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**The Next Step to Creating a More
Efficient Form of Paperless Contracting**

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September 2008**

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**THE NEXT STEP TO CREATING A MORE EFFICIENT FORM OF
PAPERLESS CONTRACTING**

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Submitted in partial fulfillment of the requirements for the degree of

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from the

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THE NEXT STEP TO CREATING A MORE EFFICIENT FORM OF PAPERLESS CONTRACTING

ABSTRACT

The purpose of this project is to explore the early years of paper-procurement and chart the progression to paperless contracting. This will be followed by the Department of Defense's next step to further improve procurement software and user interface. This will be contrasted against the Army's further refinement of their enterprise system that only removes the paper from the otherwise archaic procurement system. The author, a contracting officer whose background includes programming, business administration, management information systems, geographic information systems, and systems design, will explore the future of possible procurement solutions. This will include web-based enterprise architecture and the user interface.

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LIST OF ABBREVIATIONS

ASFI	Army Single Face to Industry
AWCF	Army Working Capital Fund
BEA	Business Enterprise Architecture
BMMP	Business Management Modernization Program
BPEL	Business Process Execution Language
BPMN	Business Process Modeling Notation
CCR	Central Contractor Registration
CECOM	Communications - Electronics Command
CRM	Customer Relationship Management
CS	Customer Service
DAASC	Defense Automatic Addressing System Center
DARS	Defense Architecture Registry System
DAU	Defense Acquisition University
DoD	Department of Defense
DODAF	DoD Architecture Framework
DODIG	Department of Defense Office of Inspector General
ERP	Enterprise Resource Planning
FAR	Federal Acquisition Regulations
FBO	Federal Business Opportunities - FedBizOpps
FM	Financial Management
GAO	Government Accountability Office
GSA	General Services Administration
GWAC	Government-Wide Acquisition Contract
IBOP	Interactive Business Opportunities
IDIQ	Indefinite Delivery Indefinite Quantity
IEEE	Institute of Electrical and Electronics Engineers
IFC	Integrated Framework Chart
ISM	Integrated Sales and Marketing
IT	Information Technology
ITMRA	Information Technology Management Reform Act
JCIDS	Joint Capabilities Integration & Development System
LMP	Logistics Modernization Program
NCE	Net-Centric Environment
OFM	Oracle Fusion Middleware

OLTP	OnLine Transaction Processing
PADDS	Procurement Automated Data & Document Systems
PCF	Project Contract Folder
PD2	Procurement Desktop-Defense
PDF	Portable Document File (Adobe)
PPBE	Planning, Programming, Budgeting and Execution
SCP	Supply Chain Planning
SEWP	Solutions for Enterprise-Wide Procurement
SOA	Service Oriented Architecture
SPS	Standard Procurement System
UI	User Interface
USSGL	United States Standard General Ledger
W3C	World Wide Web Consortium
WAWF	Wide Area Work Flow
WLMP	Wholesale Logistics Modernization Program
WOA	Web Oriented Architecture
WSBPEL	Web Services Business Process Execution Language
XML	Extensible Markup Language

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I have always wished that my computer would be as easy to use as my telephone.

My wish has come true. I no longer know how to use my phone.

—Bjarne Stroustrup

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I. INTRODUCTION

A. PREFACE

Since the early years of procurement, all contracting was done as a paper-based activity. With the introduction of mainframe computers, databases were utilized for tracking, forecasting, and electronic payments. Next came the desktop/networked PC along with word processors and spreadsheets and personal computing was born. This was networked into an enterprise system that allowed for nearly seamless transfer from requirement to award. The Department of Defense has recently implemented automated procurement programs. The Army is fine turning their present Logistics Modernization Program (LMP) that is built on SAP-R3 enterprise software.

Presently, after the contract type has been determined, contract-writing software such as Procurement Automated Data & Document Systems (PADDS) and Standard Procurement System/ Procurement Desktop-Defense (SPS/PD2) assists with choosing and filling in the requirements and FAR clauses as well as delivery and shipping information. Although the task has been simplified by use of the software, it is nevertheless the same system of contracting that requires careful proofreading to weed out ambiguities and contradictions. It is a time consuming process that produces inefficiencies and errors. Like a military specification, the contracting officer's attention is constantly directed at 'how' contracting is being accomplished.

For the DoD as well as the rest of the Federal government to manage effectively in the twenty-first century, it is the author's opinion that a system of automated business rules are not enough. A more efficient User Interface (UI) and web-based architecture must be added to the present system. As in fourth generation programming, software assisted contracting must operate from a performance driven perspective. The only contracting questions that need to be asked are what do you want and when and where do you want it delivered.

This research will explore present solutions and suggest solutions that will make the contracting practice more efficient, less ambiguous and more able to closely follow the laws regarding contracting to sole source, competitive negotiations, sealed bids, subcontracting requirements and Small Business.

B. RESEARCH OBJECTIVE

The author intends to show the progression from Paper to Paperless Contracting and recommend the next step to create a more efficient form of contracting given the increased acquisition demands and the retiring workforce with its accompanying loss of credentialed personnel.

C. RESEARCH QUESTIONS

1. Primary Research Question

Given the present state of technology, what steps should the DoD and Army take to further improve procurement software and User Interface (UI)?

2. Secondary Research Questions

- What have other agencies done to streamline and automate procurement?
- What type of enterprise architecture is available to explore and exploit?
- What are the pitfalls associated with the present system?
- What methods can be used to further increase efficiencies and effectiveness?

D. SCOPE AND ORGANIZATION

The author will account for how the DoD, and specifically, the Army makes their purchases.

Next, the possible opportunities to bring procurement into an online paperless ordering activity are researched.

Finally, specific enhancements for implementation are discussed.

E. METHODOLOGY

This research is theoretical and exploratory. The data for this project will be primarily web-based records from the DoD and the Army. These will be combined with background research of enterprise architecture and business rules research.

F. BENEFITS OF RESEARCH

This study is intended to offer insight into the future for the direction of DoD enterprise procurement systems.

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II. LITERATURE REVIEW AND BACKGROUND

A. INTRODUCTION

This project begins by examining the existing system of contracting. Next, commercially available software solutions including enterprise systems will be examined. Finally, the governments contracting needs with its incoming workforce and look for a system of Paperless Contracting that will embrace present day enterprise architecture solutions will be incorporated.

The Standard Procurement System (SPS) under the Clinger-Cohen act provides for large scale contracting improvement by the government. A hearing of the House of Representatives (February 7, 2002) explored various government failures in acquisition modernization as seen below.

The standard procurement system was meant to address both problems. Standardization of contract and purchasing processes should bring greater transparency and data commonality to DoD's tangled web of financial systems. Selection of a commercial, off-the shelf product should have brought efficiency and discipline to the data system development. Today we ask whether SPS, the 7-year-old, \$359 million Department of Defense effort to modernize, streamline, and unify Pentagon contracting, has become an expensive part of the problem or a partial solution to the Pentagon's chronic financial management woes. (United States, 2003).

Fraud and waste are continued themes throughout the report. SPS is one of many attempts that have failed to bring the acquisition system up to the standard of private industry.

B. ANALYSIS OF EXISTING SYSTEMS

The existing acquisition system is leaving talent stretched too thin. Less experienced people are handling complex tasks and productivity is lost while the new hires are acclimatizing to the workforce. Support for this statement can be found in many places. In "Many contract officers quitting," Castelli addresses the issues concerning contracting personnel retiring and leaving the acquisition force (Castelli, 2008).

According to a report entitled “Contracting workforce needs more training,” Newell emphasizes the need for more training. A survey by Office of Management and Budget’s Office of Federal Procurement Policy and the Federal Acquisition Institute indicated that they “advocated training in negotiation skills, strategic planning and the effective resolution of contract disputes” (Newell, 2007). Denett, in “The 2007 Federal Contracting Workforce Competencies Survey,” asks the question it is possible to train an incoming workforce while both technical and general competencies are being lost (Denett, 2007)? Our present software solutions are a piecemeal effort at best. Indian Head Division of the Naval Sea Systems Command stresses the need for contractors to be registered with Central Contractor Registration (CCR) and Wide Area Work Flow (WAWF) (Kennedy, 2008). An EBay type solution that has gained favor is the reverse auction. FreeMarkets on the GSA schedule provides a bidding environment whereby live, online bidding transpires for items that do not require negotiation (Kutner, 2000). The Business Management Modernization Program (BMMP) will impose strict standards on all business systems and require them to be compliant with DoD’s Business Enterprise Architecture (BEA). The BEA was developed to ensure financial compliancy, data accuracy, streamlined processes, and improved decision-making across the Department (Sylvester, 2004). Procurement Automated Data & Document Systems (PADDS) is the Army’s contracting system for acquiring major weapon systems and their supporting logistical spare parts (O’Boyle, 2008). It has become web based and incorporates an online training module. The rules based environment of Army’s Logistics Modernization Program (LMP) provides the latest attempt by the Army to provide enterprise software for contracting. Computer Sciences Corporation has customized SAP-R3 for the government (Walker, 2006). Fort Monmouth is part of the initial rollout. CECOM at Fort Monmouth, with its eleven billion plus annual contracting receipts, is the test bed for LMP enterprise system. The last of the software to be introduced is The Army Single Face to Industry. This program coexists in the Army with LMP. Figure 1 illustrates its position in the acquisition schematic:

