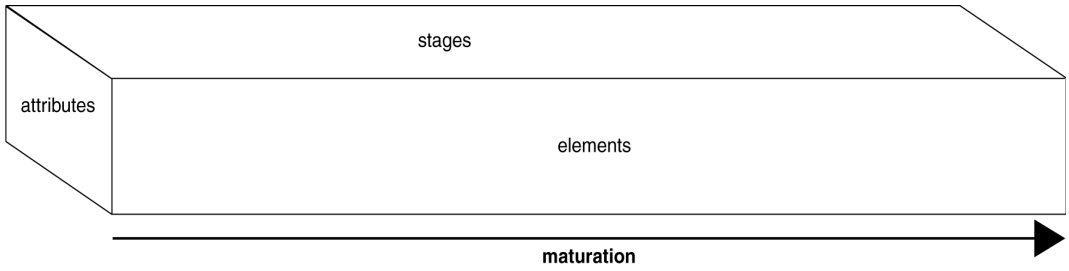

Figure 15. Simplified Three-Dimensional View of EAMMF. Shows the interrelationship of the three basic EAMMF components – stages, attributes, and elements (United States Government Accountability Office, 2010).

Exploration and establishment of a combined approach in EA and BPM for USMEPCOM projects could increase efficiency of personnel, process, and time to complete work. The USMEPCOM desires to engage in BPM to provide increased rigor for acquisition programs and ongoing operations. The addition of BPM to the existing

Enterprise Architecture Program Office (EAPO) provides an opportunity to take advantage of certain synergies that may exist between the two similar, yet different disciplines. This synergy should help the USMEPCOM adopt practices that are increasingly interconnected in response to the globalization that the DoD now faces.

In 1999, Hicks proposed that globalization would affect the DoD in two profound ways – it would alter the DoD supporting industrial base and require a reengineering of DoD acquisition and business practices; thus would necessitate the reshaping of the DoD technological environment. He qualified that prediction by stating that "within just a few years, virtually all DoD business operations, and many critical military functions" (e.g., human resources), would be conducted over the Internet and World Wide Web (WWW) (1999). The traditional industrial base which supported in-house development of equipment and services by military developers is now all but gone; today the DoD must rely on a support base that is increasingly international, often borderless, and commercial (1999).

Standards Documentation

Our research indicates that there is a significant amount of standards documentation in both private and public sectors for EA and BPM. When searching the EBSCO Publishing and Emerald Group Publishing Limited data bases for the string "Enterprise Architecture" this produces numerous private and public sector results. A similar search for the string 'Business Process Management' also provides numerous results. This documentation indicates that EA and BPM are well practiced independent disciplines. As researchers, we are familiar with the two disciplines through our professional work as certified enterprise architects.

Independently, “Enterprise Architecture” and “Business Process Management” provide a multitude of interdisciplinary papers of varying depth. Although many do not directly support the problem statement, they are still applicable. Notably, Cardwell described how companies can be successful through a structured use of EA that provides a simple set of process hierarchies so that Information Technology organizations can develop software in a way that everybody can understand (2008). We also see from Tamm, Seddon, Shanks, and Reynolds (2011) where they identified how EA use leads to organizational benefits. Research conducted by MSgt Fetters (2009) uncovered areas of best practices that support alignment between an organization’s IT and business processes.

United States government EA documentation.

The United States government has developed a significant amount of EA documentation. Much of this EA development stems from efforts to reform the way the government buys business IT systems. The government guidance documents serve to provide direction for practitioners that work as a part of or with government agencies. Some of the more prominent documents include:

- The Clinger-Cohen Act
- *DoDAF v2.0 Managers Guide*
- *DoDAF v2.0 Architect’s Guide*
- *USMEPCOM Enterprise Architecture Program Charter*

- *Organizational Transformation: A Framework for Accessing and Improving Enterprise Architecture Management*
- *Federal Enterprise Architecture Framework v1.1*, *Final Report on the Defense Science Board Task Force on Globalization and Security*
- *FEA Practice Guide*
- *FEA Consolidated Reference Model v2.3*
- *DoDAF v1.5 Volume I: Definitions and Guidelines*
- *OMB Circular A-130*
- FY2011 *Enterprise Transition Plan*
- *DoD Strategic Management Plan*
- DCMO Letter of April 30, 2011

The DoDAF v1.5 and v2.0 documents define what is required to satisfy the requirement for a need to build enterprise architecture imposed by the Clinger-Cohen Act of 1996 and OMB Circular A-130. A letter from the Under Secretary of Defense, dated Nov 15, 2010, describes EA responsibilities for the Investment Management (IM) phase of the Business Capability Lifecycle (BCL); the BCL is the acquisition management lifecycle for business systems in the DoD. The Business Mission Area (BMA) Architecture Federation Strategy and Roadmap describes how to federate or align BMA EA products into the Business Enterprise Architecture (BEA). This provides a key concept of federation where the subordinate architectures can contain separately developed products with different terminology, yet can become aligned with a bridge of

understanding so practitioners on both the BMA and the BEA can understand one another through the EA products. The Strategic Management Plan of FY12-FY13 describes the NDAA for FY05 that provides requirements to support business systems modernization through the creation of the Defense Business Systems Management Committee (DBSMC) and Investment Review Boards (IRBs). These mechanisms supported the implementation of the BEA as a guiding and constraining tool for DoD business investments.

The 2011 Congressional Report on Defense Business Operations outlines the things that can be found in new releases of the BEA. The better data standards, improvements in visualizations and the incorporation of the E2E business process models shows there is continual growth in using DoDAF to develop the BEA. The use of E2E process flows is expected to increase efficiencies realized by fewer system to system interfaces, expose and drive out redundancy, and help close gaps in functionality.

The Government Accountability Office (GAO) document *Foundational Steps Being Taken to Manage DoD Business Systems Modernization, but Much Remains to be Accomplished to Effect True Business Transformation* indicates the DoD has gained some ground toward implementing business system modernization management capabilities as required by the Ronald W. Regan National Defense Authorization Act for FY2005. While a BEA "to-be" target architecture was developed, there was no current state "as-is" architecture. This precluded the ability to perform a gap analysis between the "as-is" and "to-be" architectures.

The GAO document, *DoD Continues to Improve Institutional Approach, but Further Steps Needed* goes on to show there was an absence of planning, programming

and budgeting capabilities in the EA. There was no comprehensive listing of legacy systems not projected to be part of the target architecture and there was no accounting for system investments in all of the agencies and subordinate commands. The IRBs had not yet been implemented which was to be the regulation device that would interpret the EA products along with conformance reports showing functionality uniqueness when DoD organizations requested modernization funding.

A subsequent GAO document *DOD BUSINESS SYSTEMS MODERNIZATION Progress Continues to Be Made in Establishing Corporate Management Controls, but Further Steps Are Needed* shows an improvement with "as-is" architectures being present at the time of this publication. The GAO's further recommendations included investments for all components as well as provide key factors that support sequence planning the IT investments. This document noted that IRBs are being used to judge investment viability; however the IRBs were being executed without consistent written policies and procedures.

The *Defense Acquisition Guidebook* lists a number of DoDAF needs when producing architecture. These can be summed to: address net-centric information sharing, meet the broad requirements set forth in the Global Information Grid (GIG) Capstone Requirements document, conform to the DoDAF Meta-model (DM2) Physical Exchange Specification (PES) standard, comply with DISR specification, and conform to the DoD Net-Centric strategy requirements and intent.

BPM documentation.

A review of BPM literature provides similar positive results to businesses employing the relevant techniques. A review of BPM literature highlights a number of concepts and best practices we can reference.

Ko writes to formalize the definitions of BPM and Business Process Re-engineering (2009). Hung examined a number of key BPM concepts while demonstrating its affect on organizational performance (2006). Rohloff presents the implementation of BPM in a large international company (2011). This business case illustrates the main objectives and approach taken with the BPM initiative. We are shown that Rohloff approached BPM by developing a process framework that consisted of a reference process house (RPH) along with the introduction of common methods for process management across the organization. An interesting positive correlation of organizational effectiveness was observed by Gonsalves and Changchit (2007) when implementing a combination of BPM and TQM. They concluded their research with speculation that a synergistic effect is created with an integrated strategy. A review of the last four years of the *Business Process Management Journal*, a journal established to examine business process efficiency for competitive success, provided no intersection of BPM and EA, producing only one article focused on BPM best practices.

The United States government provided the *Fiscal Year 2010 National Defense Authorization Act – Business Process Reengineering*. It called on IT system developers to ensure the defense business system modernization project is in compliance with the enterprise architecture; and appropriate BPR efforts were undertaken to ensure that the business processes were made as efficient as reasonably possible, and requirements to

customize off-the-shelf software to facilitate custom interfaces were removed or minimized to the greatest extent possible (United States House of Representatives Office of the Law Revision Counsel, n.d.). This indicates an already presumed link between EA and BPM's radical change discipline called Business Process Re-engineering, though there is little documented practice in this intersecting area.

This lack of intersecting disciplines became fundamental to the problem statement. The two disciplines, EA and BPM, were then again searched independently with a qualifier for 'best practice.' This search provided additional information that indicates there are well established best practices for the separate EA and BPM disciplines. Fetters described EA best practices as related to IT and its business (2009). Recker provided guidance in the organizational use of Business Process Management Notation (BPMN) process flows (2010). Rohloff described the development of a process framework using a reference process (2011). There was also a GAO study providing a framework for assessing and improving EA success (2010).

Further search refinement of works, involving a combination of EA and BPM, provides severely limited information. This limitation seems to indicate there is not sufficient history of research in this intersecting area. This increases our confidence that the proposed area of study can provide new information to decrease the perceived gap in research regarding EA and BPM integration.

The distinctive power of the BPMM is that it integrates the best practices of a domain and other transformative practices into a model for organizational change with each stage removing a set of organizational barriers that impede true sustainable improvement (Object Management Group, 2008). The BPMM provides the overall

improvement framework and summary practices that improve the organization (2008). Using best practices, our study will focus on integrating these two disciplines, EA and BPM, for use at the USMEPCOM.

Summary

These developments of best practices in organizations directly support the research problem facing the USMEPCOM where best practices in BPM must be determined and integrated into an existing EA framework to provide non-duplication of effort. Furthermore the finding by Gonsalves and Changchit provides encouragement that integrated business strategies will provide a positive synergistic outcome.

Methodology

The problem to be solved at the USMEPCOM requires research and analysis of government and industry best practices to find the overlapping relationship between EA and BPM. The USMEPCOM could use these commonalities to identify those areas which can lead to potential cost efficiencies and quality improvements through synergy of effort. We will review the EAMMF and the BPMM as resources that describe maturity of disciplines to establish supporting traits between EA and BPM respectively. These similar areas can be correlated to determine primary areas of overlap. This overlap can then be analyzed for like work efforts/products that can support the hypothesis:

H_0: Collaboration between EA and BPM programs will enhance inter-program performance at the USMEPCOM.

H_a: Collaboration between EA and BPM programs will not enhance inter-program performance at the USMEPCOM.

In addition to the hypothesis, we identify two research questions:

1. What common work products will lead to synergy of effort?

2. Why are DoDAF and BPM desirable together?

Research Method

The intended research method to be used is a qualitative study of industry and DoD historical documents of highly regarded best practices in the fields of EA and BPM. Using select maturity standards we will analyze the criteria to attain higher maturity levels to research areas of possible synergy.

EA maturity standard.

For an EA standard we selected the United States Government Accountability Office EAMMF as a well documented maturity standard recognized by federal agencies engaging in EA work. The EAMMF defined seven stages of maturity from zero through six (where zero denotes no maturity). The EAMMF defined 59 core elements that comprise the practices, structures, activities, and conditions that provide an organization a roadmap to enable capabilities, that when used properly, can lead to attainment of higher maturity levels in EA work and superior results from EA efforts (United States Government Accountability Office, 2010).

BPM maturity standard.

For the BPM discipline we selected the Object Management Group (OMG) BPMM as a standard that could provide superior guidance to program maturity. The OMG is a well known and respected computer industry standards consortium. The BPMM defined five maturity levels from one through five (with level one denoting no maturity). The BPMM defined 30 process areas required to be separated into four groups to attain the higher maturity levels two through five.

Specific Procedures to be Employed

The architecture artifacts identified as required, at a minimum, to provide a basis for our research were the AV-1, OV-1, OV-2, Fit-for-Purpose OV-3, OV-5a, OV-5b and CV-4. These architecture specific products will be produced along with the normal research steps. A research process flow, which can be seen in Figure 16, will used throughout the project for guidance.

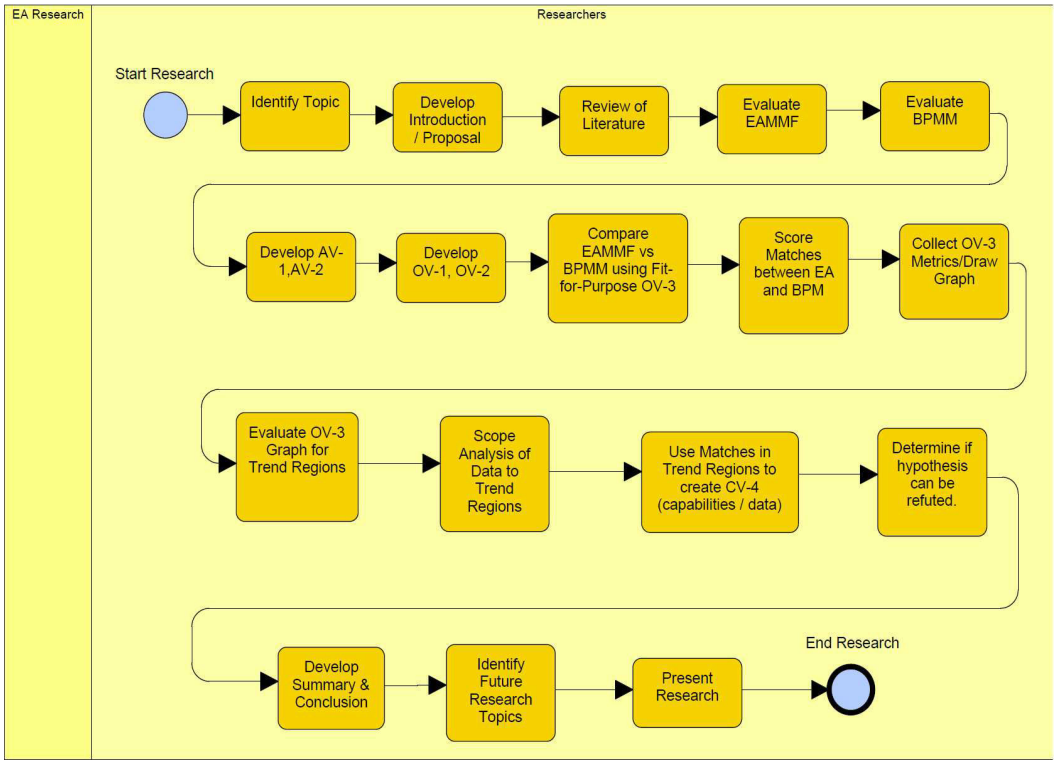

Figure 16. Research Process Flow. The research process flow depicts the individual high level steps planned to conduct this research project.

We will start documenting this research with EA tools by developing the AV-1 (see Appendix D) to provide scope and overall summary information of the project. The OV-1 will then be was then created to provide an overall, high-level description of what the architecture is supposed to convey and to round-out the executive summary of the project architecture. It includes the high-level operational graphic that depicts the overall architecture, the "As-Is" architecture and the "To-Be" architecture shown in Figure 17, Figure 18 and Figure 19 respectively. These artifacts will be created to graphically convey a roadmap of what could be achieved through collaboration of the EA and BPM programs.

