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Paperless Procurement

The Impact of Advanced Automation

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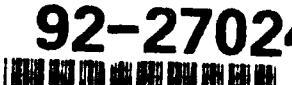
Daniel J. Drake
Gerald T. Kelley
Robert L. Crosslin



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Daniel J. Drake, Gerald T. Kelley, Robert L. Crosslin

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Advanced information technologies permit the gathering and coordination of procurement information through electronic data bases, networks, and workstations. Additionally, procurement processes can now be streamlined and automated to create a new paperless work environment. The new procurement systems will have great impact on the way work is performed, the number and skills of contracting personnel, and market and procurement organization structure. This study is intended to help DoD procurement managers understand and deal with the changes that advanced information technologies will bring about in procurement.

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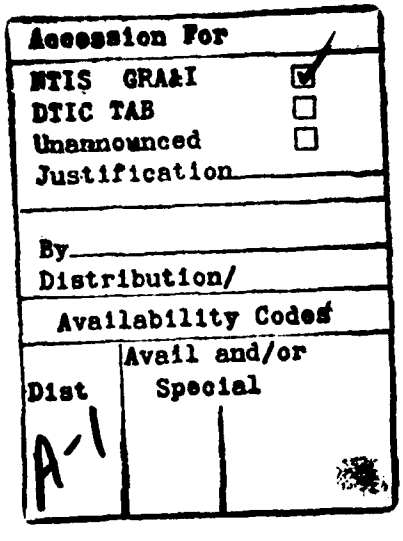

Daniel J. Drake
Gerald T. Kelley
Robert L. Crosslin

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Logistics Management Institute
6400 Goldsboro Road
Bethesda, Maryland 20817-5886

Executive Summary

PAPERLESS PROCUREMENT: THE IMPACT OF ADVANCED AUTOMATION

The application of automated information technologies to DoD procurement processes will change the way work is performed, the number and skills of contracting personnel, and the procurement organization's structure. While there has been, and will continue to be, some resistance to automation, the proper implementation of advanced automation can revolutionize workplace productivity and buyer effectiveness. The most competitive buying activities will be the ones that fully embrace advanced automation.

Office automation has improved the work environment of DoD's buying function by providing productivity gains in paper document and file preparation. Automated procurement systems are evolving well beyond word processing. When combined with advanced telecommunications, decision support software, mass data storage, and microcomputer workstations, automated procurement systems enable the development of improved buying processes.

Advanced automation technologies foster paperless procurement systems in which information can be exchanged strictly through electronic networks. These advanced automated systems will gather and coordinate procurement information through electronic mail messages and electronic data interchange (EDI) transactions conveyed over electronic networks to workstations. The systems can store and retrieve information without using paper. The payoff will not merely be increased speed, but also greater effectiveness as decision makers receive better quality information. Information technologies will give DoD greater buyer, organizational, and market effectiveness.

We anticipate enormous changes in the way business is conducted as the advanced technologies gain acceptance and use. Few current automated procurement systems are linked to other internal or external organizational systems for sharing information electronically. The gathering and data entry of such

information is left to buyers and clerks who now coordinate with internal and external organizations through written forms, mailed correspondence, telephone conversations, and facsimile (fax) transmissions. In the future, the need for clerks to handle paper and enter data will be minimized because the buyer will perform most tasks at a networked workstation.

Most procurement actions originate from local procurement offices supporting parent military organizations and from various tenant commands at military installations. The DoD has over 1,300 buying activities, the majority of which are installation support activities. The ability of these remote buying activities to obtain information about commercial products, price histories, contractor performance, and available contracts or schedules will improve greatly through electronic networks connected to centrally managed data bases. Buyers will be able to improve their knowledge of products and ordering arrangements so that they will not need to rely upon small purchase solicitations to obtain individual prices. The role of the independent, local buying office needs to be reassessed if information technology can be expected to assist in locating products and services on pre-priced contracts and, at the same time, simplify order placement.

We forecast the impact of emerging information technologies on procurement procedures, processes, markets, personnel, and organizations. The automated systems being developed with these technologies will never attain their potential unless DoD prepares the work force, suppliers, and policy makers for the change to paperless processes. We believe a paperless procurement system will affect DoD in many areas including the following:

- *Workflow processes.* All steps in the procurement process will be completely automated. Processes will be streamlined; only those tasks that contribute value will be retained. Thus, measuring and continually improving the process will be the major focus of procurement management.
- *Personnel.* Job content and skills will change. Fewer procurement clerks will be needed because the new automation will eliminate labor-intensive data entry, document assembly, and filing tasks. Fewer buyers and reviewers will be needed because the new automated systems follow programmed file checklists and documentation requirements reflecting the redesigned value-added process.
- *Regulations.* Regulations will have to be "technology-neutral" regarding policy, but also "technology-specific" regarding the application in order to clearly state the manual or electronic means permitted in specific situations.

Regulations and operating procedures will have to apply not only to paper, but also to paperless processes. Procurement regulations and operating procedures will be electronically programmed into the automated process.

- *Markets.* Electronic solicitations made available over telecommunication networks will create electronic markets where local suppliers compete with aggressive regional and national distributors and manufacturers. Trading areas no longer will be defined by local telephone and delivery areas since modern telecommunication and transportation networks permit rapid, inexpensive, and reliable service nationwide. Small businesses in particular risk losing traditional markets to competitors' service and price.

We believe that paperless procurement systems are inevitable. We recommend that once the decision to deploy these advanced systems has been made, DoD should take the following actions:

- Revise procedures and regulations to authorize paperless internal and external processes.
- Re-evaluate the functions of procurement staff members and administrative support personnel.
- Incorporate advanced automated procurement and process improvement concepts into procurement management and staff training programs.
- Prepare local trading areas for change through "awareness training" of local businesses.
- Explore the development of new procurement networks. For example, a centrally managed procurement network can be used to improve the contracting activities' access to product, price, and ordering information.

The DoD's Procurement Corporate Information Management (CIM) initiative is currently examining procurement processes and applying emerging information technologies to develop more effective standard procurement systems. We believe that DoD now has the opportunity to apply several emerging telecommunications and automated data storage technologies and thereby evolve procurement automation into paperless systems that not only improve office productivity, but also improve buyer and organizational effectiveness.

With work processes being re-engineered and a work culture being replaced, we recommend that the Procurement CIM initiative prepare DoD personnel, organizations, and suppliers for workflow process and technological system change.

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The problem is that too often computer power is shunted away from real purchasing issues and directed mainly toward procedural ones – those involved with paper processing....

The important thing is to have the vision to see the potential of computer power and harness it. That means taking this wonderful piece of office technology and using its ability to collect, retrieve, and manipulate information in making real management decisions about purchasing problems.

James P. Morgan
Editor, *Purchasing* Magazine
February 25, 1988

CHAPTER 1

INTRODUCTION

PURPOSE

The buying function is being impacted by new automated information technologies. The potential for these technologies to change procurement processes is not well understood. This report provides a structure for technological change.

OPPORTUNITIES FOR PAPERLESS PROCESSES

In two previous Logistics Management Institute reports, we described in detail how electronic data interchange (EDI) and electronic commerce might be applied to the Government/private industry business relationship.[1] Our review of the Federal Acquisition Regulation (FAR) and Defense FAR Supplement (DFARS) for this report also revealed a number of areas where paperless processes could be applied to actions within the Government. These fall into two broad areas – electronic versions of paper publications and automation of contract paperwork.

Electronic Publications

In the course of his or her job duties, a DoD contract specialist often requires information that is maintained elsewhere in DoD or by other Government agencies. This information is typically provided to the contract specialist in the form of paper lists, catalogs, or letters. Examples include product catalogs of Federal Prison Industries and National Industries of the Blind and Severely Handicapped; single or multiple award schedules of the General Services Administration's (GSA's) Federal Supply Service and Information Resource Management Service; the Department of Labor (DOL) listing of labor surplus areas; the DOL wage rate determinations; the GSA consolidated list of debarred, suspended, and ineligible firms; an individual agency's qualified bidders or product lists; an agency's price history data for

[1]Logistics Management Institute (LMI) Report PL904R1, *Electronic Data Interchange in Procurement*, Daniel J. Drake, John A. Ciucci, and Ben Milbrandt, April 1990; and LMI Report PL006R1, *Electronic Commerce and Competitive Procurement*, Daniel J. Drake and John A. Ciucci, June 1991.

individual part or stock numbers; an agency's past performance data for specific contractors; and numerous listings of addresses of suppliers, contract administration offices, paying offices, etc.

As automation of contracting continues, contract specialists will perform an increasing number of tasks via a desktop computer or workstation. The capability to provide fingertip access to information is available by using technology such as modems, networks, electronic bulletin boards, and random-access data bases. We believe that DoD and other Government agencies should develop electronically accessible versions of information currently provided in paper form. Lower clerical and mailing costs should result. The contract specialists will benefit from having up-to-date information without having to request and wait for information.

Automation of Contract Paperwork

The increasing use of computer workstations by contracting personnel will provide opportunities for the automation of contracting paperwork such as computer generation of forms, letters, and documents. The real benefit of automation, however, lies not in its word processing ability, but in its ability to manipulate the documents electronically. A "standard format" can be used for both paper and paperless media. Applications software could "paint" a user's display screen in a variety of ways – even to resemble the existing paper form – but the important consideration is the manipulation of the data elements used to present the information.[2] The move toward electronic records will make "forms management" more of a data management issue than a paper management issue. In light of this, forms management should be examined as part of the movement away from paper documents. Paper forms are used for collecting, controlling, and standardizing information. Software can do this much more efficiently by eliminating redundant data elements, presenting sophisticated help to users, utilizing validity checks, and linking elements to existing data.

As electronic storage of data increases, the common FAR and DFARS terms of "original documents" and "retaining copies" have less meaning. A well-designed data base will not duplicate the same data elements unnecessarily, although software can make the same data element appear in different applications. For electronically

[2]At the Navy's Cruise Missile Program Office, users can choose a graphic replica of the form or a simpler data entry screen. Users prefer the data entry screen because it is quicker and easier to use.

stored data, copies will be used primarily for archival purposes, backups, and up- or down-loading to other systems. For example, in the electronic environment, keeping a copy of a document in the contract folder could mean that the electronic "file folder" has links to the appropriate data elements, thereby allowing the application software to construct the document on screen for the user.

Storing and moving data electronically can eliminate the need to distribute contracting information to users by "pushing" multiple paper copies of documents on them. Instead, electronic storage allows users to pull out the required information, as they need it, from the contracting office's data base. For example, a short E-mail or EDI notice could alert a contract administrator to a contract award, but the actual contract file remains within the purchasing office, available to the administrator electronically, as needed.

BACKGROUND

Over the past 30 years, the Military Services and Defense agencies have gradually applied computer and telecommunications technologies to the procurement function and have developed a wide range of automated capabilities. Some of these capabilities are changing how purchases are conducted and managed. In this study, we analyze the impact that automated information technology has had on the procurement system and we recommend ways to prepare the procurement community for the arrival of a relatively "paperless" workflow process.

Advantages of Automation

Modern, automated information technology offers paperless means of doing business. Information can be conveyed and stored without paper documents or files. To conduct business, commercial firms and Government organizations are increasingly using such paperless techniques as EDI, electronic mail (E-mail), and digital imaging. Little is known about how these technological advances will affect Government procurement. We believe they will not only change buyer performance, office organization, and market structure but most important, they will redefine procurement processes, procedures, and regulations.

In a paperless environment, information is stored, conveyed, and acted on in an electronic or optical medium. With proper system design, electronic information is more reliable, more timely, and more accessible than paper-based information.

Furthermore, we believe that paperless information and processes provide more utility. Paper is readable, transportable, and cannot easily be repudiated should a contractual legal issue arise. Paperless processes also provide those attributes while adding instantaneous access and better security controls. Paperless systems offer instant retrieval, use less storage space, and permit work to be processed faster. Information transmittal does not wait for paper to be prepared or moved from out-box to in-box.

Before the advantages of paperless processes can be realized some issues must be resolved. How we react to these issues will have a significant effect on our ability to improve the procurement process, reduce costs, and increase customer support. The ability of information technology to increase the speed with which work is performed and, therefore, to reduce the labor hours is the initial appeal of paperless technology. However, as we illustrate in this report, paperless technology will have a far greater effect on work process improvement. Procurement managers need to view paperless procurement as more than a reduction in clerical handling costs; they need to view it as a means to making better buying decisions and ultimately offering better customer support.

FINDINGS

Most Procurement Actions can be Performed Without Paper Using Advanced Automation

Most procurement actions are routine, repetitive orders. The associated workflow lends itself ideally to automated, paperless processes. With electronic workstations, advanced procurement software, EDI transactions, and electronic or optical mass storage media, orders can be processed and issued without paper documents or files. Even competitive procurements can be conducted through paperless means as demonstrated by several electronic solicitation projects.

A few existing automated procurement systems are so advanced that their designs incorporate all of the planning, coordination, and review requirements contained in controlling regulations and instructions. Computer logic has captured procurement processes and displays the results to buyers and reviewers at electronic workstations. The buyer responds to video screen prompts for every step that cannot be acted on by the automated process. Little is required other than the automated system. Such automated procurement systems completely conform with related

Government regulations. The system knows when to obtain information for that step in the process, as required by regulation or operating procedure. Electronic networks linked to data bases or experts provide the means.

Paperless Techniques Will Change Solicitation Methods and Competition

The FAR assumes that within the local trade area in which the purchasing office is located, maximum practicable competition for small purchases can be obtained.[3] This local trade area is defined by its close proximity to the government installation and to the local telephone service area. The "new" trading area will be defined by information access and shipping or delivery costs. Electronic solicitations for quotations or bids can now be widely distributed and responses received from wider areas, thereby increasing competition for the buyer and increasing market access for the supplier. Paperless solicitations will change how information is disseminated. No longer are contracting opportunities selectively disseminated through paper devices such as the buying activity's bulletin board or its solicitation mailing list. Using advanced telecommunications technologies, information can be widely broadcast to an unlimited number of prospective offerors regardless of where they are located. Small businesses will find these electronic networks to be great equalizers in providing access to contracting opportunities.

Electronic Commerce Techniques Will Restructure the Supply Market

As DoD transfers purchasing responsibilities for some supply items from base activities to central buying activities, local distributors near military bases may receive fewer local purchase orders. For centrally managed, commercially available items, electronic delivery orders could be issued against long-term, indefinite delivery contracts (IDCs) with major suppliers, thereby creating new distribution channels.

New distribution methods, such as direct vendor delivery and just-in-time inventory techniques, are emerging as a result of new information technologies and new business partnership and teaming arrangements. Local distributors may be bypassed as the speed and the economy of central buying through electronic ordering offers better services and prices directly from major manufacturers.

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[3]FAR 13.106 (b)(3).

The "Paperless" Office is not Totally Paperless

The "paperless" office has limits. Many routine procurement tasks can be successfully performed on a computer screen and paper can be eliminated. However, complex and large procurement actions that can be assisted by automation may still need paper to display large or unique documents. Human comprehension of on-line text is an issue that most readers resolve by printing complex documents. Even in "paperless" applications, buyers will need printing capability for more private, comprehensive reviews.

Automated Information Technology Enables Workflow Process Changes

Information technology now enables procurement activities to rethink how they conduct business. The work process is not merely streamlined to eliminate paper handling costs, but also to eliminate inventory, storage, and spoilage costs. Customer support is improved. New technologies not only process, store, and communicate information better but also stimulate thinking on how work processes can be improved. Instead of first automating the paper process, the most advanced systems automate redesigned, upgraded work processes, enabling information to be shared among all interested parties simultaneously and responses to be solicited and obtained concurrently. More important, information technology fosters changes in business practice. Supplies are no longer bought in large quantities each fiscal quarter and stored in a depot awaiting requisition. Using the new processes, the electronic requisition is in effect an electronic order that goes directly to the manufacturer or distributor who ships the item to the requisitioning activity, bypassing the Government depot. The procurement office establishes the overall contract vehicle. Electronic networks connect the requisitioner to the supplier.

Paperless Processes Will Reshape the Workplace

Commercial firms are re-engineering work processes with advanced information technologies to achieve significant savings in time and in costs. We believe similar savings are available to Government procurement activities. Paperless processes eliminate paper handling and much of the redundant data-entry requirements, thereby reducing the need for some clerical support. Paperless processes also reduce the number of personnel requirements. No longer must large staffs review and control cumbersome work processes. Automated systems will provide control, through system specifications managed by a smaller staff. "Expert"

systems will analyze many routine actions and provide recommendations to the contracting officer, thereby reducing the number of buyers required. Exceptions will still have to be referred to specialists for advice or opinion, but the routine actions can be handled by the system. The result will be "flattened" organizations with fewer managers and supporting staff members.

Information Technology Promotes Joint Decentralized/Centralized Organizations

The ability of telecommunications technologies and networks to link remote offices to a central office creates organizations that are *decentralized* for local customer support purposes but are *centralized* for inventory management, long-term purchasing decision making, or policy setting purposes. Information technologies allow organizations to enjoy the benefits of both centralized and decentralized processing – simultaneously.

Procurement Regulations Need to be Technology Neutral

The FAR and its supplements assume that the procurement process is accomplished by using paper documents. Terms such as "in writing," "on plain bond paper," "typed, stamped, or printed," etc., evidence this fact. Such terms do not provide procurement managers the flexibility to adopt paperless technologies.

RECOMMENDATIONS

Revise Procedures and Regulations to Authorize Paperless Internal and External Processes

Procurement regulations that refer to paper documents and processes need to be modernized. Established procedures and procurement regulations must recognize paperless techniques if system developers are not to be constrained when re-engineering work processes.

Re-evaluate the Functions of Procurement Staff Members and Administrative Support Personnel

The functions of the procurement clerk and procurement analyst in today's environment must be reassessed in view of the changes in work processes and individual responsibilities. Position descriptions and staffing levels should reflect the automated processes, especially the associated reduction of clerical tasks.

Incorporate Automated Procurement Concepts into Procurement Management and Staff Training Programs

Procurement management and executive courses and seminars should be held to address the effect of automation on the procurement function. Basic procurement courses should be revised to present automated contracting processes and techniques.

Prepare Local Trading Areas for Change Through Awareness Training of Local Business

Business and political representatives need to be educated on the dynamic changes that information technology will bring to Government procurement and markets. Communities near military installations are going to see their geographic advantage in local procurement reduced as electronic commerce permits solicitation information to be shared with any interested party – including parties at remote locations. The message should be that their contracting opportunities exist not only at the local base, but, taking their regional or national competitors' view, also at any base to which they can economically ship material.

Improve Small Business Reporting to Better Reflect Market Changes

Small business contract and subcontract reporting must reflect market changes. For commodities such as medical supplies, electronic ordering directly to the manufacturer may reduce small business prime contract opportunities, but might simultaneously increase small business subcontract opportunities (taken as the manufacturer uses local distributors to deliver priority items). The procurement action reporting system should more accurately reflect these changes in distribution channel arrangements between manufacturers and local distribution. Otherwise, small business statistics will be distorted.

Explore the Development of New Procurement Networks

Consolidation or regionalization of procurement responsibilities may result in reduced local procurement support. One solution may permit maintenance of current local support through the development of procurement networks that provide *decentralized* support to the local commander but achieve *centralized* planning benefits and economies of scale. We recommend that the Procurement Corporate Information Management (CIM) explore the use of networked systems to provide *decentralized* support but *centralized* control, processing, and information sharing.

ORGANIZATION OF THIS REPORT

Chapter 2 presents a background on the various procurement systems, technologies, and applications. Chapter 3 discusses the procurement workflow process changes offered by information technology and describes several paperless procurement concepts. Chapter 4 discusses the impact of paperless processes on procurement personnel and their work environment. Chapter 5 reviews the policy and regulatory issues that are impeded by paperless procurement automation. Chapter 6 describes the economic impact of paperless contracting on markets and suppliers. The appendix describes Federal procurement regulations that would require revision if a "paperless" procurement system is adopted.

CHAPTER 2

AUTOMATED SYSTEMS, TECHNOLOGIES, AND APPLICATIONS

Over the years, contracting has been aided by information technologies that improve information exchange and more effectively document the contractual agreement. Today's contracting offices use automated procurement systems to help produce paper documents and files. The advanced information technologies that are now emerging will bring about paperless contracting environments and transform procurement processes. In this chapter, we describe the technological evolution of contracting from handwritten agreements through word processing systems to advanced systems that rely on telecommunications networks and electronic workstations.

BACKGROUND

Through the ages, commerce has developed various methods of conducting business. In early times, oral agreements were used to document a contract since writing instruments and media were not readily available. Parties to a contract employed witnesses and sworn oaths to chronicle their agreement, but problems arose as parties and witnesses interpreted the agreement differently or engaged in fraud. In 1677, the English Parliament passed "An Act for Prevention of Frauds and Perjuries" requiring certain contracts to be in writing.[1] The act attempted to avoid future disagreements by reducing the contract to writing, or as it has been phrased, "the most advanced data transmission and storage technology available at the time – paper and ink."[2] Writing paper was readily available by the 17th century because paper manufacturing technology was well established.[3] Since then, the availability of inexpensive paper has shaped contracting methods. The word "contract" is construed by most people to mean the physical, paper document even

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[1]That act, commonly referred to as the "Statute of Frauds," has served as the basis of similar legislation by individual American states.

[2]Peter N. Weiss, "Law and Technology: Can They Keep Abreast?" *Government Information Quarterly*, Volume 8, Number 4: pp. 377 – 388.

[3]Arnold Pacey, *Technology in World Civilization*, Cambridge, Mass.: MIT Press, 1990, Table 2, on pp. 42, indicates that paper manufacturing for writing purposes reached England in about 1490.

though, in legal terms, the contract may be an enforceable agreement whether oral or written.

In the late 19th and early 20th centuries, new communication technologies such as the telegraph and telephone improved the flow of information and permitted more timely agreements. These communication devices were gradually accepted to accelerate specific tasks (e.g., soliciting quotations and placing orders). The same is true of today's use of facsimile ("fax") transmissions to accelerate bid and proposal information. However, advanced information technologies generally have had limited application in Government procurement since paper documents and files are still preferred.[4]

PROCUREMENT AUTOMATION

Today, automated procurement information systems use software to process and print hard-copy contractual documents. These modern systems collect information needed to complete standard procurement forms, assist the buyer in selecting contract clauses appropriate for the type of procurement action, and print out on standard or departmental forms. Automation is typically used to improve the paper production process but not necessarily to improve information quality or decision making.