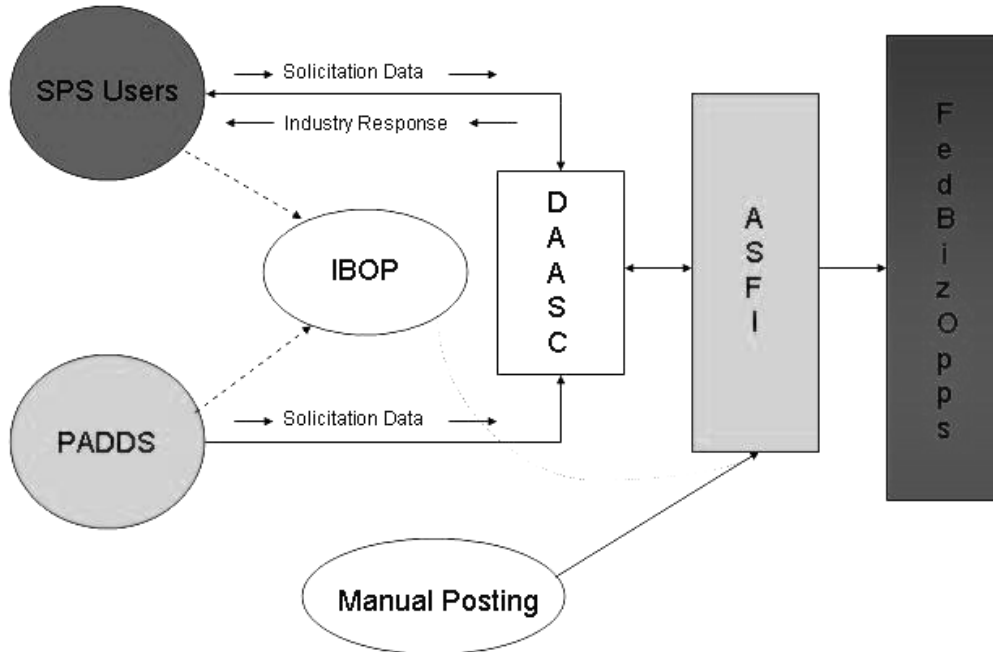


Figure 1. Flow Chart - Army Single Face to Industry (ASFI) (From: ASFI, 2006)

The process of posting solicitation data/documents to the ASFI shall be accomplished utilizing one (and only one) of the applications/processes listed above. They are via the Standard Procurement System (SPS, 2008) using Extensible Markup Language (XML) files and the Defense Automatic Addressing System Center (DAASC), the Interactive Business Opportunities Page (IBOP), the Army Materiel Command Procurement Automated Data and Document System (PADDS), and via Manual Entry (approval required). Using multiple processes will cause an error in the posting of solicitation data/documents to the ASFI and other applications such as Federal Business Opportunities (FedBizOpps) (ASFI 2006).

C. COMMERCIALY AVAILABLE SOFTWARE

Adobe Acrobat software was explored as a possible solution to paperless contracting by Freeman and Sherman in a recent thesis. Their system would allow documents to be scanned into a database and linked by way of a manually entered indexing system. The system relies on an accurate, manual entry index (Freeman, Sherman, 2007).

SAP-R3 is a highly customizable enterprise software solution that includes Customer Service (CS), Financial Management (FM), and Supply Chain Planning (SCP). SAP is a propriety system that uses a database that links to applications. All transactions are within the confines of the software with the PC serving as the terminal. Approvals and signatures are electronic and digitally signed thus eliminating the need for paper (LMP, 2002).

D. COMPLETING THE SYSTEM

In discussing the next steps in DoD business systems innovation, the GAO has said,

The DoD Business Systems Modernization agrees that additional work is required and states that under its incremental approach to developing the architecture and transition plan, and under its tiered accountability structure for reviewing and approving business system investments, improvements will occur in its architecture, transition plan, budgetary disclosure, and investment management and oversight. If these improvements do not occur, DoD's business systems modernization will continue to be a high-risk program (GAO-06-219, 2005).

One way to reduce this risk is for applications to become more interoperable. This can happen when a universal set of rules are applied as metadata. This can only happen in the web utilizing The World Wide Web Consortium guidelines (W3C, 2008).

A SAP white paper discusses how systems evolve which are not interoperable. "Companies embark on too many individual IT and transformation projects without considering how they overlap or whether they are all strategically necessary and, as a result, use up too many resources. Functional organizations tend to retain their older processes, thereby maintaining workload for themselves, while they develop systems requirements based on current processes. With limited senior governance and no overarching authority, some implementations are left to be managed as individual projects, with no attempt to connect them, learn from them, or in any way treat them as the fundamental machinery of change that they actually were" (Tomb, Dickson, 2006).

To improve interoperability, it is the author's opinion that an Open software solution must be developed. Rather than rely on a single commercial enterprise system such as SAP or any particular proprietary system, it is necessary to go in the opposite direction. Rather than being bound to a closed system, an open system that can transfer data and metadata between applications is needed. Proprietary software has no future in the next generation of web applications.

As will be detailed in the next chapter, the current DoD paperless system is a collection of proprietary systems that is not actually paperless, but maintains what will be defined in the next chapter as a 'paper-based mentality'. Recent attempts to modernize the contracting process have helped, but they are nevertheless a piecemeal attempt. Commercial software solutions are available which are web-based. The author will argue that the persistence of a paper-based mentality is because of a utility users find in old paper-based systems, which the current pseudo-paperless systems lack. The author will also postulate that whatever solutions are sought, they must adhere to web standards as imposed by The World Wide Web Consortium to insure interoperability between government and contractors databases and business software. By building on those standards, in the fifth chapter, a vision of a contracting system based on these standards, which synthesizes the human utility of paper-based systems with the cost-saving potential of truly paperless systems will be presented.

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III. ANALYSIS OF EXISTING SYSTEMS

A. INTRODUCTION

The DoD, including the Army, works with many diverse software systems during its cradle to grave procurement process. The interaction between the programs is less than perfect. Twelve software systems in use by the Army and at CECOM are evaluated. In this evaluation, it will be shown that many actions are performed with a ‘paper and paper-based’ mentality.

A ‘paper-based mentality’, in the author’s opinion, happens when electronic documents look and are treated like the paper documents they replaced. In the author’s experience, entire electronic contract folders have been reproduced in paper and given to Program Managers, legal and used for negotiations with contractors. Many documents begin as paper only to be scanned into the ‘paperless’ system. Contrast this to a ‘paperless’ mentality meaning no paper, with data storage, retrieval and display based on computer technology and aesthetics, rather than mimicking paper. Application input forms are different from reports and queries. Only required information is input or displayed.

B. PROGRAM MANAGEMENT

The evaluation of this project will be confined to software and hardware systems used throughout the procurement development, from cradle to grave. The procurement process begins with a requirement emanating from a Program Management Command. Contracting is brought into the process early to facilitate the acquisition.

As seen in Figure 2, there are division points and phases. Documents are generated that last throughout the life of the contract. These documents are passed to all who touch the project. As to be shown, due to the proprietary nature of the software used by the DoD and contractors, many of the documents including specifications, drawings

and contracting vehicles are transported by paper or a paper-based mentality. Since the paperless mandate, electronic paper exists in the form of Portable Document File (PDF) scans and email.

DEFENSE ACQUISITION DECISION POINTS AND PHASES
(DoDI 5000.2)

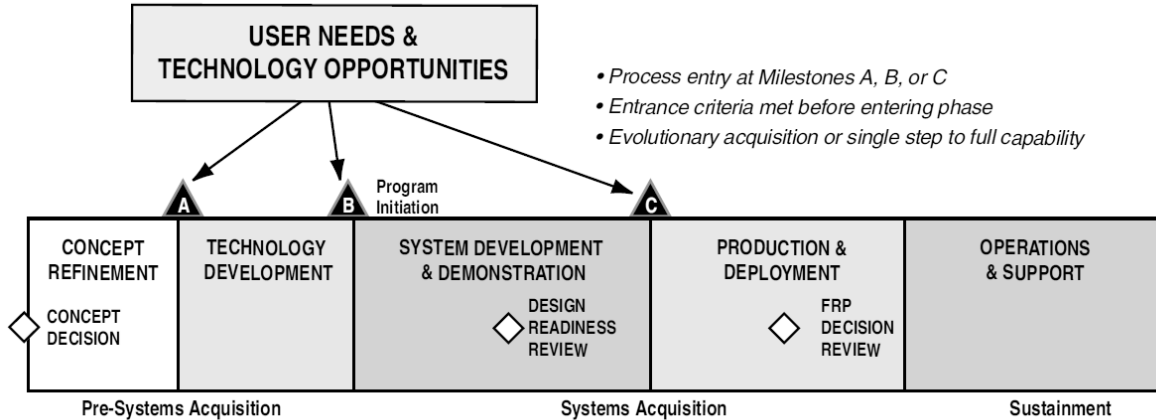


Figure 2. Defense Acquisition Decision Points and Phrases (From: DAU Program Managers Tool Kit, 2008)

The Integrated Framework Chart (IFC) is a pictorial road map of key activities in the systems acquisition process including the Joint Capabilities Integration and Development System (JCIDS); Defense Acquisition; and Planning, Programming, Budgeting, and Execution (PPBE) (Refer to Figure 3). There is an integrated system for handling information or data. There is no transparency in the data or metadata to allow various systems to interpret and integrate information and data from other systems without a high degree of risk from corruption when translating data into another medium (DAU Program Managers Tool Kit, 2008).