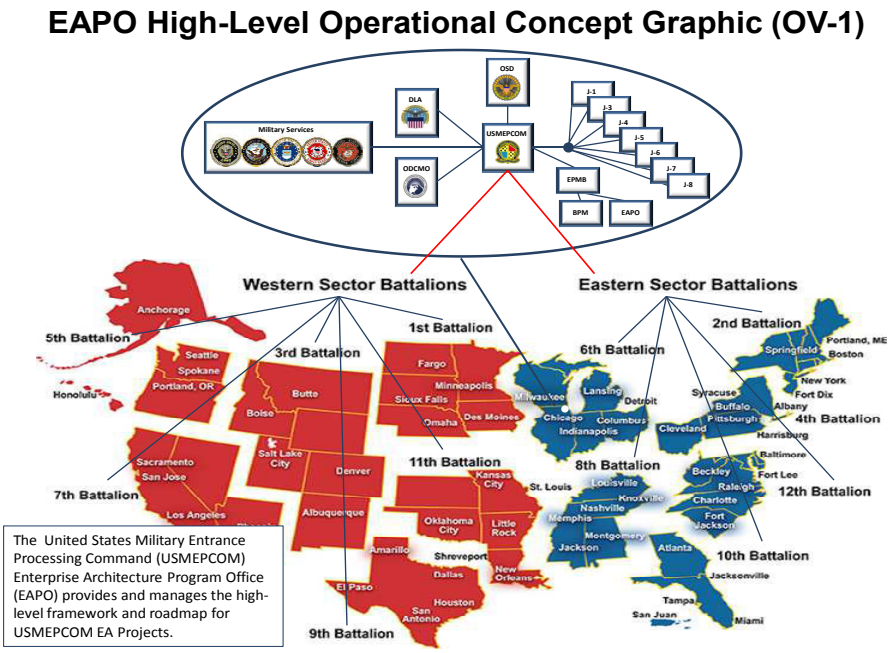

Figure 17. EAPO OV-1. The OV-1 depicts the USMEPCOM EAPO project management and communication throughout the United States.

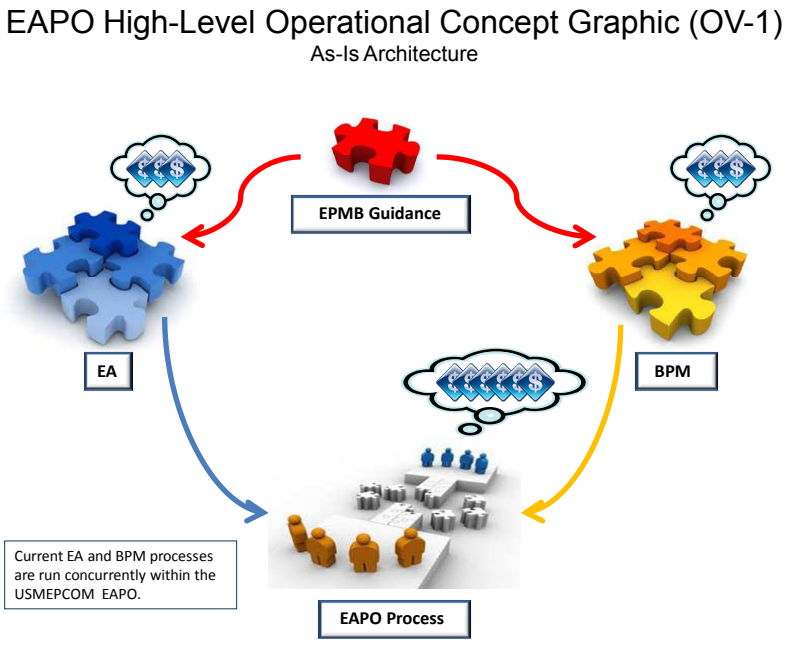

Figure 18. As-Is Architecture OV-1. The As-Is Architecture depicts the current DoDAF and BPM processes in the USMEPCOM EAPO. It highlights the separation between the DoDAF and BPM processes and the increased cost and labor time of the two programs.

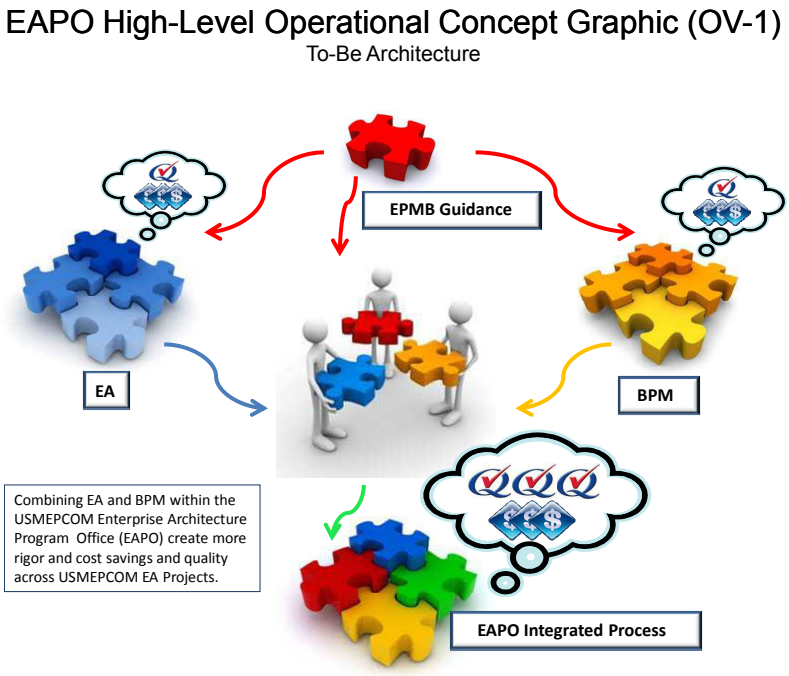

Figure 19. To-Be Architecture OV-1. The To-Be Architecture depicts the future DoDAF and BPM processes in the USMEPCOM EAPO. It highlights both the synergy and cost savings that can be achieved by combining shared parts of the two programs.

Once the OV-1 defines the use of the Architecture we will then outline USMEPCOM organizational resources and map the resource flow between identified operational activities per organization by developing an OV-2. We will create a baseline OV-2 using the USMEPCOM organizational structure which identifies stakeholders and the overall resource exchange spectrum. This baseline OV-2, shown in Figure 20, is revisited at each maturity level to specify the need to exchange or share EA and BPM information or resources at that given level.

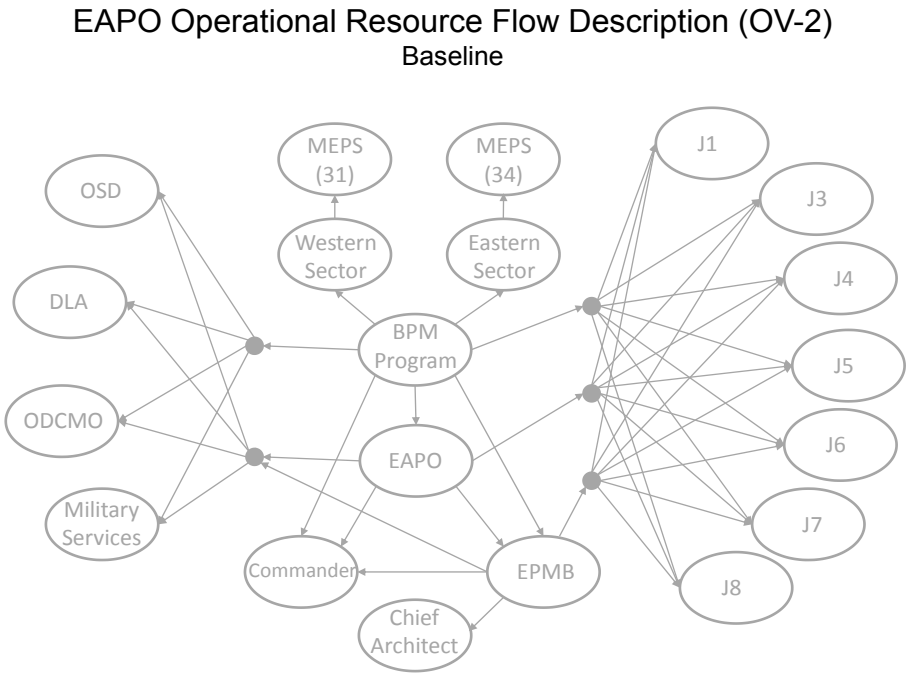

Figure 20. EAPO Baseline OV-2. The EAPO Baseline OV-2 identifies USMEPCOM stakeholders and the overall resource exchange spectrum necessary for EA and BPM.

Formats for Presenting Results

To understand and document the areas where disciplines overlap between EA and BPM, a Fit-for-Purpose OV-3 in the form of a Microsoft Excel spreadsheet, will be created that will contain the 59 core elements of EA in rows. Each BPM process area will be documented in the 30 columns in the summary sheet as shown in Figure 21.

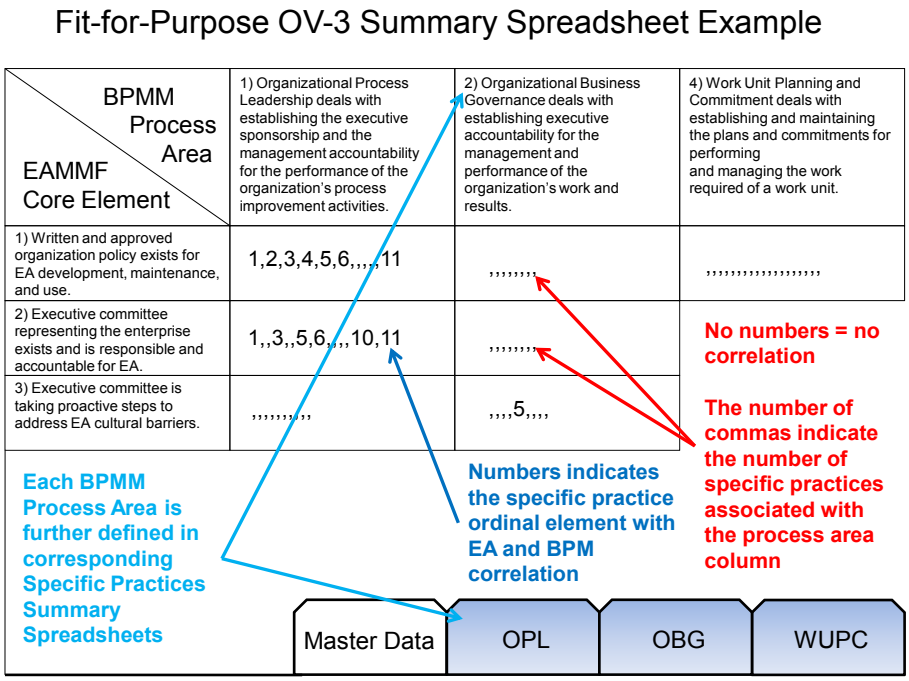

Figure 21. Fit-for-Purpose OV-3 Master Data Spreadsheet Example. This is an example showing a small set of cells that indicates correlation between EA and BPM. It also shows the separate Excel sheets related to BPM process areas.

For each BPM process area column on the master data sheet, a separate *specific practice* worksheet within the Microsoft Excel workbook will provide detailed information on that process area. Each of these sheets will contain the same rows of EA core elements with columns changed to the BPM specific practices documented for each associated process area detailed in that sheet. This can be seen illustrated in Figure 21 and again in Figure 23.

The number of specific practices varies for each BPM process area. Across all process areas the individual specific practice columns total 351; which provides 351 * 59 = 20,709 possible cells to be considered for correlation. To obtain a high level overview, a master data sheet will be created that comprises all specific practice sheet column

entries summarized into one condensed column each. This will limit the view of process areas to 30 columns total; one for each specific practice sheet (detail of a BPM process area), while still showing the 59 EA core elements (in rows). This master data view will limit the EA to BPM correlation to a matrix of 30 * 59 = 1,770 master data cells.

After examination, we determined there are 12 BPM process areas that are aligned to operational and tactical business processes. These 12 BPM process areas can be designated as out of scope for this study and could therefore be removed from consideration on this study. This can further reduce the number of cells to correlate to a reduced set of 59 * (30 - 12) = 1,062 master data cells as outlined in Figure 22.

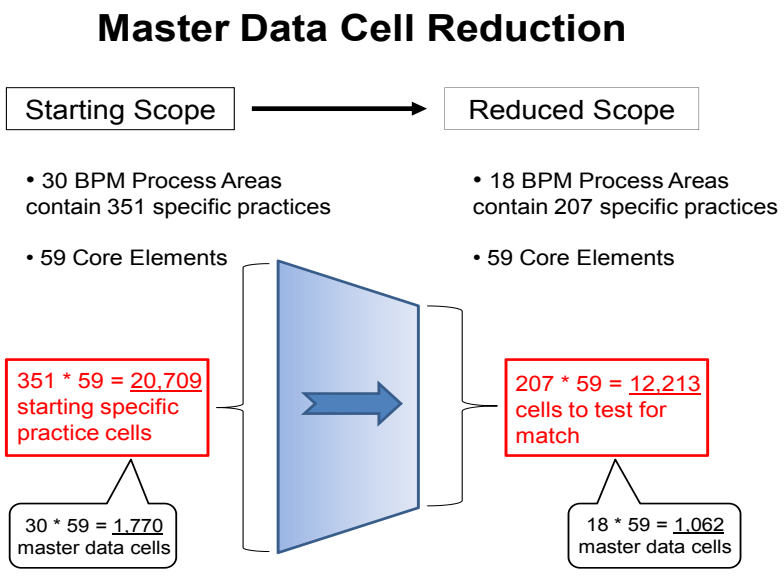

Figure 22. Master Data Cell Reduction. The master cell reduction shows a reduction of scope when determining the method of using the EAMMF and BPMM to identify matches between EA core elements and BPM process areas. This translates into a reduced number of master data cells for matching.

Each master data cell will contain a shorthand notation indicating how many of the BPM process area's (column) specific practices correlate within a given EA core element (row). This will be indicated by the affected specific practice number separated by a comma. When there is no correlation, the number will be missing with only the comma being shown as a place holder; the commas will be an indicator of how many specific practices exist in the associated process area sheet; the number of specific practices for any given process area will vary. To see the detail of any process area correlation, the process area sheet can be reviewed. This will give a view of all specific practices for the selected process area. Each cell of the specific practice that correlates to an EA core element will contain a textual description about the viability of cross program correlation. An empty cell will mean there is no perceived correlation between EA and BPM. The cells with correlation content will be the main focus of this study.

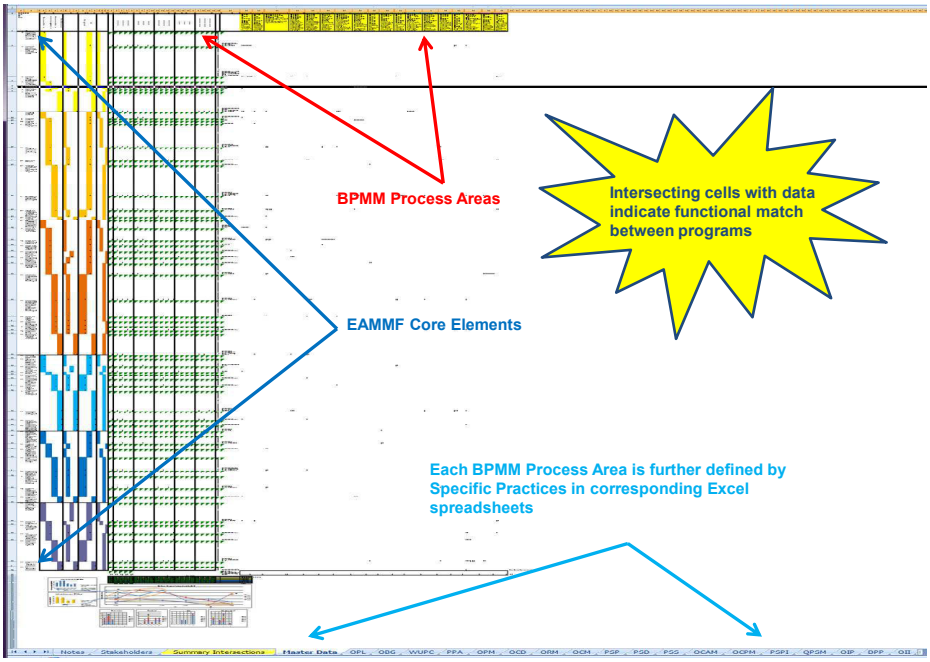

Figure 23. Fit-for-Purpose OV-3. The EA and BPM OV-3 will display the intersections where EA core elements and BPM process areas have some common information to correlate. It will contain high-level and individual process area sheets that summarize specific practice data from different viewpoints. The specific practices will be scored with a rubric contained in the *Notes* worksheet.

