AD-A238 831

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ELECTRONIC COMMERCE AND COMPETITIVE PROCUREMENT

Report PL006R1

June 1991

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91-05873

91 7 29 062

REPORT DOCUMENTATION PAGE

Form Approved
OPM No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources gathering, and maintaining the data needed, and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

1. AGENCY USE ONLY *(Leave Blank)*

2. REPORT DATE
Jun 91

3. REPORT TYPE AND DATES COVERED
Final

4. TITLE AND SUBTITLE
Electronic Commerce and Competitive Procurement

5. FUNDING NUMBERS
C MDA903-90-C-0006
PE 0902198D

6. AUTHOR(S)
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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Logistics Management Institute
6400 Goldsboro Road
Bethesda, MD 20817-5886

8. PERFORMING ORGANIZATION REPORT NUMBER
LMI-PL006R1

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
Mrs. Eleanor Spector
Director of Defense Procurement
Room 3E144, The Pentagon
Washington, DC 20301

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
A: Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

Explains the application of electronic commerce techniques [electronic data interchange (EDI), electronic mail (E-mail), electronic bulletin boards and facsimile] to competitive procurement. This report looks at how electronic solicitations and electronic bids/proposals can be used under the large-purchase procedures of the Federal Acquisition Regulation (FAR). Changes to the FAR to recognize electronic commerce are recommended. Also discussed are opportunities to use electronic commerce and small business and legal considerations of electronic commerce. This report describes how electronic business and technical data can be organized in electronic solicitations and proposals using X12 EDI, X.400 E-mail, and Computer-aided Acquisition and Logistic Support (CALS) standards.

14. SUBJECT TERMS
Electronic data interchange; Compound documents; Electronic solicitations; Electronic contracting; Computer-aided Acquisition and Logistic Support; Electronic commerce

15. NUMBER OF PAGES
105

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT
Unclassified

18. SECURITY CLASSIFICATION OF THIS PAGE
Unclassified

18. SECURITY CLASSIFICATION OF ABSTRACT
Unclassified

20. LIMITATION OF ABSTRACT
UL

Executive Summary

ELECTRONIC COMMERCE AND COMPETITIVE PROCUREMENT

Technological advances in communicating information warrant concurrent changes in contracting processes. By taking advantage of such telecommunications techniques as electronic bulletin boards, electronic mail, and electronic data interchange (EDI), the Government can better disseminate solicitation information, increase contracting opportunities, improve competition, purchase better quality products at lower prices, and reduce administrative leadtimes. These new technologies and existing computer-aided procurement systems enable the Government buying activities and contractors to communicate without exchanging, processing, or storing paper documents. By eliminating paper, the Government can reduce administrative costs through more efficient procurement, contract administration, and payment processes.

One technology in particular – EDI – allows buyers and sellers to routinely exchange business documents computer-to-computer. The Government can also make repetitive, high-volume purchases electronically with little or no human intervention and with considerable reductions in processing time and costs. All aspects of the purchasing process can be conducted electronically. The integration of EDI and the other electronic information technologies into a comprehensive, electronic, paperless system covering all business functions including contract placement, contract administration, payment, transportation, supply, and maintenance is called electronic commerce.

The Federal Government is currently well positioned to apply electronic interface techniques to purchase orders (to purchase items currently valued at less than $25,000) and delivery orders. The less restrictive small-purchase and delivery-order procedures of the Federal Acquisition Regulation and the success of several electronic purchasing systems ensure greater acceptance of electronic commerce technologies and business concepts. Many opportunities are readily available for using electronic commerce techniques for purchase orders and delivery orders. In the area of competitive procurement, we believe DoD's primary opportunity to use EDI is

with delivery orders placed against competitively established indefinite-delivery contracts.

The use of electronic technologies in formal competitive procurements over $25,000 (referred to as large purchases) offers a greater challenge. To be fully implemented, electronic commerce must transmit paperless solicitations in their entirety – the engineering drawings, specifications, and statements of work – to all interested parties. However, current telecommunications volume limitations make transmission of such complex data files slow and costly. While we believe electronic solicitations are possible today, we recognize that they are limited to items such as commercial products, qualified products, and engineering source approval items that do not require transmission of engineering data. As technology matures, we can expect telecommunications improvements that will enable us to transmit entire solicitations electronically and offerors to respond to those solicitations in the same way. We believe electronic commerce standards and technologies will eventually lead to a paperless solicitation process while meeting all the regulatory and practical business requirements.

We found few small business software packages that accept or generate EDI documents. We are certain that the marketplace will accord electronic commerce the same favorable reception it gave personal computers and facsimile machines, but in the meantime, any Government procurement strategy should ensure that all contractors no matter what their telecommunications capabilities have access to all contracting opportunities. We recommend a gradual transition strategy that combines training and assisting small businesses in electronic commerce with a formal notice of when such electronic capability will be required for a given commodity or industry.

The Government should remove all regulatory impediments to electronic commerce. Specifically, we recommend changes to the Federal Acquisition Regulation to better recognize electronic technologies and media, and permit electronic solicitations, offers, and contracts. Today, the regulation's large-purchase procedures assume paper documents; we believe the contracting parties could meet the current requirements for transmitting solicitation provisions and representations and certifications through signed and authenticated electronic transactions referencing master solicitations and annual representations and certifications.

We offer a strategic plan for applying electronic commerce to competitive procurement. Elements of the plan address a gradual transition from paper to

electronic documents by first focusing on industries familiar with EDI and then identifying those buying activities doing business in significant volume with those industries. An electronic commerce strategy is even more advantageous when it is combined with process improvement initiatives. If properly applied, electronic commerce could simplify procurement processes. DoD's corporate information management initiatives in procurement and contract payment should apply electronic commerce techniques when developing their standard systems.

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CHAPTER 1

BACKGROUND: INFORMATION TECHNOLOGIES AND OPPORTUNITIES

Until recently, computer technology automated procurement by merely automating the production of paper documents. Emerging telecommunications technologies will soon permit further changes in traditional procurement processes. Procurement automators are now confronted with a host of promising technologies, but their real challenge is to select and apply those technologies correctly and, at the same time, to develop new ways of doing business. Some technologies might offer greater competition and increased small business opportunities if, for example, they are more effective in disseminating solicitation information.