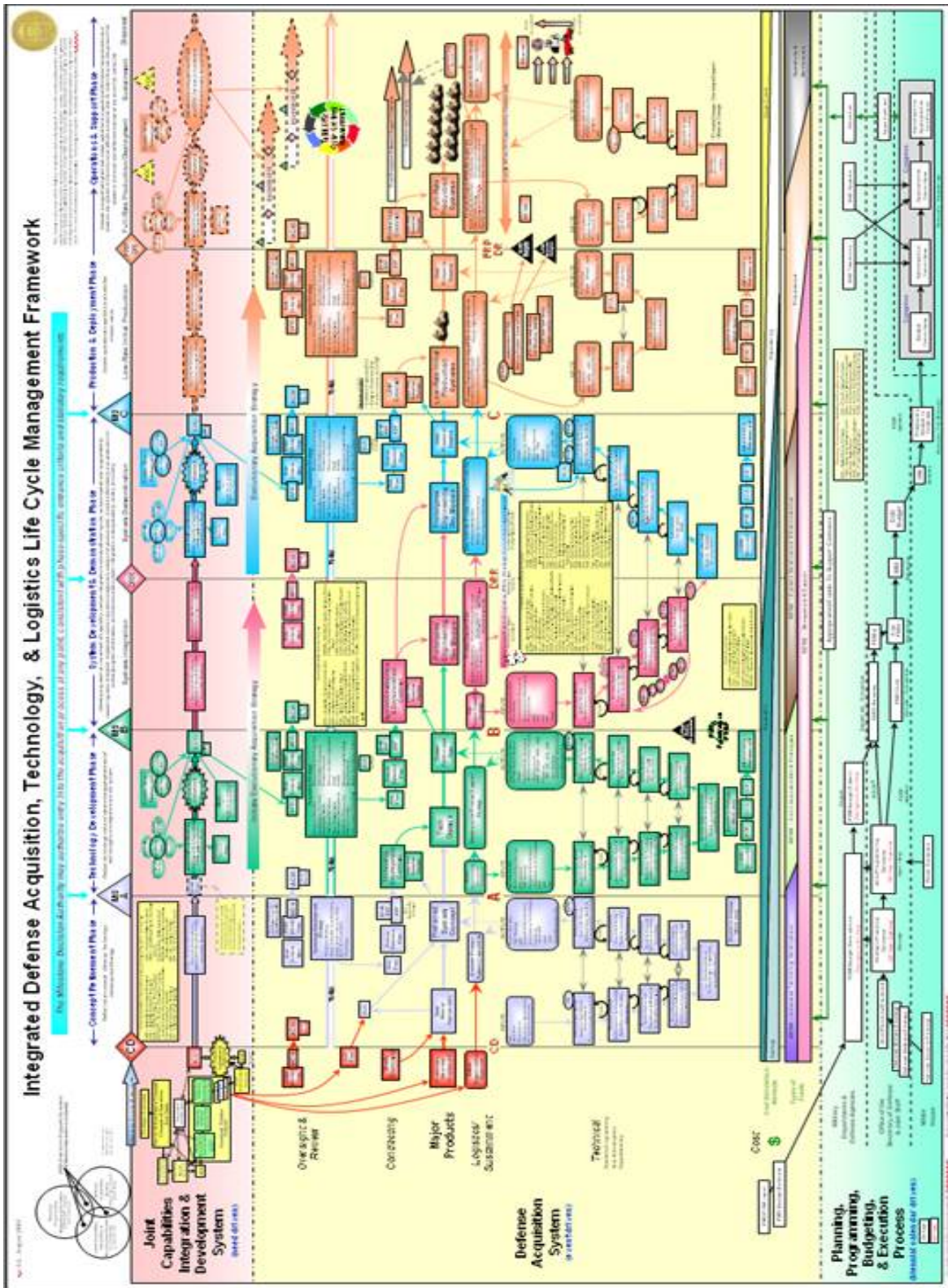


Figure 3. The Integrated Defense Acquisition, Technology and Logistics Life Cycle Management Framework Chart – Interactive (From: <https://akss.dau.mil/ifc/>)

C. STANDARD PROCUREMENT SYSTEM (SPS)

The Standard Procurement System (SPS) with over 20,000 users at more than 800 sites was designed to standardize and automate the procurement process within all branches of the DoD (SPS, 2008). PD Squared is the Procurement Defense Desktop (PD2) that allows for input into the system. Additional linkages incorporate tracking of financial data throughout the lifecycle of the procurement process. SPS is one of two solicitation entry systems shown in Figure 1.

SPS includes PRWeb (funding application) and PD2 (desktop application) to initiate and track an award through closeout. Funding is entered into PRWeb and forwarded to PD2 where the contracting officer attaches it electronically to the contract. PD2 generates solicitations and awards, modifies and closes contracts. Paper documents are scanned and stored in paper image (PDF) format. External links facilitate payment through Wide Area Work Flow (Wide Area Workflow Application Information, 2008).

D. PROCUREMENT AUTOMATED DATA AND DOCUMENT SYSTEM (PADDS)

The Procurement Automated Data and Document System (PADDS) provides the Army Material Command with a standardized system for preparation, recording and processing contracting documents (O'Boyle, 2008). The PADDS system is used by more than 2,000 contract specialists. The most recent development was the transition to becoming web based. Seven databases were consolidated into one usable system. Programming and security patches can now be administered from one location.

SPS and PADDS provide the first input system as shown in Figure 1. Paper documents provide the initial data input into both systems. The funding document is signed with a wet signature. The requirements are provided as signed printed documents.

To post the solicitation, four more systems must be traversed. Although the systems talk to each other, not all information or data is shared. The databases are proprietary to an individual system. Therefore, data that has made the trip, passing

through each software package, will have been translated into data with proprietary characteristic to that system. Character strings can be truncated and formatting will lose consistency or be lost entirely.

The loss of data integrity caused by these transfers is precisely the sort of thing automation was supposed to ameliorate, by avoiding the transcription errors that used to be caused by multiple data entry. The fact that these sorts of errors still occur even in the automated systems is an example of what the author calls a paper-based mentality.

E. INTERACTIVE BUSINESS OPPORTUNITIES PAGE (IBOP)

The Interactive Business Opportunities Page (IBOP) is a gateway where the vendors meet the government to transact business (IBOP, 2008). Here they will find synopses, solicitations and drawings. Access to the site controlled by the user's role. By using the IBOP, acquisition time has been reduced by an average of seven days. Vendors can see and respond to requests for proposal but cannot see each other's proposals or other correspondence (IBOP, 2008).

Except for manual data input, the IBOP is paperless and has a 'paperless mentality'. It is operated through a web portal and has no forms associated with it.

F. DEFENSE AUTOMATIC ADDRESSING SYSTEM CENTER (DAASC)

Defense Automatic Addressing System Center (DAASC) interjects several services into the procurement process as it continues to Federal Business Opportunities web site for posting (Refer to Appendix A). These include an inquiry system of routing codes and identifiers including an ability to query the database. DAASC can track and report response times as material flows through the logistics pipeline. There are twelve nodes for measurement (DAASC, 2008).

DAASC is a paperless system that functions as a hub for several activities. It serves as a middle ware interface allowing many different enterprise systems and applications to transfer data and information.

G. ARMY SINGLE FACE TO INDUSTRY (ASFI)

The Army Single Face to Industry (ASFI) is yet another layer added to the automated and updated procurement process (See Figure 1). Solicitations are added to the ASFI site using parameters found in 3.0 ASFI EDIT CRITERIA of the user's guide (Refer to Appendix B). While traversing the website, message boxes alert one to the various systems that will be encountered while searching for documents or adding information (see Figure 4) (ASFI, 2006).



Figure 4. MS Note - Army Single Face to Industry (ASFI) (From: ASFI, 2006)

Pre-solicitation, Solicitation and Award entries to FBO can be manually uploaded through this web portal. Databases impose rules for data entry. As seen in Appendix B, each data item has a format and attributes assigned to it such as Close Date and FSC. The NAICS must match a validation list stored in the database. Dates are entered in many formats: i.e., MM/DD/YY, MM/DD/YYYY, YYYYMMDD, and DDMMYYYY. Metadata is data about data. Transparency between databases implies a standardization of metadata (Jones, 1990). If this data is shared with other databases, metadata must be provided and understood by the sharing systems to prevent data corruption.

H. FEDERAL BUSINESS OPPORTUNITIES (FBO)

Federal Business Opportunities (FBO) is the last system in the Figure 1. FBO is the portal where the author, as a contracting officer for construction, write a synopsis,

upload the solicitation that was produced in PD2 and post drawings and specifications. This effort does not share information between FBO and PD2. They are independent operations. The complete process as shown in Figure 1 illustrates the mix-and-match approach DoD has taken toward procurement software solutions (FBO, 2008). They have continued to modernize and update by going web based with the programs. However, they remain fragmented systems with a lack of true connectivity, and hence are not truly paperless.

I. WHOLESALE LOGISTICS MODERNIZATION PROGRAM (WLMP)

The Army Working Capital Fund (AWCF) business practices had been the same for the past thirty years. The Wholesale Logistics Modernization Program (WLMP) was the Army's replacement system for the Commodity Command Standard System (CCSS) used to store logistics data pertinent to the operations of the Federal supply system. WLMP was intended to overcome the weaknesses cited in the Army's FY 2000 financial statements (Refer to Appendix C) (WLMP, 2001). In addition, United States Standard General Ledger (USSGL) was interfaced with WLMP to allow for tighter accountability (USSGL, 2008).

The WLMP modernization program has a single point of entry. The data is manually entered and therefore the input paper-based. Since the data is contained within one system, all of the applications within the system will share compatibility. However, there is no indication this database can be shared reliably with external systems. In operation, it 'paperless' in that information is entered to an electronic form. However, custom reports and queries are summoned from the database and printed giving it a 'paper-based mentality.'

J. LOGISTICS MODERNIZATION PROGRAM (LMP)

The Logistics Modernization Program (LMP) is the most recent of the enterprise systems for the Army. The Fort Monmouth's CECOM Acquisition Center, in 2003, became the test center for the initial rollout. Computer Sciences Corporation customized SAP-R3 to take over several previous systems that were not interfaced (LMP, 2002).

LMP represents a clash in disciplines. It is the Army's attempt at implementing a one-size-fits-all paperless contracting system. Since its inauguration, this author has observed new paper contract folders being assembled with most new requirements. Based on the author's observations, this is another example of a paperless system with a paper-based mentality. Before LMP, contract specialists carried the contract folder to the contracting officer for review. Since LMP, the contract specialist prints out on request portions of the contract for review. After review, the paper is discarded.

K. PROJECT CONTRACT FOLDER (PCF)

Included in the rollout was an electronic filing cabinet system that allows for approvals and digital signatures. Since then, the Project Contract Folder (PCF), system has been distributed to more than 350 locations worldwide (PCF, 2008).

PCF is de facto paper-based mentality in that it mimics the paper folder and its documents. It is used to route documents for approval and electronic signature as well as storage. There is enhanced security in that permissions are assigned for read only, edit and signing capabilities. The author has seen many documents printed, shared and discarded by some while others are toting their government notebook computers with them and sharing documents electronically. Because of these observations, the author claims that PCF is helping in the transition to the paperless mentality by giving the option of printing when hard copy is more appropriate for review and evaluation.

Rollouts are always troublesome at best. The LMP system included training that was divided into SAP functions such as Customer Service (CS), Financial Management (FM), Supply Chain Planning (SCP) and Product Lifecycle Management (PLM) (LMP, 2002).