This Fit-for-Purpose OV-3 will show a need to communicate information from the EA program to the BPM program and vice versa. The OV-3 will allow us to gain a detailed understanding of the various related aspects between EA and BPM.

Summary

We seek to understand where EA and BPM program intersections exist to support our H_0 hypothesis which states

H_0: Collaboration between EA and BPM programs will enhance inter-program performance at the USMEPCOM.

We will use a Fit-for-Purpose OV-3 to evaluate correlation matches of these intersections. The OV-3 will allow for each EA core element to be matched to the associated BPM process areas, with each process area having further detail available for review. Each process area will have a number of specific practices that explain the detail of possibilities to correlate within that BPM process area.

Results

When initially viewing the OV-3, there was no apparent high level relationship between EA and BPM integration, indicating a need to look closer. It was upon further review and refinement of the model that summations for the number of correlated process areas grouped by BPM level were made, resulting in a Fit-for-Purpose OV-3. This was done for BPM levels two through five.

Each of the BPM level summations were associated with the correlated EA core elements separate by EA groups that define the six stages of EA maturity. This gave a plotted series of values for each of the four BPM maturity levels with the series values representing EA stages one to six. The numerical value on the y-axis indicates the number of EA core elements that correlate to the respective BPM level. This yielded four series lines of BPM levels two through five. The x-axis represented the EA maturity stage one through six. The y-axis represented the number of EA core elements correlated against BPM process areas. The plots shown on Figure 24 reflect the relationships between EA and BPM maturity.

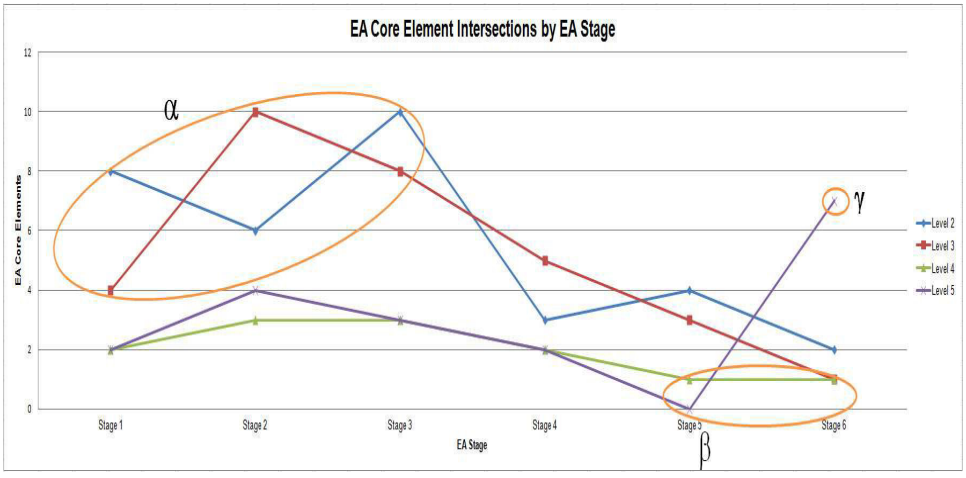

Figure 24. EA Core Element Intersections by Stage. Each plot line shows a series of points for each BPM level plotted on a graph of intersecting EA stages versus the number of intersecting respective EA core elements. Therefore a single point is the number of intersections between BPM on its associated maturity line (BPM Level) and the EA maturity stage. Areas of specific interest are identified by symbols α, β and γ.

Correlation of EA-BPM

Upon reviewing the plotlines we observed a number of trends present. Each BPM level plot line indicated a different level of BPM maturity.

BPM level two plotline.

Observation of the level two plot identified a correlation of the lowest EA stages which tapered off with a negative slope to less correlations at the highest EA stages. This plot provided an average of 5.5 correlations across all EA stages of maturity.

BPM level three plotline.

The level three plot also identified a strong correlation of the lowest EA stages. This plot also tapered off with a negative slope at the highest EA stages. This plot had an average of 4.8 correlations across all EA stages of maturity.

BPM level four plotline.

The level four plot appeared quite different from the previous two plots. This plot revealed a fairly flat level of low correlation with a low average level of 2.0 EA to BPM correlations across all EA stages of maturity.

BPM level five plotline.

This plot identified a low initial correlation with a negative slope descending to zero correlations at stage five. An interesting rise to seven correlations was noted for stage six.

Findings

Region α.

Observation of the plots in region α seemed to indicate an initial strong correlation between EA and BPM at the lower maturity levels. This was characterized by a region of points enclosed with an ellipse labeled α on Figure 22. This seemed to indicate many similar needs for EA and BPM programs at low program maturity which would be common at program initiation. As these programs are stood-up it seemed logical that there are similar needs in establishing similar infrastructure elements.

Region β.

An additional region of interest was indicated by an ellipse surrounding four points between stages five and six labeled as β on Figure 22. This region was noted as not necessarily unimportant because of low correlation, but more so an area of less inter-program synergy. This region displays synergy of improving efficiency and effectiveness, integration of products across the organization, continuous improvement of products, as well as assurance that EA-BPM products are properly aligned to LRP and these LRP driven products properly constrain the business. While region β had important properties for program maturity, it provided minimal benefit of inter-program synergy for this study.

Region γ.

The last region of interest was indicated by the ellipse and symbol γ as annotated on Figure 22. This region exhibits a marked rise at the highest stage and level of EA-BPM program maturity correlation. Further review indicated these correlations contain the following characteristics:

- tools and methods are continuously improved
- management processes are continuously improved
- develops and maintains improvement plans that are quantitatively measured against the strategic plan
- governing external organizations are solicited for guidance to ensure higher-level improvements are included
- develops, maintains and measures improvement plans against the strategic plan
- governance defines a direction for strategic planning to use in defining specific improvement goals and identifies candidates for improvement
- lessons learned are incorporated as a part of continuous improvement activities

The BPM level five plot was interesting with its negative slope to zero correlation at EA stage five. However, at the highest level of stage six there was a high correlation at the highest EA maturity stage six. Upon review of the characteristics from region γ, this could be explained by the fact that at high maturity any process should be measuring its performance, reviewing this performance and using this information for self-improvement. This is what occurred in region γ.

Resource landscapes of maturity levels.

The OV-2 was intended to track the need for resource flows between specific operational activities and stakeholders within an organization. The OV-2 was used to show level of stakeholder involvement for a given process area per maturity level as shown in Figure 25, Figure 26, Figure 27 and Figure 28. It provided an azimuth check for the OV-3 findings.

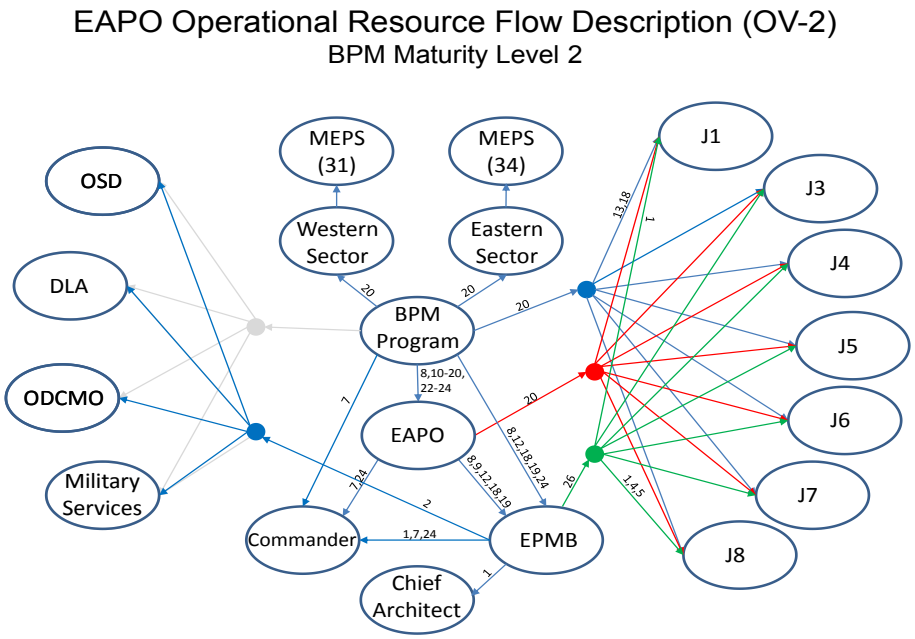

Figure 25. EAPO BPM Maturity Level Two OV-2. This diagram identified the stakeholders and the NLs that indicate a need to exchange information or share resources at BPM Maturity Level Two. The NLs correspond directly to the process areas in the OV3, OV-5a and OV-5b. Dissemination points and colors were used to provide clarity.

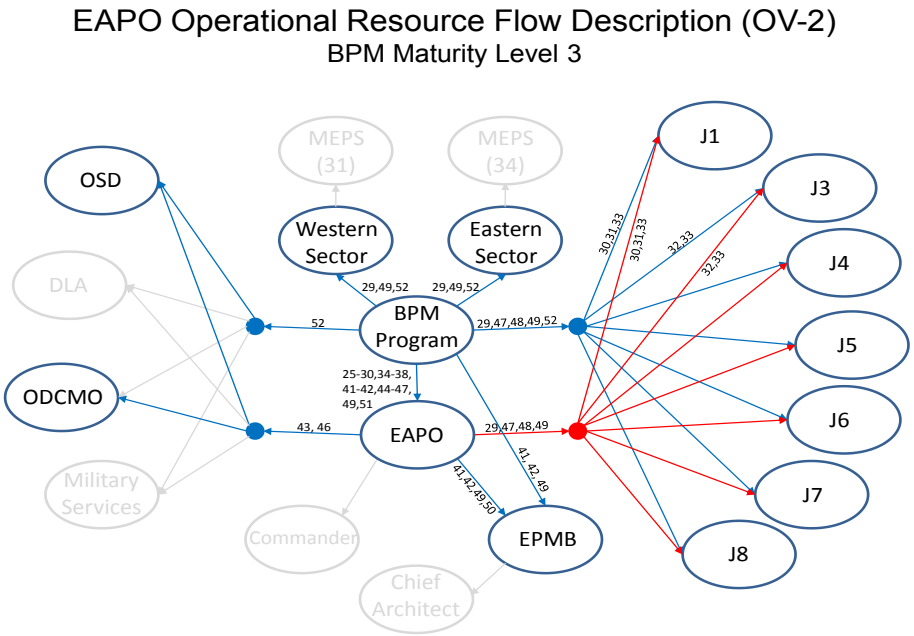

Figure 26. EAPO BPM Maturity Level Three OV-2. This diagram identified the stakeholders and the NLs that indicate a need to exchange information or share resources at BPM Maturity Level Three.

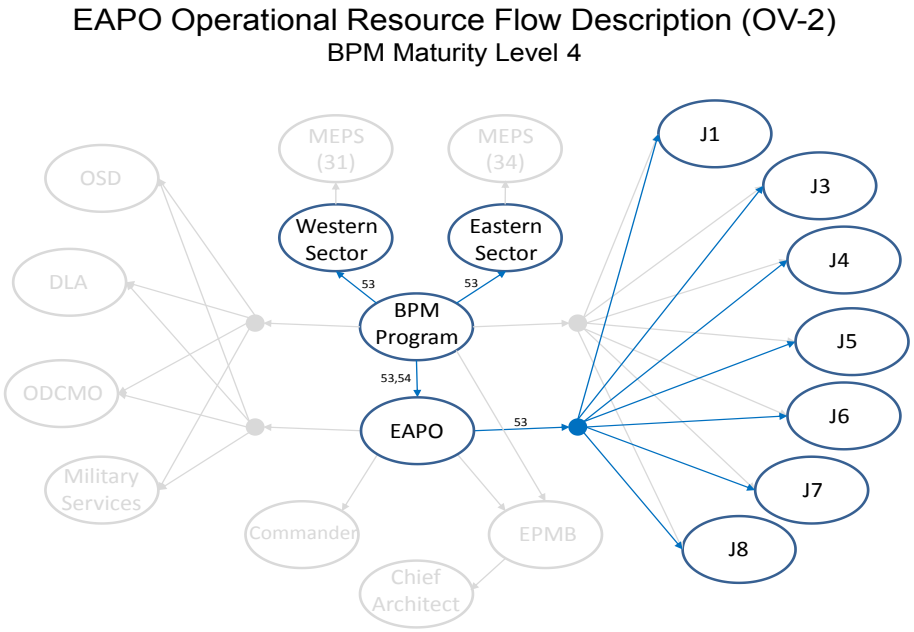

Figure 27. EAPO BPM Maturity Level Four OV-2. This diagram identified the stakeholders and the NLs that indicate a need to exchange information or share resources at BPM Maturity Level Four.

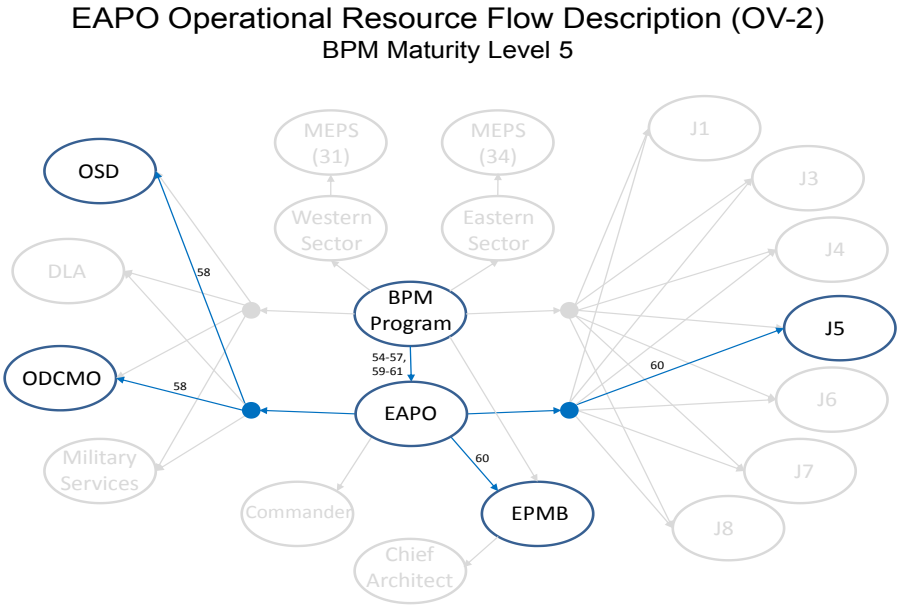

Figure 28. EAPO BPM Maturity Level Five OV-2. This diagram identified the stakeholders and the NLs that indicate a need to exchange information or share resources at BPM Maturity Level Five.

The stakeholder landscape changed dramatically between the different levels of BPM maturity. As the maturity level increased, involvement across the landscape decreased. This supports the OV-3 findings as plotted for programs in their infancy – newly established programs will have similar needs in establishing infrastructure elements. So too, as programs mature, their need for governing activities subsides into sustaining activities, eventually evolving into higher order pursuits, such as innovative

continuous improvement. Review and mapping of the process areas to the stakeholders by maturity level further substantiated this overall trend.