A variety of automated procurement systems serve DoD's diverse procurement communities. As indicated in Table 2-1, DoD procurement can be viewed as six separate contracting environments each with several automated systems. Their capabilities differ greatly, but all generally support contract document writing and procurement action tracking. Given available computer and telecommunication technologies, their focus has been on data processing and paper document production. That approach requires word processing capabilities for preparing forms and text and a supporting data base for tracking each procurement action as it progresses through the procurement process. Few of these current systems are linked to other internal or external organizations and systems for sharing common information electronically. The gathering and data entry of such information is left to buyers and clerks who now coordinate with internal and external organizations through written forms, mailed correspondence, telephone conversations, and fax transmissions. The

[4]The Federal Acquisition Regulation, Part 13, *Small Purchase and Other Simplified Purchasing Procedures*, states that oral and telecommunicated orders are exceptions to paper orders.

TABLE 2-1

DoD AUTOMATED CONTRACTING SYSTEMS

Type of contracting	System	Service/Agency/Command
Installation support	BCAS SAACONS APADE BCAS BOSS BCAS	Air Force Army Navy Marine Corps Defense Logistics Agency Defense Mapping Agency
Central supply and services	ACPS and ADIS CCSS PADDS UICP ITIMP SAMMS DPACS SPEDE POPS	Air Force Logistics Command Army Materiel Command Naval Supply Systems Command Defense Logistics Agency
Major system	AMIS DPCI CCSS PADDS CONDIRAIS FARA	Air Force Material Command Army Materiel Command Naval Sea Systems Command Naval Air Systems Command
Specialized		
Basic research	AID SAACONS RADMIS	Air Force Office of Scientific Research Army Laboratory Command Office of Naval Research
Construction	SAACONS AMALGAMAN	Army Corps of Engineers Naval Facilities Engineering Command
Commissary	SACONS-D	Defense Commissary Agency

Note: ACPS=Automated Contract Preparation System; ADIS=Acquisition Due-In System; AID=Automated Information and Documentation; AMALGAMAN=Amalgamated Management System; AMIS=Acquisition Management Information System; APADE=Automation of Procurement and Accounting Data Entry; BCAS=Base Contracting Automated System; BOSS=Base Operating Standard System; CCSS=Commodity Command Standard System; CONDIRAIS=Contract Directorate Automated Information System; DPACS=DLA (Defense Logistics Agency) Preaward Contracting System; DPCI=Distributed Processing for Contractual Input; FARA=FAR Automated; ITIMP=Integrated Technical, Item Management and Procurement; PADDS=Procurement Automated Data and Document System, POPS=Paperless Order Processing System; RADMIS=Research and Development Management Information System; SAACONS=Standard Army Automated Contracting System; SACONS-D=Standard Automated Contracting System – DeCA (Defense Commissary Agency); SAMMS=Standard Automated Materiel Management System; SPEDE=SAMMS Procurement by Electronic Data Exchange; UICP=Uniform Inventory Control Program.

implementation of advanced networking telecommunications technologies will enhance the system access and information-sharing among DoD procurement activities.

The extent of automation in DoD's procurement organizations is encouraging. Systems have evolved from simple purchase request tracking systems to integrated contract writing/data base systems. However, their focus has been improving management visibility over paper documents and the production of those documents. We believe that DoD now has the opportunity to apply several emerging telecommunications and data storage technologies and thereby evolve procurement automation into paperless systems that not only improve office productivity but improve buyer and organizational effectiveness.

TECHNOLOGIES

Automated procurement systems are evolving as advanced information technologies are being applied to various procurement processes. These technologies help the buyer convey, store, access, analyze, and/or present information.

Electronic Data Interchange

Electronic data interchange is the computer-to-computer exchange of routine business documents using pre-established standards (or transaction sets) agreed upon by the Government activity and its trading partners. EDI transactions do more than link computers. They also integrate applications. For example, EDI can automatically transmit information into a contractor's order processing system, which then updates the contractor's production (or delivery) scheduling and contract accounting applications. In return, the contractor's applications provide an acknowledgment transaction to indicate both order acceptance and delivery or performance details. This information can be received by the Government's procurement system and can be electronically shared with the supply (inventory management) and receiving areas for updating their "due-in" systems.

Electronic Mail

Electronic mail is electronic "messaging" from computer terminals through networks to other computer terminals. Normally, messages are stored on a central computer in an electronic mailbox where the addressee can retrieve messages. E-mail permits rapid communication (and coordination) among networked workers

at any time, to any location, and even with anonymity. E-mail messages can request input or advice or distribute documents by broadcasted messages. Recipients can use "filters" to select priority messages for viewing. In procurement, E-mail messages can disseminate draft procurement plans for comment or be used to obtain staff legal counsel or advice from small business specialists.

Data Bases

Data bases organize large amounts of information for easy storage and retrieval. Magnetic storage media (disk or tape) was commonly used to store megabytes (millions of bytes) of data; however, with the emergence of optical (i.e., laser) disk technology, gigabytes (billions of bytes) can be organized, stored, and retrieved. Of interest to procurement automators is the combination of these mass storage devices with relational data bases using fourth generation languages (4GLs). Such combinations permit relatively easy access by users to almost unlimited amounts of information. Data bases available on computers situated at remote locations are easily accessible today via modem. Advanced procurement systems will be programmed to query data bases automatically for needed information once the system detects a procurement with such a requirement. One example would be making an automated query to a central Federal or DoD data base for data about a prospective contractor's historic performance.

Networks

Networks use electrical or optical connections to tie together computer workstations, terminals, small computers, and mainframe computers. Early computer systems operated alone with little ability to exchange data with remote systems. Another limitation was that early networks' lower data transfer speeds were incompatible with the computers' data processing speeds.

Advanced technology is now revolutionizing data communications so that a buyer can electronically obtain volumes of information wherever it resides. The buyer can do so because high-speed telecommunications circuits permit the transfer of great volumes of data. Even higher transfer speeds are planned through the use of "national data highways" which offer "gigabit per second" data transfer speeds.[5] Such speed is possible through wide adherence to open systems interconnection

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[5]Lisa Corbin, "Governing the Guttenberg Galaxy," *Government Executive*, January 1992, p. 31. This article describes a national high-speed data network.

architectures and protocols that now permit different computer systems to communicate with each other without regard to equipment manufacturer. The use of networks linking remote computers has spawned a specialized computer called the intelligent gateway processor (IGP) that manages the interfaces and content of remote data structures. Buyers do not need to know where the data reside or even how to obtain the data. The IGP is programmed to do those tasks. Lastly, advanced telecommunications networks called integrated services digital networks are now capable of simultaneously handling multimedia digital transmissions of voice, data, and video. For procurement, telecommunications advances will mean not only faster responses to remote data queries, but also will provide the ability to conduct negotiations where the participants see and hear each other through their own desktop workstations. Also, users could access and view technical drawings from that workstation.[6]

Expert Systems

Expert systems are computer programs designed to solve problems by applying a set of "rules" to answer questions. The rules are derived from the thinking of "experts" in the particular subject matter. The purpose is to provide users with answers to problems based on the knowledge of experts in that field. The logic of an expert's rules for a given situation can be programmed into software to assist a buyer with a decision. Examples are warranty advisers who help select the type of warranty and write a warranty clause or an expert that guides a buyer through the entire procurement process. Interconnectivity between expert systems will permit advanced procurement systems of the future to solve complex, interrelated problems. Today, expert systems solve specific problems in narrow speciality areas, such as warranty, clause selection, and parts breakout decisions.[7]

Electronic Workstations

Where the user's portal to automated information was the computer terminal, with the new technology, it will be the desktop electronic workstation. In their basic

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[6]Alexander D. Korzyk, *Architectural Guidelines for Multimedia and Hypermedia Data Interchange: Computer-aided Acquisition and Logistic Support/Concurrent Engineering (CALS/CE) and Electronic Commerce/Electronic Data Interchange (EC/EDI)*, Naval Postgraduate School Thesis, September 1991.

[7]Richard J. Hernandez, *Expert Systems Applications in the Procurement Field*, National Contract Management Association/Defense System Management College Research Symposium Proceedings, 1991.

forms, workstations are microcomputers connected by networks to more powerful processors and data bases. In advanced systems, electronic workstations can display audio and video data. Not only would powerful procurement applications be available, but advanced communications techniques such as video conferencing could also be used. Someday, buyers will be able to conduct negotiations with contractors through their electronic workstations and not lose any audio or visual cues that are so important in face-to-face negotiations. Buyers, through menu-driven screens on a video display, could view their procurement workload in their "in-box," open an electronic contract file, review the computer-selected procurement plan, make changes, and distribute the revised plan for coordination and approval.

AUTOMATED INFORMATION PROCESSING IMPROVEMENTS

Advanced procurement automation applies emerging electronic technologies to systems through which information can be obtained, analyzed, displayed, and stored automatically, directly at the buyer's desk. The merger of computers for information processing with electronic networks for information gathering makes this possible. Integration of these technologies permits buyers to gather needed information and apply it to the buying decision process. Integrated systems will be designed specifically to optimize information availability and quality to improve buyer effectiveness. This integration permits fundamental changes in how work is performed.

Rapid Coordination

Telecommunication technologies such as E-mail permit buyers to rapidly coordinate their actions with others. For example, instead of relying on paper forms and internal mail to request the Small and Disadvantaged Business Utilization Specialist's (SADBUS's) concurrence, the buyer could simply send an E-mail message (including electronic copies of the purchase request and procurement planning data) directly to the SADBUS for coordination. An automated system could be designed to recognize the need for coordination and then initiate the necessary action. This automated document coordination cycle could be completed in hours instead of days.

Furthermore, all coordination among several functional specialists could be done concurrently instead of sequentially. A purchase request, procurement plan, or model contract no longer needs to be passed from one "out-box" to the next "in-box."

The appropriate individuals could receive a message in their electronic "mailboxes" simultaneously and then read and act on the message.

Improved Information Access

The integration of computers and telecommunications also permits heretofore isolated data to be accessed from computers situated at remote locations. Data are often stored on electronic media that are not readily available to buyers. The combination of computers, telecommunication networks, and IGPs permits applications to be designed so a buyer can easily obtain needed information.[8] In fact, the automated procurement system could obtain needed information automatically when certain conditions were met.

For example, when a procurement requirement is received, the automated system could extract the product's description, part number, and/or stock number to locate substitute items or alternative sources. Such information may not be available locally, but could reside in several remote data bases. An IGP, programmed with the telecommunications and query requirements of each data base, could query each data base and return the response to the automated procurement system in a user-readable format. The results of this information gathering would be seen by the buyer the first time the purchase request is reviewed.

ADVANCED SOFTWARE APPLICATIONS

A variety of advanced software applications using information technologies have been independently developed by the Military Services and Defense agencies. They can be divided into two categories: (1) internal work process applications that focus on automating clerical and buyer functions and (2) external process applications that provide paperless interfaces with contractor systems and applications.

Internal Work Process Applications

The most notable internal process applications are the Naval Supply Systems Command's Integrated Technical, Item Management and Procurement (ITIMP) system and the DPACS. Both systems provide buyers with structured procurement

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[8]See Daniel J. Drake, "Sharing Product, Price, and Performance Information to Improve Buying Decisions," *Contract Management*, February 1990, pp. 4 – 7.

processes accessible through menu-driven screens on computer terminals. They collect information electronically and store it in electronic contract file folders. The electronic contract files can be accessed and updated from computer terminals as the procurement action progresses through the procurement process. Requests for information called "referrals," are directed to supporting specialists who coordinate on the procurement action's electronic files. Referrals can be processed concurrently so the coordination process moves faster than traditional paper contract file methods. Buyers neither build paper procurement files nor move paper forms and files around the office.

External Process Applications

Several systems have created paperless relationships with suppliers, but each uses different techniques. The Naval Supply Center (NSC) in Jacksonville, Fla., created the electronically assisted solicitation exchange (EASE) to replace small purchase telephone solicitations with an electronic bulletin board (EBB) solicitation system. EASE puts the electronic equivalent of the Standard Form (SF) 18, *Request for Quotations* (RFQ), for purchases of less than $25,000 on an EBB. Firms wishing to compete place their quotes back on the EBB through a personal computer and telecommunications modem linked to EASE by a third-party network. The advantage is that RFQs are not merely disseminated to a few firms by telephone or bulletin board at the buying office but rather are made available to a much larger audience through paperless information technology. This solicitation technique has improved competition and has lowered prices.

The DLA's SPEDE system permits buyers to solicit, receive, and evaluate quotes, and to issue purchase orders through EDI transactions with vendors. SPEDE also issues delivery orders against indefinite delivery contracts. SPEDE eliminates clerical and buyer handling of these tasks by electronically matching an award decision, based upon a quote evaluation or stock number, to an IDC item, and then converting it to a paperless order.

All of the advanced applications described above have been developed to improve buyer effectiveness and to accelerate order placement. Buyers spend their time making decisions, not gathering information to help them decide. As a result, many of the clerical aspects of small purchases have been minimized or eliminated.

Procurement automation has evolved as new information technologies have arrived. Business and Government are now shifting from a focus on improving paper production to improving information gathering and dissemination. However, the advanced applications are just beginning to uncover the tremendous opportunities made available by advanced automation. The application of these technologies has been shaped by narrow procurement regulations; therefore, they have created buying processes that assume and reflect paper media, paper handling, paper storage, and so forth. As discussed in the next chapter, we must challenge that regulatory assumption so we can radically change work processes so procurement can reap the benefits flowing from advanced information technology.

CHAPTER 3

PROCUREMENT WORKFLOW PROCESS CHANGES CAUSED BY AUTOMATION

Computer automation has traditionally focused on improving the efficiency of existing procurement workflow processes. With information technologies that are now emerging, we are able to improve the current process and at the same time consider how effective every part of the process is. Current workflow procedures and policies will require adjustment when advanced automation is implemented. In this chapter, we discuss how these information technologies can transform the procurement process and improve its effectiveness.

BACKGROUND: PAPER CONTRACTING PROCESSES

As illustrated in Figure 3-1, a procurement action moves through a sequential step-by-step process which includes the following: requirement receipt and validation, procurement planning and coordination, solicitation development and issuance, offer receipt and evaluation, contract award, and contract administration through payment and close-out. Within each workflow step, a multitude of sequential substeps may take place. For example, the planning process may include sequential coordination with the SADBUS, the competition advocate, and a variety of technical specialists, as illustrated in Figure 3-2. Feedback may require re-coordination. Workflow involves the physical movement of a paper procurement file folder and document from one desk or office to another. Much time is spent while the file and document are in transit between desks, awaiting action at each step in the process or when re-coordination is required.

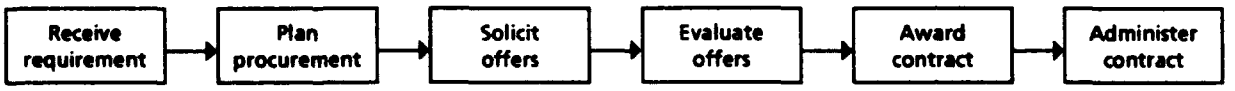


FIG. 3-1. SEQUENTIAL WORKFLOW

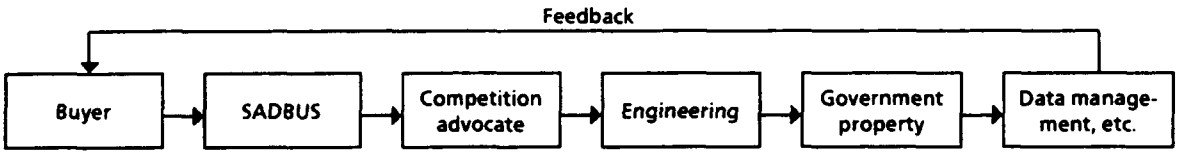


FIG. 3-2. SEQUENTIAL PLANNING PROCESS

These coordination and information-gathering tasks can now be improved by electronic means. Some coordination tasks can be performed simultaneously, but little time is gained in a paper-based process. If, for example, a procurement plan is coordinated among various specialized areas (e.g., small business, packaging, transportation, safety, security, finance) by sending copies of the draft plan to each area simultaneously, the revised draft may have to be re-coordinated again and again until all functions reach complete agreement. The differences must be recognized, communicated to each area, and individually resolved. This iterative paper process saves little more time than sending the hardcopy master draft plan to each area's functional desk sequentially and awaiting each area's separate review input one by one.

AUTOMATED PROCUREMENT PROCESSES

Advanced information technology will change the procurement function from processing paper to processing information and in so doing, will change the way work is performed. Our paper processing orientation has resulted in our focusing on quantitative factors such as purchase request (PR) processing time and document production counts. Advanced automation's information orientation will result in our focusing on qualitative factors such as analyses and decisions.[1] Electronic contracting networks that combine the electronic workstation with the computer's processing power and the network's communications capability permit us to change the procurement process. The traditional, sequential work/paper flow process depicted in Figure 3-1 changes when procurement processes are fully automated.

Work need not necessarily be completed sequentially since an electronic procurement file can be reviewed and acted on by several individuals simultaneously. The automated system also can be programmed to recognize and flag discrepancies in

[1]See Paul A. Strassmann's *Information Payoff: The Transformation of Work in the Electronic Age*, New York: The Free Press, 1985, for a discussion of how information technology will transform office work.

the file that need coordination or re-coordination. Actions can be taken concurrent with other actions. In the same way that a buyer may distribute paper copies of a proposed request for proposals (RFP) to all supporting functional and technical specialists, the draft electronic solicitation can be accessed by all program office participants simultaneously as it evolves. No longer must the buyer send out draft version after draft version for re-coordination. The electronic system can alert workers to changes in the file, highlight the changes, await re-coordination, and (if necessary) periodically provide reminders of required actions.

Because the computer can be programmed to recognize the purchase requirement's characteristics (i.e., dollar value, commodity or service type, possible sources), a "standard" procurement plan can be automatically selected and viewed at the buyer's workstation. The buyer's selection then can be automatically transmitted to the workstations of all specialists who proceed to review their sections, make changes, and approve the plan. Differences in suggested procurement plan language are automatically recognized by the computer and reviewed by the specialist responsible for resolution. Feedback as to changes is constant. Coordination is accomplished in hours or days rather than in weeks or months.

The traditional, sequential workflow process can be revised to a parallel or simultaneous process such as that illustrated in Figure 3-3. The new process includes the continuous coordination feedback loop that only an automated system can offer. The same type of constant interactive cycle could be applied for review of the solicitation or review of the award document and file. With special software called groupware, several individuals working at networked computer terminals can share the same electronic document and collaborate on its development.

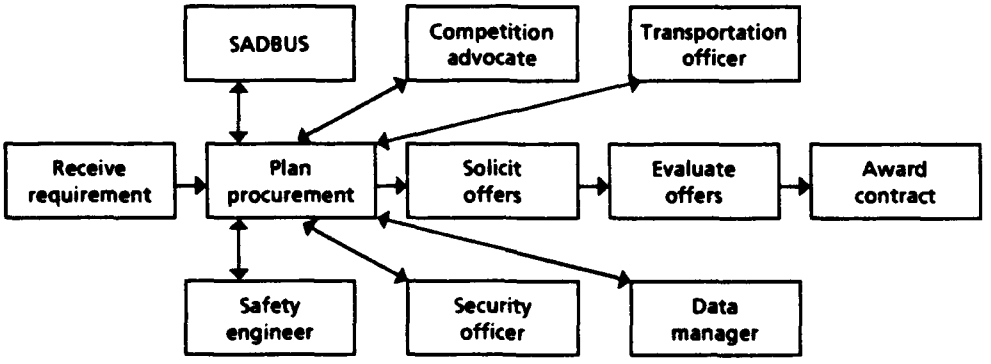
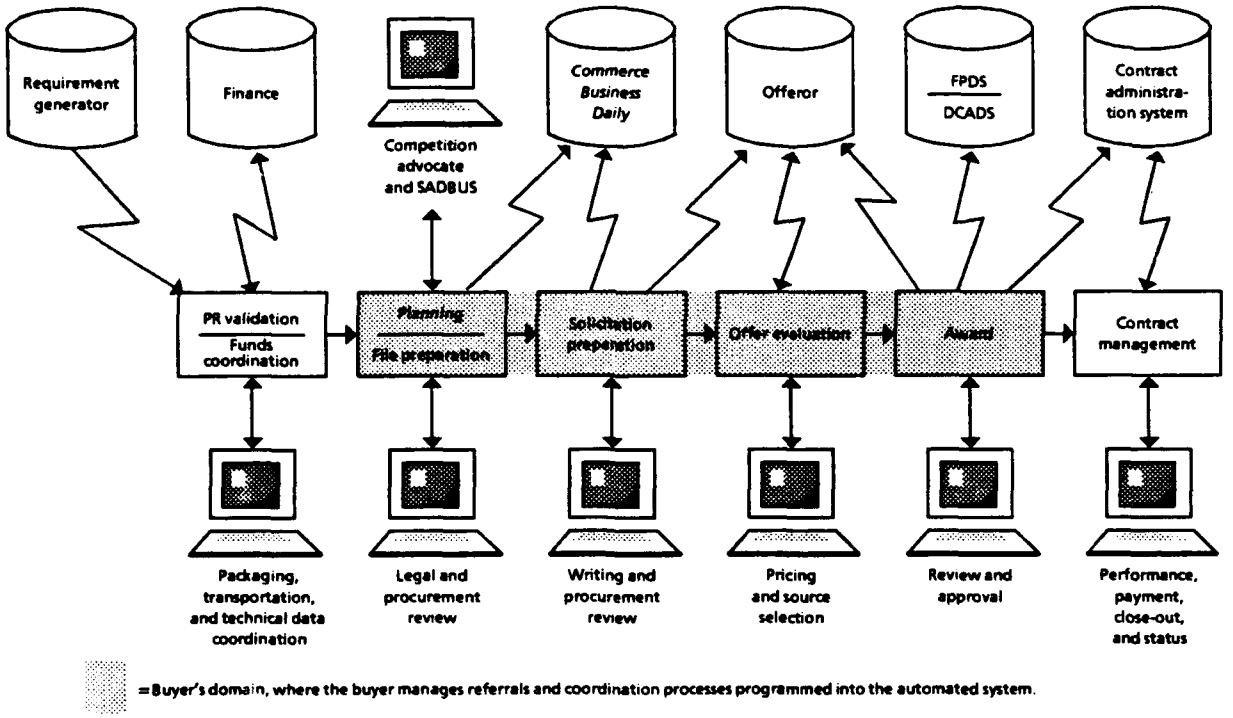


FIG. 3-3. SIMULTANEOUS PLANNING PROCESS

ELECTRONIC CONTRACTING PROCESS

When applied to automated procurement systems, advanced information technologies change those systems from mere procurement tracking or contract document preparation systems to integrated electronic contracting networks that automate every step in the contracting process. Figure 3-4 illustrates an automated contracting system in which the buyer works at an electronic workstation that provides access to information, helps make decisions, coordinates actions, creates electronic contract files, and generates procurement documents. Supporting personnel also can access the electronic file and respond to E-mail messages through their electronic workstations.