CECOM utilizes a variety of systems. Contracting done for Base Operations uses SPS/PD2 and FedBizOpps to accomplish its mission. The rest of CECOM uses the IBOP, LMP, PADDS, PCF, ASFI, and FBO. They are in a continual state up upgrading with different agencies having responsibility for each system.

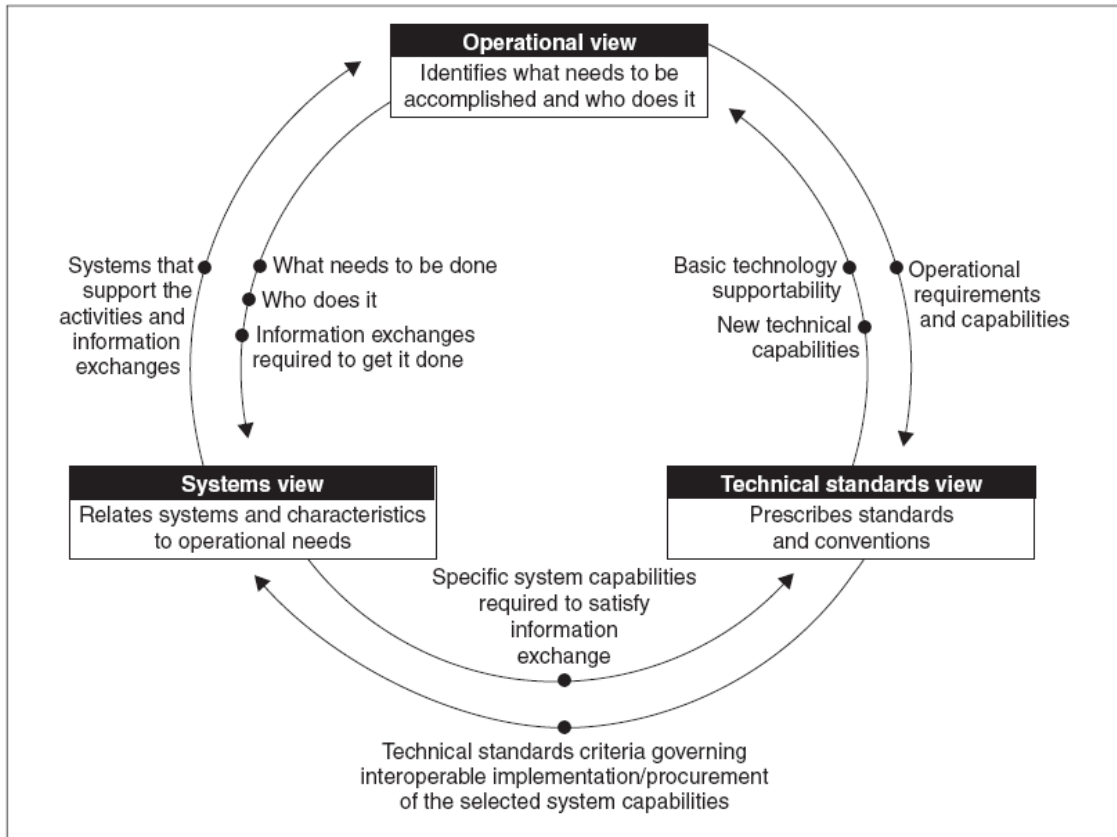
L. DOD ARCHITECTURE FRAMEWORK (DODAF)

The DoD Architecture Framework (DODAF) is the document that addresses interoperability issues among the various systems in use by the DoD within their Net-Centric Environment. The DoD Integrated Architecture Panel defined architecture as:

The structure of components, their relationships, and the principles and guidelines governing their design and evolution over time. (DoD Integrated Architecture Panel, 1995, based on IEEE STD 610.1)

Specification templates are sufficient for in house services. However, when interfacing with outside services, a detailed, machine-interpretable specification is necessary (Refer to Appendix D).

Shown in Figure 5 are the relationships between three views within DODAF architecture. The views expressed have been designed to be in agreement within an express architectural system. However, collaboration does not take place between external systems that will be sharing data and information. The DoD has a piecemeal effort of proprietary systems that are attempting to share information and data on a need to know basis (DODAF, 2007).



Source: DOD Architecture Framework Version 1.0, Volume 1.

Figure 5. Interdependent DODAF Views of an Architecture (From: DODAF, 2007).

M. SOLUTIONS FOR ENTERPRISE-WIDE PROCUREMENT (SEWP)

Solutions for Enterprise-Wide Procurement (SEWP) is NASA's attempt at a GSA ordering device. Originally entitled Scientific and Engineering Workstation Procurement, SEWP is a Government-Wide Acquisition Contract (GWAC) vehicle, consisting of 38 pre-competed Contract Holders consisting of 48 Indefinite Delivery Indefinite Quantity (IDIQ) contracts. SEWP was designed to comply with the Fair Opportunity as required by Federal Acquisition Regulations (FAR) Part 16.505(b) (FAR, 2008).

Email has been around since 1971. The Facsimile machine was introduced at the turn of the century. SEWP's method for ordering depends on one of these two methods (Refer to Appendix E). Inquiries are handled via telephone Helpline and email.

At the SEWP website, one will find search tools as well as information that will assist the customer in determining how best to fulfill their requirements needs (SEWP, 2008).

SEWP's fax manual entry, in the author's opinion, is a throwback before online ordering. The concept is dichotomous in that product searches and downloading order forms are performed online. This is an example of what the author refers to as a low-tech paper-based solution that enables data entry personnel at SEWP to adapt orders to meet changing conditions in the supply chain that would otherwise call for tech support intervention. In this case a 'paper-based' mentality may have utility, in that orders can be filled utilizing telephone or mail service which may have its place in the time of a national emergency when IT infrastructure may not be dependable. However, in the author's judgment, such redundancy is best maintained at the level of backup processing – while primary transactions should be conducted in a paperless fashion.

N. SUMMARY

Program Management initiates their requirement. The Army Single Face to Industry (ASFI) is comprised of Standard Procurement System (SPS) or Procurement Automated Data and Document System (PADDS) and leads into the Interactive Business Opportunities Page (IBOP). The action also passes form SPS and PADDS to Defense Automatic Addressing System Center (DAASC) and through ASFI ending up as a solicitation on FedBizOpps.

The Wholesale Logistics Modernization Program (WLMP) was an effort to better manage AWCF. The Logistics Modernization Program (LMP) was the Army's latest attempt at modernization and includes electronic Project Contract Folder (PCF).

The DoD Architecture Framework (DODAF) shows what has to be taken into consideration to get various systems to share data and information.

Solutions for Enterprise-Wide Procurement (SEWP) was NASA's attempt at a GWAC contracting device. However, it relies on email and facsimile to translate requirements into awards.

With the exception of DAASC, the systems presented fail at being truly paperless due in part to paper-based manual data input and the constant printing of documents needed for collaboration, and legal review. Paper can be easily handled and there are no new skills to be learned. The technology necessary for procurement consists of a pen and a ream of paper. Add to this the sophistication of the last century with its preprinted forms, typewriters, photocopiers and the facsimile. Even when technology supports innovation, humane nature is resistant to change.

In conclusion, paper and the paper-based mentality have followed the DoD into the twenty-first century.

IV. COMMERCIALLY AVAILABLE SOFTWARE

A. INTRODUCTION

Commercial software consists of large integrated enterprise systems such as SAP and large enterprise system built around a database such as Oracle.

Singular applications such as ACART represent a different kind of software. These applications assist and add functionality to other applications and databases within the business structure.

Architecture is the framework the applications run on. As an analogy, if the hardware part of a network were the paved roads then the architecture would be the signs and traffic lights.

The author have researched two approaches coming from opposite perspectives. Service Oriented Architecture (SOA) is complex ‘top down’ architecture whereas; Web Oriented Architecture (WOA) is small scale, grass roots, that is an interface-level architectural style (Smith, 2008).

B. SAP

The SAP preference of relying on their system and personnel is evident in the following excerpt:

Implementation programs with the set goal of “replacing systems” – without mentioning process improvement – are doomed to failure. Best practice indicates that a successful implementation can in fact force an organization to reevaluate its business practices and processes, focus on clearly defined goals and objectives, create a higher understanding of the need for data accuracy, emphasize time-phased material planning, and enable a more effective datasharing environment. However, such high-level benefits require a new approach to project implementation, one that applies the lessons of the past to reinvent the systems of the future (SAP, 2008).

Enterprise resource planning (ERP) systems designed by SAP may be purchased as a complete system needing very little customizing to integrate with a business's existing system. Another approach is to install the system and import preexisting data into the SAP database. This requires imported data to be cleansed and justified to the appropriate requirements for SAP. Although this is a separate operation, it is only done once. All subsequent data will be entered in native mode to SAP. Adapting input to an existing system allows SAP to utilize the modules of an old system but requires customized programming to do so. The benefit to this approach is that existing software is left intact and IT is already familiar with it. The downside is the preexisting data and concepts will not be an exact "fit" with SAP and cause debugging problems that cannot be readily solved.

SAP is a highly prioritized system. It requires custom patches and programming to hand off data and information to other systems. When implementing a new system, SAP suggests evaluating Best Practices as described below:

Best practice indicates that a successful implementation can in fact force an organization to reevaluate its business practices and processes, focus on clearly defined goals and objectives, create a higher understanding of the need for data accuracy, emphasize time-phased material planning, and enable a more effective data sharing environment. However, such high-level benefits require a new approach to project implementation, one that applies the lessons of the past to reinvent the systems of the future (SAP, 2008).

SAP moves away from the traditional stovepipe environment instead favoring a holistic, closed-loop framework that incorporates, as an integrated process, marketing and sales. Integrated sales and marketing (ISM) within the SAP system creates a homogeneous relationship between sub systems. This facilitates one data source being used for several operations.

An ISM approach combines existing technology such as enterprise resource planning and customer relationship management with capabilities such as dynamic sales and operations planning, global data synchronization, point-of-sale-based advanced analytics, integrated trade promotions management, multi-tiered collaboration and shared scorecards, brand management, retail execution, and category management (SAP, 2008).

The ISM approach allows for more integrated decision-making. Total lifecycle with its critical path and milestones are included into one integrated system for queries and reports as illustrated in Figure 6.