In this study, we explore how electronic interface technologies benefit competitive procurement. One technology – electronic data interchange, or EDI – offers special promise because of its demonstrated ability to improve business functions through better information handling.

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 all trading partners. EDI transactions do more than link computers. They integrate applications by, for example, automatically communicating purchase/delivery order information into a contractor's order processing system while also updating production or delivery scheduling and contract accounting applications.

Private industry and the Government have successfully applied EDI to purchasing as a means of speeding solicitation, quotation, order, status, shipment, receipt, invoice, and payment information. EDI is also used for direct vendor delivery and just-in-time inventory techniques that shorten leadtime, reduce inventory, and improve overall logistics processes.

In May 1988, EDI capabilities first achieved high-level DoD recognition when then Deputy Secretary of Defense William Howard Taft, III, directed DoD Components to make "... maximum use of electronic data interchange for the paperless process of all business-related transactions...." More recently, on 12 November 1990, Defense Management Report Decision 941, *Implementation of Electronic Data Interchange in DoD*, proposed milestones, identified opportunities, and suggested a level of investment for an EDI program.

ELECTRONIC COMMERCE

Electronic commerce is a paperless business relationship in which information is conveyed electronically. It integrates EDI, electronic mail (E-mail), electronic bulletin boards, electronic funds transfer, and similar techniques into a comprehensive, electronic-based system encompassing all DoD business functions including procurement, contract administration, payment, supply management, transportation, maintenance, fuels management, and base operations. The Office of the Assistant Secretary of Defense for Production and Logistics in a 7 May 1990 memorandum established the Electronic Commerce Program and designated the Defense Logistics Agency (DLA) its Executive Agent for EDI and data protection. The thrust of DoD's Electronic Commerce Program is not merely to communicate business information electronically but also to emplace the necessary systems, capabilities, and procedures that will enable DoD Components to fundamentally alter the way they carry out their day-to-day operations.

SMALL-PURCHASE OPPORTUNITIES

For many years, EDI applications have demonstrated benefits in commercial purchasing. These applications are primarily low-dollar, repetitive purchases similar to what the Government classifies as small purchases. Several Federal Government agencies have successfully demonstrated EDI quotation and ordering applications. Many opportunities exist for using EDI in low-dollar, repetitive Government purchases and the inevitable flow of shipment, receipt, invoice, and payment information.[1] As indicated in Figure 1-1, approximately 12.9 million actions (98 percent) of FY90 procurements reported by DoD to the Federal

[1] *Electronic Data Interchange in Procurement*, Logistics Management Institute (LMI) Report PL904R1, Daniel J. Drake, John A. Ciucci, and Ben Milbrandt, April 1990, focused on small-purchase EDI opportunities and the regulatory changes recommended to fully develop EDI's small-purchase potential.

Procurement Data System are for purchases of less than $25,000. The sheer volume of Government business provides many EDI opportunities.

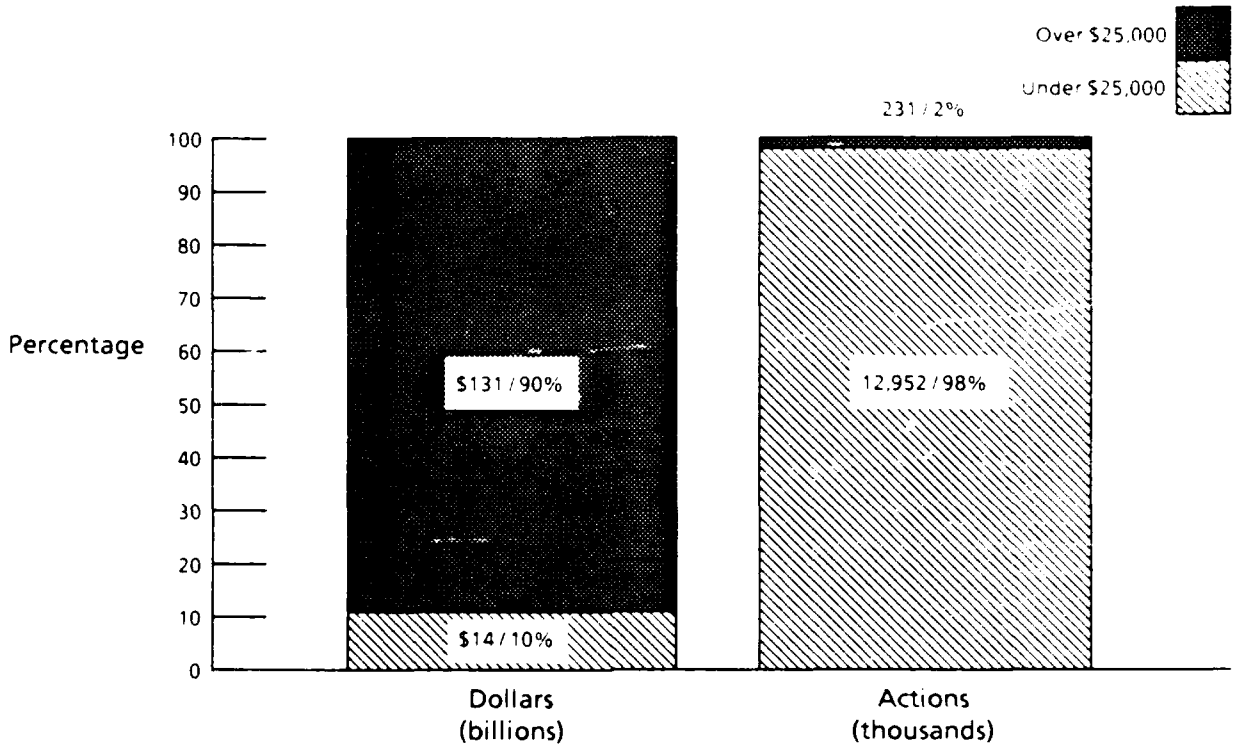

FIG. 1-1. AWARDS – VALUE AND VOLUME – FY90

LARGE-PURCHASE OPPORTUNITIES

As indicated in Figure 1-1, approximately 231,000 actions are large purchases but that represents less than 2 percent of the more than 13 million total actions. Insofar as large purchases are concerned, electronic commerce is currently limited to electronic ordering primarily through delivery orders against the General Services Administration (GSA) Federal Supply Schedule contracts.[2] The use of electronic commerce on competitive large purchases has been limited because of the more formal, rigid procedures that large, competitive purchases entail; invitations for bid (IFB), representations and certifications, etc., represent formidable barriers to electronic commerce. In this report, we recommend electronic commerce strategies for large-dollar-value procurements.