Note: FPDS = Federal Procurement Data System; DCADS = Defense Contract Action Data System.

FIG. 3-4. ELECTRONIC CONTRACTING PROCESS

Although the electronic contracting system illustrated in Figure 3-4 is a sequential process, it offers better access to information through E-mail coordination or through data base queries than an equivalent paper process. The focus is on obtaining and processing information to help buyers make decisions.

We can only go so far in improving the traditional process if procurement automation is applied merely to accelerate the coordination and information-gathering processes. These automated applications improve efficiency; they do little to improve effectiveness. Automating *ineffective* workflow processes does not give rise to significantly improved operations. However, automating already *productive* workflow processes will guarantee dramatic operational improvements. To increase effectiveness, we must go beyond these applications and rethink our business processes. Michael Hammer has stated it well:

> The usual methods for boosting performance – process rationalization and automation – haven't yielded the dramatic improvements companies need. In particular, heavy investments in information technology have delivered disappointing results – largely because of old ways of doing business. They leave the existing processes intact and use computers simply to speed them up.
>
> But speeding up those processes cannot address their fundamental performance deficiencies. Many of our job designs, work flows, control mechanisms, and organizational structures came of age in a different competitive environment and before the advent of the computer. They are geared toward efficiency and control. Yet the watchwords of the new decade are innovation and speed, service, and quality.
>
> It is time to stop paving the cowpaths. Instead of embedding outdated processes in silicon and software, we should obliterate them and start over. We should "reengineer" our business: use the power of modern information technology to radically redesign our business processes in order to achieve dramatic improvements in their performance.[2]

The subsections below provide examples of how information technology can transform procurement processes if we first rethink the underlying workflow processes.

Electronic Ordering Process

The combination of telecommunications networks and computer processing can permit requisitions to flow into a central "supply" computer where stock numbers can be compared to those of items available on pre-established IDCs thereby allowing placement of EDI orders.[3] The central supply computer will convert the requisition

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[2]Michael Hammer, "Re-engineering Work: Don't Automate, Obliterate," *Harvard Business Review*, July – August 1990.

[3]This approach is used by the DLA's POPS.

into an EDI delivery order and pass it directly to the distributor's or manufacturer's order processing system.

That approach has several advantages. It accelerates delivery of the item by using direct vendor delivery from distributors' regional supplies to the requisitioning unit or activity. The prices obtained on large-volume, long-term IDCs are generally lower than prices obtained from smaller quantities under small purchase procedures. In this scenario, the supply system connects directly with the supplier, bypassing the procurement function entirely. Procurement's role is to establish the large-volume, long-term contract. What value does the buyer add to the requisition when it passes through procurement? If the buyer's task of passing the order does not add value, we must look for a way to eliminate it.

The traditional sequential process can be revised as illustrated in Figure 3-5. This new process has eliminated two steps – solicit and evaluate – from each procurement action even though solicitation and evaluation do take place during establishment of the indefinite delivery/quantity contract. However, they occur only once, when the long-term relationship is established.

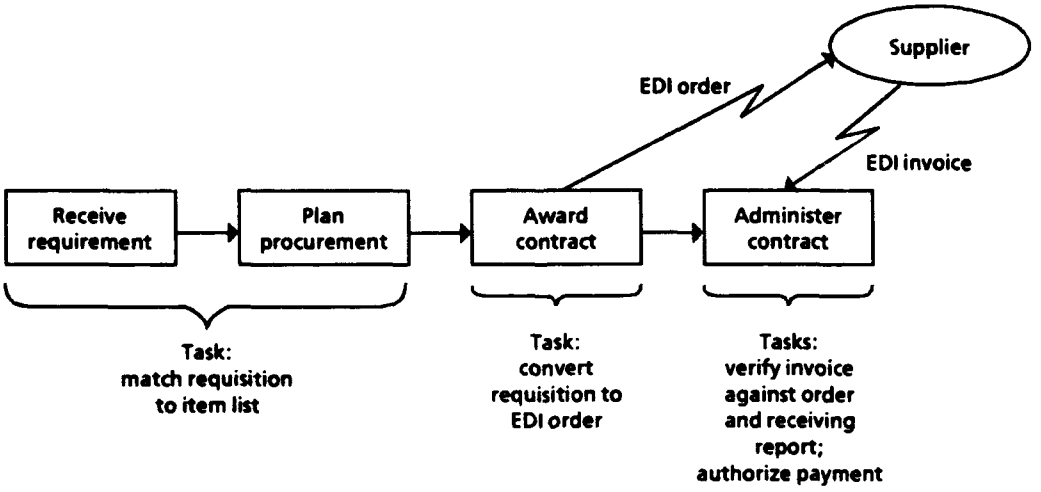

FIG. 3-5. ELECTRONIC ORDERING PROCESS

Additionally, the use of electronic requisitions and orders leads to the use of electronic invoices, receiving reports, and payments during postaward administration.

Electronic Catalog Ordering

A variation of electronic ordering can be applied to local purchases. The local procurement office typically receives small dollar (less than $25,000) purchase requests from its local supply office when the required item cannot be supplied from the Federal supply system. The items required are either matched to similar items on an existing IDC or Federal supply schedule or they are purchased locally through small purchase procedures. The problem is that locating IDC or schedule contract information is difficult for small, local procurement activities. We believe information technology can improve that supply/procurement process.

Instead of maintaining individual lists of items that can be ordered by the procurement activity, all such lists can be consolidated into an electronic catalog. That catalog can then be accessed by local supply systems attempting to match requirements to sources of supply or local procurement systems attempting to locate IDCs or Federal supply schedules. The local activity can then place the requisition (in the case of supply actions) or the order (in the case of procurement actions). If the activity chooses not to accept the listed item, it can pursue a local purchase action. The activity accessing centrally maintained information gives local activities control over the decision.

Figure 3-6 illustrates this relationship where suppliers update the catalog with EDI price changes. Currently, the Department of Veterans Affairs (DVA) offers Government (e.g., DoD, DVA, Public Health Service) pharmacies the opportunity to access a central data base of drugs available on IDCs but does not permit them to place electronic orders. Instead, the local DVA activity issues the delivery order. Also, GSA's Federal Supply Service (FSS) maintains an electronic bulletin board for copier equipment and permits requiring activities to match their requirements to individual product features and characteristics. A browse feature allows the browser to easily review the catalog. Once the reviewer finds the desired item, it can be selected and a requisition transmitted to FSS. Then the GSA consolidates all requisitions for a time period into one EDI purchase order.

The Digital Equipment Corporation's (DEC's) "Electronic Store" is a commercial example of on-line access to an electronic catalog which provides ordering capability. Actually, the Electronic Store provides much more. Besides providing product and service information, it offers pricing, lead time, and configuration

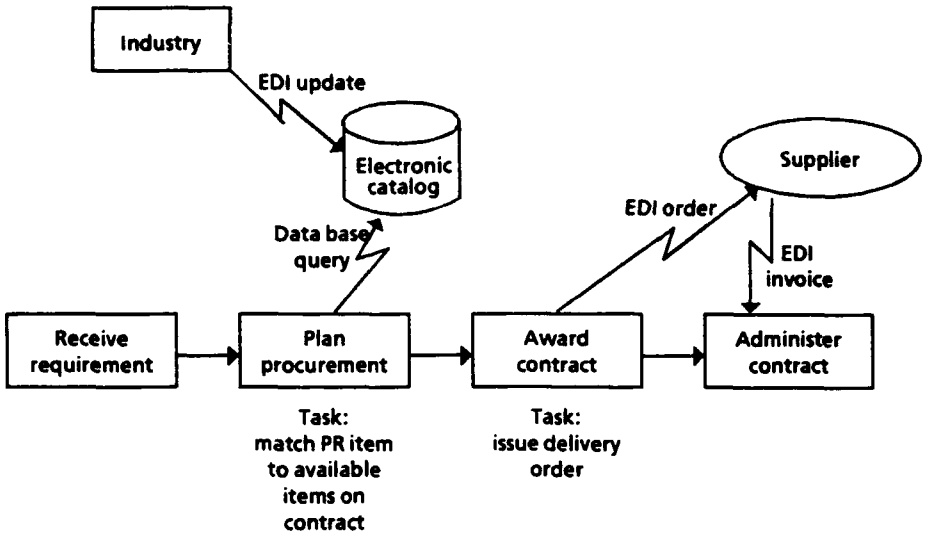

FIG. 3-6. ELECTRONIC CATALOG ORDERING

information. It also offers an automated "bridge" linking it with EDI. Customers can generate their own quotes and instruct the system to submit quotes to their company's purchasing system. In return, an EDI purchase can be sent into DEC's order processing system.[4]

Simplification to a Two-Phase Buying Process

We believe the main futuristic step in the evolution of automated procurement processes is to recognize that procurement approach and documentation can be predetermined and preprogrammed. In the future system, each procurement action will still be processed separately and decisions will be made (or concurred in) by buyers. Today's procurement culture is for each buy to stand on its own – with its own planning, documentation, and decisions. We believe that for many procurement actions, planning solicitation and evaluation can be predetermined and front-loaded into the system so that only two phases will be required – requirement receipt and award. Figure 3-7 illustrates this concept.

An indefinite delivery/quantity contract is an example of a vehicle used to predetermine orders in which receipt of a requirement can be followed by an order.

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[4]Article based on a conversation with Mike Kalagher, Manager, U.S. Administration and Chairman, Digital's Internal Electronic Data Interchange Board of Directors, "Electronic Data Interchange Creates Revenue and Efficiency Through Change," *DECWORLD*, March 1991, pp. 14–17.

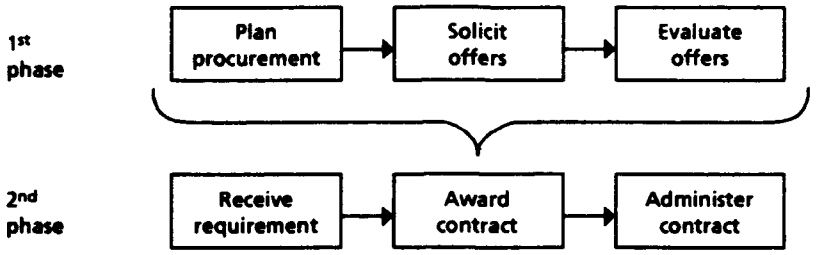


FIG. 3-7. TWO-PHASE BUYING PROCESS

However, in the two-phase buying process, the predetermination can be made for any item from any supplier and not merely for one specific item. The key is to have access to computer information about every item and supplier. Ideally, automated access to pre-positioned data bases – containing information about product specifications, procurement histories, price histories, vendor performance, price catalogs, debarred/suspended contractors, etc. – could permit predetermined and pre-programmed procurement plans to gather information for new requirements, to evaluate the supplier responses, and to make an award recommendation. The data bases would include the marketplaces for which all products are described and all prices quoted – on a continuously updated basis. Electronic "brokers" might be used as the intermediaries who gather and compile information.

An electronic marketplace is possible now. Today, electronic markets and brokers are being developed. As indicated in Chapter 6, we must prepare for changes in how markets and distribution channels function.[5]

Paperless Cost and Price Proposals

An example of a paperless process is the use of computer automation to prepare contractor cost proposals. Many contractors have for years employed computer systems to measure and account for business activity. Much of this accounting information is needed by the contractor's cost estimators to prepare price proposals. With the advent of personal computers, cost estimators and proposal managers began to use electronic spreadsheets to prepare their positions. What has now evolved are automated cost proposal preparation systems that estimators can use to access accounting and production data electronically and estimate future costs. Since

[5]Thomas W. Malone, et al., "Electronic Markets and Electronic Hierarchies," *Communications of the ACM*, Vol. 30, No. 6, June 1987, p. 484.

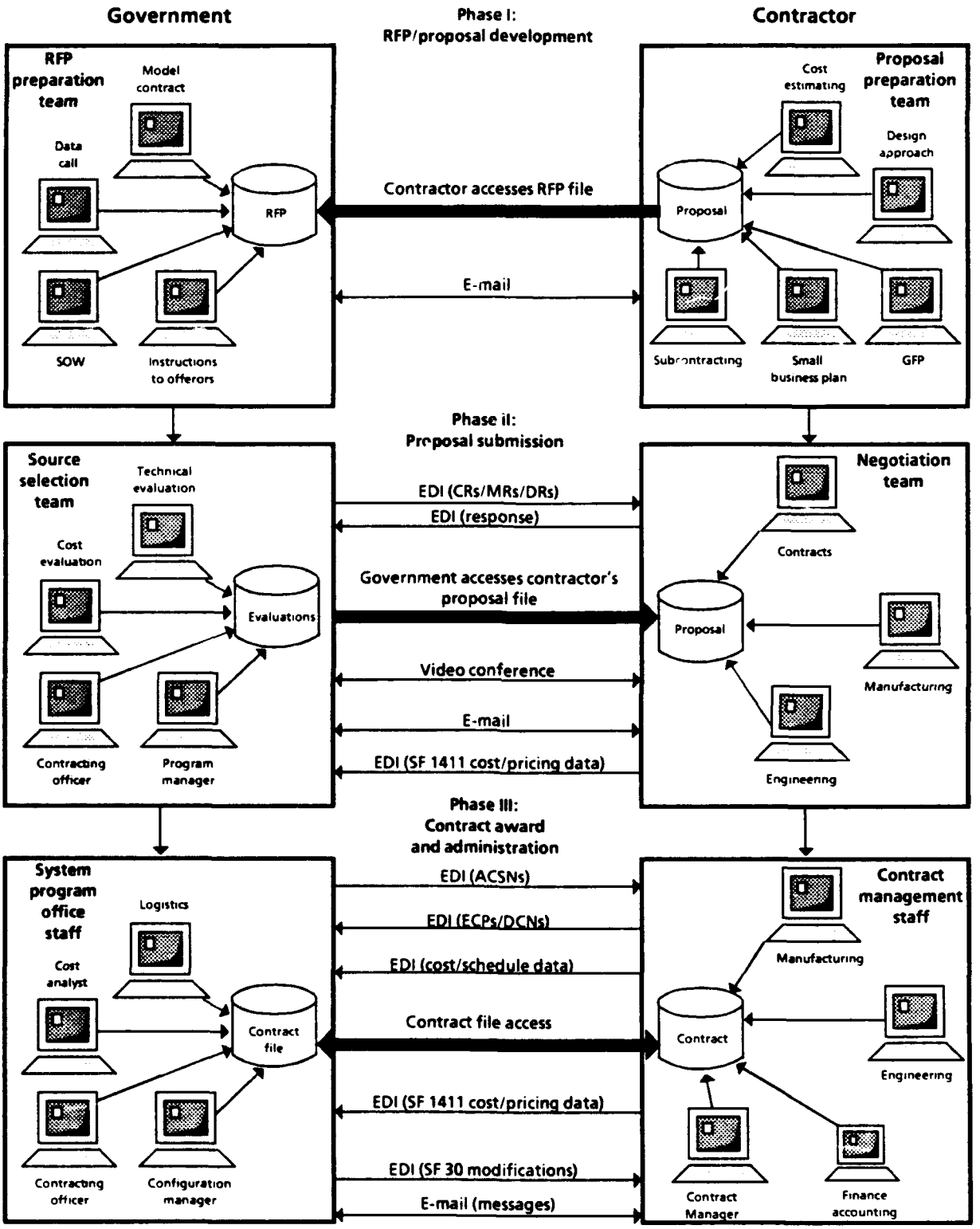
Government price analysts and contracting officers are using automated tools to evaluate the contractor's offer, the next step is the development of an EDI transaction to link the contractor's proposal preparation system with the contracting officer's proposal evaluation system.

It is now possible to transmit a paperless SF 1411, *Contractor Cost Proposal*, and all its supporting data between the prospective contractor and the Government. That process eliminates the need for the Government price analyst to extract data from the contractor's cost proposal and enter it into the Government's proposal evaluation system. Besides speeding the process, that approach eliminates data entry errors.

The electronic commerce approach illustrated in Figure 3-8 is a hybrid of EDI, E-mail, and other interface technologies integrated to support weapon system acquisition. In acquiring weapon systems, selection of a system contractor is a lengthy, formal process in which the Government's RFP and contractors' proposals both number thousands of pages and are prepared by large teams. Typically, if the process is automated, these RFP source selection and proposal preparation teams would be linked among their respective team members through word processing and spreadsheets over local area networks. The statement of work (SOW); DD Form 1423, *Contract Data Requirements List*; model contract; and instructions to offerors are each being created by different RFP participants using word processing systems that could be linked together to create the complete RFP. The private-sector contractors who were dealing with these (now automated) Government agencies are also preparing their proposals in automated environments. Government cost analysts now request contractors to submit their cost and price data on floppy disks in a specific electronic spreadsheet format so that the data can be readily analyzed.

This mutual use of automation to prepare and exchange RFPs and proposals permits access to those documents at the appropriate time by multiple parties. The Air Force's Aeronautical Systems Center (ASC) has developed a prototype of a paperless source-selection interface for major defense contracts. The ASC issues an RFP by providing interested (and authorized) parties access to an electronic RFP file, which can then be downloaded to the bidder's corporate system.[6] Similarly, granting access to information such as cost data and engineering drawings could constitute proposal submission. Figure 3-8 illustrates this concept. As the procurement action

[6]One idea is to grant potential offerors access to the draft RFP once the synopsis appears in the *Commerce Business Daily* to obtain industry feedback.



Note: ACSN = Administrative Change Study Notice; CR = Contractor Request; DCN = Design Change Notice; GFP = Government furnished property; MR = Modification Request; DR = Deficiency Report; ECP = Engineering Change Proposal.

FIG. 3-8. MAJOR SYSTEM ACQUISITION PHASES

progresses from the RFP preparation phase through source-selection contract award and post-award management, the transactions change, but the information evolves as the RFP (Figure 3-8, Phase I) is used to form the proposal (Figure 3-8, Phase II) and the proposal is used to form the contract (Figure 3-8, Phase III). Paper documents (or even magnetic media) need not be exchanged since both parties' computers access the required information.

Today, the weapon system electronic commerce approach relies on sharing data between Government and the selected contractor. This data-sharing concept is used by Computer-aided Acquisition and Logistics Support (CALS). It consists of a central data repository maintained by the system contractor or a third-party contractor. That repository contains all logistics and technical data related to a weapon system. Some of the interfaces, such as cost and pricing data, can be EDI transactions, but CALS implies on-line access to data supporting both the technical and cost proposal. The contract and its modifications could all be maintained in one data repository and accessed by all authorized Government and contractor personnel.

Electronic Auditing

Automation of accounting records, cost estimation, proposal preparation, and price analysis goes beyond mere data-handling efficiencies. The gradual evolution of contractor accounting and estimating system automation has fostered dependency (by both the contractor and the Government's price analysts and auditors) on data that exist only in electronic records. Electronic spreadsheets and specialized cost proposal software permit manipulation and analysis of these data. However, electronic records and electronic links to the stored accounting data also permit electronic auditing. The large electronic records that stand behind a contractor's cost proposal can be easily accessed by a Government auditor or analyst through a desktop computer linked to the contractor's accounting data base. That capability accelerates proposal audit and price analysis processes since it eliminates lengthy delays awaiting proposal backup information.

PAPERLESS INTERNAL PROCESSES

The previous discussion regarding paperless processes focused on external work processes: ordering, soliciting, and accessing remote records. The following

paragraphs discuss the internal workflow processes of a paperless procurement system.

In 1990, CONTEL Federal Systems developed an automated procurement system, initially to improve its purchasing department's documentation. CONTEL felt that an automated system could better create and store transactions, documents, and files to satisfy Defense Contract Management Command contractor purchasing system review requirements. A paperless internal purchasing process evolved from this initial concept where buyers accessed information through computer terminals linked to a mainframe computer. Buyers did not handle paper files since everything was stored and displayed by the computer. The system was programmed to require all necessary documentation before an award could be made. Every transaction, query, document, and file was written to a mass storage device. The historical records amassed by this constant storage process remains important for future buys. Accumulated records of previous contracts, prices, vendors, performance, etc., can be used during the planning, solicitation, and evaluation phases of the procurement cycle.

CONTEL Federal Systems developed and programmed preaward checklists and milestones into the system. Instead of the buyer completing the award steps, the system accessed stored information. Based on predetermined procedures required for a given type of action, the system obtained 80 percent of the required information and documentation – once the buyer decided to make the award. The key to the system's productivity is entering information only once, storing the data, and sharing it (based on predetermined logic for different procurement scenarios).

When the buyer needs to obtain certain documentation, they do not guess where they are in the process, or when to perform a certain task – the system already knows the commodity, price, customer, and supplier. The system alerts the buyer to perform a task or it automatically provides information needed for the next step's decision.

In effect, the procurement system now contains the procedures manual – it is programmed to be the process. We learn three lessons from CONTEL's example. First, there is conflict between an automated system's requirement for standard procedures and human nature's urge not to follow procedures. People want flexibility. They deviate from standards by taking shortcuts. Taking shortcuts can

get buyers into trouble. Therefore, the system should not be too rigid. Management must be able to override the system (e.g., CONTEL's system permits PR initiators to declare a "priority" buy).

Second, buyers often like the structure associated with automated processes because that structure makes their jobs easier and frees up their time for planning, analysis, and decision making. However, buyers sometimes become too dependent on the system. They become complacent. Buyers no longer need to think about the process because the system automatically provides the necessary cues and/or the pre-completed documentation. Some buyers are not challenged fully in this environment.

Lastly, automation has changed the way buyers learn their profession. Instead of learning by doing, buyers find themselves being presented with the solution. In the days of paper FAR and DFARS, the buyer would research the solicitation methods or warranty types to arrive at an acceptable approach. Although the buyer's approach might be rejected by the contracting officer or the reviewer, the buyer would learn from his or her mistakes. This learning method will be replaced by the automated system. Therefore, we need to revise our formal training programs to include lessons not only on procurement concepts and policies, but also on how the automated system determines its recommended approach. If such training is not provided, buyers will be unable to understand and "challenge" the system, which they must be able to do if the Government is to fully benefit from the automated system.

One approach is to incorporate explanations of process logic into the system itself. The buyer could then access this "tutorial." Also, computer-based training could be used as the delivery vehicle of these explanations.

SUMMARY

The paperless procurement process examples presented in this chapter represent the types of technologically induced change the procurement function will experience. The following chapters attempt to describe the impact of that change on procurement personnel, organizations, regulations, and markets.