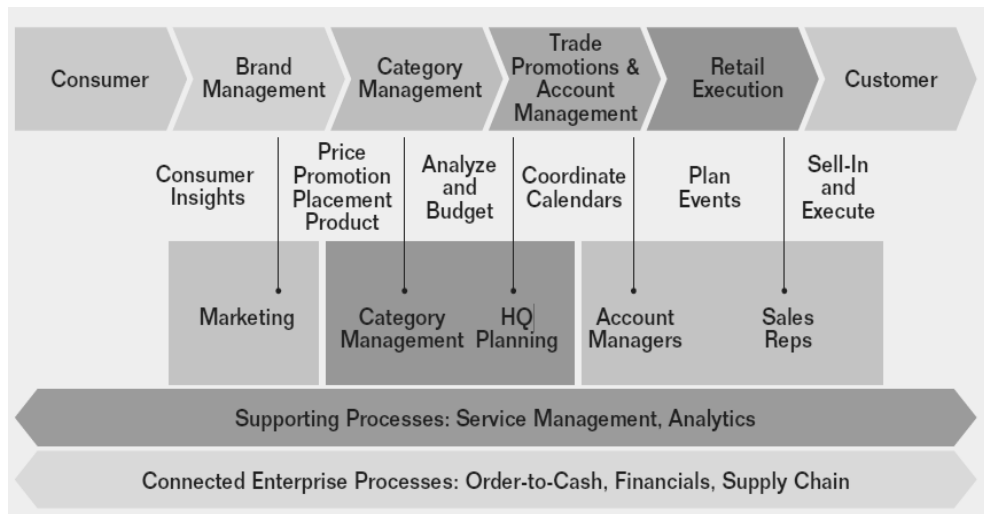


Figure 6. The ISM approach (From: SAP, 2008)

DoD has an equally complex framework as seen in Figure 3. Whereas, The ISM approach in Figure 6 is integrated and paperless, The Integrated Defense Acquisition, Technology and Logistics Life Cycle Management Framework Chart makes its connection with many proprietary applications and manual data input. Figure 6 is a template where DoD titles could replace the titles shown.

Metrics are an important part of any business. SAP provides analytics to qualify and quantify an operation.

- Better ability to discover and leverage new brand and product portfolio insights at the shelf
- Faster, more effective product introductions (and phaseouts)
- Increased consumer satisfaction and brand loyalty
- Enhanced employee satisfaction, thanks to fewer interfaces and software to be learned
- Improved sales channel satisfaction and retention of top sales and service people
- Speedier channel partner ramp-up time
- Improved alignment and consistent execution of corporate strategy
- Increased fill rates
- Enhanced brand asset utilization
- Improved financial performance, such as increased invoice accuracy and decreased cash-to-cash cycle (SAP, 2008).

Although SAP systems are designed to operate most efficiently within its own structure, supply chain and back office information must be importable. Managers need the capability of performing what if queries drawing on both internal and external databases. SAP is a robust system that can stand-alone and operate on its one integrated database while it allows for external connections to be integrated into its analytical processes.

In an effort to compete more effectively with Oracle, SAP is developing a Service Oriented Architecture (SOA) that allows its applications to interact as web applications within their system.

C. ORACLE

Recently, PeopleSoft was acquired by Oracle. The following was taken from an Oracle Applications Strategy Briefing (Video) given by Charles Phillips as he discusses Oracle Fusion Middleware (OFM) development and integration.

PeopleSoft, JD Edwards and Retek are combining the best of their applications and linking them to the Oracle database as well as each other through OFM. Throughout the seminar, OFM was compared to SAP Net Weaver. Both are examples of SOA.

Information Age Applications are Information, Standards and Industry driven.

SAP is the leader due to its integrated applications. Oracle is moving to close the gap with its development of OFM. The Oracle database can be linked to applications through sophisticated middleware. Oracle will then be able to purchase applications and integrate them into the Fusion environment. Applications are developed independently. The best in class are purchased and added in to the system. By developing this way, Oracle can meet the present needs of the customer while continuing to develop for future iterations. In addition, software must remain upgradeable until such time the customer is able to transition into a different application. Oracle's focus is a merge of past, present and future applications facilitated by OFM.

Software of the future will meet the customer's needs rather than causing the customer to conform to the application. Total Ownership Experience and Security is the hallmark of the future.

With a close customer relationship, 400 hundred advisor boards drive product direction. At Oracle, they "Try to look at needs out in the future...skating to where the puck will be."

Customer Relationship Management (CRM) technology collapsed because it did not help sales people. Therefore, they did not use it. They were receiving data while needing information.

Build to the 'process' of the customer's needs and provide long-term value with supportable and upgradable applications that will interface through OFM to the Oracle database and external environment (SAP, 2008).

At one time, Oracle was thought of as a database company while PeopleSoft marketed applications. SAP installed customized, proprietary enterprise systems consisting of its own applications coupled to its database. Oracle bought PeopleSoft to achieve parity with SAP (Oracle and PeopleSoft, 2008).

Oracle is known to buy a company to acquire its applications rather than developing in house. Oracle Fusion Middleware (OFM) became a necessity to create interoperability within the company's applications (OFM, 2008).

D. ACART

ACART is an ad hoc tool that allows the users to extract information from dissimilar systems and make comparisons (ACART, 2008).

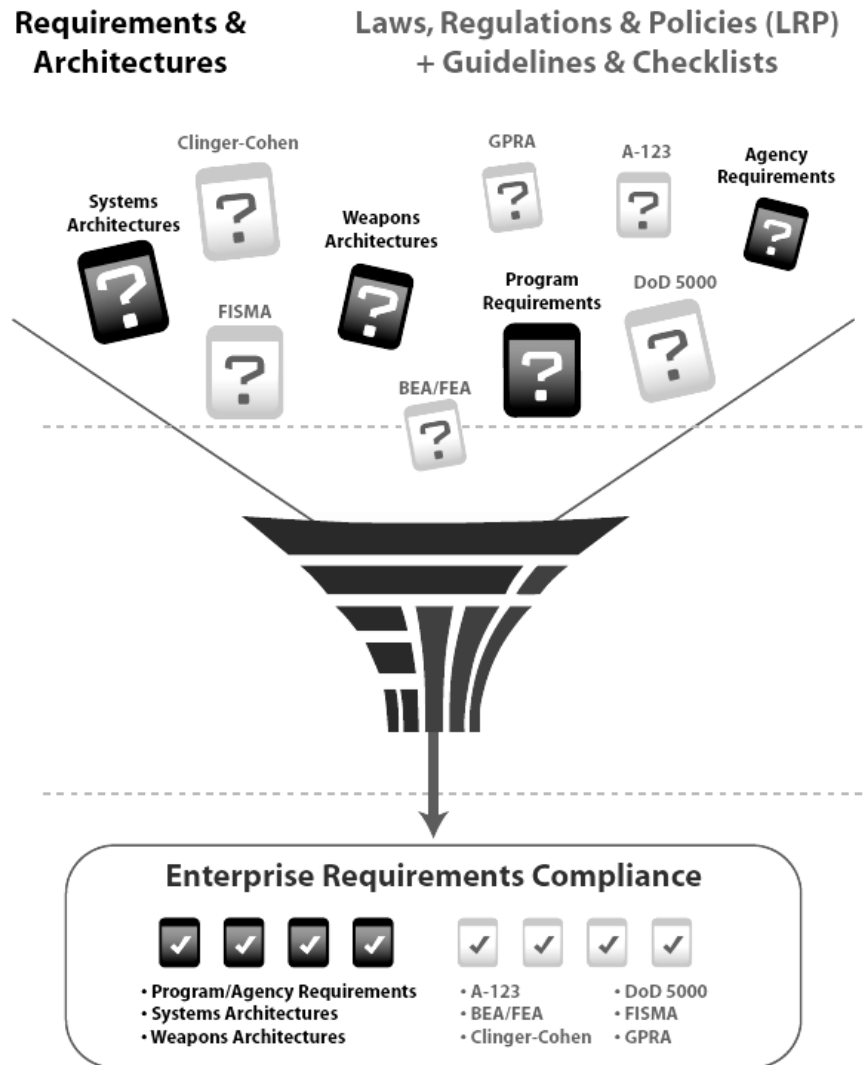


Figure 7. Sort and map enterprise requirements for targeted reporting (From: ACART, 2008)

ACART uses a paper-based mentality with a paperless solution. The query tool allows one to choose information from a multitude of systems to be evaluated and determine the rules of evaluation just as though the documents had been gathered and categorized on a desk. Information is collected and reports are written and published.

E. ARCHITECTURE

Commercial enterprise systems employing Service Oriented Architecture (SOA) have not been entirely successful due complexities and cost found in development (Hinchcliffe, 2008).

- SOAs tend to have a small and well-defined set of endpoints through which many types of data and data instances can pass.
- Traditional SOA builds a messaging layer above HTTP using SOAP and providing unique and sometimes prohibitive constraints to the Web developer
- SOA was designed from the top-down by vendors to be tool friendly
- SOA uses WS-Security and other sophisticated standards for security
- SOA must contend with the vagaries of XML Schemas for service contracts
- Traditional SOA is fairly cumbersome to consume in the browser
- Traditional SOA is facing a crises of identity at this point, particularly given fairly lackluster results (Hinchcliffe, 2008)

SOA Reshaped by the Web 2.0 Era: Granular, Radically Distributed, Web- Oriented, Open, Highly Consumable

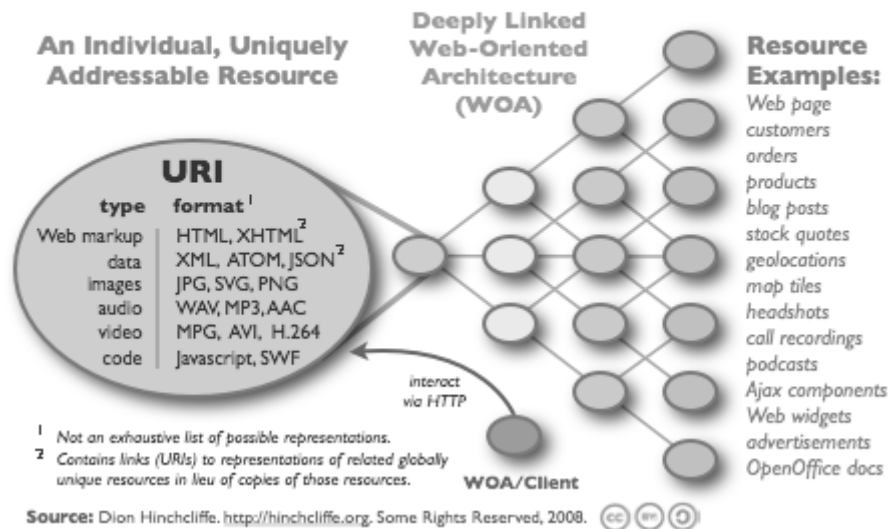


Figure 8. Service Oriented Architecture (From: Hinchcliffe, 2008)

F. SUMMARY

Commercial enterprise solutions consisting of large-scale application and its database present one side of the solution. The rest of the problem is solved by employing an ad hoc collection of applications that perform a specific purpose. Without a common interface or standardized data, it can be difficult making some of these applications work. Proprietary software shuts out other application while creating a barrier for itself.