[2]See General Services Administration Acquisition Regulation 552.216-73, *Placement of Orders*.

BROADER CAPABILITIES UNDER DEVELOPMENT

To implement electronic commerce fully across all contracting environments, DoD will have to develop additional interface capabilities including new EDI transactions. Expanded electronic network capabilities would combine E-mail and EDI while permitting transfers of binary data (i.e., images, text) files. Through interconnections between E-mail networks, messages and transactions can be directed across domestic and international networks.

One major electronic commerce requirement is the ability to provide prospective offerors the business data and technical data needed to make bid/no-bid decisions and to prepare cost estimates. Part of that requirement is the ability to transmit engineering drawings and specifications electronically when procurement urgency requires a reduced solicitation/bid cycle. An expanded EDI transaction set (standard) designed to transfer such large data files is being coordinated by the Department of Commerce's National Institute of Standards and Technology[3] and public standards organizations. Using EDI techniques to transmit data files is only an interim method; advanced E-mail capabilities should enable the transmission of EDI transactions and their accompanying data files within an E-mail envelope.

Small-purchase electronic commerce applications using requests for quotations (RFQs) and purchase orders have been successfully demonstrated, but large-purchase applications will take more time and effort to mature. For example, efforts are under way by EDI standards organizations to develop procedures and transactions for transmitting cost/schedule reports, cost/price proposals, representations and certifications, and contract awards. The technology for moving (or accessing) large data files and for electronic discussions and negotiations has been developed. For example, Open Systems Interconnection (OSI) technologies are being applied to contracting. The Air Force Systems Command (AFSC) Aeronautical Systems Division (ASD) is applying OSI technology to link the many diverse computers and software required to prepare a paperless request for proposals (RFP) that can be accessed by prospective offerors.

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[3]Formerly the National Bureau of Standards.

THE DoD'S CHALLENGE

Comparisons between Government procurement and commercial purchasing when evaluating potential EDI opportunities are not always meaningful. Although they have some similarities, they also have many differences. Commercial EDI applications are often based on selective purchasing arrangements in which major corporations team with a limited number of suppliers in exchanging EDI transactions. Government contracting cannot be so restrictive. In DoD's electronic commerce implementation, all interested parties must have equal access to purchasing opportunities. Commercial purchasing groups have successfully used EDI but have not had to meet such requirements as full-and-open competition and small business goals. As we show in this report, Government EDI applications must be designed to comply with congressionally mandated procurement policies.

Government has to apply EDI and its accompanying technologies in innovative ways unique to its business environment. It must carefully analyze its opportunities and develop an operational plan for successfully applying appropriate electronic interface technologies to its procurement. The challenge is to validate such opportunities and apply the appropriate information technology where it can offer the greatest benefits. Additionally, DoD must continually demonstrate sensitivity to small-business contracting opportunities.

REPORT ORGANIZATION

We present our specific findings and recommendations in the next chapter. Our analysis of the application of electronic commerce to specific competitive contracting opportunities is presented in Chapter 3. In Chapter 4, we discuss the procurement policy for conducting competitive electronic commerce, and we present legal issues associated with electronic signature authentication in Chapter 5. The final chapter, Chapter 6, describes small business considerations.

We present four appendices: the first sets forth a strategic plan for electronic commerce's application to procurement, the second suggests changes to the Federal Acquisition Regulation (FAR), the third reports on the need to transmit technical data "bid sets" when buying supply items, and the last applies various EDI transactions and data exchange specifications to electronic solicitation and offer requirements.

CHAPTER 2

FINDINGS AND RECOMMENDATIONS

FINDINGS

Information Stimulates Competition

Electronic commerce can increase contracting opportunities by changing the way solicitations are publicized and disseminated. Before electronic commerce techniques were available, the Government would provide a solicitation to only a few firms on the basis of solicitation mailing list criteria; it had to control the administrative costs of preparing solicitations and evaluating offers. Now, electronic commerce techniques permit all interested parties to receive notices of all opportunities and, if interested, to directly request or access the electronic solicitation.

The Naval Supply Systems Command's experience with a small-purchase electronic solicitation board, called Electronically Assisted Solicitation Exchange (EASE), demonstrates how broad dissemination of solicitation information can increase opportunities, stimulate competition, and reduce overall prices while reducing the overall administrative workload of buyers and clerks.

Electronic commerce techniques can be used to broadcast large-purchase solicitations to all interested parties instead of merely to select firms from a solicitation mailing list and firms responding to a *Commerce Business Daily* synopsis. Interested parties could easily obtain large-purchase solicitations and hopefully stimulate greater participation in Government procurement.

Electronic Commerce Changes Business Practices

Electronic commerce will change how business is conducted. With instantaneous availability of information, items can be located, ordered, shipped, invoiced, and paid rapidly and accurately and with no manual processing of paper. Recent DoD initiatives toward commercial practices – use of nondevelopmental items, direct vendor delivery, and just-in-time inventory – are all facilitated by

electronic commerce. Maintenance of large safety stocks and the stocking of commercial items in the supply system may no longer be necessary.

Competitive Large-Purchase EDI Opportunities Are Currently Limited

The two primary large-purchase solicitation documents are the IFB for sealed bids and the RFP for competitive proposals. When the IFB is used to acquire supply items, it usually defines the item with great precision, i.e., item description (part number, specification, standard), quantity, delivery schedule, and ship-to point. Similarly, the required response to the IFB is generally a distinct amount – the bid price. This item detail fits well with the data structure contained in current EDI transaction sets.

The RFP generally uses large amounts of textual material to define and describe the requirement. Proposals provide precise price information but also include many pages of text describing and justifying the proposed approach. Current EDI transaction sets and the automated receiving systems would have difficulty handling such a volume of text without human assistance, thereby mitigating EDI's benefit. Because most EDI data transactions are structured, automated systems can read information and respond to it; the free-form text in proposals is not easily read by computers. Another limiting factor is the need to conduct discussions when evaluating competitive proposals. The use of EDI would have to be supplemented with telephone, E-mail messages, video teleconferences, or face-to-face meetings for those discussions.