Having been mapped to the BPM process areas in the OV-3, the key players in the OV-2 were then mapped to the interactions necessary to conduct the corresponding operational activities within the OV-5a and OV-5b. Positive mapping to both the OV-3 and the OV-5 suite provided further evidence of the heftiness of correlation at the lower maturity levels.

Hierarchy of operational activities.

The Fit-for-Purpose OV-3 was used to correlate the EA inputs to the BPM process areas. These correlated EA core elements and BPM process areas were represented in a hierarchical OV-5a as shown in Figure 29. The OV-5a provided the context of the study by outlining the EPMB, EAPO, and the BPM Program operational activities and emphasizing the focus of this research effort. The same correlated EA core elements and BPM process areas were then elaborated in a number of detailed OV-5b diagrams.

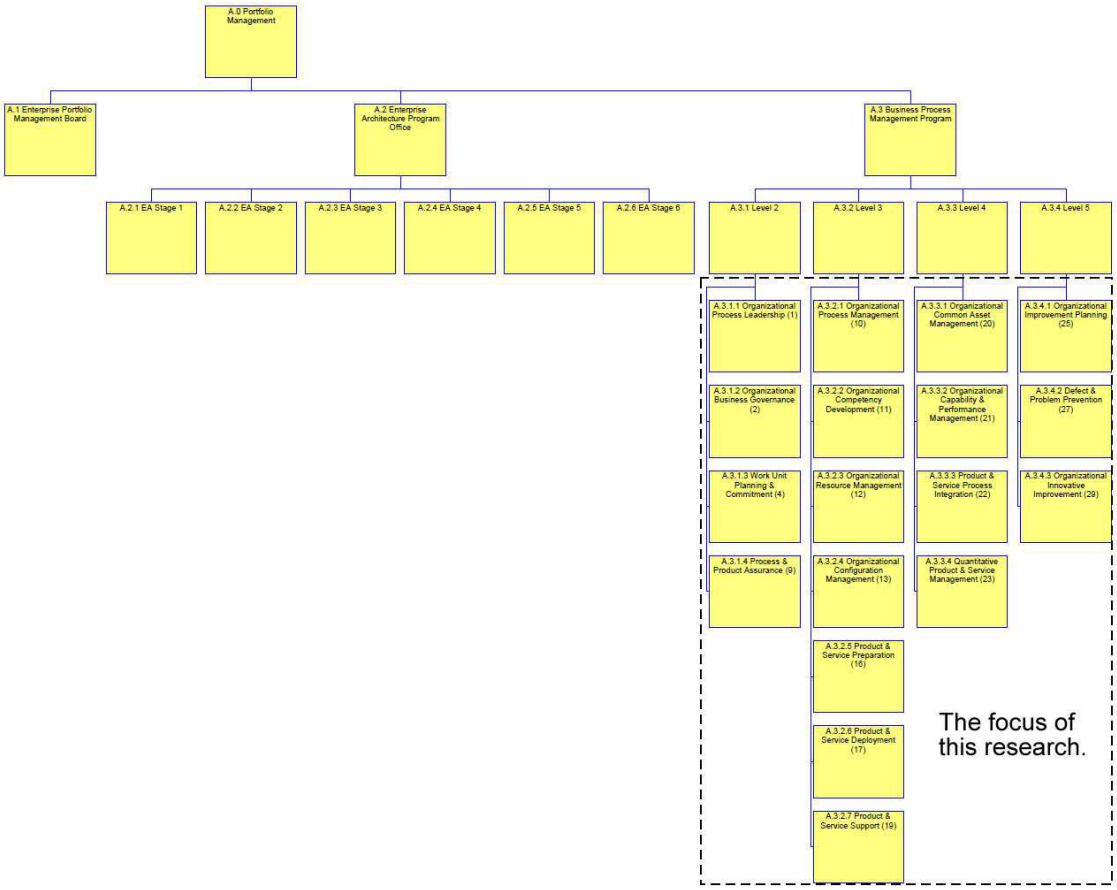

Figure 29. The Portfolio Management Node Tree. This is the node tree that comprises EPMB, EAPO, and the BPM Program. The bounded area indicates the focus of this research effort on the BPM activities under maturity levels two, three, four, and five.

The highest level OV-5b is the *context diagram*. The context diagram, depicted in Figure 30, defined the highest level of elements considered under this study.

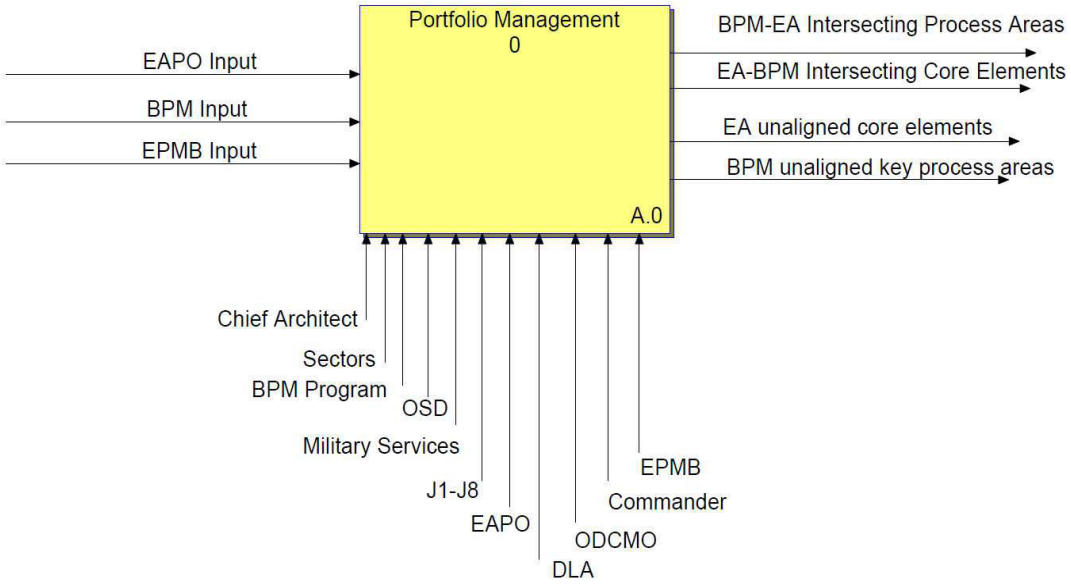

Figure 30. The context diagram. This is the high level OV-5b that gives context to all other diagrams that are further decomposed from it.

The next level of decomposition of the OV-5b, seen in Figure 31, depicted the Enterprise Portfolio Management Board (EPMB), the EAPO, and the BPM Program as defined in the OV-5a. This study concentrated on the correlation of EA core element inputs to the BPM process areas. Since the EA and BPM intersections indicated in the OV-3 become duplicative as both EA and BPM intersect with each other, a viewpoint from the BPM program perspective was studied in this research.

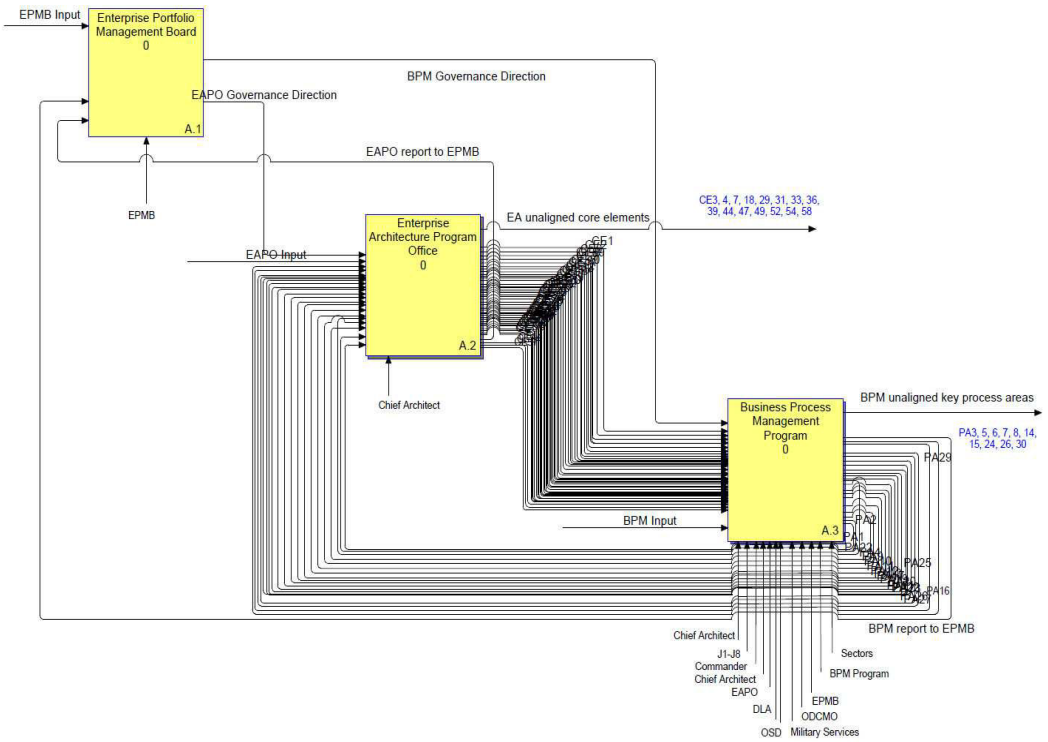

Figure 31. EPMB, EAPO, and BPM Program. The OV-5b A.1-A.3 diagram shows three operational activities. This research is concerned with the integration of the Enterprise Architecture Program (A.2) and the Business Process Management Program (A.3). The Enterprise Portfolio Management Board is a proposed management governance structure that can provide governance for both programs.

Upon reviewing the EA Core Element Intersections by EA Stage (Figure 24), we investigated the region α correlations at low maturity for both BPM and EA programs. The lowest BPM maturity plot lines for BPM level two and level three are observed to correlate to EA stage one, stage two and stage three. Since there is an existing EA program we will analyze the correlation from the BPM process areas point of view to identify any value it can share with EA. This is supported by further decomposing the BPM Program in the OV-5b A.3 diagram in Figure 32.

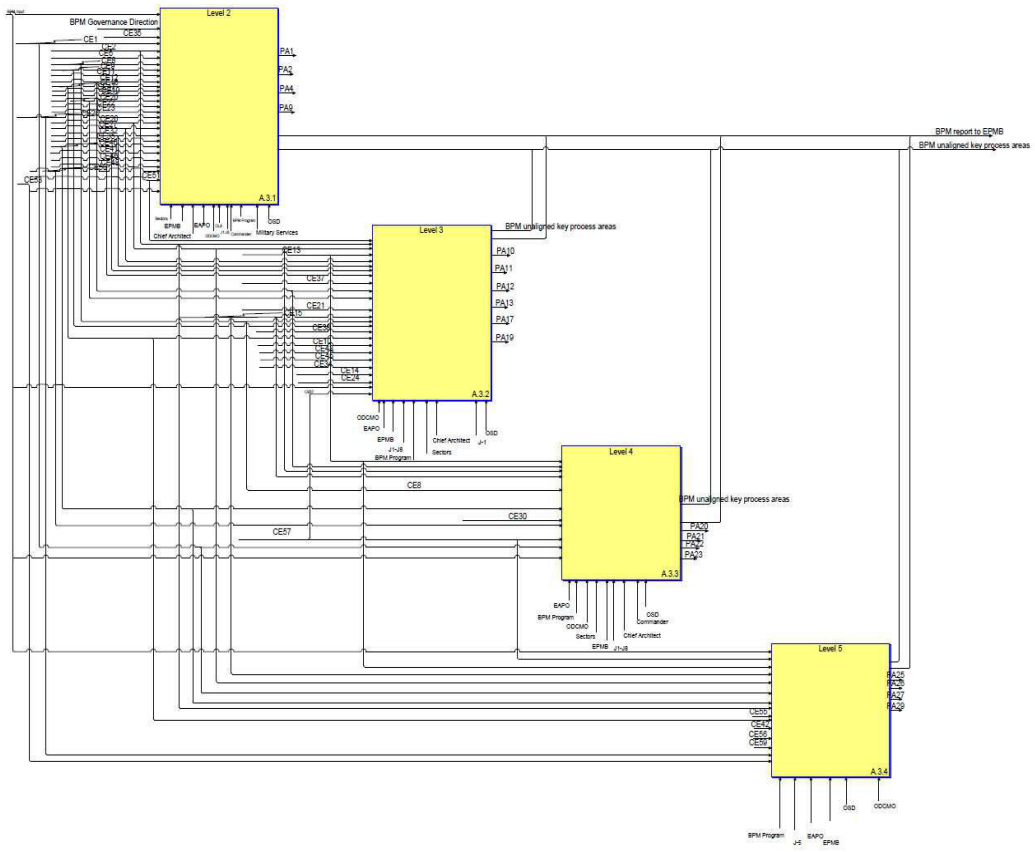

Figure 32. The OV-5b A.3 diagram. The BPM OV-5b shows the four stages of BPM maturity with inputs at the right of each activity coming from the EA program as core elements. The outputs are the process areas that are correlated to the EA program.

Levels two and three.

Each stage of BPM maturity can be decomposed for clarity as shown in Figure 33, Figure 34, Figure 35 and Figure 36. This granularity provides greater insight into the exact correlations between EA program core elements and BPM process areas. The BPM process areas identified for level two and level three include:

- Organizational Process Leadership
- Organizational Business Governance

- Work Unit Planning Commitment
- Process and Product Assurance
- Organizational Process Management
- Organizational Competence Development
- Organizational Resource Management
- Organizational Configuration Management
- Product and Service Preparation
- Product and Service Deployment
- Product and Service Support

These process areas are shown to have 46 correlations with EA core elements from stage one, two, and three as annotated in the EA Core Element Intersections by EA Stage Figure 24, region α. These intersections include aspects of governance (27), content (11), use (one), and measurement (seven) followed by the count of related points.

These points represent the needs to exchange information between EA and BPM programs as defined in the EAMMF and BPMM. This region's majority of correlations show that governance is the most significant amount of correlation at the lowest maturity levels. This substantiates the findings of the OV-2 and the Fit-for -Purpose OV-3 for the lowest maturity levels.