CHAPTER 4

PERSONNEL AND ORGANIZATIONAL IMPACTS CAUSED BY AUTOMATION

Application of automated information technologies to DoD procurement processes will change the way work is performed, the number and skills required of contracting personnel, and will reorganize the procurement office's structure. While there has been, and will continue to be, some resistance to advanced automation, the proper implementation of automation can revolutionize workplace productivity. The most competitive organization activities will be the ones that fully embrace automation. The major force driving these changes is the removal of paper from the workplace. These projected changes are explained in this chapter.

BACKGROUND: THE PAPERLESS OFFICE

The paperless office was widely and regularly heralded throughout the late 1980s, but it never arrived. This tardiness results from technological shortcomings and the paper culture's entrenched acceptance. The current literature is now replete with concern about the viability of the paperless electronic office.[1]

This concern is directed primarily at the primitive ways information is presented by existing automated systems. Current video display screens do not permit effective absorption of complex information. The technical limitations of video display screens, organizational and space constraints posed by displayed text, and the strong cultural bias for using paper for the presentation of information must be overcome. Paper will be the preferred media until the technical limitations are overcome.

MAN-MACHINE INTERFACES

Problems arise when a lot of video-screen-displayed text must be read and understood. Contracts with SOWs and exhibits may not be read easily when viewed

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[1]Jean-Louis Gassee, "Will We Ever Work in the 'Office of the Future'?" *MacWEEK*, Vol. 5, No. 8, 26 February 1991, p. 26, and Stewart Alsop, "Will We Achieve a Paperless Office Environment in This Lifetime?" *Inforworld*, Vol. 12, No. 48, 26 November 1990.

on a video display terminal. Such problems limit automation's acceptance by contracting personnel and restrict the use of automation to relatively simple procurement actions. We believe that Government contract specialists and procurement analysts will continue to want to use paper until improvements are made to the screen's textual presentation. The following improvements are suggested:

- *Better monitors.* Incorporate advanced display screens into system design. Viewing text on an ordinary video display can reduce one's reading rate by 20 to 30 percent. Better video monitors using color video graphics adapter (VGA) (or better) resolution or a paper-white display will improve reading rates by making the screens appear to have a greater resolution (by eliminating interlacing).[2] Also, monitors that fully display an entire 8×11-inch page would eliminate scrolling and would improve acceptance of electronic forms.

- *Better visual design.* Organize displayed information to improve readability. Techniques such as arranging items in a logical, familiar pattern; grouping related items; dividing the screen into functional areas, and laying out the display to guide the user's eyes should be considered by procurement system developers.[3] Another technique is to group words into "microblocks" so they can be read as a block phrase or as thought in their entirety.[4] Also, information contained on a specific procurement form would be better understood on a video simulation of the form.

- *Navigational aids.* Use page counts, legends, highlighters, pointers, and return markers to ensure that the reader does not get disoriented in the text. When reviewing large text documents, readers need constant visual reminders of where they are in the document and how to get to the next area of interest.

- *Intelligent text management.* Use an emerging technology that manages large text messages and files through automatic content-based categorization of on-line text. This technology can determine the subject matter of entries in textual data bases or high-volume streams of text.[5] We believe such software can analyze the text of large contract documents so relevant information is more presentable to buyers or reviewers.

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[2]Roxanna Li Nakamura, "Better CRTs Shown to Boost Reading Speeds; Productivity Gain May Outweigh Higher Cost," *InfoWorld*, 9 April 1990, p. 23.

[3]William Horton, "Visual Rhetoric for Online Documents," *IEEE Transactions on Professional Communications*, Vol. 33, No. 3, September 1990.

[4]Caroline M. Grills, "Microblock: A New Method of Presenting Text for Visual Communicators," *Journal of Micrographics*, November/December 1979, pp. 87–92.

[5]Carnegie Group Inc., *Technical Brief for Text Categorization Shell*, 1989.

Information contained on a simple procurement form such as Defense Department (DD) Form 1155, *Order for Supplies or Services*, can be more easily displayed on a video screen than a large contract can be. User comprehension would still depend upon how the document displays. Buyers understand and accept information conveyed on paper procurement forms because the form's format organizes the information in blocks. The same information may be even more understandable if the video screen displays the information (e.g., from the purchase order or RFQ) in the appropriate position on the form. Even if the information is stored or transmitted in an EDI transaction format, the form's electronic image appears with transaction information in the corresponding blocks. User acceptance of electronic orders will increase when such methods are adopted.

Much of the foregoing discussion deals with human comprehension and the cognitive effects associated with man-machine interface issues. A related issue is the "ergonomics" of the automated workplace.[6] These man-machine interface details are not seriously considered by many system developers. This is a major reason for employee turnover and eventual rejection of the automated office environment. Paul Strassman has stated

> Demoralization can be the largest automation expense . . . Employee dissatisfaction stemming from poor ergonomics can demolish the economic benefits expected from an otherwise profitable new computer system. . . . Bad ergonomics is bad business.[7]

Another issue is how the automated procurement system deals with users once they have become accustomed to menu-driven screens and system option selection methods. We observed that buyers on earlier versions of DPACS found screen selection methods too slow once they had gained experience. This user dissatisfaction problem can be solved by distinguishing between novice and expert users when designing man- machine interfaces. Query short cuts and "hot" keys need to be designed into the system to accommodate advanced users.

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[6]Ergonomics is defined in the *Dictionary of Computers, Information Processing and Telecommunications*, 2nd Edition, Jerry M. Rosenberg, 1987, as "the technology that studies the biological and engineering problems of the man-machine relationship." *The Random House Dictionary of the English Language*, 2nd Edition, Unabridged, 1987, refers us to "human engineering – an applied science that coordinates the design of devices, systems, and physical working conditions with the capacities and requirements of the worker."

[7]Paul A. Strassman, *The Business Value of Computers, An Executive's Guide*, New Canaan, Conn.: The Information Economics Press, 1990, p. 315.

An example of how man-machine interface problems can be overcome is the Air Force B-2 Bomber System Program Office's use of an electronic writing pad to annotate copies of letters displayed on a video screen. Letters that a buyer creates with word processing software and a keyboard are sent via an electronic network to the contracting officer's workstation for viewing. If the contracting officer wants to edit the letter, an electronic writing pad with an electronic writing instrument is used to place written and drawn corrections onto the visual image. This edited copy is then electronically returned to the buyer for review. Although paper has been replaced by a video display screen, the same editing methods can be maintained by an analogous electronic interface.

TASK ELIMINATION AND REALIGNMENT

As technology enables streamlined work processes, tasks are eliminated and labor hours are reduced so fewer personnel can produce the same amount of work. Clerical functions will be changed as the most advanced software applications automatically generate EDI orders, create paperless files, and store all transactions and documents on optical disks. Data entry, printing, collation, distribution, and filing tasks can be eliminated. For example, when information is conveyed on paper purchase requests, information must be extracted from the PR form and manually transferred to the purchase order form by typing (or word processing) a paper form. Technology can eliminate the procurement clerk's data entry and paper-handling tasks. The PR form's line-item details can be automatically passed from the electronic PR to the contract/order-writing system. The paper PR need not be filed since all of the information that constitutes the PR is automatically filed in a data base where it can be easily retrieved later.

Using additional automated links can also eliminate almost all clerical tasks from the entire supply/acquisition cycle. From the point a product is requisitioned – through supply, procurement, and order issuance – automated systems can communicate information previously contained on paper. The result is reduced data entry, paper-handling, distribution, and filing costs.

Paperless procurement will not eliminate many buyer positions, but the buyer's tasks will be realigned. Instead of processing manual small purchase actions by issuing paper or telephonic RFQs and purchase orders, with minimal buyer involvement, automated systems can place electronic RFQs and purchase orders in

the supplier's electronic mailbox through a telecommunications network. The buyer working at an electronic workstation can view supplier quotes ranked for evaluation and award decisions. The buyer's time is focused on evaluating information, negotiating, and making decisions instead of making telephone calls and recording quotes on paper forms.

Procurement review tasks will also be affected. Advanced automated systems can be programmed to check for required file documentation and, with expert systems, perform content reviews. For small-dollar procurement actions, electronic documents and files can be viewed by the contracting officer at an electronic workstation. For large-dollar actions, a procurement reviewer might view the action and supporting material. The contracting system's internal review logic will seek out inconsistent or incomplete details and alert the reviewers.[8] The review alert could provide an on-screen display of questionable documentation, highlighting or splitting the screen display to show inconsistent values on separate pages.

MERGER OF FUNCTIONS

Another impact of advanced automation will be a rethinking of functions and job descriptions. The distinction between supply specialist and buyer may disappear as both functions can be performed automatically for a large number of required items. In some cases, the need for a supply analyst to research sources of supply and a buyer to acquire items not available in supply may disappear. This may permit management to merge the remaining functions into one position.

IBM's Federal System Division has developed an electronic system that blurs the distinction between supply and procurement functions. An individual needing an office product can, through a network, gain workstation access to an electronic list of standard office supplies available under a competitively negotiated contract. IBM requires the successful offeror to maintain an electronic catalog of available office supplies which are significantly below retail prices. If, for example, a desk lamp is needed, the description, price, quantity, and availability of a variety of lamps are listed. Descriptive information, as found in a paper catalog, is available. For example, once a lamp is selected, the system verifies the individual's authority to order such an item and checks funding availability. The order is then accepted, stock

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[8]Ronald M. Lee, "A Logic Model for Electronic Contracting," *Decision Support Systems*, Vol 4., No. 1, 1988, p. 26.

is committed, and a shipment date is projected – all automatically. The personnel impact is a reduced need for a supply analyst to research sources of supply and item availability, and, in cases where the item must be procured locally, a reduced need for buyers to process small-purchase actions.

The use of automation to streamline supply research and ordering advances the trend in commercial purchasing to blend supply and procurement functions into "material management."[9] This approach not only eliminates workflow process steps, it also eliminates tensions over late requirement determinations, unrealistic need dates, and ever increasing procurement lead times.

The application of information technology crosses functional lines as we have illustrated in the IBM example above. Michael Hammer states that efforts to re-engineer work must look at the business processes from a cross-functional perspective. When Ford Motor Company undertook improvements to invoice processing in its accounts payable department, it found that the scope needed to be broadened across acquisition process workflows, including purchasing, receiving, and accounts payable.[10]

We believe that information technologies will foster changes in work processes that will eventually require a reassessment of job titles, position descriptions, and even civil service job classifications.

Organizational Changes

As indicated above, information technology can break down the functional boundaries within organizations so that one individual can perform what had heretofore been performed by separate functional specialists. In doing so, information technology also changes the organization's structure by eliminating or merging departments, reducing layers of management, and centralizing or decentralizing activities.

We have already addressed how the number of procurement staff members supporting the buying process may be reduced when automated programs check for file content and document completion. Management oversight can also be reduced.

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[9]This trend has been observed in DoD where the Defense Mapping Agency has merged responsibility for supply and procurement into a common department.

[10]See Hammer, Note 2, Chapter 3, where Ford's invoiceless payment system is described.

The number of supervisors or managers assigned to an organization has been shaped by upper management's need to have control through a hierarchical structure. Information flowed up through lower level managers to those who had the knowledge or authority to act on it. Control systems that gathered this information and moved it up each layer of the pyramid were developed. This organizational structure and the need for controls are outgrowths of the 19th century industrial era where work was broken down into defined, specialized tasks and the people performing those tasks were grouped into departments under a manager.

Such hierarchical organizations with layers of subordinate managers are outmoded. Information technology applications are changing work tasks and processes so specialization by distinct departments and individuals is being undertaken by individuals working in merged functional areas. Additionally, automated systems provided management information across the entire organization so intermediate-level managers provide little value.

Another organizational change will concern where the work is performed. Most procurement actions originate from local procurement offices supporting parent military organizations and from various tenant commands at military installations. The DoD has over 1,300 buying activities, the majority of which are installation support activities.[11] Movements are underway within DoD to consolidate buying responsibilities for various commodities and even to centralize or regionalize buying activities. Much of this interest stems from the belief that economies of scale are realized from concentrated requirements. However, removal of local buying offices may reduce support for local customers.

We believe that advanced procurement systems and their telecommunications networks can support centralized or regionalized buying but still provide local customer support. Instead of relying solely upon a central buying activity to manage and acquire a commodity, DoD could link small, dispersed buying activities to a central activity through electronic networks; information could be shared. The local buying office would still be decentralized for local support to the base commander and units, but its buying power would be part of the centralized network. By accessing centrally maintained electronic catalogs, ordering from centrally developed IDCs, or providing purchase requests to the central or regional activity for consolidation (as

[11]DFARS, Appendix G, Activity Address Numbers.

illustrated in Figure 4-1), the local activity can benefit from centralized information processing; however, the local activity still appears to be "local" to its customers by providing instantaneous order processing and status reports. We believe that this "centralized-buying-with-decentralized-support" concept provides better local support to military operations while providing better prices and service.

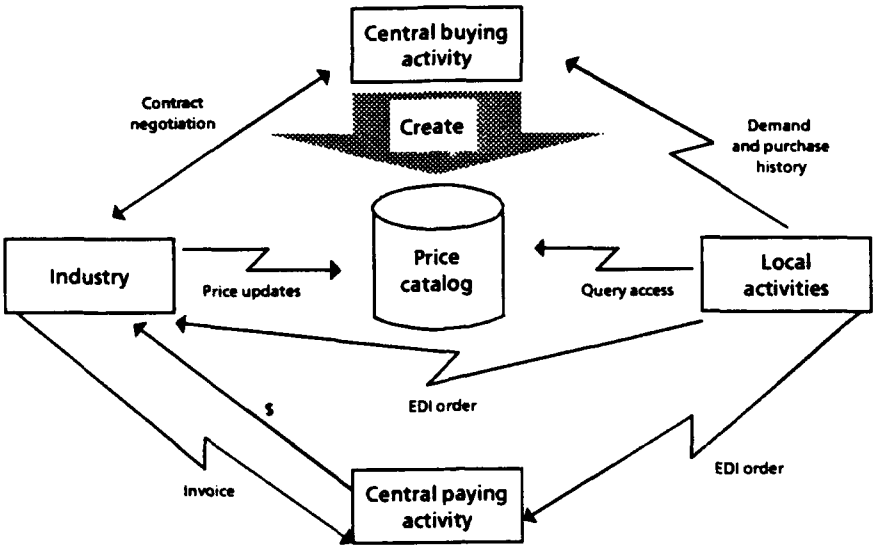

FIG. 4-1. DECENTRALIZED/CENTRALIZED ELECTRONIC PROCUREMENT NETWORK

The resulting organization structure no longer has the "chain of command" of the steep hierarchical structure where information moves up and down (vertically) in the organization. Now, information moves laterally (horizontally). The local activity is networked to external organizations. The organizational structure is no longer self-contained, but is instead integrated with, and dependent upon, numerous external organizations.[12]

SUMMARY

The impact of paperless procurement processes may be greatest among buying personnel and organizations. For that reason, DoD's Procurement CIM staff must ensure that system developers emphasize the man-machine interface issues or risk rejection of the system. The factors that will reduce clerical tasks and streamline organizational structures need to be considered by system developers.

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[12]See Charles M. Savage, *Fifth Generation Management, Integrating Enterprises Through Human Networking*, Digital Press, 1990.

CHAPTER 5

IMPACT ON PROCUREMENT REGULATIONS

Throughout the FAR and DFARS, the language describing actions or policy predominately assumes that the process is accomplished by using paper documents. Terms such as "in writing," "on plain bond paper," "typed, stamped or printed," "file drawers," "certified mail," etc., can be found. While there is nothing inherently wrong with these terms, the acquisition regulations run the risk of becoming outdated by rapidly advancing technology. The old terminology may serve as an impediment to improved processes made possible by new technology.

BACKGROUND

As part of our consideration of the issues surrounding paperless procurement processes, we conducted a part-by-part review of the FAR and DFARS to identify impediments to paperless processes, and perhaps more importantly, opportunities for change. The results are found in Appendix A, and are organized by FAR and DFARS Chapters. The FAR and DFARS comments are interspersed since many DFARS sections correspond to FAR sections. We expect that additional impediments and opportunities would be found by conducting similar reviews of the Military Service and agency supplements to the FAR, as well as review of local contracting activity operating procedures.

REGULATORY RECOGNITION OF NEW TECHNOLOGIES

The FAR and DFARS have been modified in recent years to recognize technologies such as electronic funds transfer and facsimile transmission of bids. We believe that technologies such as EDI, E-mail, optical disks, compact disk-read only memory (CD-ROM), EBBs, value-added networks, and relational data bases should be referenced in the contracting regulations as alternative methods for carrying out many of the paper-based policies and procedures. For example, GSA's FSS is operating an electronic information system called the Multi-Use File for Interagency News (MUFFIN). The MUFFIN consists of data about sources of supply (supply schedules), excess/surplus personal property, customer service information, the quality improvement program, household goods, and requisition status. We believe

it is appropriate to reference the MUFFIN system at FAR 8.401(b), which tells FAR users how to obtain paper copies of the supply schedules.

There are a few instances where flexibility has already been written into the regulations, allowing new technology to be used. The paragraph at FAR 33.211(b), which deals with disputes, states that the contracting officer shall furnish the contractor a copy of the decision by certified mail, return receipt requested, *or by any other method* that provides evidence of receipt. This would allow the contracting officer to use an EDI transaction (along with receipt verification) instead of a paper copy. Another example is found at DFARS 204.202(4), which provides for distribution of modifications by an automated means. We recommend placing similar, flexible language elsewhere in the regulations to encourage paperless processes. These areas are identified in Appendix A.

STRATEGIES FOR REVISING THE FAR AND DFARS

There are three options available for revising the contracting regulations to promote paperless processes. These range from a minor rewrite to an extensive rewrite. A minor rewrite would expand the definitions of certain terms such as "written," "document," "file," "form" "mailing," and "signature" to provide for electronic equivalents. New terms can be added as necessary to keep current with technological advances. This method is the easiest to accomplish, but the paper-based process descriptions remain intact and will eventually become obsolete and require revision.

An interim step between a minor and major rewrite of the FAR and DFARS would be an approach that targets certain parts of the regulations for more extensive changes. The targeted subject areas would be those most likely to first utilize paperless processes, such as Part 13, *Small Purchase and Other Simplified Purchase Procedures*. The policy language could be revised so that a variety of different technologies could be accommodated.

The third option is a major rewrite of the entire regulations. The goal would be to make the regulations as technologically neutral as possible by revising process descriptions to avoid mandating a particular method. This would be a difficult task since many acquisition functions do not yet have an alternative to the paper process, and how paperless processes might be applied to these functions has not been

analyzed. For processes that occur infrequently, the existing paper process may be suitable for quite some time.

We recommend a combination of the first two options. Definitions should be broadened to allow paperless contracting initiatives to develop whenever feasible. More extensive changes should be made to areas that are now beginning to utilize paperless processes, such as for small purchases, ordering procedures, and transportation. The FAR and DFARS, as they are currently written, are similar to functional specifications in that they describe exactly how to accomplish a given action. Ultimately, we believe that the FAR and DFARS should be written more like performance specifications, where the outcome is specified, but the method for attaining the outcome is given greater discretion.[1]

IMPEDIMENTS TO PAPERLESS PROCESSES

The review of the FAR and DFARS highlighted several issues that could slow the movement toward a paperless contracting process. New technology will allow old processes to be accomplished in different and better ways, but policy and organizational problems will need to be resolved before workflow process changes can be fully implemented.

One example is the requirement for synopsizing solicitations over $25,000 in the *Commerce Business Daily* (CBD). Electronic bulletin boards, EDI, and networks may eliminate the need to synopsize requirements by making the actual solicitation available electronically to all who wish to examine it. Interested parties could then immediately download a copy. Reproduction costs would be eliminated. The mandatory time frames for posting CBD notices may be unnecessary or could be shortened, if electronic solicitations could be easily and quickly provided to interested parties. Statutory revisions would be necessary to *Public Contracts*, 41 U.S.C. 416 and *Commerce and Trade*, 15 U.S.C. 637(e), because these laws mandate publication of CBD notices at least 15 days before the solicitation is issued. Even though technology could improve the process, Congress may still require compliance with the existing publication policy because the CBD is the one source that alerts potential

[1]On 31 December 1991, a new streamlined DFARS went into effect. An initial overview of the new DFARS indicates that it contains much less procedural, technology-specific language than its predecessor. It also gives greater recognition to automated and electronic processes.

contractors to all solicitation opportunities, regardless of a contractor's technological capability.

Protection of contractors' proprietary information is an issue made more complex by changing technology. The FAR requires that proprietary information be "marked." This is easy to do for paper documents, but electronic proprietary data poses a more difficult challenge. As the Government and contractors move away from paper-based documents and increasingly utilize relational data bases to manage information, it will be necessary to identify the individual data elements that are proprietary. Data streams might contain both proprietary and nonproprietary information. Electronic transactions and applications software will need to be designed so that the appropriate restrictions are displayed to the user in order to ensure that proprietary data are protected.

The complexity of the sealed bid and request for proposal actions, coupled with their relatively low number of awards (as compared with small-purchase actions), means that the conversion of these processes to paperless ones may not be cost-effective until paperless contracting processes are well-established. These actions only account for about 1.6 percent of all DoD contract actions.[2] The savings from automating these actions would likely be minimal, and their unique and lengthy requirements greatly complicate the development of a paperless contracting process.

Another potential impediment to the increased use of electronic contracting processes is the ability of contracting organizations to respond quickly to legislative and regulatory policy changes. Under the current paper-based system, policy changes can be implemented fairly easily. As paperless systems become more prevalent, a system's infrastructure must be able to make rapid programming changes to keep pace with policy changes.

Finally, the ability to use technology to improve the contracting process depends in part upon cooperation between the organizations that maintain data and organizations that use the data. Because technology can link organizations electronically, individual organizations need to communicate with their "customers" and "suppliers" before taking unilateral actions that could adversely affect others. If DoD and other Government organizations act individually, then progress toward a unified contracting information system will be slowed. By viewing each

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[2] *Department of Defense Prime Contract Awards*, FY90, Report P03, p. 2.

organization's contribution to the contracting function as part of an overall process, the movement toward shared information and a more effective workflow process will be enhanced.

SUMMARY

This chapter discusses several recurring themes that were identified as a result of our regulatory review. We recommend that individuals responsible for procurement automation efforts within DoD review our findings for incorporation into their automation design plans. We also recommend that the drafters of FAR and DFARS policy take a proactive approach to fostering automation by making appropriate wording and definition changes to the regulation to facilitate the current and future use of paperless processes in Government contracting.