An analysis of data from DD Form 350, *Individual Contract Action Report*, indicates limited use of the solicitation method most conducive to EDI. As indicated in Table 2-1, only 11 percent of the solicitations reported for new large-purchase work from 1986 to 1990 were IFBs. [The relative insignificance of the sealed-bid method is even more apparent when the 49,992 IFB solicitations are compared to the 67 million total small- and large-purchase actions reported in the 5 years from FY86 to FY90.]

Other Large-Purchase EDI Opportunities Are Available

Besides the limited EDI opportunities currently available using IFBs and RFPs, other large-purchase electronic commerce opportunities exist. Sole-source basic ordering agreement (BOA) orders and competitively placed indefinite delivery-type contract (IDC) delivery orders both lend themselves to EDI since the contractor

TABLE 2-1

SOLICITATION METHODS FOR NEW WORK, FY86 – FY90

(DoD procurement actions above $25,000)

Sealed bid (IFBs)	Competitive proposals (RFPs)	Combination (2 step)	Other competitive	Noncompetitive
49,992 11.3%	157,156 35.4%	1,157 <.1%	128,943 29.0%	107,009 24.1%

Source: Department of Defense Prime Contract Awards, Table 14, "Actions and Percent of DoD Prime Contract Awards by Solicitation Action," FY86 – FY90.

Note: Only actions awarded since implementation of the Competition In Contracting Act (CICA) are shown.

knows the item being ordered. The ordering clauses in both contract types could be established or modified for electronic ordering. An existing EDI order transaction can easily convey order details.

Information Technologies Are Emerging

Although EDI currently has limited applicability to large competitive procurements, other new information technologies offer future promise. With OSI communications protocols, we have access to what heretofore were incompatible computers. OSI and its Government implementation, Government Open Systems Interconnection Profile (GOSIP), make the electronic submission of large documents, such as proposals with text and engineering detail, possible regardless of the hardware and operating system in which the document is stored.

Currently, AFSC's ASD is developing an open-system architecture within its system program offices and with its aerospace contractors to permit formal source selections to be conducted electronically. Someday it may cease to issue paper RFPs and, instead, grant prospective contractors' proposal teams access to the solicitation electronically. Similarly, contractors may cease to submit paper proposals and instead, the Government's source-selection evaluation team may access the proposals electronically. Alternative information media are also available. AFSC's Space Division is exploring how to use compact disk, read-only memory technology to disseminate RFPs to prospective offerors.

EDI Can Be Used for Representations and Certifications

Although relatively few certifications are required for low-dollar procurements, large-dollar procurements require many representations and certifications. Signed representations and certifications are currently obtained in writing. That approach would have obvious limitations in any paperless electronic contracting system. An interim solution would be to obtain annual signed representations and certifications that would satisfy the paper requirements and to electronically reference the annual representations and certifications in an EDI transaction along with an authenticated digitized electronic signature. Another solution would be to post electronic copies of the required representations and certifications on an electronic bulletin board for access and electronic acceptance and completion by any bidder or offeror. Eventually, a dedicated representations and certifications EDI transaction set could be developed for bidders and offerors to provide the required information electronically in a completed and signed set.

Technical Data Transmission Is Currently Limited

A significant number of large-purchase, competitive procurements rely on solicitation packages with large amounts of technical data, engineering drawings, and statements of work, etc., that cannot be easily transmitted by EDI. The DoD's Computer-aided Acquisition and Logistic Support (CALS) program is developing data exchange formats and networks for such documents. However, aerospace companies participating in engineering development joint ventures report that the transmission times even for a few drawings are excessive because of slow telecommunications transmission rates and inefficient data compression algorithms. Digitized technical data and drawing sets, fiber optic telecommunications, and better data compression utilities are now emerging to permit faster transmission; costs, however, are still prohibitive. Telecommunications technology will eventually overcome these problems but in the meantime mail delivery of magnetic disks/tapes will be rapid enough and cost effective.

Small-Business Microcomputer Technology Is Available

Buying activities in DoD that have conducted contractor workshops on the use of electronic bulletin boards have noted a high percentage of personal computer (PC) ownership among small businesses. Although this observation may be the result of the computer sophistication of those who attend such workshops, no one can deny the

ever-broadening diffusion of microcomputer technology in current business and society.

Increased availability of microcomputer technology by small businesses is a critical precondition of the application of electronic commerce to procurement. If microcomputers are readily available, small businesses can access electronic commerce networks and electronic mailboxes.

EDI Software Is Not Readily Available to Small Businesses

Although PC hardware and EDI translation software are readily available, a survey of business application software used by small businesses indicates few software packages currently provide EDI capability. This dearth of EDI business application software raises issues on how well EDI technology has been accepted in current business practice and how small businesses will be able to receive and transmit EDI transactions without the translation capability included in common business software packages.

RECOMMENDATIONS

Establish and Publish an Electronic Commerce Plan for Procurement

The Executive Agent for electronic commerce, directed and supported by the Director of Defense Procurement, should develop an electronic commerce implementation plan for the procurement function. As a starting point, we have developed a strategic plan for electronic commerce applied to DoD procurement, and we present that plan in Appendix A.

Based on the implementation plan, the Director of Defense Procurement should develop a schedule for the targeted industries, commodities, and buying activities to change from paper to electronic commerce. The transition to electronic commerce must permit the use of various electronic and paper media while contractors gradually acquire the necessary technical expertise and equipment. DoD should provide public notice of its electronic commerce schedule in the *Federal Register* and the *Commerce Business Daily*. DoD should also solicit public comments on proposed FAR changes to recognize EDI or other electronic commerce technologies.

Identify Opportunities by Procurement Activity, Industry, and Commodity

The DoD should determine the dimensions and dynamics of its contracting relationships through an in-depth study of the types and number of procurement and contract administration transactions between buying activities and contractors. Detailed analysis of the volume and timing of these transactions will aid in the identification of electronic commerce opportunities. Currently, available contract award data for procurement actions valued at less than $25,000 are limited. The preponderance of procurements (98 percent) are small-dollar actions issued by all buying activities to a wide range of contractors. Small-purchase relationships cannot necessarily be derived from analysis of available large-purchase data. Analysis of individual contracting activity small-purchase data is needed.