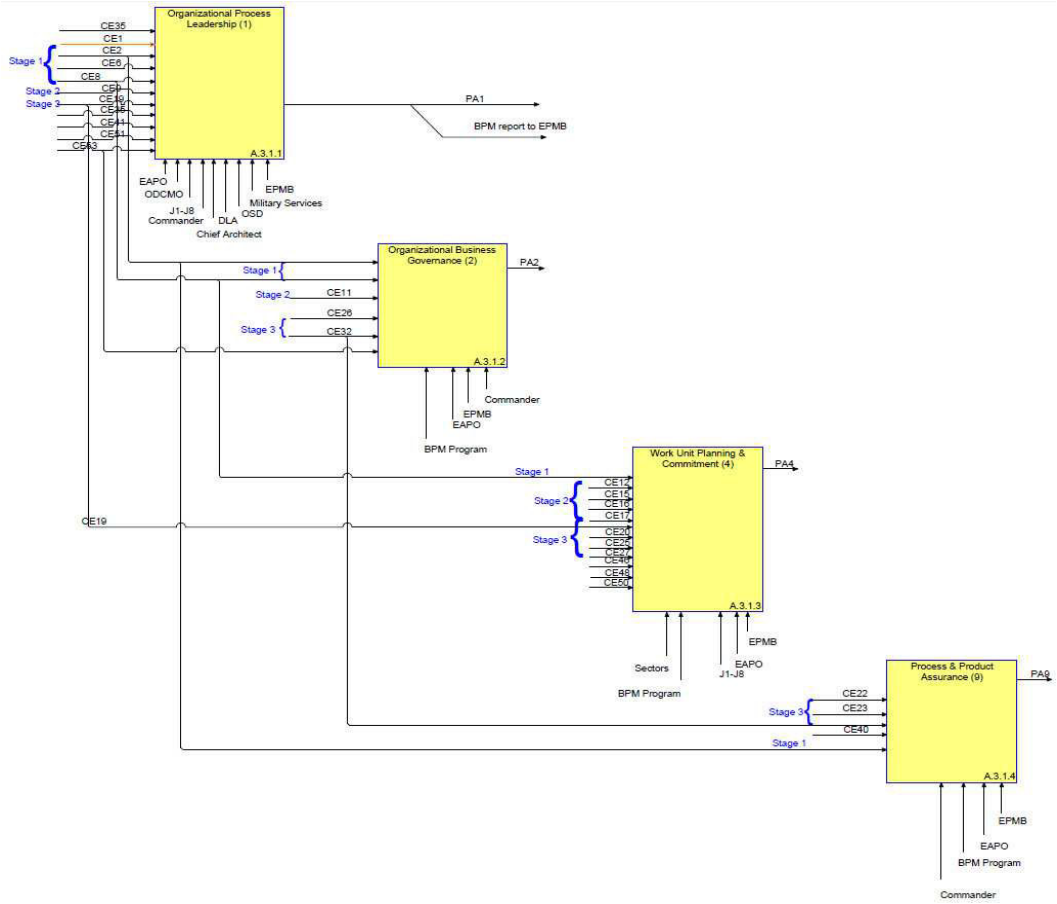

Figure 33. A.3.1 BPM Level Two Activity Diagram. The A.3.1 Level Two Activity Diagram shows the EA core element inputs for each of the Level Two BPM core processes.

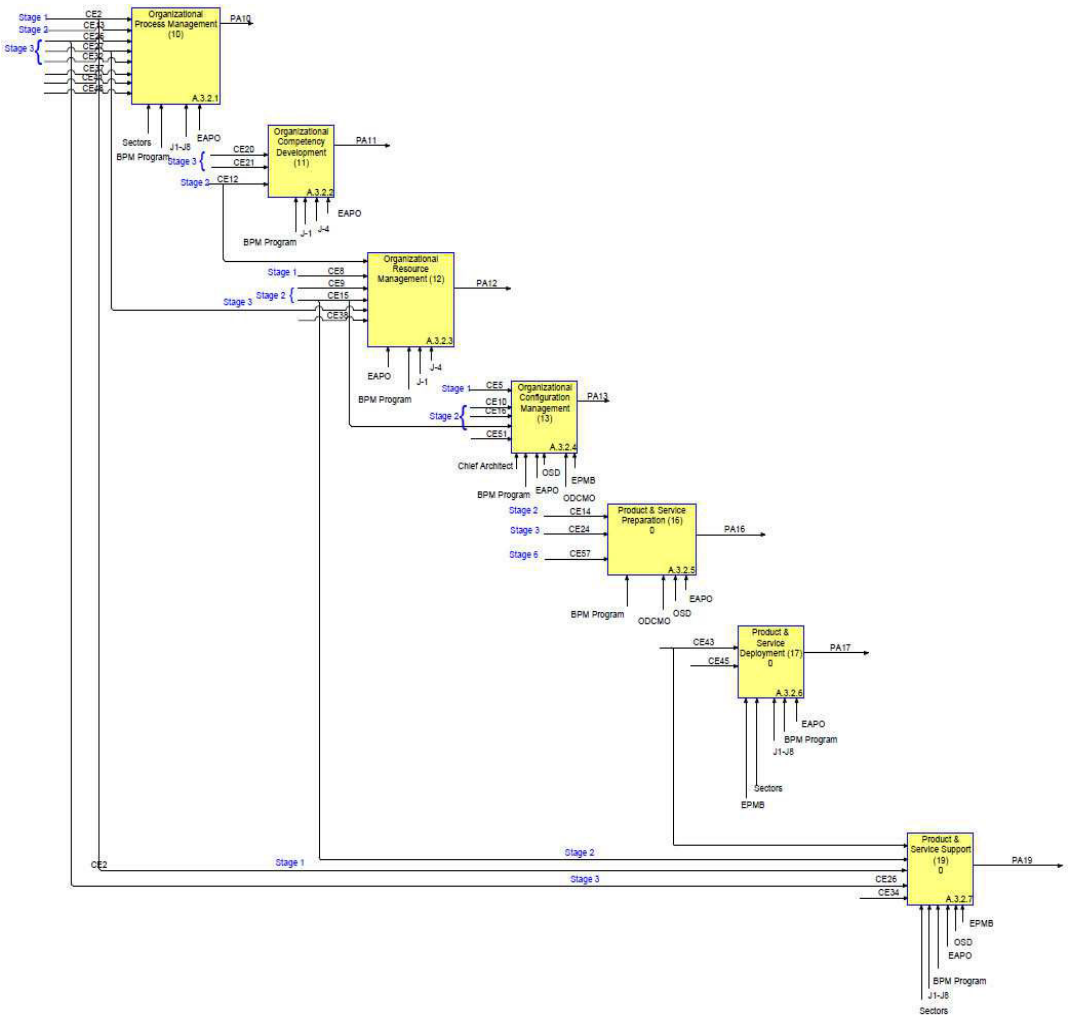

Figure 34. A.3.2 BPM Level Three Activity Diagram. The A.3.2 Level Three Activity Diagram shows the EA core element inputs for each of the Level Three BPM core processes.

Level four.

The level four correlations between EA and BPM were significantly smaller in number than the other two regions of interest as annotated in the EA Core Element Intersections by EA Stage of Figure 24, region β; note the smaller number of inputs

entering the left side of each activity box in Figure 35. This level will not be analyzed due to greater areas of interest for this study.

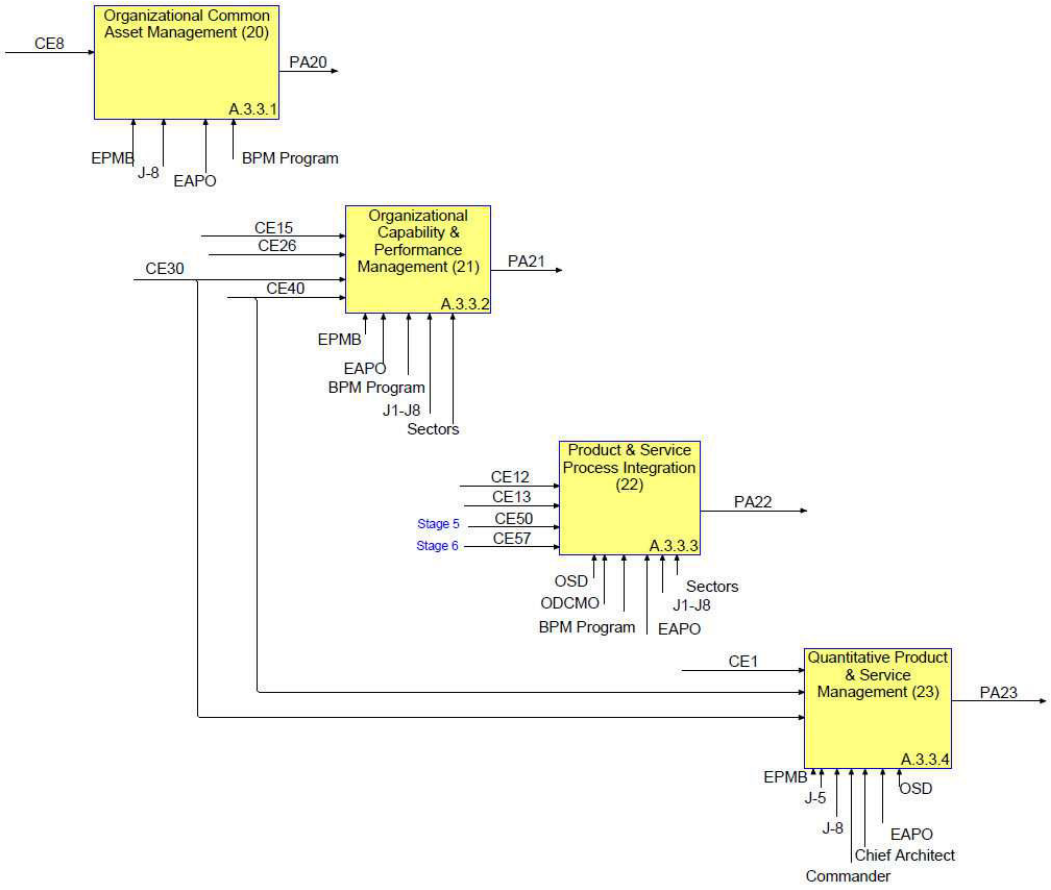

Figure 35. A.3.3 BPM Level Four Activity Diagram. The A.3.3 Level Four Activity Diagram shows the EA core element inputs for each of the Level Four BPM core processes.

Level five.

Region γ, as annotated in the EA Core Element Intersections by EA Stage Figure 24, shows a large increase at the highest maturity level intersection of level five and stage six. The BPM process areas for this region, shown in Figure 36, include: Organizational

Improvement Planning, Defect and Problem Prevention, and Organizational Innovative Improvement.

These process areas all show a need to improve the organization, reduce defects, and improve innovation. These are classic organizational improvement initiatives that strive to improve the organization after an initial operational maturity is established and maintained.

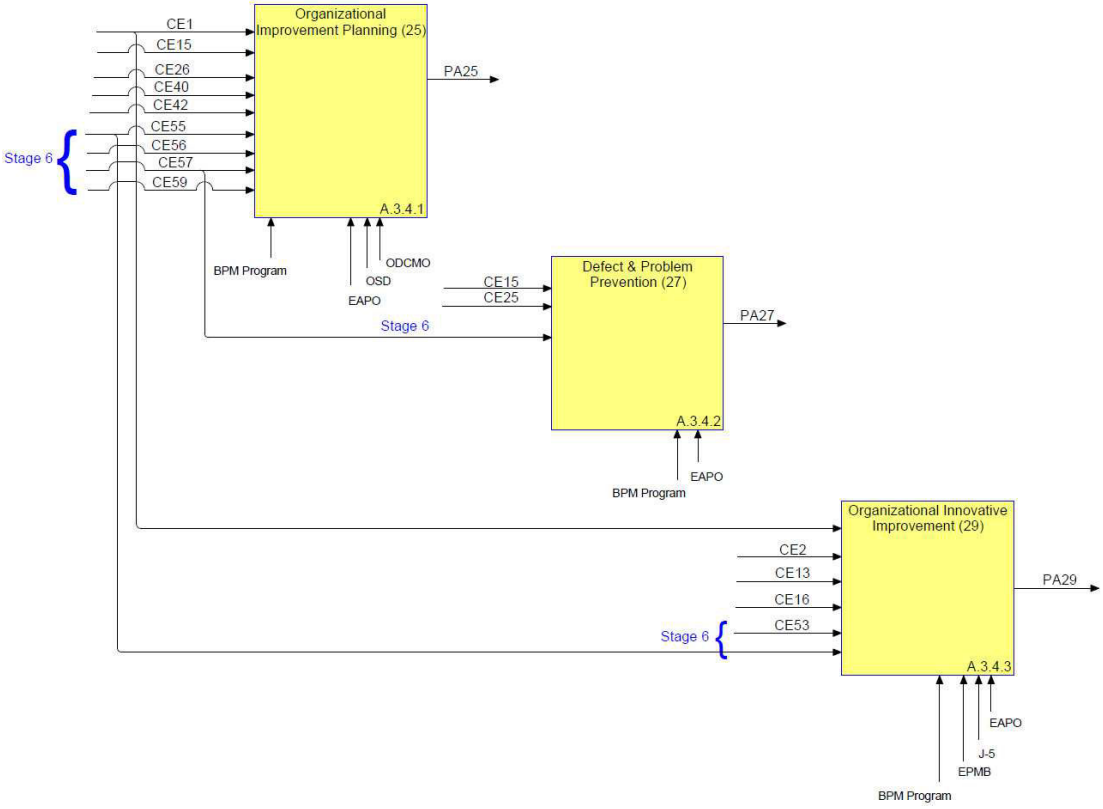

Figure 36. A.3.4 BPM Level Five Activity Diagram. The A.3.4 Level Five Activity Diagram shows the EA core element inputs for each of the Level Five BPM core processes.

Work Products.

With the completion of the OV-2, OV-3, OV-5a, and OV-5b we created a summary of findings in the fit-for-purpose OV-3 called *Summary Intersections*. These intersections are those defined in the previously discussed regions α, β, and γ. Through careful analysis of our data we discovered that the CV-4 Capability Dependency is an appropriate instrument to represent the Summary Intersections data. We were able to use the Fit-for-Purpose CV-4 to align the intersecting needs to collaborate between EA and BPM as capabilities within the context of the diagram. This then allowed the identification of collaborative synergy and highlighted dependencies between capabilities. By adding data to the capabilities that illustrate what type of data or tangible work product would be reasonable to generate or consume as the outcome of the associated capability we were able to align capabilities to work products.

The common work products are the data items that are identified in the Fit-for Purpose CV-4. A CV-4 was created for region α and region γ as annotated in the EA Core Element Intersections by EA Stage of Figure 24; note that region β has already been deemed of lower interest in this study and will not be further pursued.

Common work products for region α.

Due to the size and complexity of the Region α Fit-for-Purpose CV-4, it can be viewed in its entirety in Appendix G. This CV-4 specifically aligns capabilities to work products for region α. The work products may be not be directly associated with all capabilities, but instead be related through other capabilities in a hierarchy relationship to relevant work products. The Region α Fit-for-Purpose CV-4 outlines what capability

dependencies exist at the lowest maturity levels of EA and BPM to attain a synergy of common work products.

Common work products for region γ.

The Region γ Fit-for-Purpose CV-4 can be viewed in Figure 37. This CV-4 specifically aligns capabilities identified in region γ to work products. As in region α, the work products may be not be directly associated with all capabilities, but instead be related through other capabilities in a hierarchy relationship to relevant work products. The Region γ Fit-for-Purpose CV-4, seen in Figure 37, outlines what capability dependencies exist at the highest maturity levels of EA and BPM to attain a synergy of common work products.

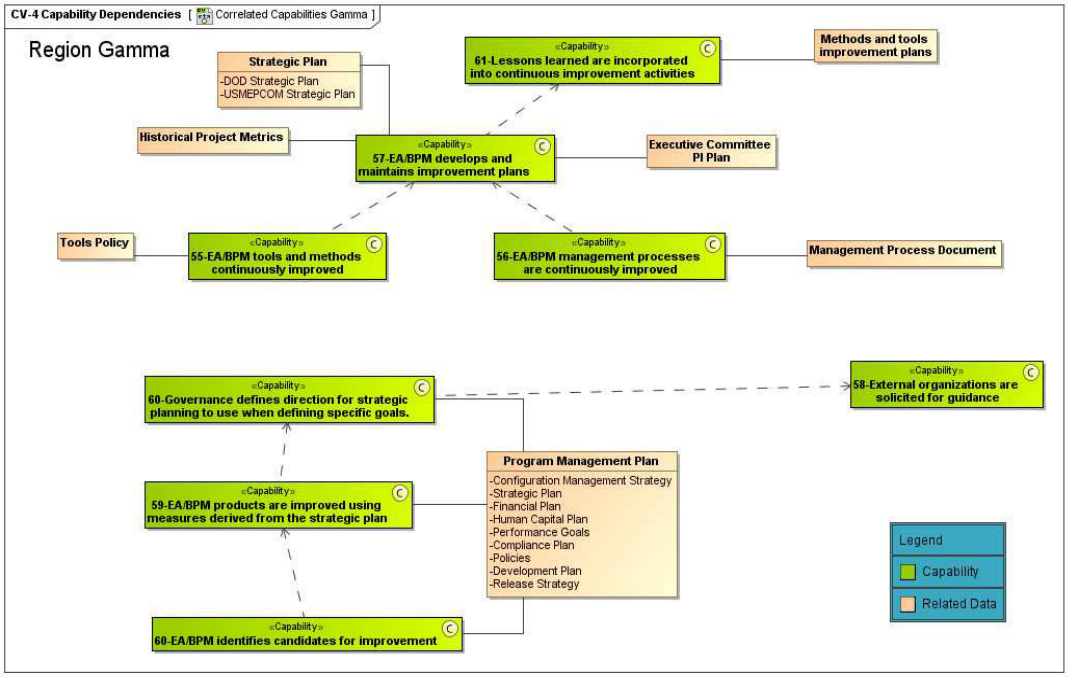

Figure 37. Region γ Fit-for-Purpose CV-4. This CV-4 shows what capability dependencies exist at the highest maturity of EA and BPM to attain a synergy of common

work products.