CHAPTER 6

ECONOMIC IMPACTS ON THE SUPPLY MARKET CAUSED BY AUTOMATION

The implementation of electronic contracting within DoD will result in long-term economic benefits achieved from increased competition and lower supply prices for DoD. A paperless DoD procurement process caused by increased automation would affect the way DoD and its suppliers communicate procurement information to one another. Table 6-1 summarizes the potential economic impact of communications technologies such as EDI on the supply market. Interrelationships are identified. This chapter examines the economic impacts of these prospective procurement changes on the vendor market that supplies products to DoD.

TABLE 6-1

ECONOMIC IMPACTS OF DoD EDI ON THE SUPPLY MARKET

Economic impacts of EDI	Impact's relationship to other impacts[a]
A. Market structure	
1. Improved purchaser/vendor relationships	B3
2. Increased number of vendors nationwide	A3, B1, B4
3. Increased number of vendors in regional markets	A2, B2, B3, B6
B. Competition and price	
1. Increased number of quotations per RFQ	A2, B4
2. Sharing of corporate vendor base nationwide	A3
3. Increased local small businesses focus on service and timeliness	A1, A3
4. Lower average purchase prices	A2, B1, B5
5. Increased vendor awareness of competitors' prices	B4
6. Increased use of charge back system between manufacturers and local suppliers	A3

[a] Each alphanumeric designation refers to the alphanumeric numbering sequence used for each entry in the "Economic impacts of EDI" column.

BACKGROUND: ISSUES TO BE ADDRESSED

To assess the economic impact of increased automation on the supply market, we must address market structure, competition, price, small business, and impact duration issues. Each of these potential economic impacts is briefly described below.

Market Structure

Market structure is important because it often relates to competition in price and service. Will paperless procurement processes affect the geographic structure of the vendor market? If there are geographic changes, will the proportion of local vendors decrease? Will the vendor market be more regionalized, or more nationalized as a result of the paperless process?

Competition

Competition, as measured by the size of the vendor base and the number of bids received by the DoD, is another important potential effect of a paperless workflow process. At least part of this effect is distinct from any changes in the geographic distribution of the vendor base. Would a change in the size of the vendor base affect the number of bids received and/or the quality of the competition?

Price

Numerous price impacts could potentially occur; these would be related to changes in vendor market structure and to the amount of competition resulting from a paperless workflow process. Of course, price changes could occur because of changes in the order processing costs incurred by vendors. However, the focus of this chapter is on price changes resulting from changing market structure and competition.

Small Business

Small business groups are concerned about potentially harmful and unfair side-effects on small business vendors if any changes in market structure, competition, and price occurs. To what extent are these concerns likely to materialize? What can be done to eliminate unfair economic impacts on small businesses and to ameliorate other impacts that might naturally arise from changes in the competitive environment? In 1990, Congress mandated that a study be completed by the Small Business Administration (SBA) on these issues.

Duration of Impacts

Finally, are there likely to be differences between the short- and long-run impacts described in the paragraphs above? Are most, if not all, of the impacts likely to be temporary ones that will disappear as the vendor market adjusts to a new, highly automated environment?

SUPPLY MARKET STRUCTURE

Many information technology experts are recommending that information technology be used by businesses to gain competitive and strategic advantages in the marketplace.[1] A few of those experts are recommending that businesses take radical steps to capture the true benefits that technology, especially EDI, has to offer.[2] Michael Hammer's view is that we should never automate outdated business and workflow methods (e.g., purchasing operations). He recommends that we design business operations around the available capabilities of information technology, instead of the other way around, in order to capture the potentially huge economic benefits offered by today's automation. His article reports about one organization, Ford Motor Company, that did just that with EDI in its procurement process and saved as much as 75 percent in labor costs. Hammer calls this approach "re-engineering work," and it is the primary benefit of increased electronic commerce.

A recent study by Coopers & Lybrand reports that 10 percent of all financial transactions are currently conducted via EDI, and that will increase to 25 percent in 2 years.[3] The percentage varies significantly by industry. For example, financial transactions for aircraft parts distribution in the private sector is now conducted through EDI 80 percent of the time. A recent Coopers & Lybrand survey indicates that 62 percent of respondents currently use EDI, that EDI is becoming the accepted method for conducting business transactions, and that most respondents expect their EDI transactions to double or triple in the next 2 years.[4] These figures show that paperless electronic contracting is well on its way to becoming the standard in private industry. It is only a matter of time, and perhaps a very short time, before

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[1]Michael E. Porter, *Competitive Advantage*, New York: Free Press, 1985.

[2]See Hammer, Note 2, Chapter 3.

[3]Stan Kolodziej, "EDI: Use It or Lose It," *Computerworld Focus on Integration*, 7 August 1989, p. 40.

[4]See Kolodziej, Note 3, this chapter.

virtually all businesses in the private sector, large and small, will be using EDI for most of their interorganizational business transactions.

Literature regarding the private sector indicates that EDI changes the nature of the purchaser-vendor relationship (e.g., manner of ordering, billing, notification, and payment). For example, as early as 1986, Margaret Emmelhainz stated that

> (t)he increased use of EDI is a significant issue, from both an intra-organizational and an inter-organizational perspective, for a number of reasons. ... EDI directly affects the method of communication between buyers and sellers – an area of critical importance in purchasing. ... EDI represents a new technology which may change the traditional ways in which vendor relations are maintained. ... it appears that EDI will reach all sizes and types of firms.[5]

Paperless, electronic contracting will definitely change the manner of communication between DoD and its suppliers.

According to research about the private sector, EDI usually does not change the local/regional/national distribution of the marketplace, although it may narrow the number of vendors in the marketplace (at least initially) for several reasons:

- EDI is absolutely required in order to do business.
- There are closer ties to a smaller number of companies because of the increased time-sensitivity of the relationships.
- Some companies use proprietary EDI software.
- Some vendors perceive more than normal technological complexities with EDI.

These fundamental changes sometimes cause initial problems in persuading vendors to participate in electronic contracting. Union Pacific Technologies, a long-time EDI user, has not yet achieved its goal of receiving all bills of lading electronically from its business partners.[6] In April 1990, 41 percent of the bills were received by EDI, 48 percent by fax, and 11 percent by telephone. This is consistent with our discussions with both EASE and SPEDE officials who told us that the number of companies participating in their electronic contracting systems is directly

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[5]Margaret Emmelhainz, *The Impact of Electronic Data Interchange on the Purchasing Process*, unpublished dissertation, The Ohio State University, Columbus, Ohio, 1986.

[6]Tom Smith, "Unwilling Partners Handicap EDI Users," *Network World*, 9 July 1990, p. 23.

proportional to the amount of public relations and information dissemination they provide to potential vendors.

Empirical research by Emmelhainz found that EDI improves buyer-vendor relationships:

> EDI encourages the sharing of information which, in turn, encourages and enhances trust between the partners. . . . EDI eliminates nuisance factors such as lost orders, incorrect information, etc., which often create conflict between buyers and vendors.[7]

She also found that the 15 organizations included in her study split evenly over whether the vendor base would decrease due to EDI. She concluded that

> (t)hese findings . . . indicate that EDI does not significantly impact the basic roles of the buyers and vendors, but rather only the method of documentation transmission.

However, we must remember that companies in the private sector tend not to operate under "full and open competition and small business set-aside procedures." Instead, they tend to pre-identify the universe of feasible vendors/suppliers. Therefore, they tend not to expect the number/location of vendors/suppliers to increase as a result of EDI contracting. As electronic contracting becomes the standard in both private industry and the Federal Government, we expect the size of the DoD vendor market to increase as suppliers realize that potential sales are only a phone call away. Payne and Anderson (1991) suggest that

> EDI tools will permit DoD to tap existing marketplaces more effectively, will allow vendors easier access to opportunities for doing business with DoD and will afford vendors the opportunity to identify themselves as potential sources of supply.[8]

Early evidence indicates that electronic contracting increases the size of the vendor base for each site by making the DoD market wider (i.e., more regional or national); however, the degree of widening depends on the nature and price of the item as well as transportation costs. Although NSC of Jacksonville, Fla., always had some regional and national suppliers, since the advent of EDI, they have more of them, and more bids from them. The NSC-Jacksonville has not experienced a decrease in the number of local vendors. The Defense Personnel Support Center

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[7]See Emmelhainz, Note 5, this chapter.

[8]The RAND Corporation, Report R-4030-P&L, Judith Payne and Robert Anderson, *Electronic Data Interchange: Using Electronic Data Interchange to Enhance Defense Logistics*, 1991.

(DPSC) finds that SPEDE encourages the use of the Federal supply schedule, which results in more regionalization and nationalization of the vendor base. EDI contracting allows a wider audience of vendors to be reached given the same staff (e.g., less reliance on phone calls and mailing lists), so that firms located anywhere can have easy access to DoD purchase opportunities. EDI "shrinks the world" by reducing the significance of geographic differences. Vendors reviewing RFQs regarding EASE can review and bid on NSC – San Diego, Calif., requests just as easily as they can on NSC-Jacksonville requests. Of course, transportation costs of product shipments affect the amount of regionalization and nationalization that occurs. Local vendors can compete effectively in the areas of hands-on service and delivery time responsiveness.

These market structure impacts are interrelated with the competition and price impacts discussed below. They all form an intricate web of actual and potential effects of moving to a paperless electronic procurement system within DoD.

COMPETITION

If the Navy's EASE and DLA's SPEDE experiences are any indication, EDI increases the amount of competition by increasing the size of the vendor base and the number of bids. The vendor base increases because the Government gains increased access to regional and national suppliers, access to "connected" (versus previously "disconnected") vendors and has the potential to entice more local suppliers into the vendor base, provided the technological and cost barriers are kept low. The ability to electronically connect previously disconnected vendors is somewhat unique to the Federal Government. In the private sector, geographically dispersed sites usually share the same corporate vendor base, electronically or otherwise, because corporate management tends to force a corporate-wide view of suppliers for cost and quality control purposes. McDonalds and Southland (7-Eleven convenience stores) are cases in point.

Electronic contracting in DoD will bring with it a corporate-like view of suppliers. For example, as Naval Supply Systems Command (NAVSUP) extends EASE to additional NSCs, NAVSUP will add the local and regional vendors from the additional NSCs to the common EASE vendor data base. While there were previous legal barriers to "connected" vendor bases, NSC local buyers have been less likely to

call vendors in geographically distant localities than in the local areas, particularly when only one to three calls were normally made to fill a small purchase order.

When vendors obtain access through EDI, the number of bids received per RFQ increases for at least two important reasons: (1) the size of the vendor base increases and (2) EDI RFQs reach a larger number of vendors (than phone call RFQs), given the same staff levels.

Increased competition does not have to emanate strictly from an increase in the actual number of DoD-wide vendors; it can result from the "corporate view" of increased vendor bases of electronic contracting. Increased competition (using the same size staff as before) has an important side benefit – increased productivity of DoD buyers. Using SPEDE, DPSC's Medical Directorate processed over 18,000 requisitions for Operation Desert Shield/Desert Storm in 3 months using three buyers, without needing to pay them overtime.

PRICE

In addition to increases in the number of vendors and the number of bids, price is another element affecting competition. There is little evidence of supply/price reductions due to the use of EDI in the private sector. Economic theory would not cause us to expect price reductions in the private sector since companies tend to negotiate price and other terms on a direct, one-to-one, basis. However, in the public sector, economic theory suggests a supply-price effect because of the increase in full and open competition afforded by EDI, at least for small purchases (less than $2,500) where only one phone call is sufficient to establish a price. The EASE and SPEDE experiences indicate that prices paid by DoD decrease, and the amount of price decrease varies by type of product and the quantity of the product purchased.

The EDI RFQs are read electronically by many vendors who are forced by the competition to submit their best price because the bidders know that they are competing with more than just one or two bidders on each quote. SPEDE allows vendors to specify unit prices (to four decimal places), and many vendors are taking advantage of the extra two decimal places to further hone their bids.

The SPEDE implicitly encourages the use of FSS purchases instead of the "two-phone-call" method for DPSC hospital/medical supplies. This, in turn, encourages purchases directly from manufacturers instead of wholesalers. Phone RFQs are

normally made to local wholesalers. SPEDE officials made tabulations of price comparisons for products actually purchased electronically during one 3-week period in 1990. During that short period, DPSC saved over $78,000 on EDI SPEDE purchases made directly from manufacturers (when one compares the prices wholesalers would have charged). The average price savings on items purchased varied among manufacturers and ranged from 34 to 112 percent. DPSC's Medical Directorate decided to analyze procurements for 2 years *prior* to that 3-week period to see how much money they could have saved using SPEDE to order directly from manufacturers at FSS prices. They compared actual contract awards made without SPEDE to the FSS prices that could have been obtained with SPEDE, for 27 commonly purchased items. (DPSC's Medical Directorate manages over 75,000 different line items.) For just those 27 commonly purchased items, we estimate that DPSC paid 53.6 percent more for these items than if the items had been purchased directly through SPEDE at FSS prices. Although the DPSC SPEDE tabulations did not come from a random sample, they are a strong indication that relatively large savings from supply price decreases are possible by using electronic competitive procurement to deal directly with the manufacturers.

NAVSUP officials report similar price reductions with EASE. EASE officials reported saving 8 to 15 percent on price for many seasonal items such as food, based on tabulations for a short period of time.

Some major suppliers have indicated they would provide price reductions of 15 to 20 percent for some items, if they were given the opportunity to receive electronic orders directly instead of through their distributors. This could have a profound impact on the Military Services' and Defense agencies' small business programs when small-dollar, small business set-asides are replaced by large-dollar contracts outside of the small business FAR set-aside of Part 13.

There is another factor, separate from connected regional and national vendor bases, that should not be overlooked. That factor follows from basic principles of the economics of information. If everybody gets to see the successful bid at the instant of contract award notification, in a Government electronic contracting environment for small purchases, all suppliers would have virtually perfect information about the structure of prices in the marketplace. Such information is not as readily available in the private purchasing sector, where it tends to be treated as proprietary information. This can be a very strong and driving competitive force that works to

the advantage of DoD (and the taxpayers). The more market information available to suppliers, the more competition of all types that occurs, resulting in improvements in the efficiency of the marketplace for DoD-purchased goods and services.

SMALL BUSINESS

Small businesses and the Congress are concerned about the potential impact of electronic contracting on the many small businesses that deal with the Federal Government. Congress, in 1990, passed legislation requiring the SBA to study the benefits and adverse effects of EDI on small businesses. The study will identify technical and financial assistance which the SBA can offer, measures for implementing a uniform technical standard for EDI, measures to prevent EDI from adversely impacting small businesses in the Federal procurement process, and measures to prevent EDI from becoming a competitive barrier to small businesses.

The concern of Congress and small businesses is understandable, given that EDI affects the nature of the relationship between buyers and sellers and that it appears to cause some increase in the regionalization and nationalization of vendor bases. Although we do not attempt to answer all of the questions raised by the legislation, we do address some of the issues raised by that legislation.

One indication is that no major complaints from small businesses have yet been received concerning implemented EDI contracting systems (EASE and SPEDE), even though there has been an increased regionalization and nationalization of vendor bases.

Small Business Set-Asides

The EASE and SPEDE, projects are not replacing their activity's small business set-asides. There has been little impact on purchases under $2,500 because about 99 percent of these are small business set-asides. Small businesses that want to obtain the sales are those with EDI capabilities. Some SPEDE purchases favor larger businesses in instances where the manufacturers are large. However, SPEDE also promotes small manufacturers since their products are less easily substituted (when substitution is requested) under an electronic contracting system than with a less precise phone-call-solicitation system.

Larger purchases, especially those over $25,000, are not regularly awarded to small businesses. The primary reason is that manufacturers and large wholesalers

have a cost (and, therefore, price) advantage, over small retailers when it comes to large single procurement. However, this is not due to EDI and cannot be considered an impact of electronic contracting.

An important related issue concerns the way the Federal Government "counts" small business awards which causes the amount of Government business given to small businesses to look smaller than it really is. The issue arises from a practice referred to in industry as a "charge back." A charge-back scheme works like this: A large, well-known manufacturer of medical supplies often submits the lowest bid in response to SPEDE RFQs and then asks local wholesalers, many of whom are small businesses, to deliver the items to the military facility at the manufacturer's price. Then, the local supplier is allowed to charge back to the manufacturer the difference between the manufacturer's award price and the local supplier's regular price for the item. The anomaly is that none of the procurement is counted as a "small business" procurement. In fact, there is no substantive difference between this case and one in which the local supplier receives an award for the same item at the same price. In both cases the small business receives the same amount of revenue and profit. However, in the former case the entire procurement is counted as a large business award; whereas in the latter case, the entire procurement is counted as a small business award. Such charge backs are likely to be more common under electronic contracting systems than under phone/paper contracting systems. Therefore, the current method of counting small business awards unfairly distorts the impact of electronic contracting on small businesses.

Officials at both the Jacksonville, Fla., and Dayton, Ohio, Chambers of Commerce are not now opposed to electronic contracting. The Dayton Chamber believes that electronic contracting can only increase the number of vendors with access to DoD contracting, resulting in healthier competition.

Some SBA staff members believe that a lower price charged by national wholesalers and manufacturers, by itself, is not a valid issue. They believe that small businesses must continue to compete by using their strengths of responsiveness and timeliness of service to the customer. Service can be just as important to the buyer as price. Their legislative mandate is concerned with impacts on small businesses other than price.

A recent survey of small businesses conducted for DoD's Executive Agent for EDI examined participation by such businesses in DoD EDI implementation.[9] Although the sample size was too small to be considered statistically relevant (only about 50 firms returned responses), two-thirds of the respondents have equipment and expertise to implement EDI right now. Most want more information about how EDI works and how to implement EDI in their procurement activities. And, a majority responded that they would implement EDI if provided with technical assistance.

Costs of Implementing EDI

Research indicates that a growing majority of small businesses already possess the ability to participate in electronic contracting without significant additional hardware and software investment. "Roughly half of all small businesses already have the basic hardware to send and receive EDI transactions."[10] The cost issue may be overstated.

Training is an important issue, but it is one that can be minimized from standardization. Small businesses may have to train one (or more) of their staff members to run EDI. Then, that person(s) must spend time running EDI. Manpower restricted to EDI activity has an associated opportunity cost. This cost is unnecessarily increased if nonstandard (i.e., proprietary) software is used and the vendor wants to participate in electronic contracting with more than one Federal agency. The time and money required for learning and running multiple EDI software is much greater for small businesses. According to Payne and Anderson,

> . . . transaction standards, translation software, and telecommunications networks used to implement EDI to DoD-wide must . . . make DoD buying, shipping, receiving, and inventory control points accessible to vendors.[11]

Networks provide a type of "technology interface" standard. Caroline Reich states that "the use of a third party network is most appropriate when a buying

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[9]Dynamic Technology Systems, *Small Business Participation in DoD Electronic Data Interchange Implementation*, Alexandria, Va., November 1990.

[10]*The State of Small Business: A Report to the President*, U.S. Government Printing Office, Washington, D.C., 1988, p. 70.

[11]See Payne and Anderson, Note 8, this chapter.

organization deals with a large number of vendors who have different types of computer setups and . . . use different paperwork procedures."[12]

Cost is the greatest impediment to small businesses considering investment in automation. Minimum EDI-related hardware costs are $2,500 for a personal computer, modem, and printer. Communication software costs at least another $300. Connection charges to a network, e.g., EASE, cost about $50/month plus connect time. Total communication charges will vary from $600 to $1,200 per year. The network provider (third party) can have a strong influence on this cost depending on the billing method. Totaling all of these costs, and including part of the salary of an employee to run the electronic technology, the minimum direct cost to a small business to implement EDI is about $10,000.[13]

The number of expected orders and the profit/order per year determines the cost-effectiveness of EDI contracting for the small business.[14] An R. J. Reynolds purchasing executive explains that the expected profits from sales to the company might be enough for many small businesses to make the jump to EDI. Therefore, costs are harder to justify for very small businesses. However, when small businesses take into account their sales and profits from all purchasers, including the Federal Government, the investment in EDI can be worth the money, especially if the forecasts of the experts are correct and it is only a matter of time before EDI is the required way of conducting business transactions.

DURATION OF EDI IMPACTS ON PROFITABILITY

The findings presented indicate that it will take time to convince businesses, large and small, to implement EDI as the way of doing business. In the short run, business will be attracted to companies using EDI now, or who are willing to start EDI soon. Economic impacts in the short run will reflect the decision to do business with the leading-edge firms. When EDI becomes the accepted and preferred method of transmitting business documents and as technology standards are adopted, all of the negative impacts of EDI technology can be expected largely to subside.

As more vendors implement EDI, the number of quotations per RFQ (or bids per invitation for bid), and the price competition will be greater in the long run than in

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[12]Caroline Reich, "How to Get Started in EDI," *Purchasing World*, June 1985, pp. 72 – 74.

[13]See Kolodziej, Note 3, this chapter, pp. 37 – 41 and Smith, Note 6, this chapter.

[14]See Smith, Note 6, this chapter.

the short run. These are permanent, beneficial impacts in the procurement marketplace. Beneficial impacts (e.g., increased competition, lower prices, larger vendor base) can be brought about sooner, and any negative impacts (e.g., costs to small businesses) can be lessened through the implementation of EDI standardization and training.

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APPENDIX A

REVIEW OF FEDERAL PROCUREMENT REGULATIONS RELATED TO PAPERLESS INFORMATION TECHNOLOGY

REVIEW OF FEDERAL PROCUREMENT REGULATIONS RELATED TO PAPERLESS INFORMATION TECHNOLOGY

The following sections describe Federal Acquisition Regulation (FAR) and the Defense FAR Supplement (DFARS) regulations that would require revision if a "paperless" procurement system is adopted. A review of the FAR and DFARS for policies that would be inappropriate in a paperless environment follows.

Citation: FAR 1.703(b)

Subject: Class determinations and findings

Analysis: States that an expiration date must appear in the document, implying that there is a paper document.

Recommendation: Broaden the definition of "document" to include electronic media.

Citation: FAR 2.101

Subject: Definition of "contract"

Analysis: States that contracts shall be in writing unless otherwise authorized. Also states that orders become effective by written acceptance.

Recommendation: Redefine "writing" and "written" to include electronic media. Paperless methods could be addressed here in order to avoid conflicts with other FAR language.

Citation: FAR 3.104-4(j)(1) – (2)

Subject: Defines proprietary information in relation to improper business practices.

Analysis: Proprietary information must be marked. This section does not address how electronic proprietary data will be "marked" in order to protect proprietary information. Paragraph (j)(2) mentions a transmittal document and a label for a magnetic media storage container but does not mention purely electronic media.