The DoD should apply electronic commerce to those relationships that provide the greatest benefit. However, certain commodity or industry relationships may provide immediate opportunities. For example, the grocery industry is highly automated and currently uses EDI ordering between grocery chains and suppliers. Because of the grocery industry's acceptance of electronic commerce concepts, EDI ordering might offer an excellent opportunity for the newly established Defense Commissary Agency.

Opportunities to apply EDI to simple IFB solicitations may only exist at certain buying activities for certain items sold by a select group of contractors. To locate these opportunities, considerable data collection and analysis are needed.

Emphasize Total Electronic Relationship

The electronic commerce relationship developed between buying activity and contractor should not be limited to one transaction, e.g., electronic purchase orders. For electronic commerce to be successful, a broad electronic relationship must be established from solicitation mailing list registration through final contract payment. Contractors approached to receive electronic orders should be offered electronic invoices, remittance advice, and payments as a participation incentive.

Additionally, to ensure a common approach, electronic commerce techniques should be integrated with standard systems developed by the corporate information management (CIM) initiatives in procurement and contract payment. If electronic

commerce is applied through CIM standard systems, the uniform electronic interface will be more acceptable to contractors.

Use Annual Representations and Certifications and Master Solicitations

To minimize the transmission of voluminous representations and certifications, buying activities should include annual representations and certifications as part of a trading partner agreement with each prospective EDI offeror. The representations and certifications can be reaffirmed and re-signed electronically through authenticated, digital signatures.

The DoD should use master solicitations in conjunction with the annual representations and certifications to minimize transmission of provisions and clauses. Authenticated digital electronic signatures should be obtained to indicate acceptance of the referenced master solicitation in specific electronic bids or proposals. Eventually, DoD should develop EDI transaction sets to transmit individual representations, certifications, solicitation provisions, and contract clauses, and if necessary, text files of nonstandard special provisions.

Develop EDI Transactions for Large-Purchase Solicitations

We recommend that DoD develop dedicated RFP and proposal EDI transaction sets. We believe existing RFQ and quotation EDI transaction sets can be adapted to simple IFBs and bids. However, RFPs and proposals need dedicated transactions because they include large amounts of textual and graphic data as opposed to structured data normally associated with EDI transactions.

Establish an Electronic Solicitation Demonstration for Large Purchases

Although large-purchase electronic solicitation opportunities are generally limited, in some cases items can be easily described or the prospective contractor already possesses adequate technical data. We recommend that DoD prepare an electronic solicitation demonstration starting with supply items that have Acquisition Method Suffix Codes (AMSCs) to indicate the contractors already have the technical data. Candidate AMSCs for consideration are, for example, T (qualified product list), C (engineering source approval), and Z (commercial item). Any electronic solicitation demonstration should include EDI transaction sets for IFBs, RFPs, bids, and proposals.

Conduct Discussions and Negotiations by E-Mail

The DoD should transmit EDI transactions and E-mail messages through telecommunications value-added networks[1] so that detailed structured data can be combined with free-form text. E-mail will facilitate paperless queries, discussions, and negotiations while providing electronically archived messages for documentation. The ability to conduct discussions and negotiations with offerors electronically by E-mail supports the competitive proposal solicitation method. However, telephone discussions may still be possible, timely, and efficient, depending on the situation and the sensitivity of the message.

Coordinate with Small-Business Outreach Programs

Eventually, the success of electronic commerce will depend on the ability of small businesses to acquire the knowledge and equipment to receive and transmit electronic data. Individual buying activities can conduct small-business outreach conferences, but we recommend that formal training be conducted through existing Federal Government small-business programs such as U.S. Small Business Administration (SBA)-funded small-business development centers (SBDCs) and DoD's Procurement Technical Assistance Program (PTAP).

We also recommend that electronic commerce's small-business outreach program be coordinated with the DoD Small and Disadvantaged Business Utilization office and the SBA.

[1]An EDI value-added network (VAN) provides document handling and distribution services (electronic mailboxing), protocol and speed conversion, network interconnectivity, data back-up, and customer service. Without a VAN, EDI users would have to negotiate individually with numerous trading partners to establish compatible communication protocols, schedule the daily transfer of information, and arrange for back-up procedures in the event that communications fail.

CHAPTER 3

OPPORTUNITY ANALYSIS

The application of electronic commerce to Government procurement is just beginning. Before electronic commerce technologies can be applied to contracting, we must analyze Government-contractor relationships and prioritize procurement situations that provide the best economic opportunities with the least regulatory or technical barriers. One of the first steps is determining the breadth and depth of DoD's procurement relationships, not merely in terms of dollars or actions awarded by a contracting activity to one contractor but an in-depth understanding of the entire contracting relationship with a specific contractor and its corporate parent.

DETERMINING GOVERNMENT OPPORTUNITIES

In our research of EDI procurement opportunities in DoD, we analyzed annual summary procurement reports, *Department of Defense Prime Contract Awards* for Fiscal Years 1986 through 1990.[1] Unfortunately, only large-dollar awards (over $25,000) are available in the detail needed to assess opportunities.

As shown in Chapter 1, the majority of DoD procurement actions are small purchases valued at less than $25,000. Table 3-1 provides details for FY86 through FY90. Uncounted are the numerous actions that do not obligate funds, such as changes within contract scope or funding, no-cost administrative change notices, and shipping instructions.

When we separate the three components of large purchases – new work, delivery orders (DOs), and modifications – a surprising result appears: In FY90, 40 percent of large-purchase actions (93,019 of 231,214) were DOs. Table 3-2 presents the numbers of large purchases by type between FY86 and FY90. Delivery orders offer DoD a significant opportunity for placing orders electronically and for the eventual electronic transmission of shipping, receiving, invoicing, and payment transactions.

[1]FY89 summary data are available but appear incomplete since total procurement actions reported dropped from 14 million in FY88 to 9 million in FY89.