Aspects of quality.

USMEPCOM is sponsoring this research to identify solutions for the thesis to address the need to evaluate, correlate, and apply the best practices in the EA and BPM disciplines to enhance the efficiency and effectiveness of program implementation over the next three to five years.

A major facet of applying best practices to enhance efficiency and effectiveness for the USMEPCOM is a well known tenant of the Total Quality Management – customer satisfaction (Goetsch & Davis, 2010, p. 5). Identifying solutions for the problem of establishing an integrated program of BPM and EA at USMEPCOM is a solution to the sponsor's satisfaction.

Aside from customer satisfaction, the identification of common work products through the Fit-for-Purpose CV-4, provides evidence that duplicate work products can be avoided, thereby reducing waste and over-all program costs. The correlation between BPM core elements and EA process areas pinpoints which program areas have a high-level of similarity. Minimizing documentation, redundancy and waste; leveraging limited or valuable skill-set pools and reducing stove-pipes between or among programs in these specific areas can lead to improved USMEPCOM business operating environment.

Summary of Results

By engaging in this research we were able to correlate common aspects of EA and BPM functionalities as described by recognized industry standard maturity models for the EA and BPM disciplines.

Region α summary.

Region α, as annotated in the EA Core Element Intersections by EA Stage of Figure 24, contains the low maturity correlations between EA stages one, two and three along with BPM levels one and two. These are the capabilities a program manager would be required to exercise when standing up combined EA and BPM programs in an organization (see Appendix G). At this lowest maturity level intersection, region α requires the following work products to attain synergy in this maturity region:

- Activity Description
- Budget
- Configuration Management Audit
- Compensation Plan
- EA Repository
- EA Sequence Plan
- EA/BPM Conformance Audit
- Executive Business Activities Report
- Executive Committee Process Improvement Plan
- Historical Project Metrics
- OV-5a
- Portfolio Management Charter
- Process improvement work unit report

- Program Charter
- Program Management Plan
- Project Management Plan
- Resource Allocation Log
- Strategic Plan
- Training Plan

Region γ summary.

Due to the nature of region γ being an intersection of the highest maturity levels, it further refines capabilities initiated in region α. Region γ, as annotated in the EA Core Element Intersections by EA Stage of Figure 24, exhibits high level capabilities that correspond to the high level of maturity it addresses. From the Region γ Fit-for-Purpose CV-4, it was determined the following work products are needed to succeed at synergy in this region's high maturity:

- Strategic plan
- Executive Committee process improvement plan
- Program management plan
- Historical project metrics
- Methods and tools improvement plans
- Tools policies
- Management process

These synergistic work products were found to be required to be present to execute a combined EA and BPM business at the highest maturity level. These products will not ensure maturity, but they will allow for that highest level to be attained when used as expected in the EAMMF and BPMM.

Conclusions

This study sought to enhance USMEPCOM inter-program performance through collaboration between the existing EA and BPM programs. The EA and BPM programs were very similar in nature with many common process areas and work products at varying levels of maturity. However each program was mandated by DoD to execute their full discipline and rigor, and could not simply be merged. Thus, areas of synergy that could be leveraged to assist the Command in improving its business process understanding and reduce overall costs was identified using correlation between EA EAMMF and BPMM standards.

Currently, the DoD Strategic Management Plan calls for a need to reduce stovepipes, which requires reengineered business processes to allow for cross-functional processes that can gain form a synergy of cross-functional efforts (Department of Defense, 2012, p. 10). USMEPCOM is researching ways to reduce expenditures given such DoD directives. This study pinpoints where the EA and BPM programs can be integrated to maximize cost savings.

Both government and industry maturity standards documents were analyzed for correlation between the EA EAMMF and BPM BPMM standards. The qualitative analysis reviewed 59 EA core elements and 30 BPM process areas in multiple EA viewpoints. EA viewpoints were used as a tool to support documentation and analysis of this study.

The correlations were documented in intersecting Fit-for-Purpose OV-3 spreadsheet cells with metrics and graphs created to understand the information. A

subset of 43 core elements and 18 process areas were found to correlate in 94 intersecting *Master Data* cells - high-level summary of which can be seen in Figure 38.

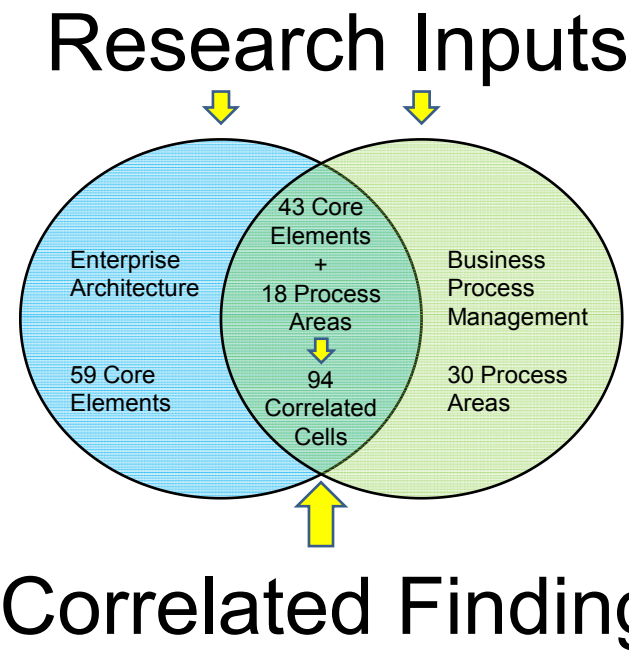

Figure 38. High-Level Summary of Findings. This graphic represents the high-level summary of the correlated findings between EA core elements and BPM process areas.

This subset of 18 process areas further breaks down to 207 specific practice cells. This is a result of reviewing 12,213 specific practice cells as highlighted in Figure 39.

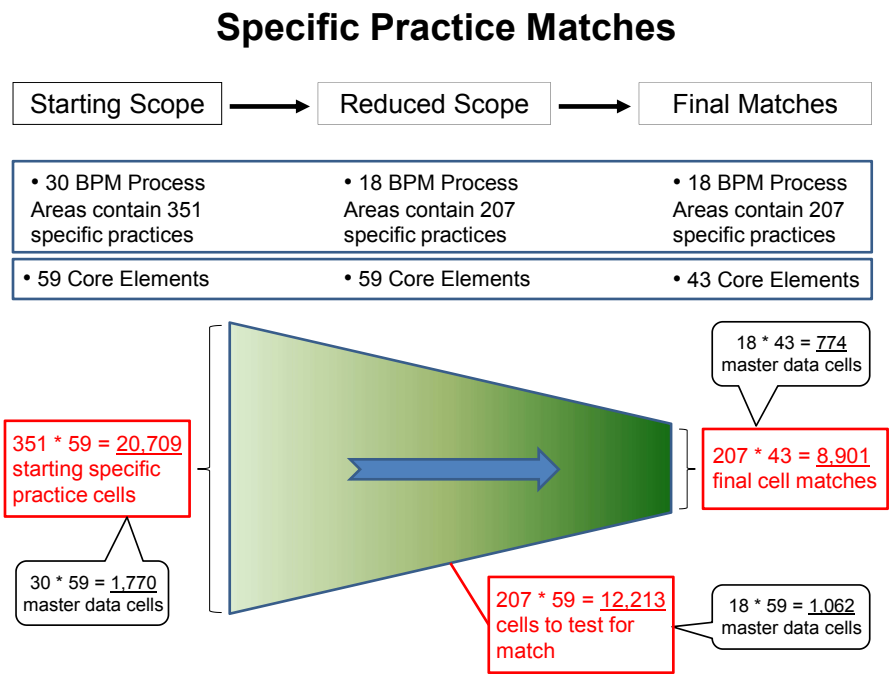

Figure 39. Reduced Specific Practices. The reduced scope specific practices of BPM times the number of scored EA core elements gives scope of the resultant data for this study.

Analysis of the EA artifacts identified two regions of interest and an additional noteworthy region. Summary data was created in the Summary Intersections worksheet within the Fit-for-Purpose OV-3 that details the correlated cells in the α and γ regions of interest. The AV-1, AV-2, OV-2, OV-5a, and OV-4 EA artifacts were developed to confirm the correlation data and assist in mapping the maturity level landscapes. A Fit-for-Purpose CV-4 was then created for the two areas of interest to identify what capability dependencies existed at the each maturity levels of EA and BPM to attain a synergy of common work products.

Research Questions

The Fit-for-Purpose OV-3 supported creation of an additional summary viewpoint that can be analyzed to answer the research questions. The OV-2, OV-5a and OV-5b provides artifacts that support confirmation of the OV-3 summary intersection data and the further derived Fit-for-Purpose CV-4 viewpoint.

What common work products will lead to synergy of effort?

The Fit-for-Purpose CV-4 provides a map of the intersections between EA and BPM represented as capabilities with dependency lines shown creating a web of dependent capabilities. This CV-4 gave us the answer to the first research question.

The associated data in the Fit-for-Purpose CV-4.

The CV-4 was created as *fit-for-purpose* to include data associated with capabilities. The Fit-for-Purpose CV-4 specifically aligns capabilities identified in a specified region to work products. This, in essence, mapped the associated data to work products, which was analyzed for commonality.

Why are DoDAF and BPM desirable together?

We used the Fit-for-Purpose CV-4 to visually observe each capability that can be shared between EA and BPM to gain a synergy of effort. We conclude that it is desirable to have EA and BPM programs complement each other for the following reasoning.

Reduction of documentation, redundancy and waste.

Collaboration between the EA and BPM programs provides increased opportunities to leverage common processes and, thereby reducing costs through redundant practices. Valuable skill-set pools and limited Human Resources could be leveraged for both programs simultaneously. Duplicate work activities could be avoided.

Single-source associated data could be shared with confidence of authority, eliminating redundant, non-authoritative documentation. This leads to additional cost savings by only producing one, definitive work product where appropriate.

Improved business operating environment.

Collaboration of the EA and BPM programs will increase the EAPO, and subsequently, the EA and BPM, efficiency and effectiveness. By reducing stovepipes and promoting synergy among cross-functional efforts USMEPCOM can improve service. This speaks directly to the intent of the DoD Strategic Management Plan and is a priority of USMEPCOM.

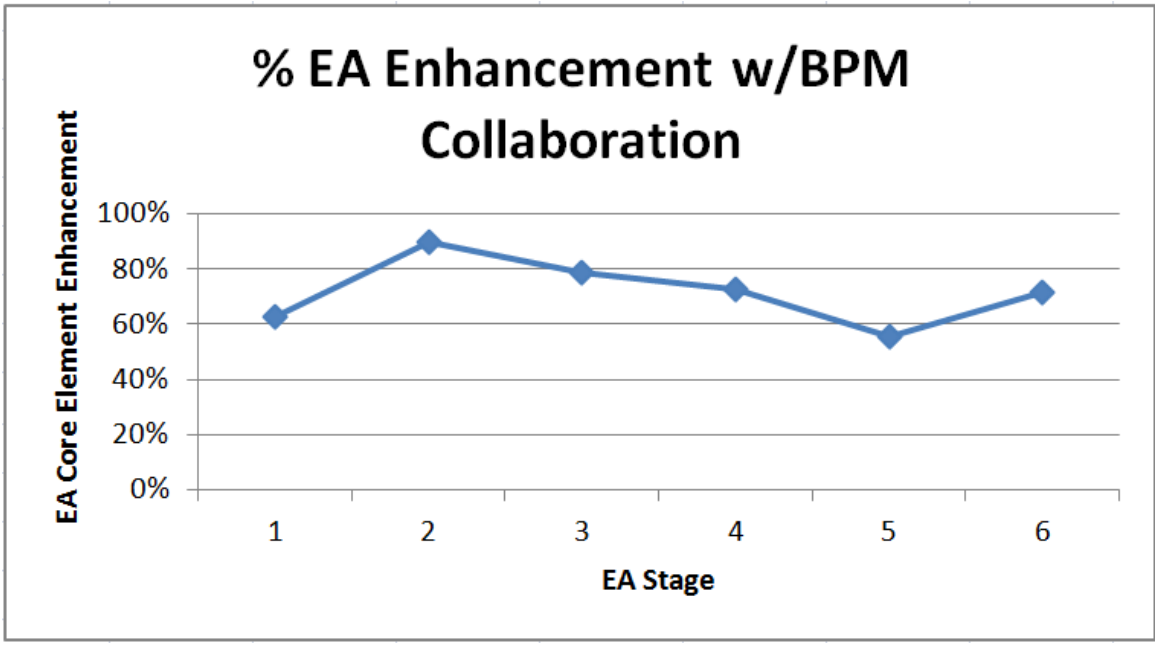

Figure 40. EA Enhancement with BPM Collaboration. The EA program can be shown as enhanced with BPM collaboration based on the percent of EA core element intersections by stage.

Review of Figure 40 indicated a nearly linear relationship across all EA stages where EA is enhanced by collaboration with BPM process areas. A peak at stage two

additionally supported the greatest enhancement by percent of EA core elements for the lower maturity attainment when establishing a program. This is yet another way of stating the economic gain to the business by realizing enhancement to EA through BPM collaboration.

Quality.

An important part of improving the business operating environment is quality. Kaoru Ishikawa stated "To practice quality control is to develop, design, produce and service a quality product which is most economical, most useful, and always satisfactory to the consumer (Ishikawa, 1981/1985, p. 44). We are confident that the USMEPCOM Command business needs will be satisfied by a synergy of effort between EA and BPM. This synergy will affect the people and processes in the Command to drive down cost and improve quality, further aligning to Ishikawa's definition.

This definition aligns with perceived outcomes of synergy between EA and BPM. An attempt was made to align the key elements of TQM with the mutual capabilities found between EA and BPM. This alignment is further proof there is a decidedly positive gain to be had by alignment and synergy of the correlated areas that define capabilities in the Fit-for-Purpose CV-4 (see Appendix H).

Implications for Further Research

This study suggests several avenues for further research. There is a potential cost savings for Federal Agencies with multiple programs supported by documented maturity standards. Provided a Federal Agency had documented maturity levels, they could benefit from the type of analysis documented in this study.

Further benefits could also be found at USMEPCOM by expanding the research scope to include the tactical or operational business environment. Another area for further research is expanding the correlation areas to include areas that were not addressed by this study.

Recommendations

Based on our finding, and the research we conducted, we recommend that the EA and BPM processes be integrated at strategic process areas, common to both programs, to maximize cost savings.

Specifically, we recommend the following:

- Document the Fit-for-Purpose CV-4 capabilities with common processes and procedures for EA and BPM where identified
- Align operational processes for EA and BPM to support Fit-for-Purpose CV-4 capability data where identified
- Define configuration management procedures for all shared data identified in the Fit-for-Purpose CV-4s
- Define ownership of common processes where it may not clearly have an owner
- Develop a hybrid approach to share the Fit-for-Purpose CV-4 capabilities between EA and BPM programs

Based on the alignments seen on the Fit-for-Purpose CV-4 artifacts we reject the H_a hypothesis due to the many opportunities to share capabilities and work products between the USMEPCOM EA and BPM programs. Additionally the CV-4 artifacts

provide data to answer our research questions. We therefore accept the H_0 hypothesis that collaboration between EA and BPM programs will enhance inter-program performance at the USMEPCOM.