V. COMPLETING THE SYSTEM

A. INTRODUCTION

The DoD has made the transition to a kind of automated, paperless contracting. However, much of it remains based in what the author calls a ‘paper based mentality’. To be fully functional, it must become people friendly. Just as in ergonomic issues concerning where and how people work physically, the ergonomics of business functionality must be addressed. The DoD needs to make the paperless environment look, feel and operate like paper in the ‘minds’ of contracting personnel. Without this, the DoD will continue to need filing cabinets, printers and photocopiers. Redundant systems of paperless and paper-based have evolved requiring additional maintenance (Sellen, 2008).

B. WEB-BASED MENTALITY

What the author refers to as a ‘Web-based mentality’ is a construct that synthesizes the persistent human utility of Paper-Based systems and paper-based mentalities with the computational and cost efficiency of Paperless systems. There are processes that are inherent with humans such as visualization and manual manipulation. Humans desire communication with one another. Since the dawn of civilization, until recently, communication media was seen and handled. It could be understood by what it looked like and how it was seen to function.

In the middle twentieth century, that concept began to change. Mainframe computers stored data. Manual data input is an impersonal process. As the paperless revolution continued, more of the process was automated and performed by software applications.

As the process begins, a new account is entered into the system. It is uploaded by manual data input. The process involves the customer filling in a form, which is then input by a clerk. From this point forward, the account is paperless until the mail comes and the customer opens the envelope and reads the bill.

Today, the world has progressed to electronic transfers of funds. Humans touch very little of the process.

The Web-based process puts a 'human face' on the paperless environment. The World Wide Web has become the paper of the twenty-first century. People of all ages are as comfortable interacting with web applications as they are reading a magazine or filling in the form for a car loan.

Procurement has followed the same route. In the beginning, all acquisitions were done on paper and handled by people. Then in the mid twentieth century, mainframe computers were employed. This was followed by networked personal computers.

The contracting process is complex and requires the continual review of the contents of the document folder. Since this folder has become electronically stored, it must be viewed on a monitor.

This process has not been accepted by many in contracting. In the author's experience, many contracts at CECOM have complete paper-based contract folders. They exist to facilitate contract negotiations and document maintenance. PCF was intended to bring closure to paper-based contracting. Nevertheless, reams of paper are being printed every day in a paperless environment. This is followed by shredding, since being paperless, there is no need for filing cabinets.

In the past year, notebook computers have been issued to some as well as dual or wide-screen monitors and docking stations in an attempt to become truly paperless. The author carries his notebook computer to meetings only to find that he is the only person with a computer. He still needs a note pad because typing is disrupting to others and the battery only lasts two hours.

Acquisition enterprise applications must be made to be more desirable to use. While people are comfortable surfing the web, they are on edge while using acquisition enterprise applications. Hence, they default back to paper.

Table 1 illustrates the relationship between Paper-Based, Paperless and Web-Based processes and mentalities, or the way people physiologically interact with the contracting environment.

-BASED PROCESS

- Paper, Pen, Typewriter, Photocopy, Facsimile
- Document Forms, Templates
- Data is manually manipulated
- Thinking one must manually handle paper during the process
- Visualization of the paper
- Data availability is ad hoc
- Electronic Database, Application Software, Computers, Networks
- Input forms, Reports, Queries
- Data is manipulated by application software
- Cerebral method used to spatially process information
- Knowledge of applications and databases
- Data is entered and requested by applications
- A Paperless Process with a Paper-Based Mentality
- Visualization of a Webpage
- Data is manipulated by application software
- Computers are similar
- Web-Based interfaces are similar
- Data availability is ad hoc

Table 1. Web-Based Mentality

A Paper-Based system is comprised of printed and hand written documents. These documents are organized and assembled into folders. While not being used, they are stored in filing cabinets provided space is available. The author has observed contracting personnel printing entire electronically stored contract folders for the desire

of working with paper. When asked about working with paper as opposed to keeping and working with files in electronic format, they cited it was more convenient to use paper documents when discussing contracting issues with colleagues. Other departments outside of contracting require paper documents and folders. Program managers and the legal department want full paper-based documentation in folders with wet-signatures.

Electronically stored documents are not sufficiently protected in the author's experience. Many electronically stored documents reside on personal computer hard drives under desks. A hardware failure can render the data, stored on the drive, irretrievable. All electronically stored data can be accidentally deleted and lost.

The Paperless environment consists of databases and applications residing on a networked enterprise system. Some of the procurement process has been automated as stated elsewhere in this report. It is possible to have a fully secure electronic system. Through the use of Redundant Array of Independent Disks and Uninterruptable Power Supplies, the chance of data loss is remote. Data server rooms can be locked down and fireproofed. Data can be encrypted and networks made secure. On the other hand, a paper document must be kept under lock and key due to being easily read and misplaced. In the author's experience, interaction with present procurement applications is strained. An unintentional mouse click can have disastrous results. Proprietary or classified information may be sent to the wrong email address. When mailing with paper, outside mail goes into Priority or Express envelopes, down to the mailroom for stamping and out for delivery. Internal documents are sent in special envelopes for internal delivery. With email, there can be Reply or Reply to All combined with a concatenation of previous messages. In the author's experience, he has received many emails that had unintended recipients.

Web-Based, as defined by the author, is a convergence of present, automated, paperless, enterprise systems with the psychological feel and safeguards of a paper-based system. The web-based system consists of the present applications and databases that employ middleware for interoperable transparency. Data validation patches and metadata would be applied to existing software to insure data compatibility between applications.

In the author's opinion, Web-Based applications are the paper of the future.

To accomplish this, the DoD must implement a Web-Based User Interface (UI) that will replace the psychological and legal need for paper. Applications must link seamlessly and securely to facilitate movement within several enterprise systems.

The individual's User Interface would be stored on a Personnel Server and accessed with the Common Access Card (CAC) at logon. Single logon to other systems could be achieved by the application accepting the CAC logon. Systems that are not native to DoD would be accessed by retrieving the user identification and password for that particular application. A user identification and password record would be stored with the user's profile information for each non-native application. The Virtual Desktop would be accessible through any web browser provided security conditions have been met.

Applications and databases would reside on secured servers. Applications would be requested from the server when needed. When available, application updates would occur based on usage. Applications could be run on thin client computers entirely online with the user supplying data input. Other computers could have application updates pushed at the convenience of the IT department. This type of division allows many users to have access to a limited number of application licenses.

Databases would transmit encrypted data to the users Desktop to be decrypted by the user's CAC card. To insure security when logging off, data files on the user's computer would be deleted and overwritten.

To discourage the use of paper, the Virtual Desktop must be more user friendly, secure, and easily accessible. Utilizing the Virtual Desktop will enable procurement personnel to access their desktop from any desktop computer, notebook computer, or mobile Blackberry device as long as the security parameters are met.

The screen layout or visual display would be organized to create a logical order to the flow of work. This could be done by using movable objects within various applications to customize the application's look, feel, and use according to each user's personal design. Several customized personal desktops could be stored for suit particular

contracting needs. This would be similar to spreading out and organizing one's work on their desk. For instance, there could be a specific desktop for reviewing and signing an award from a Blackberry.

C. WEB-BASED OVERARCHING ARCHITECTURE

Service Oriented Architecture (SOA) and Web Oriented Architecture (WOA) are two solutions to the same problem. Until recently, SOA was thought of as the more robust of the two. With its reusable code, it is able to perform more complex and secure operations. Contrasted to WOA, which is resource oriented, has been thought, until recently, to be more limited and data focused. SOA is a system level architecture whereas WOA is interface-level.

The technical aspects of the architecture are beyond the scope of this paper. An important difference between the two is WOA is less expensive to implement. SOAs have been tried but the return on investment has not been sufficient. However, WOAs are thought of as a startup company resource. Recently IBM and Amazon have been testing this architecture because it is less expensive to develop. In addition, MindTouch is working with the Army developing an open source wiki collaboration and content management platform with IT governance (Smith, 2008).

Combining present enterprise systems and their SOA style architecture with the WOA model would allow for the development of a truly paperless web-based system where personnel using the system would feel comfortable sharing information without the need for printing it out. The WOA is a cost effective solution for achieving a truly 'paperless' solution for contracting. (Hinchcliffe, 2008).

- WOAs tend to have a very large and open-ended number of endpoints; one for each individual resource. Not an endpoint for each type of resource, but a URI-identified endpoint for each and every resource instance
- WOA finds HTTP and related transfer mechanisms to be the ideal layer of abstraction for most applications
- was emerged from the bottom up from the Web naturally and has the best support in simple procedural code and an XML parser
- WOA tends to just use HTTPS

- WOA largely ignores the issue and lets Web services naturally represent whatever formats are desired
- WOA is extremely easy to consume just about anywhere
- WOA are easier to implement, scale better, and result in much greater uptake and usage scenarios (Hinchcliffe, 2008)



Figure 9. Web Oriented Architecture (From: Hinchcliffe, 2008)

In the author’s opinion, Web-based architecture must be implemented by the DoD and Army to facilitate bringing web-based applications and databases to fruition. From the article ‘Oracle Fusion Architecture Eases the Adoption of Service-Oriented Architecture’, Summit Strategies the company suggests:

During the past few years, a confluence of IT customers’ pressing technical and business requirements and the availability of new technical capabilities has set the stage for the next generation of business computing. Summit Strategies labels this generation as one of “dynamic computing,” and broadly characterizes it as an era in which IT resources become more automated, more agile and—most important—more synchronized with the business processes and objectives that the resources support. Dynamic computing and the business agility it promises, in turn, depends on various building-block tools and technologies.