TABLE 3-1

DoD SMALL- AND LARGE-PURCHASE ACTIONS

Actions	FY86	FY87	FY88	FY89	FY90
Less than $25,000	14.1M	15.0M	14.5M	9.0M	13.0M
Over $25,000	256K	255K	246K	216K	231K
Total	14.4M	15.3M	14.7M	9.2M	13.2M

Source: Department of Defense Prime Contract Awards, Report P03, for FY86, FY87, FY88, FY89, and FY90.

TABLE 3-2

DoD POST-CICA LARGE PURCHASES BY TYPE

Type	FY86	FY87	FY88	FY89	FY90
New work	110,516	105,786	93,115	82,866	83,872
DOs	96,006	98,010	97,466	83,982	93,019
Modifications	49,610	51,434	55,630	48,814	54,323
Total	256,132	255,230	246,211	215,662	231,214

Source: Department of Defense Prime Contract Awards, Report P03, for FY86, FY87, FY88, FY89, and FY90.

Note: CICA = Competition in Contracting Act.

Large-purchase DO transactions alone do not constitute the full opportunity to use electronic commerce. Many more small-dollar DOs are issued against IDCs or requirement contracts for every large-purchase DO issued. Procurement analysts at the Office of the Director of Defense Procurement, Deputy Director of Contract Policy and Administration, estimate that approximately 30 percent, or almost 4 million, of the small-purchase transactions per year are DOs. Individual DD Form 1057 reports contain DO information for the activity submitting the report but do not identify contractors. Such details are only known by the local contracting activity. More detailed research data are needed to fully measure the potential for electronic placement of DOs.

Electronic placement of DOs not only offers a great opportunity since EDI orders are within our current transaction and telecommunications capabilities but also is now recognized in acquisition regulations. The GSA Acquisition Regulation Subpart 516.506, *Indefinite-Delivery Contracts*, was recently modified to allow EDI American National Standards Institute (ANSI) X12 orders under Federal Supply Schedule contracts when both the contractor and the issuing agency agree to conduct business electronically.[2] Furthermore, EDI DOs are much easier to implement since such transactions can be agreed to in advance by the contracting parties when the paper IDC is established. Through such advance agreements, EDI DO placement avoids contract formation issues created with the exchange of electronic solicitation, bids/offers, and awards

Individual buying activities must give full consideration to order volumes to determine where opportunities are greatest for EDI transactions. We have analyzed the electronic order potential of large purchases at major spare parts buying activities during FY89 and in Table 3-3 show the numbers of IDC DOs, BOA orders, and Federal Supply Schedule orders issued. A significant number of large-purchase actions are orders. Some activities issue fewer orders than other activities; their procurement management should consider expanding the use of orders to take advantage of EDI. If the order placement provisions of the respective contracts and agreements allowed EDI orders, a significant number of large purchases could be made with EDI.

COMPETITIVE EDI OPPORTUNITIES

Since enactment of the Competition in Contracting Act (CICA), competitively established IDCs have become a popular means for complying with competition requirements while ensuring rapid response to purchase requirements. Contracting activities estimate their annual (or multiyear) requirements, issue a consolidated solicitation, attract greater market interest because of the solicitation's size, and presumably receive better bid or proposal prices. The opportunities to receive electronic orders and submit electronic invoices may also attract firms that have not heretofore participated because of the Government's reputation for complex paper processes and slow payment.

[2]The *Federal Register*, Vol. 56, No. 3, 4 January 1991, pg. 376.

TABLE 3-3

LARGE-DOLLAR ORDERS BY MAJOR SUPPLY CENTER – FY89

Buying activity	Total large-dollar actions	IDC delivery orders	BOA orders	Federal Supply Schedule orders	Orders as a percent of actions
Army Materiel Command					
Aviation Systems Command	2,685	104	938	1	38.8
Communications and Electronics Command	3,427	771	39	95	26.4
Missile Command	2,946	724	140	42	55.3
Armament, Munitions and Chemical Command	1,972	29	173	1	10.3
Tank-Automotive Command	2,651	65	60	59	6.9
Troop Support Command	594	226	2	9	39.9
Air Force Logistics Command					
Ogden Air Logistics Center (ALC)	3,982	826	369	175	34.4
Oklahoma City Logistics Center	5,971	673	1,480	104	37.8
Sacramento ALC	2,912	1,049	425	149	55.7
San Antonio ALC	6,488	1,433	1,373	186	46.1
Warner Robins ALC	4,753	537	754	126	29.8
Defense Logistics Agency					
Defense Construction Supply Center	4,003	493	521	20	25.8
Defense Electronics Supply Center	2,239	325	196	21	24.2
Defense General Supply Center	3,505	386	80	186	18.6
Defense Industrial Supply Center	2,171	282	417	5	32.4
Defense Personnel Support Center	9,280	3,950	16	8	42.8
Naval Supply Systems Command					
Aviation Supply Office	6,151	62	3,077	0	51.0
Ships Parts Control Center	4,940	179	1,292	107	31.9

Source: Federal Prime Contract Awards – 1989, Eagle Eye Publishers, Inc., Arlington, Va

As shown in Table 3-4, not only is the use of DOs increasing but so is the number of DOs for which the IDC was established under full and open competition. Although the available data only reflect purchases greater than $25,000, we believe use of small-dollar delivery orders is also increasing.

TABLE 3-4

COMPETITIVE DELIVERY ORDERS – ALL DoD

(Number of actions)

	FY86	FY87	FY88	FY89	FY90
Post-CICA DOs	54,048	70,615	76,156	79,589	88,974
Full-and-open competition DOs	28,310	43,077	47,788	51,584	56,995
Percentage	52.4	61.0	62.8	64.8	64.1

Source: Department of Defense Prime Contract Awards, Report P03, for FY86, FY87, FY88, FY89, and FY90

If DoD could combine its increased use of competitive DOs with electronic processing of orders, invoices, and payments, it will have a major opportunity to lower costs through competitive and administrative efficiencies. We believe that DoD should consider the use of DOs against competitively established IDCs as the primary opportunity to pursue EDI.