The research shows that identification of overlapping process capabilities between the EA and BPM programs was achieved. It also highlights the potential to minimize overall costs while improving quality and the business operating environment. This begs the question:

Who wouldn't want more efficiency, higher quality, and an improved business environment at a lower potential price?

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Appendix A AV-2 – Integrated Dictionary

The following is the AV-2 Integrated Dictionary.

AFEES	Armed Forces Examining and Entrance Station
ASVAB	Armed Services Vocational Aptitude Battery
AV	All Viewpoint
AV-1	Overview and Summary Information
AV-2	Integrated Dictionary
BCL	Business Capability Lifecycle
BEA	Business Enterprise Architecture
BMA	Business Mission Area
BPM	Business Process Management
BPMM	Business Process Maturity Model
BPMN	Business Process Modeling Notation
BPR	Business Process Reengineering
BRM	Business Reference Model
C4ISR	Command, Control, Communications, Computers, and Intelligence, Surveillance and Reconnaissance
CCI	Continuous Capability Improvement
CE	Core Element
CIO	Chief Information Officer
COI	Community of Interest
CV	Capability Viewpoint
CV-4	Capability Dependencies

DAS	Defense Acquisition System
DBSMC	Defense Business Systems Management Committee
DISR	Department of Defense Information Technology Standards and Profile Registry
DIV	Data and Information Viewpoint
DLA	Defense Logistics Agency
DoD	Department of Defense
DoDAF	Department of Defense Architecture Framework
DM2	Department of Defense Architecture Framework Meta-Model
DPP	Defect and Problem Prevention
DRM	Data Reference Model
E-Security	Electronic Security
E2E	End-to-End
EA	Enterprise Architecture
EAMMF	Enterprise Architecture Management Maturity Framework
EAPO	Enterprise Architecture Program Office
E-Gov	E-Government
EPMB	Enterprise Portfolio Management Board
ETP	Enterprise Transition Plan
FEA	Federal Enterprise Architecture
FEAF	Federal Enterprise Architecture Framework
FEA RM	Federal Enterprise Architecture Reference Model
FY	Fiscal Year

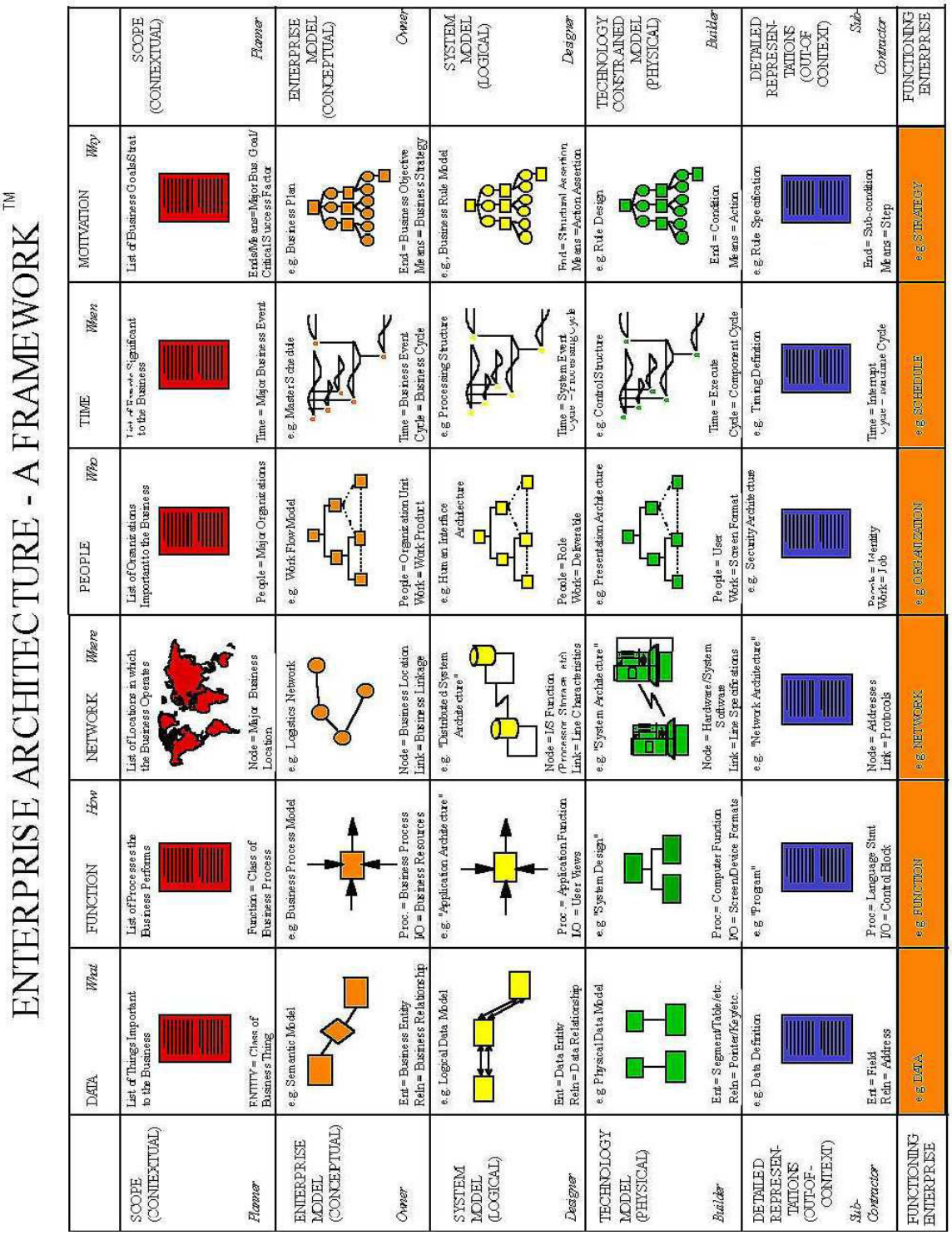
GAO	General Accounting Office
GIG	Global Information Grid
HQ	Headquarters
HJDS	Headquarters Joint Directorate Staff
IE	Information Exchange
IM	Investment Management
IRB	Investment Review Board
IT	Information Technology
ITA	Information Technology Architecture
JCIDS	Joint Capabilities Integration and Development System
J1	Manpower and Personnel Directorate
J3	Operations Directorate
J4	Logistics Directorate
J5	Strategic Plans and Policy Directorate
J6	Command, Control, Communications and Computer/Cyber Systems
Joint Capability Development	
J7	Directorate for Joint Force Development
J8	Force Structure, Resources, and Assessment Directorate
LoB	Lines of Business
LRP	Laws, Regulations, and Policies
MEPCOM	Military Entrance Processing Command
MEPS	Military Entrance Processing Station
MET	Military Entrance Test

NDAA	National Defense Authorization Act
NL	Needline
OA	Operational Activity
OBG	Organizational Business Governance
OCAM	Organizational Common Asset Management
OCD	Organizational Competency Development
OCM	Organizational Configuration Management
OCPM	Organizational Capability and Performance Management
ODCMO	Office of the Deputy Chief Management Officer
OID	Organizational Improvement Deployment
OII	Organizational Innovative Improvement
OIP	Organizational Improvement Planning
OMB	Office of Management and Budget
OMG	Object Management Group
OPA	Organizational Performance Alignment
OPL	Organizational Process Leadership
OPM	Organizational Process Management
ORM	Organizational Resource Management
OSD	Secretary of Defense
OSP&T	Office of Strategic Planning and Transformation
OV	Operational Viewpoint
OV-1	High-Level Operational Concept Graphic
OV-2	Operational Resource Flow Description

OV-3	Operational Resource Flow Matrix
OV-5a	Operational Activity Decomposition Tree
OV-5b	Operational Activity Model
PA	Process Area
PES	Physical Exchange Specification
PfM	Portfolio Management
PPA	Process and Product Assurance
PRM	Performance Reference Model
PSBM	Product and Service Business Management
PSD	Product and Service Deployment
PSO	Product and Service Operations
PSP	Product and Service Preparation
PSPI	Product and Service Process Integration
PSS	Product and Service Support
PSWM	Product and Service Work Management
PV	Project Viewpoint
QPM	Quantitative Process Management
QPSM	Quantitative Product and Service Management
RPH	Reference Process House
SM	Sourcing Management
SME	Subject Matter Expert
SPT	Strategic Planning and Transformation
SRM	Service Reference Model

StdV	Standard Viewpoint
SvcV	Services Viewpoint
SV	Systems Viewpoint
TQM	Total Quality Management
TRM	Technical Reference Model
USAREC	United States Army Recruiting Command
USMEPCOM	United Stated Military Entrance Processing Command
USMIRS	United States MEPCOM Integrated Resource System
WUCM	Work Unit Configuration Management
WUMC	Work Unit Monitoring and Control
WUP	Work Unit Performance
WUPC	Work Unit Planning and Commitment
WURM	Work Unit Requirements Management
WWW	World Wide Web

Appendix B Zachman Framework



Appendix C DoDAF V2.0 Models

Models	Descriptions
AV-1: Overview and Summary Information	Describes a Project's Visions, Goals, Objectives, Plans, Activities, Events, Conditions, Measures, Effects (Outcomes), and produced objects.
AV-2: Integrated Dictionary	An architectural data repository with definitions of all terms used throughout the architectural data and presentations.
CV-1: Vision	The overall vision for transformational endeavors, which provides a strategic context for the capabilities described and a high-level scope.
CV-2: Capability Taxonomy	A hierarchy of capabilities which specifies all the capabilities that are referenced throughout one or more Architectural Descriptions.
CV-3: Capability Phasing	The planned achievement of capability at different points in time or during specific periods of time. The CV-3 shows the capability phasing in terms of the activities, conditions, desired effects, rules complied with, resource consumption and production, and measures, without regard to the performer and location solutions.
CV-4: Capability Dependencies	The dependencies between planned capabilities and the definition of logical groupings of capabilities.
CV-5: Capability to Organizational Development Mapping	The fulfillment of capability requirements shows the planned capability deployment and interconnection for a particular Capability Phase. The CV-5 shows the planned solution for the phase in terms of performers and locations and their associated concepts.
CV-6: Capability to Operational Activities Mapping	A mapping between the capabilities required and the operational activities that those capabilities support.
CV-7: Capability to Services Mapping	A mapping between the capabilities and the services that these capabilities enable.
DIV-1:Conceptual Data Model	The required high-level data concepts and their relationships.
DIV-2: Logical Data Model	The documentation of the data requirements and structural business process (activity) rules. In DoDAF V1.5, this was the OV-7.
DIV-3: Physical Data Model	The physical implementation format of the Logical Data Model entities, e.g., message formats, file structures, physical schema. In DoDAF V1.5, this was the SV-11.
OV-1: High-Level Operational Concept Graphic	The high-level graphical/textual description of the operational concept.
OV-2: Operational Resource Flow Description	A description of the Resource Flows exchanged between operational activities.
OV-3: Operational Resource Flow Matrix	A description of the resources exchanged and the relevant attributes of the exchanges.
OV-4: Organizational Relationships Chart	The organizational context, role or other relationships among organizations.
OV-5a: Operational Activity Decomposition Tree	The capabilities and activities (operational activities) organized in a hierarchal structure.

OV-5b: Operational Activity Model	The context of capabilities and activities (operational activities) and their relationships among activities, inputs, and outputs; Additional data can show cost, performers, or other pertinent information.
OV-6a: Operational Rules Model	One of three models used to describe activity (operational activity). It identifies business rules that constrain operations.
OV-6b: State Transition Description	One of three models used to describe operational activity (activity). It identifies business process (activity) responses to events (usually, very short activities).
OV-6c: Event-Trace Description	One of three models used to describe activity (operational activity). It traces actions in a scenario or sequence of events.
PV-1: Project Portfolio Relationships	It describes the dependency relationships between the organizations and projects and the organizational structures needed to manage a portfolio of projects.
PV-2: Project Timelines	A timeline perspective on programs or projects, with the key milestones and interdependencies.
PV-3: Project to Capability Mapping	A mapping of programs and projects to capabilities to show how the specific projects and program elements help to achieve a capability.
SvcV-1 Services Context Description	The identification of services, service items, and their interconnections.
SvcV-2 Services Resource Flow Description	A description of Resource Flows exchanged between services.
SvcV-3a Systems-Services Matrix	The relationships among or between systems and services in a given Architectural Description.
SvcV-3b Services-Services Matrix	The relationships among services in a given Architectural Description. It can be designed to show relationships of interest, (e.g., service-type interfaces, planned vs. existing interfaces).
SvcV-4 Services Functionality Description	The functions performed by services and the service data flows among service functions (activities).
SvcV-5 Operational Activity to Services Traceability Matrix	A mapping of services (activities) back to operational activities (activities).
SvcV-6 Services Resource Flow Matrix	It provides details of service Resource Flow elements being exchanged between services and the attributes of that exchange.
SvcV-7 Services Measures Matrix	The measures (metrics) of Services Model elements for the appropriate time frame(s).
SvcV-8 Services Evolution Description	The planned incremental steps toward migrating a suite of services to a more efficient suite or toward evolving current services to a future implementation.
SvcV-9 Services Technology & Skills Forecast	The emerging technologies, software/hardware products, and skills that are expected to be available in a given set of time frames and that will affect future service development.
SvcV-10a Services Rules Model	One of three models used to describe service functionality. It identifies constraints that are imposed on systems functionality due to some aspect of system design or implementation.
SvcV-10b Services State Transition Description	One of three models used to describe service functionality. It identifies responses of services to events.
SvcV-10c Services Event-Trace Description	One of three models used to describe service functionality. It identifies service-specific refinements of critical sequences of events described in the Operational Viewpoint.

StdV-1 Standards Profile	The listing of standards that apply to solution elements.
StdV-2 Standards Forecast	The description of emerging standards and potential impact on current solution elements, within a set of time frames.
SV-1 Systems Interface Description	The identification of systems, system items, and their interconnections.
SV-2 Systems Resource Flow Description	A description of Resource Flows exchanged between systems.
SV-3 Systems-Systems Matrix	The relationships among systems in a given Architectural Description. It can be designed to show relationships of interest, (e.g., system-type interfaces, planned vs. existing interfaces).
SV-4 Systems Functionality Description	The functions (activities) performed by systems and the system data flows among system functions (activities).
SV-5a Operational Activity to Systems Function Traceability Matrix	A mapping of system functions (activities) back to operational activities (activities).
SV-5b Operational Activity to Systems Traceability Matrix	A mapping of systems back to capabilities or operational activities (activities).
SV-6 Systems Resource Flow Matrix	Provides details of system resource flow elements being exchanged between systems and the attributes of that exchange.
SV-7 Systems Measures Matrix	The measures (metrics) of Systems Model elements for the appropriate timeframe(s).
SV-8 Systems Evolution Description	The planned incremental steps toward migrating a suite of systems to a more efficient suite, or toward evolving a current system to a future implementation.
SV-9 Systems Technology & Skills Forecast	The emerging technologies, software/hardware products, and skills that are expected to be available in a given set of time frames and that will affect future system development.
SV-10a Systems Rules Model	One of three models used to describe system functionality. It identifies constraints that are imposed on systems functionality due to some aspect of system design or implementation.
SV-10b Systems State Transition Description	One of three models used to describe system functionality. It identifies responses of systems to events.
SV-10c Systems Event-Trace Description	One of three models used to describe system functionality. It identifies system-specific refinements of critical sequences of events described in the Operational Viewpoint.