Recommendation: Electronic contracting systems that will allow submission of proprietary data through pure electronic means need to be designed with enough flexibility so that a contractor can identify

and "mark" proprietary data in electronic format. The application software must be able to recognize data that are tagged as proprietary and it must display an appropriate message to the user. Data bases should be designed so that individual data elements containing proprietary data are flagged and so that users are notified when a set of data contains proprietary elements.

Citation: FAR 3.104-9

Subject: Certification requirements for procurement integrity; contracts over $100,000.

Analysis: Must be in writing and submitted for each applicable situation. The certification should be on plain bond paper.

Recommendation: Revise the wording so that an electronic version of the certification is permissible, technology permitting.

Citation: FAR 3.405

Subject: Contingent Fee Statement

Analysis: Requires the completion of a Standard Form (SF) 119, *Statement of Contingent or Other Fees*, if the contractor answered the related clause in the affirmative. This information could conceivably be transmitted electronically, but since this situation occurs infrequently, the paper process is acceptable until paperless contracting systems are firmly established.

Recommendation: No changes are needed presently. The FAR's wording should be updated to allow for an electronic equivalent when it becomes practical to convert this requirement to a paperless process.

Citation: FAR 3.705(c)(1)

Subject: Voiding and rescinding contracts

Analysis: Notice must be in writing and sent by certified mail. The final decision of the agency must also be sent by certified mail (3.705(e)). Electronic data interchange can provide the same functionality as certified mail through electronic acknowledgment transaction.

Recommendation: The key point is to ensure that the intended receiver actually receives timely notice of the proposed action. The language should be adjusted so that it focuses on the process without

specifying a particular method. For example, the policy could state that the notice shall be sent by any verifiable means.

Citation: FAR 3.804(b)

Subject: Payments to influence Federal transactions

Analysis: States that the contracting officer must forward a copy of the disclosure to the appropriate official and retain the original in the contract file. This could also be accomplished electronically, but the paper process is acceptable until paperless contracting processes become firmly established.

Recommendation: No changes are needed presently.

Citation: FAR 4.101(a),(b)

Subject: Contracting officer's signature

Analysis: States that the contracting officer's signature shall be typed, stamped, or printed on the contract. Does not address electronic media. This section also distinguishes between an original and a copy. There is little need to make this distinction between the original and copies in a paperless environment.

Recommendation: The language should be updated to recognize electronic signatures, and there should not be a need to identify copies as "DUPLICATE ORIGINALS."

Citation: FAR 4.102(a)

Subject: Contractor's signature

Analysis: An individual's signature shall be followed by the person's typed, stamped, or printed name. This section does not address electronic media.

Recommendation: The language should be updated to recognize electronic signatures.

Citation: FAR 4.201

Subject: Contract distribution procedures

Analysis: This section refers to the distribution of signed contracts (or contract reproductions) to various offices, including contract administration and accounting and finance. The section's wording implies the existence of

paper copies. In a paperless system, it may not be necessary to send copies of the data to other offices. It may be sufficient to grant them access to the contracting office's electronic files and allow them to call up the information as needed.

Recommendation: The wording should be updated to reflect the electronic distribution of contracts, including the notion that distribution could also be achieved by sending an electronic notice to the necessary parties and providing them with access to the data base as required.

Citation: DFARS 204.201

Subject: Distribution of copies of contracts

Analysis: Sets forth additional distribution requirements for DoD. If electronic distribution is utilized, there is no need to send multiple paper copies of the contract to an office.

Recommendation: Recognize that electronic distribution can be done to many people simultaneously. This could be done in corresponding FAR Section 4.201.

Citation: FAR 4.203

Subject: Taxpayer identification number (TIN)

Analysis: The contracting officer shall attach a copy of the TIN solicitation provision (FAR 52.204-3) to the last page of the contract sent to the paying office. This information could be easily provided electronically and automatically if the TIN provision is electronically attached to the contract.

Recommendation: When developing a paperless contracting system, ensure that the paying office receives, or has access to the data when electronic distribution of the contract occurs.

Citation: FAR 4.706

Subject: Microfilming records

Analysis: Details how the microfilming of documents should be accomplished. Does not address storage on optical disks or compact disk-read only memory (CD-ROM).

Recommendation: This section should be updated to keep pace with current record keeping storage technology such as optical disk and CD-ROM.

Citation: FAR 4.800

Subject: Contract files

Analysis: This and following sections detail the requirements for maintaining contract files. The language assumes paper files. Contract files in the future may be combinations of data elements, scanned documents, and paper, which could complicate information retrieval.

Recommendation: No major changes are required so long as there is recognition that paperless files can store information more efficiently than paper files and that cross-references can eliminate the need to store duplicate records. Mixed-media files should be authorized, provided that adequate cross-references can be established.

Citation: DFARS 204.802

Subject: Contract files

Analysis: This and related sections address aspects of various contract files. Paper files are assumed.

Recommendation: Language should be updated to include paperless storage technologies.

Citation: FAR 4.804-5(c)

Subject: Closing out contract files

Analysis: Refers to placing a signed original and signed copy of the close-out statement in the appropriate file. This procedure is designed for a paper process. Applications software can simplify the close-out process in an automated contracting system by utilizing existing information on file and prompting the contracting officer for additional information when necessary.

Recommendation: Automated contracting systems should be designed with a module to accomplish the close-out function. For electronic storage of the statement, electronic signature by the contracting officer should be provided.

Citation: DFARS 204.804

Subject: Close-out of contract files

Analysis: Provides instruction for filling out Defense Department (DD) Form 1594, *Interim Contract Completion Statement.* Use of this form prepared on paper should decrease as Military Standard Contract Administration Procedures (MILSCAP) is modernized to allow this information to be sent electronically.

Recommendation: No major changes. The wording should be updated to keep current with MILSCAP technology as necessary.

Citation: DFARS 204.804-1 and -2

Subject: Closing out contract files

Analysis: Provides instructions for completing DD forms involved with contract closeout (DD Forms 1593, 1594, and 1597). This documentation could be done electronically in a paperless environment.

Recommendation: Automated contracting systems should be designed with a module to accomplish the contract close-out function. For electronic storage of the forms, an electronic signature by the close-out official should be provided. The language in this section should be kept current with MILSCAP technology as necessary.

Citation: FAR 5.101

Subject: Disseminating information

Analysis: The information contained in this and the following sections may be obsolete in a paperless environment. Bulletin boards, electronic data interchange (EDI), and networks may eliminate the need to synopsize requirements by making the actual solicitation available electronically to all who wish to examine it. Interested parties could then immediately download a copy. Reproduction costs would be eliminated. The mandatory time frames for posting notices may be unnecessary, or could be shortened, if electronic solicitations could be easily and quickly provided to interested parties. Perhaps an exception for electronic solicitations could be added to those at 5.202. Statutory revisions would be necessary to 41 U.S.C. 416 and 15 U.S.C. 637(e), because they mandate publication of *Commerce Business Daily* (CBD) notices at least 15 days before the solicitation is issued.

Recommendation: Develop new FAR coverage for disseminating electronic solicitations. Compliance with the CBD synopsis requirements may still be necessary because it is the one source that will alert potential contractors to all solicitation opportunities, but the 15-day period between the publication of the notice and issuance of the solicitation should be shortened for electronic solicitations because of the elimination of reproduction and mailing time requirements.

Citation: FAR 5.403(b)

Subject: Including members of Congress on solicitation mailing lists

Analysis: Including members of Congress occurs infrequently, but they must still be considered when establishing an electronic solicitation system.

Recommendation: Contracting systems designed to transmit all solicitations electronically should also be flexible enough to automatically handle special situations like this. The easiest way might be to simply generate a hard copy and mail it to the requester as is done currently.

Citation: FAR 5.404

Subject: Long-range acquisition estimates

Analysis: These estimates may by publicized to assist industry planning.

Recommendation: Develop an electronic bulletin board (EBB) for publication of this information.

Citation: FAR 6.303

Subject: Justifications

Analysis: An "expert system" may be able to prepare a draft Justification and Approval (J&A) automatically, based upon how a previous buy was made. The J&A could also be routed electronically for signature. The Warner Robins Air Force Logistics Center at Robins Air Force Base in Georgia has developed a J&A expert system.

Recommendation: This contracting function is ideally suited for automation using expert systems technology and it should be designed into any electronic contracting systems that will handle purchases over $25,000.

Citation: FAR 7.105

Subject: Contents of acquisition plans

Analysis: Acquisition plans are good candidates for automation through the use of expert systems or artificial intelligence programs because they can be designed to take the user through the multitude of considerations that plans must address. Previous contracts and plans could be automatically reviewed, and a recommended plan automatically developed for the current acquisition. The plan could be tailored by the contracting officer as needed.

Recommendation: Consider automation of acquisition plans when designing electronic contracting systems. In addition to their preparation, the acquisition plans should also be "routed" for approvals electronically.

Citation: FAR 7.202

Subject: Economic quantities

Analysis: An automated system could automatically transmit quantity "price break" information to the supply system so decisions could be rendered concerning current and future buys. Quantities could be adjusted before the buyer receives the purchase request, thereby reducing procurement administrative lead time.

Recommendation: Electronic contracting systems should be designed with the ability to store contractor price break information, which then could be queried automatically by the requirements generation system for comparison to the proposed purchase quantity.

Citation: FAR 7.303

Subject: Contractor versus Government performance [Office of Management and Budget (OMB) A-76]

Analysis: Requires synopsis in the CBD. In a paperless environment, an EBB could be used to alert commercial sources. The notice could remain on the bulletin board, eliminating the need to send several submissions to the CBD.

Recommendation: No changes are required presently. The volume of A-76 actions is not large enough to recommend changes at this time, but changes should be considered as electronic contracting systems

and bulletin boards become more prevalent between Government and industry.

Citation: FAR 8.103

Subject: Information on excess personal property

Analysis: EBBs or catalogs could also provide this General Services Administration (GSA)-required information to contracting activities. GSA has established the Multi-Use File for Interagency News (MUFFIN), which is an electronic information system. Information on excess personal property is included.

Recommendation: Update the FAR to add MUFFIN to the list of sources for information on excess personal property.

Citation: FAR 8.203-2

Subject: Jewel bearings certification

Analysis: The jewel bearing certification must be handled on an individual action basis rather than an annual basis. If jewel bearings will be used, the offeror must attach an estimate of the jewel bearings and related items required. The contracting officer must then furnish this information from the winning contractor to the William Langer Jewel Bearing Plant. The requirements of this process could also be met electronically through EDI transactions.

Recommendation: When designing a transaction to handle this requirement, it will be necessary to provide additional fields for obtaining the offeror's "attachment," which is separate from the provision. The information could also be sent to the Plant electronically, but paper may be just as practical given the limited occurrence of this certification requirement.

Citation: FAR 8.401

Subject: Federal Supply Schedules

Analysis: GSA's MUFFIN system can provide information on schedule items. It also has the ability to receive on-line requisitions. A gateway for EDI transactions is also being developed. The FAR only mentions how to obtain paper copies of schedules.

Recommendation: The MUFFIN system should be identified in the FAR as a source of Federal Supply Schedule (FSS) information.

Citation: DFARS 208.404

Subject: Federal Supply Schedules

Analysis: This area is ripe for automation. An electronic data base of supply schedules could be queried automatically by the contracting office's system and alert the buyer to FSS supply sources.

Recommendation: Electronic contracting systems should have the ability to automatically query schedules for availability and price. This information should then be available to the buyer as soon as the purchase request is received.

Citation: DFARS 208.405-2

Subject: Order placement

Analysis: References are made to DD 1155, oral orders, delivery tickets, and invoicing, but there is no mention of electronic ordering and payment.

Recommendation: Update the language to acknowledge electronic ordering and payment.

Citation: FAR 8.602

Subject: Acquisition from Federal Prison Industries (FPI)

Analysis: The schedule of available products could be provided electronically. Contracting offices could query FPI's data base to determine if there was a product or service match.

Recommendation: FPI should develop an electronic data base of their products and services. DoD electronic contracting systems that manage the types of products provided by FPI should be designed to automatically query the FPI data base and report availability of products to the contracting officer. Electronic ordering should be implemented.

Citation: FAR 8.703

Subject: Procurement list for purchases from blind and handicapped workshops

Analysis: This list could be provided electronically as a data base and then could be queried by the contracting office.

Recommendation: The Workshops for the Blind and Other Severely Handicapped should develop electronic data bases of their products and services. DoD electronic contracting systems that manage these types of products should be designed to query the data bases and report availability of products to the contracting officer. Electronic ordering should be implemented.

Citation: DFARS 208.7000

Subject: Coordinated acquisition (Military Interdepartmental Purchase Requests [MIPRs])

Analysis: MIPRs could be electronically transmitted to the contracting office's procurement system. A DD Form 448-2 is used to accept the MIPR. An electronic acceptance could be made in its place. Both would achieve time savings.

Recommendation: Develop an electronic MIPR transmission and acceptance capability among contracting activities that are currently using or developing electronic contracting systems and that have a sufficient volume of MIPR activity to justify this capability.

Citation: DFARS 208.7004-5

Subject: Notification of inability to obligate

Analysis: Refers to returning the MIPR with a transmittal letter.

Recommendation: Build this notification requirement into any system designed to process MIPRs electronically.

Citation: DFARS 208.7103

Subject: NASA purchase request and acceptance

Analysis: This section references several forms and documents that may not be necessary or could be streamlined under an electronic contracting system.

Recommendation: If there is a sufficient volume of documentation to warrant automation of this feature, build this capability into any

electronic contracting systems between NASA and DoD activities where technologically feasible.

Citation: FAR 9.105-1

Subject: Obtaining information on contractors

Analysis: Contracting officers could have quick and easy access to all contractor-related data if Federal and DoD electronic data bases existed. The contracting system could query these data bases through intelligent gateway networks, thereby giving access to performance, quality, financial, technical capability, debarment, suspension, and ineligibility information.

Recommendation: The GSA and Defense Logistics Agency should create contractor data bases for use by civilian and DoD contracting offices, respectively. Develop gateways to enable various contracting systems to access the information, allowing DoD access to civilian data and vice versa.

Citation: DFARS 209.106-2

Subject: Preaward surveys

Analysis: Requests must be completed on an SF 1403, and three copies must be sent (along with the solicitation package) to the administration office. By eliminating mailing delays between the contracting and administration offices, electronically completing survey requests could reduce the time required for survey completion.

Recommendation: Develop the capability for electronically processing preaward surveys when designing paperless contracting systems for DoD contracting offices and Defense Contract Management Agency offices.

Citation: FAR 9.203

Subject: Qualified Product Lists, Qualified Manufacturers Lists, Qualified Bidders Lists

Analysis: These lists are published by the Naval Publications and Forms Center (NPFC) for DoD agencies. An EBB could be used to distribute these lists. The advantages would be improved speed and accuracy. Updates would be available quickly, with less chance that agencies would maintain outdated copies.

Recommendation: As an alternative to paper copies, NPFC should develop an EBB for these lists and allow other agencies to download the lists they need.

Citation: FAR 9.204; 9.205

Subject: Establishing qualification requirements

Analysis: Requires publicizing qualification requirements in the CBD. This could also be done through an EBB.

Recommendation: No changes are required presently. However, change should be considered at some future date when an electronic CBD becomes available. Publicizing this information on local contracting activity bulletin boards should be permitted, but it is unlikely that an exemption from publication in the CBD would be granted.

Citation: FAR 9.206-1

Subject: Acquisitions subject to qualification requirements

Analysis: Requires publication of a presolicitation notice, general synopsizing requirements. The maximum time between solicitation issuance and contract award is encouraged. At the minimum, the time frames specified in 5.203 shall be complied with when applicable. Paperless processes could change the time frames if synopsis is no longer necessary in an EDI or bulletin board environment.

Recommendation: No change is required presently. This policy should be re-examined when an electronic CBD – or an exemption to CBD requirements for electronic solicitations – becomes available. Legislative changes would be necessary to alter general CBD requirements and time frames.

Citation: FAR 9.404

Subject: Parties excluded from procurement programs

Analysis: The GSA will maintain the list of contractors debarred, suspended, or ineligible. An electronic version of this list would make access easier for agencies. Updates would be available immediately. Agencies could also use EDI to notify GSA of additions or changes to the list.

Recommendation: GSA should develop an electronic version of the list for use by contracting agencies and should also provide for electronic changes to the list.

Citation: FAR 9.406-3(e)

Subject: Notice of debarring official's decision

Analysis: States that contractors will be notified by certified mail, return receipt requested. EDI can accomplish the notification and the confirmation as well.

Recommendation: The FAR language should be updated to allow this notice to be sent via EDI message or electronic mail (E-mail) with receipt verification. Because this modification action is relatively infrequent, a standard mail notice may be the most practical method unless electronic messaging between the parties already exists.

Citation: DFARS 210.070

Subject: Bill of materials

Analysis: If required, it can be provided electronically. If provided separate from the supplies, the bill shall be furnished on DD Forms 346 and 347. If the bill could be provided electronically, then it could be linked to the supply contract without the need to complete forms.

Recommendation: Electronic contracting systems should have this function built-in to support contracting activities that utilize bills of material.

Citation: DFARS 210.008

Subject: Availability of specifications

Analysis: By sending a DD 1425, specifications are now available through NPFC. If ordering could be done electronically, it would reduce the amount of time needed for contractors to get specifications.

Recommendation: NPFC should develop an on-line specification ordering system as an alternative to the DD Form 1425. If developed, it should be referenced in the DFARS.

Citation: FAR 11.004(d)

Subject: Commercial products – market research and analysis

Analysis: Many, if not all, of the sources of information listed could be handled in electronic form. These include access to other contracting activities' source lists, company catalogs, and publication of notices. Various CD-ROM products now provide contractor catalogs and technical information. The GSA MUFFIN system contains information on Federal Supply Schedules.

Recommendation: As technology and resources permit, DoD should identify or develop data bases that contain information useful for market research purposes. Gateway networks that provide contract specialists with instant access to these data bases should be created.

Citation: FAR 12.103(e)

Subject: Delivery of supplies or services

Analysis: Contracting officers evaluate delivery dates based on a contractor's receipt of contract by adding 5 days to the delivery time bid by the contractor, which allows for mailing time. In an EDI environment, this would be unnecessary because the contract would electronically arrive at the contractor's place of business on the same day that it is dated. Clauses 52.212-1 and 52.212-2 will also require modification.

Recommendation: Revise the FAR policy and clauses when contracts are to be provided electronically. Electronic contracting systems that automatically evaluate offers should also be reviewed and revised if necessary, provided this policy change occurs.

Citation: FAR 12.303

Subject: Rated orders

Analysis: An automated system must take into consideration the requirements of the Defense Priorities and Allocations System. Perhaps the system could automatically assign Defense Materials System ratings based upon established DoD policy.

Recommendation: Develop automated contracting systems that are compatible with current Defense Priorities and Allocations System policy. For electronic transmission of contracts and orders, the contractor's translation software must be able to alert the

contractor to the rating so the contractor can properly schedule production.

Citation: FAR 12.402

Subject: Construction contracts – variation in quantity

Analysis: States that a contractor desiring an extension of time must notify the contracting officer in writing within 10 days of a delay caused by the quantity variation. This notification could also be done electronically through E-mail.

Recommendation: No changes are required if the term "writing" is defined in Part 2 to encompass electronically transmitted messages.

Citation: FAR 13.104(g),(h)

Subject: Procedures for small purchases

Analysis: Paragraph (g) refers to public display requirements. Under an EBB system, it may not be necessary to display a hard copy if access is available to the bulletin board. Paragraph (h) addresses rejection of oral or written quotes due to nonresponsibility. Electronic quotes should also be addressed, unless "written" is loosely constructed to include electronic quotes as well.

Recommendation: Revise the FAR policy to allow display requirements to be met by posting Requests for Quotations (RFQs) on an EBB and by providing public-access terminals at the contracting office.

Citation: FAR 13.105(d)(1)

Subject: Small business-small purchase set-asides

Analysis: Refers to written and oral solicitations.

Recommendation: No changes are required if the definition of "written" encompasses electronically written solicitations.

Citation: FAR 13.106

Subject: Competition and price reasonableness

Analysis: Refers to oral and written solicitations. The policy expresses a preference for oral solicitations unless impractical. Only one source must be solicited if the action is valued under 10 percent of the small purchase limitation,

while three sources must be solicited if over 10 percent of the limitation. Under a bulletin board system, there may not be any reason to limit quotes to one or three sources if there are few administrative costs associated with soliciting or making the solicitation available to additional sources.

Recommendation: The policy should recognize that electronic solicitations may be as efficient as, or more efficient than, oral solicitations. While technology may allow additional sources to be solicited without increases in time or cost, delays in awards could result from having to evaluate a large number of quotes. For a low-dollar purchase, the benefit of increased competition should be weighed carefully against the cost of evaluating many quotes.

Citation: FAR 13.106(b)(7)

Subject: Standing price quotations

Analysis: Standing price quotations could be provided electronically. The contracting system could automatically check requirements against the price list and provide the price to the buyer upon receipt of the purchase request.

Recommendation: This function should be built into any electronic small purchase systems for contracting activities that utilize standing price quotes frequently.

Citation: FAR 13.106(c)(3)

Subject: Data to support small purchases

Analysis: Electronic solicitations are not mentioned.

Recommendation: Include "electronic solicitations" language, unless "written" is defined as encompassing electronically stored information.

Citation: FAR 13.108

Subject: Legal effect of quotations

Analysis: This section describes acceptance of orders in writing and withdrawing/amending orders in writing. Electronic transactions could also be used for these actions.

Recommendation: No changes are required provided that "writing" and "written" are previously defined as encompassing electronically stored information.

Citation: DFARS 213.203-1

Subject: BPAs – General

Analysis: States that blanket purchase agreements (BPAs) shall be prepared and issued on DD Form 1155. The policy should also allow for the electronic transmission format.

Recommendation: The DFARS language should be changed to allow an electronic equivalent, unless previously authorized by a blanket policy elsewhere.

Citation: FAR 13.204(e)

Subject: Purchases under BPAs

Analysis: States that purchases should normally be made orally. Also, if a document is issued, a locally developed form may be used. The language assumes that paper transactions will be used.

Recommendation: FAR policy should give equal consideration to purchases agreed to orally and electronically. Electronic purchases could be even more efficient than oral purchases. The language need not be changed if the definitions of "document," "written," and "form" encompass electronic data.

Citation: FAR 13.303(a)

Subject: Preparation of fast payment orders

Analysis: Paragraph requires the use of Optional Form 347 or other agency-authorized purchase order form. These orders could also be processed electronically.

Recommendation: Paragraph should be updated to allow for electronic transmission of orders.