None of these enablers is more important or wide-reaching than that of service-oriented architecture (SOA) (Oracle Fusion Architecture Eases the Adoption of Service-Oriented Architecture, 2006).

As discussed in the previous section, SOA is designed for the enterprise, large systems level. SOA have been around for a few years, were expensive to implement and at the time unnecessary since corporate, business software was not run on the web. Now that open source and interoperability are necessary to reduce the cost of future software development, both SOA and WOA have been receiving a lot of interest from developers.

OnLine Transaction Processing (OLTP) from Trigon Blue is an application using Server Side Scripting Server Side Scripting (such as Active Server Pages), it is possible to connect to other components of a distributed system in the form of business objects on the Transaction Server and to send messages to the Database Server (Web Based Architecture, 2008).

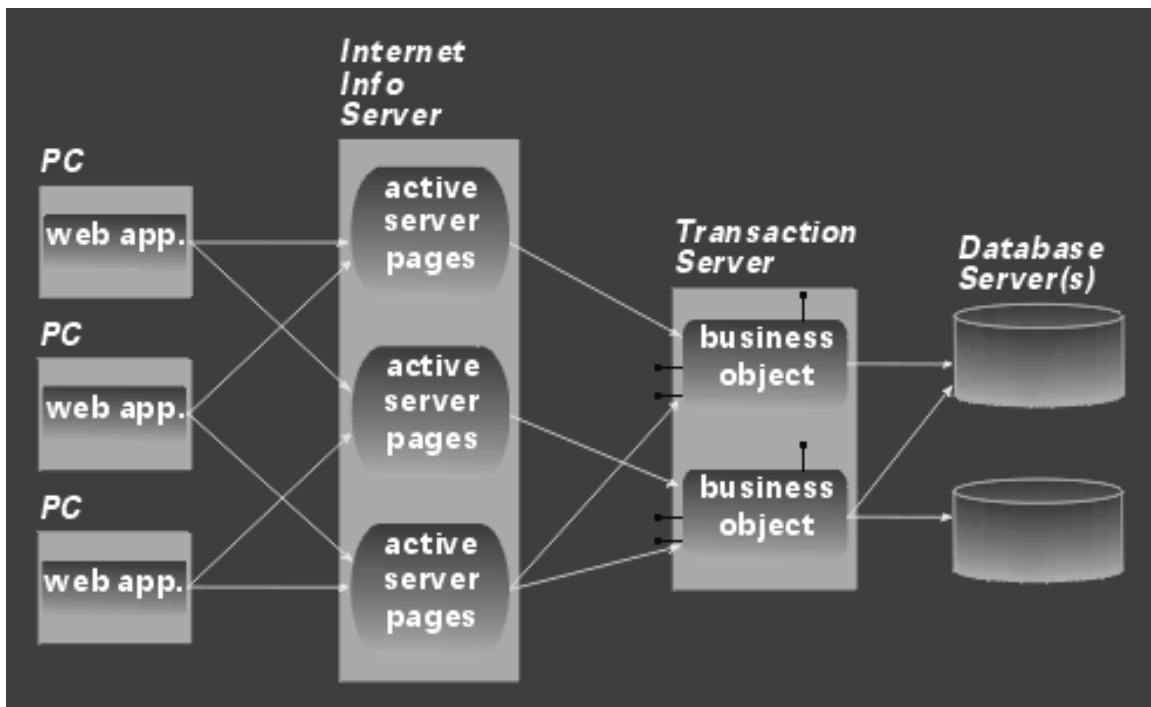


Figure 10. OnLine Transaction Processing (OLTP) (From: Web Based Architecture, 2008)

D. SUMMARY

Completing the system means taking the automated, paperless, procurement enterprise system and causing it to function as intended: paperless. To answer the question, “Why are acquisition people using so much paper?” the author compared processes and coined ‘mentality’ as a term referring to how people think and act. For example (to his frustration), the author has experienced being told to print entire folders for legal review and for use in negotiations.

Web applications serve as the twenty first century paper. Web architecture will allow web-based applications and databases to exchange information securely without corruption.

VI. CONCLUSION AND RECOMMENDATIONS

A. CONCLUSION

The author's research began with paper-based acquisition for the DoD. Next, he followed it to mainframe computers. This was followed by networks and personal desktop computers. Applications evolved from paper-based forms to electronic forms. Business practices have gone from written rules to rules that are embedded in the applications.

As the present workforce retires, the incoming personnel must be prepared to carry on. People have become World Wide Web savvy. They read the news and do their banking online while seamlessly traversing web applications and databases of all types. This has been made possible due to the guidance of the World Wide Web Consortium.

The DoD is improving its automatic procurement software daily. However, improving the software is not enough. The user interface lacks paper-based mentality. It does not feel right to the user. In the author's opinion, that explains why SEWP decided on the fax form to initiate an order. The DoD needs to put a web-face on all applications.

Web architecture and middle ware, applications are needed for the next step in efficient contracting. Going the web presents security issues. Data transmission can be made secure either through network security hardware or data encryption applications.

The pitfalls of the present system is the feeling that the task has been accomplished when in actuality the system is broken. It is difficult to fix a problem when you cannot see it. The IT people do not see the problem and the contracting people that see it do not know how to fix it. To compensate, they print and shred documents with regularity.

B. RECOMMENDATIONS

The DoD must transition from handling paper to utilizing web based virtual desktops to manipulate web applications. To accomplish this, they must eliminate the

psychological and functional need for paper. A notebook computer is the same size and weight as a folder and like a folder can be easily carried. In addition, paper is difficult to secure. Instead of photocopying and carrying paper, store data on a data server or USB that is encrypted with a polymorphic key tied to CAC card.

Rather than logging into a specific personal computer with individual security, profiles should be stored on the profile server. Security enhancements could include the CAC card, biometrics and passwords. Access to the system would be through any device that supports online web applications and meets the security requirements for the information to be handled. For instance, one could logon to an Army server and gain information about the base but be restricted from contracting applications because his virtual desktop lacked a CAC card reader.

Virtual desktops abound in college and corporate settings. Numerous computing devices and operating systems have the means for linking into online web applications. Besides the personal computer, mainframes, cell phones, personal digital assistants (PDA), televisions and video games can provide an interface.

Build toward and online web based infrastructure. Using the SAP model of a large, integrated enterprise system, continue to improve on present applications, such as LMP, while building toward interoperability for the future. SAP's Net Weaver implementation and standardized W3C databases will enable transparency in web-based transactions.

Continue using the Oracle model of a standardized database tied to many different applications through the use of Oracle Fusion Middleware (OFM) and like products. Piecemealing applications into an enterprise system allows the DoD to fund the 'best in class.' In addition, it allows for one-off and rapid development applications.

Build Service Oriented Architecture (SOA) for a large scale, reusable service that fulfills a distinct business function and Web Oriented Architecture (WOA) limited data focused functions (Smith, 2008).

Dashboard applications like ACART will enable queries of multiple systems across the web.

C. SUGGESTED AREAS FOR FURTHER RESEARCH

This thesis has made claims about the persistence of what has been called a ‘paper-based mentality’ in systems that were intended to be ‘paperless.’ Future research needs to be done to examine the prevalence of this ‘paper-based mentality’ in contracting systems, and perhaps across the DoD. The author has indicated that the ‘paper-based mentality’ is persistent because paper has a human utility that is not captured in current systems. Future research needs to be done to better define and quantify that utility. Finally, the author has defined a construct called a ‘web-based mentality’ and claimed that it can capture the human utility of paper-based systems as well as the potential cost savings of paperless systems. Future research needs to be done to support this claim as well.

Beyond the immediate claims of this thesis around WOA and the ‘web-based mentality’, research should continue to investigate the application of other leading edge information technology to Contracting. Further research should include best in class applications, transparent databases with appropriate metadata allowing information to be passed among applications without corruption or being misrepresented.

As in organizational behavior, explore the environment looking at people, surroundings and their work to be accomplished. Look at the employees’ ‘tools of the trade.’ Should the employee be made to adapt or should designers build to reduce the learning curve by building to fit the person. The way people think, act, and move must be the design criteria when designing for the future. Human behavior and utility investigations should be performed to find the most efficient, cost effective method of contracting.

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APPENDIX A.

Defense Automatic Addressing System Center (DAASC) (DAASC, 2008)

https://www.daas.dla.mil/daashome/daasc_services.asp

The DAASC INQuiry System provides information on Communication Routing Identifiers (COMMRI), DoD Activity Address Codes (DODAAC), Routing Identifier Codes (RIC), Military Assistance Program Address Codes (MAPAC) and National Item Identification Number (NIIN) Codes.

Additionally, eDAASINQ, an enhanced version of DAASINQ described above, provides additional queries and downloads by service or “All” in “TA1” delimited format. eDAASINQ is PKI-enabled and access to the application may be requested by submitting a System Access Request (SAR).

DAMES is a PC based software package that provides the user with the capability to communicate with the Defense Automatic Addressing System Center (DAASC). It provides capability to send/receive logistics transactions and narrative text through a modem using standard telephone lines or the Internet.

The LMARS/CWT Reporting System is a capability to nodally track material as it flows through the logistics pipeline and report the associated response times. The office of the Under Secretary of Defense for Logistics has identified twelve nodes for measuring the logistics pipeline.

DAASC Logistics Reports, including Priority Designators, LIDS, MILSBILLS, MILSTEP and Publications.

MILSBILLS Inquiry System is a query system providing both local and remote users the capability to query and display Interfund Bills (MILSBILLS) and Materiel Obligation Validation (MOV) files and generate retransmit requests on-line. The MOV System contains all inquiry batches and AE status documents submitted during the recent quarter, retaining the data for 90 days.

WEBLINK and PCLINK have transitioned to Asset Visibility.