Appendix D AV-1 – Overview and Summary Information

Overview and Summary Information (AV-1)

Purpose

The purpose of this document is to present the As-Is and To-Be architecture for the United States Military Entrance Processing Command (USMEPCOM) using DoD Architecture Framework Version 2.02 (DoDAF v2.0) to facilitate a greater understanding among senior level government staff and decision makers.

More specifically, there is a five-fold benefit to documenting the Enterprise Architecture (EA) program of the USMEPCOM System from a DoDAF v2.0 perspective:

1- It will facilitate a clear understanding across the DoD of the existing USMEPCOM accessions system, and allow for better management and control of the USMEPCOM process.

2- It will allow for the identification of inefficiencies and opportunities for optimization of the existing EA process.

3- It will help to bridge the gap between architecture and informed decision making. There currently exists a wealth of architectural data for the many programs across the various USMEPCOM initiatives. Clearly articulating the processes that this architectural data is meant to enable will allow the USMEPCOM to bring that data to bear in prioritizing and approving plans, programs, and budgets.

4- It can be used to identify “architecture insertion points”: areas within the process where capability-based architecture-driven decision support could enable the USMEPCOM process. (e.g. Where in the process would architecture data/views for a particular program or programs be useful in addressing capability gaps/shortfalls).

5- It will enable more streamlined integration with the other key decision support systems within the DoD. For example: the Joint Capabilities Integration and Development System (JCIDS), the Defense Acquisition System (DAS), the Portfolio Management (PfM), or the Business Capability Lifecycle (BCL).

Background

USMEPCOM is the principal military accessions system for the Department of Defense (DoD), charged with the joining of applicants into military service. The USMEPCOM accessions process is not currently defined in a formal architectural sense; rather, it is

collectively described via a myriad of Directives, Instructions, Memos, Charters, and other policy and guidance within USMEPCOM. Additionally, differences exist between what is described in the aforementioned documentation and that which is actually implemented by the stakeholders. These factors have led to a system that is inherently confusing and inefficient.

Scope

The scope of this architecture includes the research, analysis, and documentation of the As-Is Architecture of the USMEPCOM accessions system. Architectural development is constrained to maturity levels of the USMEPCOM Process, and is rendered from the viewpoint of the Stakeholders who manage and control the USMEPCOM Processes. The architecture is instantiated across the Command with development supported by Subject Matter Experts (SME) as required. The architecture focuses on breadth and not depth in any given area of the process and is based on current DoD instruction, directive, policy, orders, law, doctrine and guidance. In short, this architecture is straightforward and high-level. It facilitates a greater understanding among senior level government staff and decision makers.

Constraints

The architecture is constrained to top-level activities, data, systems and services between identifying stakeholders. The processes internal to each stakeholder/organization were not examined. IT infrastructure and individual system architectures were not addressed.

In additions there were some identified external and internal technical constraints. External constraints prescribed that the allocated systems and services of the organizations performing the USMEPCOM process have to meet defined technical standards and be interoperable. The internal technical constraints included the use of different encyclopedias, architects that are not co-located, and that lack of a standardized shared toolset for the development team.

Stakeholders and Their Issues

Five main stakeholders have been identified.

1- Office of the Secretary of Defense (OSD)

2- Headquarters Joint Directorate Staff (HJDS) – which includes the Manpower and Personnel

Directorate (J1), Operations Directorate (J3), Logistics Directorate (J4), Strategic Plans and Policy Directorate (J5), Command, Control, Communications and Computer/Cyber Systems Joint Capability Development (J6), Directorate for Joint Force Development (J7), Force Structure, Resources, and Assessment Directorate (J8)

3- Other DoD Components – which includes the Defense Logistics Agency (DLA)

4- Office of the Deputy Chief Management Officer (ODMCO)

5- USMEPCOM Enterprise Architecture Program Office (EAPO)

These Stakeholders have unique issues that the architecture will seek to mitigate. This architecture will attempt to normalize any identified shared Stakeholder issues. The specific Stakeholder issues are outlined in Table-1 below.

Stakeholder Issues					
	Stakeholder				
Issue	OSD	HJDS	Other DoD Components	ODCMO	EAPO
What common work products will lead to synergy of effort?					X
Why are DoDAF and BPM desirable together?					X
What common work processes will lead to synergy of effort?					X
What is the scope of the EAPO process?				X	X
Does the current process properly encompass our strategic intent?	X	X		X	X
Where are the bottlenecks, inefficiencies, redundancies in the process?				X	X
What would be the impact of making a specific change or changes to the process?	X				X
What are the organizational relationships/rules of engagement between the process stakeholders?	X	X	X	X	X
What are the key milestones and associated timing?		X	X		X
What dependencies exist for the activities for which I am responsible?	X	X	X		X
Who/what organizations are dependent upon my organization in this process?		X	X		X
What sources of data are available to my organization to accomplish its' EAPO required tasks?		X	X		X
Can I pinpoint the USMEPCOM process areas that are impeding my ability to accomplish my EAPO required tasks?					X
What delineates each phase of the USMEPCOM process?					X
What common information is shared between the EAPO and BPM Program?	X			X	X

Table 1 – Stakeholder Issues

Architecture Viewpoints and Tools

Based on the Stakeholder Issues, several architecture viewpoints were required to be developed. These architecture viewpoints were based on DoDAF v2.0. In an effort to mitigate identified internal technological constraints, certain tools were chosen for the architecture development. Table-2 contains the list of architecture viewpoints mapped to the tool utilized and the standard methodology or language used in its' development.

Architecture Viewpoints and Tools			
Viewpoint	**Title**	**Tool**	**Standard**
AV-1	Overview and Summary Information	MS Word 2007	Text
AV-2	Integrated Dictionary	MS Excel 2007	Table
OV-1	High Level Operational Concept Graphic	MS Powerpoint 2007	Graphic Diagram
OV-2	Operational Resource Flow Description	MS Powerpoint 2007	Graphic Diagram
OV-3	Operational Resource Flow Matrix	MS Excel 2007	Table
OV-5 Context Diagram	Operational Activity Decomposition Tree	Visio 2007	Graphic Diagram
OV-5a	Operational Activity Decomposition Tree	Visio 2007	Graphic Diagram
OV-5b	Operational Activity Model	Visio 2007	IDEF0
CV-4	Capbility Depedencies	Visio 2007	Graphic Diagram

Table 2 – Architecture Viewpoints and Tools

Information Requirements Mapping for Stakeholders

Table-3 maps the architecture viewpoints to stakeholder issues and information needed for completion of identified viewpoints.

Information Requirements Mapping for Stakeholders			
Issue	**Stakeholder**	**Information**	**Products**
What common work products will lead to synergy of effort?	EAPO	Consumed & Produced Data, Data Providers & Consumers, Capability Dependencies	OV-3, OV-5a, CV-4
Why are DoDAF and BPM desirable together?	EAPO	Process, Strategic Vision, Data reporting between organizations, Consumed & Produced Data, Data Providers & Consumers, Capability Dependencies	OV-1, OV-2, OV-3, OV-5a, CV-4
What common work processes will lead to synergy of effort?	EAPO	Consumed & Produced Data, Data Providers & Consumers, Capability Dependencies	OV-2, OV-3, OV-5a, CV-4
What is the scope of the EAPO process?	OSD, ODMCO, EAPO	Strategic Vision, Scope	OV-1, OV-5 Context Diagram

Information Requirements Mapping for Stakeholders			
Issue	**Stakeholder**	**Information**	**Products**
Does the current process properly encompass our strategic intent?	OSD, ODMCO, EAPO	Process, Strategic Vision, Organizations Involved	OV-5 Context Diagram, OV-5a
Where are the bottlenecks, inefficiencies, redundancies in the process?	OSD, ODMCO, EAPO	Consumed & Produced Data, Data Providers & Consumers, Capability Dependencies	OV-5b, OV-3, CV-4
What would be the impact of making a specific change or changes to the process?	OSD	Consumed & Produced Data, Data Providers & Consumers	OV-5a, OV-5b
What are the organizational relationships/rules of engagement between the process stakeholders?	OSD, HJDS, Other DoD Components, ODMCO, EAPO	Data reporting between organizations	OV-2
What are the key milestones and associated timing?	OSD, HJDS, Other DoD Components	Data Providers & Consumers	OV-5b
What dependencies exist for the activities for which I am responsible?	OSD, HJDS, Other DoD Components	Process, Consumed & Produced Data, Data Providers & Consumers	OV-3, OV-5a, OV-5b
Who/what organizations are dependent upon my organization in this process?	HJDS, Other DoD Components	Process, Consumed & Produced Data, Data Providers & Consumers, Data reporting between organizations, Task Definitions	OV-2, OV-3, AV-2, OV-5b
What sources of data are available to my organization to accomplish its' EAPO required tasks?	HJDS, Other DoD Components	Data Providers & Consumers, Task Deifinitions, Capability Dependencies	OV-5b, AV-2, CV-4
Can I pinpoint the USMEPCOM process areas that are impeding my ability to accomplish my EAPO required tasks?	HJDS, Other DoD Components	Data Providers & Consumers, Capability Dependencies	OV-5b, CV-4
What delineates each phase of the USMEPCOM process?	OSD, HJDS, Other DoD Components	Data Providers & Consumers	OV-5b
What common information is shared between the EAPO and BPM Program?	OSD, ODMCO, EAPO	Consumed & Produced Data, Data Providers & Consumers, Capability Dependencies	OV-5a, OV-5b, CV-4

Table 3 – Information Requirements Mapping for Stakeholders

Success Measures

Tangible benefits to DoD USMEPCOM community as a result of this architecture will be measured by greater understanding among senior level government staff and decision makers.

Preliminary Findings

TBD.

Appendix E EA Core Elements

Item	Stage	EA Core Element
1	1	Written and approved organization policy exists for EA development, maintenance, and use.
2	1	Executive committee representing the enterprise exists and is responsible and accountable for EA.
3	1	Executive committee is taking proactive steps to address EA cultural barriers.
4	1	Executive committee members are trained in EA principles and concepts.
5	1	Chief architect exists.
6	1	EA purpose is clearly stated.
7	1	EA framework(s) is adopted.
8	1	EA performance and accountability framework is established.
9	2	EA budgetary needs are justified and funded.
10	2	EA program office(s) exists.
11	2	Key program office leadership positions are filled.
12	2	Program office human capital plans exist.
13	2	EA development and maintenance methodology exists.
14	2	Automated EA tools exist.
15	2	EA program management plan exists and reflects relationships with other management disciplines.
16	2	Work breakdown structure and schedule to develop EA exist.
17	2	EA segments, federation members, and/or extended members have been identified and prioritized.
18	2	Program office readiness is measured and reported.
19	3	Organization business owner and CXO representatives are actively engaged in architecture development.
20	3	EA human capital plans are being implemented.
21	3	Program office contractor support needs are being met.
22	3	Program office staff is trained in EA framework, methodology, and tools.

Item	Stage	EA Core Element
23	3	Methodologies and tools exist to determine investment compliance with corporate and subordinate architectures.
24	3	Methodologies and tools exist to determine subordinate architecture alignment with the corporate EA.
25	3	EA-related risks are proactively identified, reported, and mitigated.
26	3	Initial versions of corporate “as-is” and “to-be” EA and sequencing plan are being developed.
27	3	Initial version of corporate EA describing the enterprise in terms of performance, business, data, services, technology, and security is being developed.
28	3	One or more segment and/or federation member architectures is being developed.
29	3	Architecture products are being developed according to the EA content framework.
30	3	Architecture products are being developed according to a defined EA methodology.
31	3	Architecture products are being developed using EA tools.
32	3	Architecture development progress is measured and reported.
33	4	Executive committee has approved the initial version of corporate EA.
34	4	Key stakeholders have approved the current version of subordinate architectures.
35	4	EA is integral to the execution of other institutional management disciplines.
36	4	Program office human capital needs are met.
37	4	Initial versions of corporate “as-is” and “to-be” EA and sequencing plan exist.
38	4	Initial version of corporate EA captures performance, business, data, services, technology, and security views.
39	4	One or more segment and/or federation member architectures exists and is being implemented.
40	4	EA product quality is measured and reported.
41	4	EA results and outcomes are measured and reported.

Item	Stage	EA Core Element
42	4	Investment compliance with corporate and subordinate architectures is measured and reported.
43	4	Subordinate architecture alignment with the corporate EA is measured and reported.
44	5	Organization head has approved current version of the corporate EA.
45	5	Organization component heads or segment owners have approved current version of their respective subordinate architectures.
46	5	Integrated repository tools and common EA framework and methodology are used across the enterprise.
47	5	Corporate and subordinate architecture program offices operate as a single virtual office that shares resources enterprise wide.
48	5	Corporate EA and sequencing plan are enterprise wide in scope.
49	5	Corporate EA and sequencing plan are aligned with subordinate architectures.
50	5	All segment and/or federated architectures exist and are horizontally and vertically integrated.
51	5	Corporate and subordinate architectures are extended to align with external partner architectures.
52	5	EA products and management processes are subject to independent assessment.
53	6	EA is used by executive leadership to inform organization strategic planning and policy formulation.
54	6	EA human capital capabilities are continuously improved.
55	6	EA methodologies and tools are continuously improved.
56	6	EA management processes are continuously improved and reflect the results of external assessments.
57	6	EA products are continuously improved and updated.
58	6	EA quality and results measurement methods are continuously improved.
59	6	EA continuous improvement efforts reflect the results of external assessments.

Appendix F BPM Maturity Process Areas

Item	Level	BPM Process Area
1	2	Organizational Process Leadership (OPL)
2	2	Organizational Business Governance (OBG)
3	2	Work Unit Requirements Management (WURM)
4	2	Work Unit Planning and Commitment (WUPC)
5	2	Work Unit Monitoring and Control (WUMC)
6	2	Work Unit Performance (WUP)
7	2	Work Unit Configuration Management (WUCM)
8	2	Sourcing Management (SM)
9	2	Process and Product Assurance (PPA)
10	3	Organizational Process Management (OPM)
11	3	Organizational Competency Development (OCD)
12	3	Organizational Resource Management (ORM)
13	3	Organizational Configuration Management (OCM)
14	3	Product and Service Business Management (PSBM)
15	3	Product and Service Work Management (PSWM)
16	3	Product and Service Preparation (PSP)
17	3	Product and Service Deployment (PSD)
18	3	Product and Service Operations (PSO)
19	3	Product and Service Support (PSS)
20	4	Organizational Common Asset Management (OCAM)
21	4	Organizational Capability and Performance Management (OCPM)
22	4	Product and Service Process Integration (PSPI)
23	4	Quantitative Product and Service Management (QPSM)
24	4	Quantitative Process Management (QPM)
25	5	Organizational Improvement Planning (OIP)
26	5	Organizational Performance Alignment (OPA)
27	5	Defect and Problem Prevention (DPP)
28	5	Continuous Capability Improvement (CCI)

Item	Level	BPM Process Area
29	5	Organizational Innovative Improvement (OII)
30	5	Organizational Improvement Deployment (OID)

Appendix G Region α CV-4

The CV-4 for region α appears here. The file is provided as an embedded digital file in PNG format file. Modern operating systems have applications (such as Microsoft Windows Photo Viewer, Microsoft Paint, Microsoft Office Picture Manger, or any modern web browser) that can read this open standards file format to view graphical images. This file is also included in digital format on the companion compact disk at the end of this document.

Correlated
Capabilities Alpha_H.

Appendix H Total Quality Management Spreadsheet

The synergistic capabilities and TQM key elements are represented in this spreadsheet. The file is provided as an embedded digital file in Microsoft Excel file format. This file is also included in digital format on the companion compact disk at the end of this document.

Region_alpha_gamma_vs_TQM.xlsx

Appendix I Master and Specific Practice Spreadsheets

The research worksheets that were used to score and sum matches between the EA and BPM programs are represented in this spreadsheet file. The file is provided as an embedded digital file in Microsoft Excel file format. This file is also included in digital format on the companion compact disk at the end of this document.

EAMMF_BPMM_19.xlsm