Citation: FAR 13.501(g)

Subject: Purchase orders – signature

Analysis: Paragraph authorizes signatures received by facsimile for automated purchase orders.

Recommendation: Revise FAR language to authorize electronic signatures.

Citation: FAR 13.502(c)

Subject: Unpriced purchase orders

Analysis: Paragraph states that unpriced purchase orders may be issued by written purchase orders or written telecommunications orders. There is no mention of electronic purchase orders.

Recommendation: Add wording that allows electronic transmission of unpriced purchase orders, unless "written" is previously defined to encompass electronically stored information.

Citation: FAR 13.503(d)

Subject: Contractor acceptance of purchase order modifications

Analysis: Paragraph refers to written acceptance of modifications.

Recommendation: Update language to allow for electronic acceptance, unless "written" is previously defined to encompass electronically stored information.

Citation: DFARS 213.503(b)

Subject: Contractor acceptance of purchase order modifications

Analysis: The language appears to be more restrictive than the FAR coverage by stating that the SF 30 shall be used to modify purchase orders. The FAR allows for agency-approved automated formats.

Recommendation: Revise the language to allow for electronic formats and to provide for electronic acceptance.

Citation: FAR 13.504

Subject: Termination of purchase orders

Analysis: States that the contractor shall be notified in writing.

Recommendation: Revise the language to allow for electronic notification, unless "in writing" is previously defined to encompass electronically stored information.

Citation: DFARS 213.505

Subject: Purchase order and related forms

Analysis: This paragraph discusses the use of DD Form 1155 for purchase orders.

Recommendation: Update the language to allow an equivalent electronic format of the DD Form 1155.

Citation: FAR 13.506

Subject: Purchase orders via written telecommunications

Analysis: This paragraph permitted transmission of orders via telex or telegraph where a signature could not be transmitted but the order could be printed out on paper. Technology now permits electronic transmission of the order with an electronic authentication code representing the contracting officer signature. The order can be written to electronic media as opposed to paper.

Recommendation: The FAR should be updated to recognize electronically transmitted orders with electronic signatures that are not necessarily documented on paper.

Citation: FAR 14.201-1(c)

Subject: Uniform contract format

Analysis: This paragraph needs revision to accommodate electronic solicitations and contracts. Certain representations and certifications could be made on an annual basis and thus would not need to be obtained for every solicitation. While technologically feasible, the policy complications increase greatly for purchases over $25,000 employing sealed bid or negotiation procedures. At the same time, the volume of these purchase actions is only about 2 percent of all purchase actions, making for limited returns on

investment. Transition from a paper to an electronic process should be a long-term objective.

Recommendation: No change is required presently. Forms such as the SF 26, SF 33, and SF 1447 could be replaced by electronic formats that convey the necessary information.

Citation: FAR 14.201-2

Subject: The Schedule

Analysis: This section was written with a paper process in mind. The references to forms may be unnecessary under a paperless process.

Recommendation: No change is required presently. Wording changes will be necessary to accommodate electronic bids when they become feasible and cost effective.

Citation: FAR 14.201-9

Subject: Simplified contract format

Analysis: Permits the use of a simplified format for firm-fixed-price contracts. For electronic solicitations, there should be no need for a separate format, since only the necessary information would be transmitted and presented to the offeror by the application software.

Recommendation: No change is required presently. Wording changes will be necessary to accommodate electronic bids when they become feasible and cost effective.

Citation: FAR 14.202-1

Subject: Bidding time

Analysis: One of the factors mentioned for determining bidding time is mailing time for both solicitations and bids. In an electronic system, the "mailing time" delay would be virtually eliminated, perhaps allowing adjustment of the bidding time downward from 30 days. This assumes that technical data would not have to be sent by mail. Reducing bidding time would help to improve overall administrative lead time for purchases.

Recommendation: No change is required presently. When electronic bids are feasible and cost effective, the bidding time issue should be reexamined for electronic bids. A statutory change would be

needed to change the 30-day bidding time for synopsized solicitations.

Citation: FAR 14.202-7

Subject: Facsimile bids

Analysis: Authorizes the use of facsimile bids. A previous section (14.202-2) addresses telegraphic bids.

Recommendation: No change is required presently. Coverage for electronic bids should be developed when electronic bidding becomes feasible and cost effective.

Citation: FAR 14.203

Subject: Methods of soliciting bids

Analysis: The methods discussed were written with paper documents in mind. A computer file of the master solicitation document would be easier to maintain and could be placed on a bulletin board for downloading by contractors. Electronic versions would reduce printing costs.

Recommendation: No change is required presently. Contracting activities that use master solicitation documents should consider placing them on EBBs as a supplement, and perhaps eventual replacement, for paper versions.

Citation: FAR 14.205

Subject: Solicitation mailing lists

Analysis: It would be beneficial to establish a national data base of contractors that would be used by all contracting activities. This would eliminate the duplication of effort by contractors who must fill out multiple applications in order to be on the lists of more than one contracting activity. Networking will make access to the data base possible by all activities. Each contracting activity could establish its categories for bidders lists, but the application and maintenance would be centrally controlled, perhaps by the Department of Commerce.

Recommendation: DoD and the other Federal departments should work together to develop a national bidders list. If a combined DoD – non-DoD list is impractical, DoD should at least develop a consolidated list for itself.

Citation: FAR 14.205-4

Subject: Excessively long solicitation mailing lists

Analysis: With EDI or bulletin board solicitations, there may be less administrative costs associated with providing solicitations to as many firms as want them than there are for providing paper solicitations. The inability to transmit large amounts of technical data to contractors means that rotation of bidders will still be necessary. Electronic contracting is likely to change how bidders lists are used. Contractors may be able to submit a profile that allows specific targeting of solicitations to their firms, perhaps even on the basis of particular national stock numbers. This contrasts with the current practice of developing lists based on broad product categories. The result will be many more lists, but computerization and centralization should make them manageable. The practical limits of transmitting technical data means that a two-tiered system will still be needed. If bidders profiles are used, a solicitation could automatically trigger an automated drawing retrieval system. The corresponding technical data could then be mailed to the contractor Alternatively, the contractor could be instructed to contact the contracting activity if it needs to have the technical data.

Recommendation: No changes are required presently. When it becomes feasible to provide solicitations electronically, contracting activities should review their policy on rotating the bidders list if electronically provided solicitations can be easily and economically provided to many contractors.

Citation: FAR 14.208

Subject: Amendment of invitation for bids

Analysis: States that the SF 30 shall be used for amendments. In an electronic environment, a form is not necessary. A transaction set and a verification of receipt are all that is required.

Recommendation: Paragraph (b) should be updated to add facsimile transmissions and electronic messages as ways of notifying bidders of an extension of the opening date. No other changes are required presently. An electronic transaction for bid amendment will need to be developed at a time when it is practical to provide contractors with solicitations electronically.

Citation: FAR 14.209

Subject: Cancellation of IFBs before opening

Analysis: In a paper system, bids are returned to the bidder unopened after cancellation. In a paperless system, there is no reason to return a bid since it is comprised only of data elements. An unopened paper bid assures the bidder of the integrity of the cancellation process. In an electronic system, some type of security must be provided to ensure that electronic bids are not examined before they are canceled. An audit trail should exist in order to provide process integrity.

Recommendation: No changes are required presently. When electronic bids become practical, a transaction should be developed to handle the cancellation process. The bidder should be advised that the solicitation was canceled, and the system should delete the bid without allowing the contents to be revealed.

Citation: FAR 14.301

Subject: Responsiveness of bids

Analysis: Telegraphic and facsimile bids are addressed in this section.

Recommendation: A sentence or two about electronic bids should be added.

Citation: FAR 14.303

Subject: Modification or withdrawal of bids

Analysis: Bids may be modified or withdrawn by written or telegraphic notice prior to bid opening. A bid may also be withdrawn in person, with the person signing a receipt for the returned bid. An electronic solicitation system could have a withdrawal mechanism that provides verification to the contractor and prevents the bid information from being disclosed. Electronic bids should also be able to be withdrawn in person.

Recommendation: Add language encompassing the modification or withdrawal of electronic bids.

Citation: FAR 14.304

Subject: Late bids, late modifications of bids, or late withdrawal of bids

Analysis: The wording in this section assumes that paper bids will be used. Paragraph (2) mentions bids sent by telegram or facsimile but does not

address electronic bids. Standards for determining timely electronic bids will need to be developed.

Recommendation: Update paragraph (2) to encompass electronic as well as telegram and facsimile bids. This should be sufficient for addressing bidding via an EBB. However, when bidding via EDI becomes a workable alternative, this section should have coverage added for determining the timeliness of EDI bids. Factors should include an electronic time stamp for submission verification, responsibility for equipment failures, and value-added network relationships and responsibility.

Citation: FAR 14.304-2

Subject: Notification to late bidders

Analysis: The language in this section assumes that paper bids will be used.

Recommendation: No changes are required presently. Contracting systems that permit electronic bidding should automatically provide an appropriate notice to the bidder upon receipt of a late bid.

Citation: FAR 14.401

Subject: Receipt and safeguarding of bids

Analysis: This section addresses security aspects of paper bids. Coverage will need to be added for electronic bids. The safeguarding may be a built-in feature of the automated system, but security control standards (such as public key encryption) should be developed for all electronic contracting systems.

Recommendation: No changes are required presently. Security issues associated with electronic bids must be addressed so electronic bids become a viable alternative to paper bids. Issues include bidder anonymity, encryption of bid information, and value-added network responsibilities.

Citation: FAR 14.402

Subject: Opening of bids

Analysis: Policy will need to developed for opening unclassified and classified electronic bids. Since there are no physical bids, a public "opening" may involve display on a terminal and/or printing hard copies for posting and inspection.

Recommendation: No changes are needed until electronic bidding becomes feasible. Design electronic bid contracting systems with the ability to automatically handle the opening of classified and unclassified bids. Many of the controls can be built into the system. The language should be revised to acknowledge electronic bidding.

Citation: FAR 14.403

Subject: Recording of bids

Analysis: An electronic contracting system can automatically prepare a bid abstract. An SF 1409, SF 1410, OF 1419, and OF 1419A would be unnecessary if the information is available in suitable electronic format. A public display terminal and/or hard copy would need to be available to meet the public inspection policy.

Recommendation: No changes are required until electronic bidding becomes feasible. Minor wording changes to acknowledge a paperless bid abstract would be required.

Citation: FAR 14.404-2(k)

Subject: Rejection of bids

Analysis: This paragraph will need to be rewritten to include electronic bids. The paragraph refers to "originals" and "papers."

Recommendation: Rewrite paragraph (k) to eliminate media-specific language (unless the paragraph is broadly interpreted to include electronically stored information).

Citation: FAR 14.405

Subject: Minor informalities or irregularities in bids

Analysis: Automated bid preparation software could prevent irregularities from occurring by preventing the transmission of bids that contain missing data.

Recommendation: Design electronic contracting systems so that it is impossible to transmit bids that are missing required information, such as electronic signatures, prices, and other bidder-supplied fill-ins.

Citation: FAR 14.406-2(b)

Subject: Apparent clerical mistakes

Analysis: This paragraph is written with a paper bid in mind. The contractor will need to send an electronic verification of the correction. The contracting officer will need to make the correction on the electronic bid if the data are used during other automated calculations. There must be an annotation of the correction or an electronic copy of the unaltered original. The bidder should also receive a verification of the change.

Recommendation: Provide electronic contracting systems with the ability to correct mistakes in a bid. Minimize mistakes in the bid by designing bid preparation software that prevents transmission of bids containing most clerical errors.

Citation: FAR 14.406-3(g)(4)

Subject: Other mistakes disclosed before award

Analysis: Even for electronic bids, the evidence necessary to establish a mistake may be in the form of paper. There may not be much benefit in having an electronic process to handle these mistakes. When time is of the essence, contracting officers may refer cases to the proper authority by telephone or telegraph. Electronic referrals should also be authorized.

Recommendation: Add to the language: "electronic referral" as a means of notifying the proper authority. No other changes are required presently.

Citation: DFARS 214.503-1

Subject: Step one of two-step sealed bidding

Analysis: States that requests for technical proposals may be in the form of a letter. They could also be in electronic form (i.e., on diskette). But, since this type of sealed bidding is infrequently used, there may not be a sufficient payoff to attempt to do this electronically until paperless contracting is being widely used for sealed bidding.

Recommendation: None at present.

Citation: FAR 15.402(i)

Subject: Requests for Proposals (RFPs) – General

Analysis: This paragraph permits the use of facsimile RFPs. Electronic RFPs could also be used. As a practical matter, the complexity of most RFPs and their relative infrequency of use (in terms of contract actions) should relegate them to a low priority for paperless conversion. Some RFP candidates, such as single- or limited-source part-numbered items, manufacturers' source control items, and single-source specification items, require little or no transmission of technical data and would be better candidates for initial paperless RFP efforts.

Recommendation: No changes are required until electronic RFPs become a viable alternative.

Citation: FAR 15.406-1

Subject: Uniform contract format

Analysis: A number of forms are referenced in this section. In an EDI transaction, hard-copy forms are not needed. The software could be designed to display the information as a form (for familiarity). It may generate a form for hard-copy use if required.

Recommendation: No changes are required presently. At a time when electronic RFPs become a viable alternative, this section should be updated to authorize electronic equivalents of the forms.

Citation: FAR 15.408(c)

Subject: Issuing solicitations

Analysis: Requires use of air mail for solicitations sent to foreign firms. Should be revised to allow the use of electronic solicitations.

Recommendation: No changes are required presently. The policy should be updated to allow electronic transmission of RFPs when this becomes a practical alternative to paper.

Citation: FAR 15.410

Subject: Amendment of solicitations before closing date

Analysis: Coverage should permit notifications of amendments, and amendments themselves, to be made electronically.

Recommendation: No change is required presently. Update the language to include electronic transmission of amendments and notices when electronic proposals become feasible.

Citation: FAR 15.412

Subject: Late proposals and modifications

Analysis: For electronic proposals, standards will need to be developed for establishing evidence of lateness and Government mishandling of the electronic proposal. Clause 52.215-10 will need modification in order to cover electronic proposals. Automated contracting systems will need to be designed with a date and time verification for receipt of proposals. Policy will need to be developed for value-added network responsibility, especially if the value-added network was designated by the Government. Withdrawal of proposals requires written notice and must be done in person. This should be re-evaluated to determine if this is appropriate when proposals are in electronic format. The automated system must also be designed to prevent access to proposals that are received late until after award, then retain them with other unsuccessful proposals.

Recommendation: No changes are required presently. This section should be revised when electronic proposals become a viable option to the paper process.

Citation: FAR 15.414

Subject: Forms

Analysis: Language in this section refers to agency-approved paper forms.

Recommendation: Update the language to encompass electronic equivalents of agency-approved paper forms.

Citation: FAR 15.509

Subject: Unsolicited proposals – limited use of data

Analysis: Language in this section assumes the proposal will be in a paper format (i.e., "attach a cover sheet").

Recommendation: No changes are required presently, but the language should eventually be updated to keep current with technology and to eliminate media-specific references.

Citation: FAR 15.804-3(e)

Subject: Waiver of cost or pricing data

Analysis: The paragraph refers to the SF 1412.

Recommendation: The FAR language should be updated to allow an electronic equivalent of the SF 1412 when electronic proposals become feasible.

Citation: FAR 15.804-4

Subject: Certificate of Current Cost or Pricing Data

Analysis: Language requires submission of this paper certificate.

Recommendation: Update the language to permit this information to be submitted electronically when electronic proposals become feasible.

Citation: FAR 15.804-6(b)(1)

Subject: Procedural requirements

Analysis: Requires that cost and/or pricing data be submitted on an SF 1411.

Recommendation: Update the language to encompass electronic submission of these data.

Citation: DFARS 215.804-6(b)(2)(A)

Subject: Procedural requirements

Analysis: Requires the use of DD Forms 1921 and 1921-1 to support the SF 1411 when contract cost data reports are required.

Recommendation: Update the language to encompass submission of this information electronically.

Citation: DFARS 215.805-5(c)(i)

Subject: Field pricing support

Analysis: This paragraph assumes that requests will be paper-based. Electronic mail could also be used to transmit requests and audit reports.

Recommendation: Update the language to remove media-specific references.

Citation: DFARS 215.873

Subject: Estimated data prices

Analysis: Data delivered under a contract are listed on DD Form 1423, *Contract Data Requirements List.* For electronic solicitations, an EDI transaction should be developed.

Recommendation: No changes are required presently. An electronic equivalent should be authorized when it becomes feasible to use electronic proposals.

Citation: DFARS 215.970

Subject: Weighted Guidelines method

Analysis: The method uses DD Form 1547. A computer version could be developed. It could be linked to the procurement instrument identification number (PIIN) and could have help screens to assist the contracting officer in its preparation. The linkage would also call up data elements that have been previously entered elsewhere, thereby avoiding redundant data input.

Recommendation: Develop an automated module for calculation of profit targets for contracting activities that use the Weighted Guidelines Method. Integrate the module with the contracting office's information system in order to minimize data entry.

Citation: FAR 16.506

Subject: Ordering (Indefinite delivery contracts)

Analysis: Section authorizes orders.

Recommendation: Update the language to encompass electronic ordering.

Citation: DFARS 216.703(d)(2)(i)

Subject: Basic Ordering Agreements

Analysis: This paragraph authorizes ordering.

Recommendation: Update the language to encompass electronic ordering.

Citation: DFARS 217.7602-2

Subject: Issuance of provisioned item orders

Analysis: Issuance of orders could be accomplished through an EDI transaction instead of an SF 30.

Recommendation: Provisioned item orders should be considered for conversion to an electronic process if transaction volumes are sufficient to warrant the conversion.

Citation: FAR 19.202-2(a)

Subject: Locating small business sources

Analysis: Slight rewording is necessary to encompass electronic contracting procedures (e.g., "mailing lists" might become "solicitation lists").

Recommendation: Update the language to stay consistent with any other related changes made elsewhere in the FAR.

Citation: FAR 19.302

Subject: Protesting a small business representation

Analysis: The current protest procedures are worded for a paper process (e.g., "letter postmarked," "certified mail," etc.). Protests could also be handled through an electronic transaction, from both protester to contracting activity and the contracting activity to Small Business Administration (SBA) regional office. The relatively low volume of protests may relegate this process for implementation at a time when paperless processes are more widely in use.

Recommendation: Facilitate a paperless process by eliminating the media-specific language, or by expressly authorizing an electronic equivalent.

Citation: FAR 19.303(c)

Subject: Determining product or service classifications

Analysis: States that appeals must be in writing, or confirmed in writing in the case of telegraphic appeals.

Recommendation: No changes if "in writing" is deemed to encompass electronic messages by prior definition.

Citation: DFARS 219.702(a)

Subject: Statutory requirements – subcontracting plans

Analysis: Through EBBs and networks, master subcontracting plans could be made available to many DoD contracting activities.

Recommendation: DoD should encourage electronic submission of master subcontracting plans and develop EBBs to provide easy access for DoD contracting activities.

Citation: FAR 19.704(a)(5)

Subject: Subcontracting plan requirements

Analysis: References SF 294 and SF 295. EDI can provide an alternate method of transmitting the information. Some data elements on the forms would be redundant in an automated system since they would appear as data elements elsewhere.

Recommendation: Update the language to permit an electronic equivalent of the subcontracting plan to be submitted.

Citation: FAR 19.804-1

Subject: Agency evaluation – 8(a) Small Business Program

Analysis: A data base of contractors and capabilities will assist agencies in supporting the 8(a) Program.

Recommendation: The SBA should develop a data base of contractors and make it electronically available to Government contracting offices.

Citation: FAR 19.811-1

Subject: Preparing contracts

Analysis: The procedures in this section assume that a paper process is being used, (e.g., appropriate blocks of SF 26, continuation sheet, etc.). Electronic transactions could also be used to do SBA 8(a) contracting, but the volume is probably insufficient to justify a separate initiative.

Recommendation: No changes are required presently. This area should be considered for paperless processing when electronic bids and proposals become feasible.

Citation: FAR 20.104(b)

Subject: Specific policies – Labor Surplus Area (LSA) concerns

Analysis: An electronic data base of LSA firms that could be interrogated or downloaded by contracting agencies would save time. The information contained in such a data base would be more timely than hard-copy versions.

Recommendation: The Department of Labor (DOL) should develop an electronic data base of LSA firms and make it available to all Government contracting offices.

Citation: DFARS 222.101-3

Subject: Reporting labor disputes

Analysis: States that DD Form 1507 should be used to report work stoppages. Reporting could also be done via E-mail or EDI transactions.

Recommendation: The language should be updated to allow an electronic equivalent to be used instead of the paper form.

Citation: FAR 22.404-1

Subject: Types of wage determinations

Analysis: The DOL issues general wage determinations. These could be posted on an EBB system and made available for use by contracting activities.

Recommendation: The DOL should develop a data base of wage determinations and make it available electronically to Government contracting offices.

Citation: DFARS 222.404-3

Subject: Requesting wage determinations

Analysis: Time could be saved if there was a way to electronically submit these requests to the DOL.

Recommendation: The DOL should establish an automated system that allows wage determination requests to be submitted electronically.

Citation: FAR 22.404-6

Subject: Modifications of wage determinations

Analysis: This section will need to be modified to allow for paperless methods. For example, there are references to date and time stamping of modifications and publication dates in the Federal Register.

Recommendation: Update the language to be consistent with other FAR changes related to paperless processes.

Citation: FAR 22.406-3

Subject: Additional classifications

Analysis: Requires that the contractor submit an SF 1444. The submission of this information could also be done electronically but would only be practical in an environment where offers are already being processed electronically.

Recommendation: An electronic equivalent of the SF 1444 should be developed when electronic offers become feasible.

Citation: FAR 22.406-5

Subject: Subcontracts

Analysis: Requires contractors and subcontractors at any tier to submit a fully executed SF 1413. This information could also be submitted electronically, but would be practical only if offers are already being processed electronically.

Recommendation: No changes are required presently. The wording should permit an electronic equivalent when paperless processing of offers becomes feasible.

Citation: FAR 22.804-2

Subject: Affirmative action – construction

Analysis: A unified electronic data base of covered geographic areas would save time and be more current than paper copies.

Recommendation: Office of Federal Contract Compliance Programs (OFCCP) should develop a data base of geographic areas and make it electronically available to all Government contracting offices.

Citation: FAR 22.805

Subject: Affirmative action – clearances

Analysis: Electronic clearances could speed the award process. Clearances could also be obtained before bid opening in situations where there is only one known contractor.

Recommendation: Any automated system developed should permit clearances to be sent electronically.