Competitive large-purchase EDI opportunities are limited when compared with those for small purchases. Small-purchase procedures (FAR Part 13) are more discretionary in that they permit oral (telephonic) RFQs and telecommunicated purchase orders that have been broadened to include electronic RFQs and purchase orders. Large-purchase EDI solicitations are more limited because sealed-bid and competitive-proposal regulatory requirements assume they will be promulgated as paper documents, sent through the U.S. mail, and available for full and open competition. If the regulatory changes discussed in Chapter 4 and Appendix B are accepted or deviations are granted for large-purchase electronic commerce, the Government would have to overcome the current technological limitations in electronically transmitting large solicitations or receiving bids and proposals. We analyzed supply items bought competitively at one representative supply center and found that the Government could issue electronic solicitations for many items that do

not require transmission of technical data. Those items are coded with AMSCs indicating technical data are probably available to prospective offerors because of the nature of the item. Our case for selecting electronic solicitation opportunities based on AMSCs is presented in Appendix C.

CHAPTER 4

ELECTRONIC SOLICITATIONS AND COMPETITIVE PROCEDURES

Federal Government procurement laws and regulations generally require full and open competition for all procurements greater than $25,000. The current competitive process uses elaborate rules and procedures to manage solicitation mailing lists; solicitation issuance; and the receipt, handling, and evaluation of bids or proposals. Those rules and procedures have been promulgated under the assumption that documents and files are prepared on paper. Technology is challenging that assumption and, as we show in this chapter, it needs to be recognized in procurement regulations.

The Government has many opportunities to conduct competitive procurements electronically. One of the most appealing is small-purchase competition under FAR Part 13, *Small Purchases and Other Simplified Purchase Procedures.* For those competitions, less formal procedures have long been used, procedures such as telephone solicitations and telecommunicated purchase orders.[1] More important, small-purchase competition requirements are considerably less restrictive than large-purchase requirements. Specifically, purchases of $2,500 or less can be made without competition,[2] and purchases between $2,501 and $24,999 can be made after soliciting a reasonable number of sources[3] rather than after the full and open competition required of large procurements ($25,000 and over). FAR Part 13 also gives contracting officers and activities much greater discretion in how they conduct business than do the procedures described in FAR Part 14, *Sealed Bidding*, and FAR Part 15, *Contracting by Negotiation.* In a previous Logistics Management Institute (LMI) report, we recommended regulatory changes to small-purchase procedures to recognize telecommunications and computer technologies.[4] Additional FAR changes

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[1]FAR 13.107 and FAR 13.506, respectively.

[2]FAR 13.106(a).

[3]FAR 13.106(b).

[4]LMI Report PL904R1, *Electronic Data Interchange in Procurement*, Daniel J. Drake, John A. Ciucci, and Ben Milbrandt, April 1990.

specifically directed at sealed bids are given in Appendix B. This chapter provides analysis and support of our recommended regulatory changes.

COMPETITION AND SOLICITATION REQUIREMENTS

In 1984, the CICA fundamentally changed Federal Government procurement by requiring full and open competition and removing the preference for a formally advertised bidding system. As stated in FAR 6.003, *Definitions*, " 'full and open competition' means that all responsible sources are permitted to compete."

The primary means for achieving full and open competition are two types of solicitations, IFBs and RFPs. They describe the Government's requirements and state how the competitive process will be conducted. The criteria for selecting sealed bidding (IFBs) versus competitive proposals (RFPs) are stated at FAR 6.401, *Sealed Bidding and Competitive Proposals*, as follows:

> (a) *Sealed bids*. . . . Contracting officer shall solicit sealed bids if –
>
> (1) Time permits the solicitation, submission, and evaluation of sealed bids;
>
> (2) The award *will be made* on the basis of price and other price-related factors;
>
> (3) It is not necessary to conduct discussions with the responding offerors about their bids; and
>
> (4) There is a reasonable expectation of receiving more than one sealed bid.
>
> (b) *Competitive proposals*. . . .
>
> (1) Contracting officers may request competitive proposals if sealed bids are not appropriate under paragraph (a) above.
>
> (2) Because of differences in areas such as law, regulations, and business practices, it is generally necessary to conduct discussions with offerors relative to proposed contracts to be made and performed outside the United States, its possessions, or Puerto Rico. Competitive proposals will therefore be used for these contracts unless discussions are not required and the use of sealed bids is otherwise appropriate. . . .

The choice between IFB and RFP turns on the complexity of the procurement's technical, manufacturing, and cost details and, consequently, the need for discussions with prospective contractors to determine their understanding of, and capabilities to meet, the requirements. Therefore, the IFB method is limited to requirements that are so well defined that the buyers or the prospective bidders have no doubt about

what is required. Generally, IFBs are used for items whose technical details are clear, that need no discussion, and that can be easily priced. When technical and cost complexities necessitate discussions, if not negotiations, with prospective contractors, the RFP should be used rather than the IFB. In general, however, RFPs contain more complex requirements and solicit more complex responses than IFBs.

The distinction between IFBs and RFPs and the need for discussions relative to the degree of technical and cost uncertainty is a critical issue in the application of EDI to procurement. Commercial purchasing has EDI experience with items that can be precisely described and priced: commercial items, cataloged spare parts, and recurring production materials. Private companies have used EDI because of the structured nature of its transaction sets in which the information transmitted is detailed business data precisely identifying the item required and specifying when and where it is to be delivered. In summary, commercial EDI applications most closely approximate the type of descriptions and details found in the Government's IFB procedures. However, since many Government large purchases, especially those for complex items, cannot be easily described by part number or stock number, prospective offerors must be provided with text and illustrations in the form of item specifications, manufacturing drawings, and statements of work. Each of those documents is so large it does not easily lend itself to EDI transmission or, more important, to analysis by computer-aided contracting systems. When an EDI-transmitted purchase order contains the precise part number, quantity, and delivery details, computers can make predetermined, programmed decisions on meeting the requirement. With textual documents, humans must analyze solicitation or proposal details before making a decision. Technology may eventually provide machine-based analysis of text, but it cannot do so yet.

Invitations for bids, the solicitation method most conducive to EDI, is used infrequently, and that limits the opportunities to use EDI. Table 4-1 shows some statistics on new work contract actions reported through the *Individual Contract Action Report* (DD Form 350) for FY86 through FY90.[5] Table 4-1 shows that IFBs constitute only 11.3 percent of new contract actions while RFPs constitute more than 35 percent. Also, many noncompetitive actions are the result of RFPs used to state

[5]New work statistics exclude contract modifications and delivery orders.

the requirement and contract terms to the sole-source contractor. These statistics indicate that DoD's primary large-purchase solicitation document is the RFP.