<https://www.av.dla.mil/welcome/welcome.jsp>

Transportation Account Code Inquiry - TACs are used and assigned daily all over the world by shippers, Transportation Offices, Ports, and Transportation Component Commands (TCCs), and are essential to the operation of the DTS. DAASC maintains a single repository for updating TAC codes and the dissemination of daily changes. Also provided are various data base queries, TAC manual publication generation and service downloads.

The DSS WEB BRIDGE provides a web-based, read-only, capability for customers to track logistics transactions exchanged between the DLA Distribution Standard System (DSS) and the Navy Fleet Industrial Supply Center (FISC) wholesale supply system (UADPS U2). The DSS Bridge translates transactions to/from the Defense Logistics Standard System (DLSS) format processed in DSS and the Navy User Defined File (UDF) format processed in the Navy wholesale supply system. The DSS WEBBRIDGE provides images of the transactions and the associated communications information as they flow through the DSS Bridge application.

Web Requisitioning (WEBREQ) is a DAASC Web product that provides customers a means to input materiel requisitions, cancellations, follow-ups, modifications, and Materiel Obligation Validation (MOV) documents. WEBREQ can also provide status documents back to the user.

Web Supply Discrepancy Reporting (WEBSDR) system will provide a web-based entry method for SDRs, routing for web submissions and logistics transactions according to business rules, any-to-any translation to support unique and standard transaction formats, information exchange between the action office and the shipper, SDR resolution responses, capture of SDR and response management statistics and assimilation of SDR metrics along with Customer Wait Time/Logistics Response Time in support of perfect order fulfillment. This process reduces manual SDR form creation and provides an automated process for tracking SDR response information.

WEB Visual Logistics Information and Processing System. WEB VLIPS is a web based, access controlled query system that is useable from any Internet attached PC. It accesses the Logistics On-line Tracking System (LOTS), a DAASC relational database system, which portrays the life cycle of a logistics action.

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APPENDIX B

The Army Single Face to Industry (ASFI) (ASFI, 2006)

Users Guide, August 2006

3.0 ASFI EDIT CRITERIA

Regardless of the process utilized to post solicitation data/documents certain data must be present and valid. In order to successfully post solicitation data/documents to the ASFI

Data Item	Expected Results
Solicitation Number (Mandatory)	Maximum Length = 13 characters
Amendment Number (Mandatory)	Maximum Length = 4 characters
Close (Response) Date (Mandatory)	Format = DDMMYYYY (Must be greater than current date)
NAICS	If provided, must be valid NAICS
Solicitation URL (Mandatory)	Maximum Length = 250 characters
Solicitation Issue Date	Format = DDMMYYYY
Solicitation Status (Mandatory)	Values; 00 = Initial or Original Solicitation 01 = Cancellation (Amendment) 02 = Add (Amendment) 04 = Change 05 = Replace (Conformed Solicitation) 17 = Cancel, to be Reissued
Buyer Name (Mandatory)	Maximum Length = 35 characters
Buyer E-mail Address (Mandatory)	Maximum Length = 80 characters
Buyer Phone Number (Mandatory)	Maximum Length = 30 characters
FSC	If provided, must be valid FSC
Noun	Maximum Length = 65 characters

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APPENDIX C

Wholesale Logistics Modernization Program

The business processes used for the working capital fund have not changed significantly in the last three decades. As a result, logistics processes have become outdated and costly to maintain. The Wholesale Logistics Modernization Program was thus devised to improve the agility, reliability, and responsiveness of the AWCF activities.



Through adoption of private sector supply chain and financial management best practices, WLMP will improve force readiness and mission performance, take advantage of efficiencies in systems operations, improve system maintainability and adaptability, and provide full asset visibility through the integration of logistics and financial data, giving the AWCF an integrated cost accounting system. Through the DFAS Corporate Information Infrastructure (DCII) environment, WLMP additionally will interface with DoD-wide USSGL data to improve accounting and finance reporting for AMC at the AMC, Army, and DoD levels of interest. This is just one illustration of how the Army is progressing toward the use of transaction-driven, USSGL-based accounting systems.

When fully implemented, WLMP will provide a single point of entry for the recording, reporting, and analysis of inventory and related financial data, directly addressing an identified internal control weakness cited in the Army's FY 2000 financial statements. The modernization program will provide a financial information management system while simultaneously providing the logistics community with easy access to online, real-time information at a detail level low enough to enable data to be summarized and sorted. Managers will be able to use these data to perform such functions as Activity-Based Costing and bringing financial data for the AWCF under general ledger control.

APPENDIX D

DoD Architecture Framework (DODAF) (DODAF, 2007)

Version 1.5, Page 2-13

CONCEPT: Populate the Net-Centric Environment

This concept addresses the data, information, and capabilities that are being made discoverable and accessible on the NCE so that they can be leveraged by others. The information and capabilities provided to the NCE should support discovery and enable access to authorized users (human or machine, known and unanticipated) using a webbased device or platform. While there are many methods and technologies to provide information to the NCE, web-based, open technology standards are preferred. As information and capabilities are provided to the NCE, architects and engineers should ensure that they are done so in a manner that provides the most value, in convenient ways, to the broadest set of potential users. In essence, architects and engineers should provide value-added services to the NCE.

The term service has many definitions, depending on the context and intended use. DoDAF v1.5 embraces the IEEE 1003.0 definition of a service, which is “a distinct part of the functionality that is provided by a system on one side of an interface to a system on the other side of an interface.” To better align with overarching DoD net-centric strategies, the DoDAF v1.5 extends this definition of service to include those interfaces that allow execution of a business or mission process, or exchange information among both machine and human users via standard interfaces and specifications without regard for the underlying implementation. For example, a service can be an information processing routine that is invoked to assist in a business processing function (e.g., payroll lookup). Or, a service can be one that provides map imagery directly to a human that has access to a web-based device or platform (e.g., a web-enabled PDA). Accordingly, web portals, web sites, and Web Services all fall within the definition of a ‘service’ as discussed in DoDAF v1.5. Note, while the net-centric guidance provided in the DoDAF v1.5 focuses on webbased services, much of the guidance is applicable to any form of electronic information processing or access service. Regardless of the type of service that

provides information and/or a capability to the NCE, the service provider (i.e., the entity that actually provides the capability) will need to describe the service in a robust manner that gives both humans and machines enough details to make a decision on when, where, and how to use the service (in addition to other important details such as performance level expectations and information assurance specifics). A service specification is the set of descriptive metadata that provides a consistent way to describe the use, composition, and implementation of a service to service providers, users, developers, and managers. A service specification should be provided for each service that is or will be provided to the NCE. The service specification enables services to be documented in a consistent manner, and the DoD-wide Service Specification

Template (SST) should be used to the extent possible for describing each service.

Regardless of the precise service specification template employed in the subject architecture, a minimum set of information for each service must be provided in the following categories:

- Interface Model Category – describes the interface, available operations, any faults that an individual operation may generate, and points to access the service
- Information Model Category – describes the capability the service provides, the expected input and output data model, and outlines the available metadata for the service
- Behavior Model Category – Identifies how the service interacts with other services, describes the underlying processing rules of the service, and describes the multiple integration patterns available to users of the service
- Fault Model Category – describes how the service will handle faults and under what conditions a fault may be returned to the consumer
- Quality Model Category - describes the security requirements of the service, the QoS levels, and any performance considerations for service deployment
- Point of Contact Information Category – describes the types of contacts associated with a service, which may include developers, managers, or maintenance organizations.
- Service Access Point Information Category – describes the message format and transmission protocol, Uniform Resource Locator (URL), the operational status and point of contact, and the lifecycle step of the service (e.g., Development, Testing, or Production)

The level of detail contained within a service specification is driven partly by the type of service. Human-facing web services (e.g., portals, web sites) generally need only be specified in a manner that allows a human to find and understand what the service does, how to access it, and how to understand its outputs. Both human facing services and system facing services are described using the template. However, where the primary user of services is another system, a more detailed specification is required to be machine interpretable. These system consumable services generally will be specified through the service information, service interface, and service implementation categories in the specification template.

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APPENDIX E

Solutions for Enterprise-Wide Procurement (SEWP) FAX Form Tool

The screenshot shows a web browser window titled "NASA SEWP IV FAX Form - Windows Internet Explorer". The address bar shows the URL "http://www.sewp.nasa.gov/fax_form.shtml". The browser's menu bar includes "File", "Edit", "View", "Favorites", "Tools", and "Help". The main content area features a header with the NASA SEWP logo and contact information: "Helpline: (301) 286-1478 help@sewp.nasa.gov" and "Orders: FAX (301) 286-0317 sewporders@sewp.nasa.gov". A small duck logo is also present. Below the header is a navigation menu with links: "Info Center >", "Contract Holders >", "Order Info >", "SEWP Tools >", "Customer Service >", "Agency Specific >", "News", "Site Map >", and "Home". A "Fast Access" sidebar contains links for "FAQ", "Training Video", "Procurement Resources", "Manufacturer Lookup", "Request for Quote", "Event Calendar", "Address and Directions", "Give Us Your Feedback", and a "Search" box. The main form area is titled "SEWP Fax Form Tool" and includes a note: "Note: Items marked with * are mandatory!". The form fields are: "* # Pages including Cover:" (text input), "* First Name:" (text input), "* Last Name:" (text input), "E-mail:" (text input), a checkbox for "Notify me when this order has been processed in the the SEWP office and sent to the Vendor.", "* Order #:" (text input), "* Anticipated Delivery Date:" (text input), "* Phone:" (text input), "* Fax:" (text input), "* Government Contracting Agency:" (text input), and "Zip Code:" (text input). Below these is a section for "508 Compliance (optional)" with the question "Is this acquisition compliant with Section 508 of the Rehabilitation Act of 1978, 1998 Ammendments?" and three radio button options: "508 is not applicable/exempt", "Yes Compliant", and "Not Compliant". A link is provided: "To view the full text of the accessibility standards, go to <http://www.access-board.gov/508.htm>". A "Comments:" section has a text area with "type here" and a vertical scrollbar. At the bottom of the form are "Print" and "Reset" buttons. The browser's status bar at the bottom shows "Internet" and "100%" zoom.

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