Citation: FAR 22.1007

Subject: Requirement to submit Notice (SF 98/98a)

Analysis: A revision should be made to permit the Notice to be sent electronically. Also, the *Wage and Hour Division's Service Contract Act Directory of Occupations* could be placed on an EBB for use by contracting agencies. It is necessary to refer to this publication when preparing the Notice.

Recommendation: The DOL should develop an automated system to allow the Notice to be sent electronically. The *Directory of Occupations* should also be made available electronically to Government contracting offices.

Citation: FAR 22.1011-1

Subject: Response to Notice by DOL

Analysis: This paragraph assumes that the response will be on paper. It should be modified to allow electronic submission of the response.

Recommendation: Update the language to remove media-specific references.

Citation: DFARS 225.105

Subject: Evaluating offers – foreign acquisition

Analysis: In theory, it should be possible to design a program that will automatically do the evaluation. It would check the representation of each offeror and base the evaluation on each offerors representation. It should be flexible enough to allow for input changes from the contracting officer and then recalculate the evaluation. This area appears to be ideal for using expert system technology.

Recommendation: Automated contracting systems should have a module to assist buyers in evaluating foreign offers. The module should be fully

integrated into any paperless systems developed and made available to paper-based systems as a standalone module if necessary.

Citation: FAR 25.304

Subject: Excess and near-excess foreign currencies

Analysis: The Office of Management and Budget (OMB) publishes bulletins identifying the countries of which the U.S. holds excess or near-excess currencies.

Recommendation: OMB should make this information available to contracting offices electronically through a bulletin board system.

Citation: DFARS 225.603(b)

Subject: Procedures – customs and duty

Analysis: The procedures for formal entry and release require the submission of a number of forms and certificates. Both large and small purchases are subject to these requirements. This information has potential for automation but would require the cooperation of the U.S. Customs Service. The contractor or subcontractor must also notify the Contract Administration Office (CAO) of a number of items immediately upon award of a contract to a foreign supplier. This information could also be automated but would only be beneficial as part of an overall paperless contract administration office.

Recommendation: The U.S. Customs Service, in conjunction with DoD, should develop automated alternatives to the paper documents required for entry and release of material.

Citation: DFARS 225.7002-3

Subject: Preference for domestic wool

Analysis: Evaluation factors for foreign wool are derived from information published in the Department of Agriculture's "Market News." In a paperless system, this information could be made available electronically and downloaded by the contracting office.

Recommendation: The Department of Agriculture should make an electronic version of the "Market News" available to Government contracting offices.

Citation: DFARS 225.870

Subject: Procedures for Canadian purchases

Analysis: Paperless processes will need to be coordinated with the Canadian Commercial Corporation (CCC), including procedures for listing and soliciting Canadian firms, and endorsement of bids by CCC. Since small purchases are conducted directly with Canadian firms, paperless processes should be easier to establish in the small purchase area.

Recommendation: No changes are required presently. CCC should be kept informed of DoD paperless processes so that they are able to respond when electronic bids and proposals become feasible.

Citation: DFARS 225.872-3(d)

Subject: Procedures for purchases from qualifying countries

Analysis: This paragraph specifies that international air mail shall be used to solicit foreign sources, security permitting. Solicitations could conceivably be sent electronically as well, but air mail may be the best alternative for some time to come.

Recommendation: No changes are required presently. The wording will need to be changed to allow electronic transmission at a time when paperless offers become feasible.

Citation: DFARS 226.7005

Subject: Eligibility of offeror – Historically Black Colleges and Universities (HBCU) and Minority Institutions (MI)

Analysis: A list of HBCUs and MIs is published periodically by the Department of Education and may be obtained from the contracting activity's Small and Disadvantaged Business Utilization Specialist. If this information was made available electronically, the contracting officer could obtain a quicker and more accurate indication of a firm's eligibility under this section.

Recommendation: The Department of Education should develop an electronic data base of HBCUs and MIs and make this available to all DoD contracting activities on line.

Citation: FAR 27.304(a)(5)

Subject: Patents, data, copyrights – procedures

Analysis: Paragraph states that fact-finding results and decisions regarding contractor appeals shall be sent to the contractor by registered or certified mail. Electronic transmission should be permitted. EDI transactions could verify if the electronic document was received and read, but as a practical matter, mailing is probably the best method until electronic transmission becomes more widely used.

Recommendation: Update the wording to allow other means of transmission that offer receipt verification.

Citation: FAR 27.304(g)(5),(6)

Subject: Exercise of march-in rights

Analysis: A copy of findings shall be sent to the contractor via registered or certified mail. Electronic transmission could also be used at some future time.

Recommendation: Update the wording to allow other means of transmission that offer receipt verification.

Citation: FAR 27.305-4(b)

Subject: Conveyance of invention rights acquired by the Government

Analysis: Paragraph refers to ". . . papers evidencing any rights of the Government in patents . . . ." Electronically stored data should also be considered.

Recommendation: Update the wording to eliminate media-specific references.

Citation: FAR 27.306(b)

Subject: Licensing background patent rights to third parties

Analysis: States that contractors shall be given notification of the determination by certified or registered mail.

Recommendation: Update the language to permit the notice to be sent by any means, including electronic-offering receipt verification.

Citation: DFARS 227.403-70(a)(2),(4)

Subject: Procedures for establishing rights in technical data – notifications

Analysis: Pre- and postaward notifications can be sent by electronic mail. The policy requires that the representation in clause 252.227-7013(j) accompany notices. The representation must be dated and signed. An EDI transaction would need to take that into account, as well as the fact that the notice and representation could be sent more than once during the contract cycle (unlike most other information, which is returned with the offer).

Recommendation: No changes are required presently. When electronic offers become feasible, the establishing rights procedures will need to be built into any paperless systems.

Citation: DFARS 227.403-77(b)

Subject: Procedures – acquisition of rights in computer software

Analysis: Paragraph refers to DD Form 1423, *Contract Data Requirements List (CDRL).* The CDRL could also be a file submitted electronically.

Recommendation: The wording should be revised to allow an electronic equivalent of the CDRL.

Citation: FAR 28.106

Subject: Bonds and bond-related forms

Analysis: The information could also be sent electronically, but requirements for stamping with corporate seals would need to be addressed. Several states require an adhesive seal on bonds. The current process is satisfactory until paperless processes are firmly established.

Recommendation: No changes are required presently.

Citation: FAR 30.202-5

Subject: Filing disclosure statements

Analysis: Disclosure statements must be on Form Number CASB-DS-1. Provision could be made for electronically filing disclosure statements. Also, the system must be able to protect any privileged or confidential information that the disclosure might contain.

Recommendation: The wording should be revised to allow an electronic equivalent of the form.

Citation: DFARS 230.7000

Subject: Estimating facilities capital cost of money

Analysis: This is normally prepared by the contractor on Form CASB-CMF.

Recommendation: The wording should be revised to allow for submission of an electronic equivalent of the form.

Citation: FAR 31.105(d)(2)(i)(B)

Subject: Construction and architect and engineering (A&E) contracts

Analysis: Discusses publication schedules of equipment use rates published by the Army Corps of Engineers.

Recommendation: The Army Corps of Engineers should place the rate schedules on an EBB and make them available to all Government contracting offices.

Citation: FAR 31.205-46(a)(2)

Subject: Travel costs

Analysis: The Federal Travel Regulations (from GSA), Joint Travel Regulations (from DoD), and Standardized Regulations (from Department of State) could all be made available electronically to contractors and contracting offices. These publications list maximum per diem rates for travel costs.

Recommendation: The organizations above should develop EBBs for their travel rates and provide access to contractors and contracting offices.

Citation: FAR 32.503-1

Subject: Contractor requests for progress payments

Analysis: This paragraph requires that payment requests be submitted on SF 1443. Requests could also be submitted electronically. If the FAR language was modified, the supplementation at DFARS 232.503-1 could be eliminated. The DFARS coverage allows submission on computer-generated equivalents of the SF 1443.

Recommendation: Modify the FAR language to permit electronic equivalents of the SF 1443. Upon making this change, delete the DFARS coverage discussed in 232.503-1.

Citation: FAR 32.805

Subject: Procedure – assignment of claims

Analysis: This procedure requires a legalistic notice of assignment, requiring attachment of a "true" copy, and various degrees of certification depending upon whether the firm is a corporation, partnership, or individual. The information could be transmitted electronically, but there may be legal barriers that have to be addressed before it is accepted in electronic format. The procedure at DFARS 232.803 adds more paper processing steps. This procedure is probably best left alone until paperless processes are firmly established.

Recommendation: No changes are required presently.

Citation: FAR 32.907(d)

Subject: Late invoice payment

Analysis: Language in this paragraph effectively makes provision for an electronic data message.

Recommendation: No changes are required. The section's flexible language should be used elsewhere in the FAR (as identified in this appendix) to avoid requiring the use of a specific media or technology.

Citation: FAR 33.211(b)

Subject: Claims – contracting officer's decision

Analysis: States that the contractor shall be given a copy of the decision by certified mail, return receipt requested, or by any other method that provides evidence of receipt. This wording is flexible enough to allow for an EDI transaction that automatically provides verification of receipt.

Recommendation: No changes are required. This wording should be considered for use elsewhere in FAR and DFARS to allow for electronic transactions as an alternative to paper.

Citation: FAR 35.015(b)

Subject: Basic agreements – educational and nonprofit organizations

Analysis: The FAR Secretariat is responsible for preparing and publishing a list of all basic agreements pertaining to R&D. This list could be made available electronically to agencies.

Recommendation: The FAR Secretariat should make these agreements available to agencies by placing them on an EBB.

Citation: DFARS 235.015(b)

Subject: Basic agreements – educational and nonprofit organizations

Analysis: For DoD, the office responsible for maintaining basic agreements with these firms is the Office of Naval Research. The agreements are made available to the Defense Acquisition Regulatory Council for periodic publication in a Defense Acquisition Circular, but they could also be made available electronically to DoD contracting offices.

Recommendation: The Office of Naval Research should place these agreements on an EBB and provide access to DoD contracting offices.

Citation: DFARS 235.015-71(e)

Subject: Contracting procedures – Short Form Research Contract

Analysis: For an electronic contracting system, a transaction set would need to be developed for the short form contract.

Recommendation: No changes are required presently. This type of contracting should be considered for a paperless process at a time when electronic contracting becomes more feasible.

Citation: FAR 36.603

Subject: Collecting data on, and appraising, firms' qualifications – A&E

Analysis: Requires that offices and evaluation boards maintain qualification data files. These should be stored electronically in order to increase accessibility from outside of the local office.

Recommendation: Contracting offices should electronically store qualification data on contractors to increase the offices' value to both local and nonlocal information users.

Citation: FAR 36.604

Subject: Performance evaluation – A&E

Analysis: Requires use of the SF 1421. Consideration should be given to an electronic equivalent in view of the ease of electronic distribution and storage.

Recommendation: Update the language to allow an electronic equivalent of the SF 1421 to be used as an alternative.

Citation: FAR 36.7

Subject: Standard and optional forms for use in contracting for construction, A&E, and dismantling, demolition, or removal of improvements

Analysis: The various mandatory forms referenced in this subpart could also have electronic equivalents.

Recommendation: The FAR language should be revised to allow electronic equivalents of these forms to be used.

Citation: DFARS 237.7204

Subject: Format for educational service agreements

Analysis: Ordering procedures allow delivery orders or other "written communications."

Recommendation: No changes are required if the term "written communication" is broadly interpreted to encompass electronic ordering.

Citation: FAR 38.102-3

Subject: New Item Introductory Schedule

Analysis: This schedule is used to introduce new or improved items into the Federal supply system and is published four times a year. The schedule could also be published electronically.

Recommendation: GSA should add this schedule to their MUFFIN system, and the FAR should then be updated to reference GSA's MUFFIN system as a source for this information.

Citation: FAR 42.102

Subject: Procedures – contract administration

Analysis: The DoD *Directory of Contract Administration Services Components* and the *Directory of Federal Contract Audit Offices* could both be published in electronic format to facilitate a paperless environment. These publications also tend to become outdated quickly. Electronic versions would be easier to update centrally.

Recommendation: The Defense Contract Management Agency should publish an electronic version of the *Directory of Contract Administration Services Components* on a bulletin board for use by DoD contracting offices.

Citation: DFARS 242.770

Subject: Certificate of indirect costs

Analysis: This certificate could also be provided electronically. An electronic signature would be needed. The current paper process is sufficient until paperless transactions become more widely established.

Recommendation: No changes are required presently.

Citation: DFARS 242.803

Subject: Disallowing costs after incurrence

Analysis: For cost reimbursement contracts with the CCC, CCC shall certify and forward the invoice with an SF 1034 to the administrative contracting officer. If the costs are disapproved, the administrative contracting officer shall issue Defense Contract Audit Agency Form 1 to the contractor. These forms could be provided electronically. CCC cooperation will be required. The volume of these transactions is insufficient to warrant a conversion to an electronic transaction at this time.

Recommendation: No changes are required presently.

Citation: DFARS 242.1106

Subject: Reporting requirements

Analysis: This section lists several reports and forms initiated by the contract administration office to advise the contracting officer of performance delays. These forms could all be generated and transmitted electronically. An internal Government EDI transaction could also acknowledge receipt of the messages.

Recommendation: The DFARS should be revised to allow the use of electronic equivalents of these forms and reports. The Defense Contract Management Command (DCMC) should consider this area for a paperless process initiative if transaction volume justifies the investment.

Citation: FAR 42.1203

Subject: Processing agreements – novation and change of name

Analysis: The flexibility of the language allows these agreements to be done electronically. However, some of the documentation required to support these agreements is unlikely to be available in electronic form (e.g., bill of sale, transfer of assets, deed, court decree, minutes of board meetings). Therefore, presently it is not beneficial to attempt to process these agreements electronically.

Recommendation: No changes are required presently. Electronic signature capability will be necessary.

Citation: FAR 43.201(c)

Subject: General – change orders

Analysis: States that telegraphic change orders can be issued only under unusual or urgent circumstances and that the original copy of the message must be signed by hand.

Recommendation: The language should be expanded to allow for transmission via EDI. EDI could handle electronic signatures as well as receipt verification.

Citation: FAR 43.301

Subject: Use of forms – modifications

Analysis: The language is oriented toward a paper system. Electronic transmission of these forms would also be effective.

Recommendation: Update the FAR language to allow for electronic equivalents of these forms.

Citation: DFARS 245.505-6

Subject: Special reports of plant equipment

Analysis: Reports and property records are prepared on paper.

Recommendation: Revise the DFARS language to permit electronic equivalents of these reports.

Citation: FAR 45.606-5(b)(3)

Subject: Instructions for preparing and submitting schedules of contractor inventory

Analysis: This paragraph allows the submission of "machine listings."

Recommendation: Revise language to allow the submission of electronically prepared and transmitted inventory schedules through a current technology such as EDI with electronic signatures.

Citation: FAR 45.608-2(b)(2)

Subject: Standard screening of contractor inventory

Analysis: This process involves reporting to the GSA on SF 120. The regional GSA office prepares approved orders and shipping instructions for the plant clearance officer. The regional GSA office also prepares and issues circulars and catalogs to all Federal agencies in the region.

Recommendation: GSA should improve this process by using electronic transmission of information where practicable, and by placing the circulars and catalogs on EBBs that could be queried by agencies.

Citation: DFARS 245.608-70, 71

Subject: Contractor inventory

Analysis: DoD procedures for reporting usable inventory involve SFs 1428, 1434, 120, and DD Forms 1342 and 1348-1. As in the FAR procedure, this process could also be done electronically.

Recommendation: The DFARS should be updated to allow electronic equivalents of the referenced forms.

Citation: DFARS 245.7101

Subject: Forms – Plant clearance

Analysis: This subpart references a number of forms for plant clearance actions.

Recommendation: The DFARS should be updated to allow electronic equivalents of the referenced forms.

Citation: DFARS 246.473

Subject: Authorizing shipment of supplies

Analysis: Refers to signing or stamping of shipping papers and typing or stamping a statement on copies of the shipping papers.

Recommendation: Revise the wording to remove media-specific references to allow for electronic methods.

Citation: FAR 47.103

Subject: Transportation Documentation and Audit Regulation

Analysis: Title 41 of the Code of Federal Regulations now permits EDI to be used for documentation and payment of transportation bills. Also, Defense Management Review Decision 941 commits DoD to replace existing documents with EDI equivalents.

Recommendation: The FAR should be updated here to keep pace with other regulatory changes that authorize the use of EDI technology in the transportation area.

Citation: FAR 47.305-10(c)

Subject: Packing, marking, and consignment instructions

Analysis: To meet delivery schedules, the contracting officer may issue instructions by telephone, teletype, or telegram.

Recommendation: Revise the language to allow the use of other electronic transmission methods such as facsimile, E-mail, or EDI for issuing these instructions.

Citation: DFARS 247.305-10(b)(v)(C)

Subject: Packing, marking, and consignment

Analysis: This paragraph only mentions telephone, teletype, or telegram.

Recommendation: Revise the language to allow the use of other electronic transmission methods for issuing these instructions.

Citation: DFARS 247.370

Subject: SF 30, Amendment of Solicitation/Modification of Contract

Analysis: Mentions confirmation of instructions issued by telephone, teletype, or telegram.

Recommendation: Revise the language to allow the use of other electronic transmission methods such as EDI, E-mail, and facsimile for issuing these instructions.

Citation: FAR 49.102

Subject: Notice of termination

Analysis: States that the notice shall be sent by certified mail, return receipt requested. The notice could also be sent electronically and have built-in receipt verification.

Recommendation: No changes are required presently. This function should be considered for an electronic transaction when paperless contracting becomes more prevalent.

Citation: FAR 49.109-7(b), (d)

Subject: Settlement by determination

Analysis: These paragraphs state that certified mail shall be used to transmit notices and determinations to the contractor. Electronic messages can also provide the functionality of certified mail.

Recommendation: Update the FAR language to allow other methods of transmission that provide receipt verification.

Citation: FAR 49.112-2(a)

Subject: Final payment

Analysis: This paragraph refers to a paper process of attaching a copy of a settlement agreement to a voucher or invoice and forwarding the documents to the disbursing officer.

Recommendation: This section should be reworded to allow for electronic exchange of the information.

Citation: FAR 49.302(a)

Subject: Discontinuance of vouchers

Analysis: Wording in this paragraph is designed for a paper process, (i.e., submission of proposal for fee on an SF 1437 or by letter appropriately certified).

Recommendation: The language should be updated to allow for electronic transmission of this information.

Citation: FAR 49.304-2

Subject: Submission of settlement proposal (fee only)

Analysis: Wording in this section is oriented to a paper process.

Recommendation: The language should be updated to allow for electronic transmission of this information.

Citation: FAR 49.601

Subject: Notice of termination for convenience

Analysis: This subpart provides formats for telegraphic and letter notices. It could also allow for notices transmitted electronically. EDI transmission would also eliminate the requirement to send notices and confirmation via certified mail.

Recommendation: Update the language to allow the notice to be sent by any means with receipt verification.

Citation: FAR 51.1

Subject: Contractor use of Government supply sources

Analysis: Wording in this subpart may need to be updated to recognize paperless transactions. GSA assists contractors in preparing and submitting orders. Eventually, these functions may be accomplished electronically.

Recommendation: Revise the wording in this subpart to eliminate media-specific references.

APPENDIX B

GLOSSARY

GLOSSARY

A&E	=	architect and engineering
ACPS	=	Automated Contract Preparation System
ACSN	=	Administrative Change Study Notice
ADIS	=	Acquisition Due-In System
AMALGAMAN	=	Amalgamated Management System
AMIS	=	Acquisition Management Information System
APADE	=	Automation of Procurement and Accounting Data Entry
ASC	=	Aeronautical Systems Center
BCAS	=	Base Contracting Automated System
BPA	=	blanket purchase agreement
CALS	=	Computer-aided Acquisition and Logistics Support
CBD	=	*Commerce Business Daily*
CCC	=	Canadian Commercial Corporation
CCSS	=	Commodity Command Standard System
CDRL	=	*Contract Data Requirements List*
CD-ROM	=	compact disk-read only memory
CFR	=	Code of Federal Regulations
CIM	=	Corporate Information Management
CONDIRAIS	=	Contract Directorate Automated Information System
CR	=	Contractor Request
DCADS	=	Defense Contract Action Data System
DCN	=	Design Change Notice
DD	=	Defense Department

DEC = Digital Equipment Corporation

DFARS = Defense FAR Supplement

DLA = Defense Logistics Agency

DoD = Department of Defense

DOL = Department of Labor

DPACS = DLA Pre-Award Contracting System

DPCI = Distributed Processing for Contractual Input

DPSC = Defense Personnel Support Center

DR = Deficiency Report

DVA = Department of Veterans Affairs

E-mail = electronic mail

EASE = electronically assisted solicitation exchange

EBB = electronic bulletin board

ECP = Engineering Change Proposal

EDI = electronic data interchange

FAR = Federal Acquisition Regulation

FARA = FAR Automated

fax = facsimile

FPDS = Federal Procurement Data System

FPI = Federal Prison Industries

FSS = Federal Supply Service

GFP = Government-furnished property

GSA = General Services Administration

HBCU = Historically Black Colleges and Universities

IBM = International Business Machines

IDC = indefinite delivery contract

IFB = invitation for bid

IGP	= intelligent gateway processor
ITIMP	= Integrated Technical, Item Management and Procurement
J&A	= Justification and Approval
LMI	= Logistics Management Institute
LSA	= Labor Surplus Area
MI	= Minority Institutions
MILSCAP	= Military Standard Contract Administration Procedures
MIPR	= Military Interdepartmental Purchase Request
MR	= Modification Request
MUFFIN	= Multi-Use File for Interagency News
NASA	= National Aeronautics and Space Administration
NAVSUP	= Naval Supply Systems Command
NPFC	= Naval Publications and Forms Center
NSC	= Naval Supply Center
OMB	= Office of Management and Budget
PADDS	= Procurement Automated Data and Document System
POPS	= Paperless Order Placement System
PR	= purchase request
RADMIS	= Research and Development Management Information System
RFP	= request for proposals
RFQ	= request for quotations
SAACONS	= Standard Army Automated Contracting System
SACONS-D	= Standard Automated Contracting System – DeCA (Defense Commissary Agency)
SADBU	= Small and Disadvantaged Business Utilization
SADBUS	= Small and Disadvantaged Business Utilization Specialist
SAMMS	= Standard Automated Materiel Management System

SBA	=	Small Business Administration
SF	=	Standard Form
SOW	=	statement of work
SPEDE	=	SAMMS Procurement by Electronic Data Exchange
TIN	=	taxpayer identification number
UICP	=	Uniform Inventory Control Program
U.S.C.	=	United States Code
VGA	=	video graphics adapter