TABLE 4-1

NEW WORK CONTRACT ACTIONS

(FY86 – FY90)

Statistic	FY86	FY87	FY88	FY89	FY90	Total	Percent
Sealed bids (IFBs)	11,155	9,024	7,384	10,501	11,928	49,992	11.3
Competitive proposals (RFPs)	33,313	35,023	31,243	28,907	28,670	157,156	35.4
Combination	230	280	236	222	189	1,157	<.1
Other competitive	30,295	30,687	28,599	21,199	18,040	128,943	29.0
Noncompetitive	19,056	22,212	21,176	20,570	23,995	107,009	24.1
Total	94,049	97,226	88,638	81,399	82,822	444,257	100.0[a]

Source: Department of Defense Prime Contract Awards, Table 14, "Actions and Percent of DoD Prime Contract Awards by Solicitation Action," FY86 – FY89.

Note: Only actions awarded since enactment of CICA are shown.

[a] Data rounded.

The Government's use of EDI for large-dollar-value competitive procurements faces several formidable obstacles. First, the IFB is used relatively rarely for such procurements, which is unfortunate since it is well structured for EDI. It usually describes the requirement in precise details (e.g., part number, specification, and drawing number), and the response to the IFB is very straightforward – the bid price. Such simple, precise information can be transmitted with relative ease through existing EDI transactions and networks.[6] Second, the most popular solicitation method, the RFP, tends to use text and graphics to describe more complex items, and because of the complexity and volume, neither text nor graphics is well suited for EDI transmission. Finally, policy requires that when a Government agency uses the competitive proposal solicitation method, it must hold discussions with each offeror (unless an award is made without discussion to the lowest priced

[6]ANSI X12 840 transaction – *Request for Quotation* – contains a data element "Purchase Order Type Code" that provides a "BD" code to signify bids as opposed to quotes.

offeror). Such a requirement does not apply to sealed bids and obviously complicates any EDI application to RFP solicitations.

These impediments, however, do not preclude EDI's use for RFPs. Some RFPs might be well suited for EDI transactions if the items they seek are described by part numbers or service task numbers and do not contain large amounts of text or graphics. Furthermore, the problems of large RFPs and the need for discussions can be resolved. As discussed in Appendix D, the Accredited Standards Committee (ASC) X12 841 *Specification/Technical Information* transaction set is an interim means of transmitting text and graphics. One interim solution would simply provide large data files to prospective offerors on magnetic or optical media. Another long-term solution would place EDI transactions within an E-mail envelope so large files can be more easily moved through interconnected messaging networks. We believe a combination of ANSI X12 EDI and X.400 E-mail would permit exchanging business documents, allow discussions about the documents, and if necessary enable retransmission of revised or confirming documents.[7]

PUBLICIZING CONTRACT ACTIONS

To comply with statutory competition requirements, contracting officers are required to publicize contracting actions. The 41 United States Code 416(a)(1)(B) states that

> . . . an executive agency intending to solicit bids or proposals for a contract for property or services shall post, for a period of not less than ten days, in a public place at the contracting office issuing the solicitation a notice of solicitation described in subsection (f) –
>
> (i) in the case of an executive agency other than the Department of Defense, if the contract is for a price expected to exceed $10,000, but not to exceed $25,000; and
>
> (ii) in the case of the Department of Defense, if the contract is for a price expected to exceed $5,000, but not to exceed $25,000; . . . .

[7]X.400 E-mail is an international standard of the Consultative Committee on International Telephony and Telegraphy. The X.400 version designed for EDI/E-mail integration and file transfers is X.435. See "The Benefits of X.400 for EDI Users," *EDI Forum: The Journal of Electronic Data Interchange*, Vol. 4, 1991 Issue, No. 1, pg. 126, and Appendix D of this report.

FAR 5.002, *Policy*, states:

> Contracting officers shall publicize contract actions in order to –
>
> (a) Increase competition;
>
> (b) Broaden industry participation in meeting Government requirements; and
>
> (c) Assist small business concerns, small disadvantaged business concerns, and labor surplus area concerns in obtaining contracts and subcontracts. . . .

These requirements are met by publishing proposed contract actions in the *Commerce Business Daily* or by posting a notice of the solicitation in a public place at the contracting office. Additionally, contracting opportunities are publicized through the following means delineated in FAR 5.101(b), *Methods of Disseminating Information*:

> (1) Preparing periodic handouts listing proposed contracts, and displaying them as in 5.101(a)(2).
>
> (2) Assisting local trade associations in disseminating information to their members.
>
> (3) Making brief announcements of proposed contracts to newspapers, trade journals, magazines, or other mass communication media for publication without cost to the Government.
>
> (4) Placing paid advertisements in newspapers or other communications media, . . .

Note that FAR 5.101(b) does not mention electronic dissemination of contracting opportunities although electronic solicitation boards are currently being used to post such opportunities.[8] Some organizations no longer post solicitation notices on a bulletin board. Instead, they place solicitations on an electronic network so anyone with a computer terminal and telephone modem can remotely access them. They also make a computer terminal in the contracting office's reception area available to parties who wish to access the electronic solicitation board. Additionally, the receptionist or small-business specialist is prepared to provide assistance for querying electronic solicitation board information. The FAR needs to be revised to

[8]For the most recent example, see *Contract Management*, March 1991, Vol. 31, Issue No. 3, pg. 4, "Electronic Bid Board," by Robert D. Larson. Also, Defense Communications Agency's Defense Commercial Communications Office, Scott Air Force Base, Ill., operates a competitive large-purchase electronic bid board called "Inquire/Quote/Order."

recognize current electronic solicitation board initiatives that publicize proposed contracts. A revision to FAR 5.101 is recommended in Appendix B.

SOLICITATION AVAILABILITY

The FAR stipulates how solicitations are to be made available to interested parties:

> **5.102 Availability of solicitations.**
>
> (a) The contracting officer shall –
>
> (1) Maintain a reasonable number of copies of solicitations publicized in the CBD, including specifications and other pertinent information (upon request, potential sources not initially solicited shall be mailed or provided copies of solicitations, if available);
>
> (2) Provide copies of a limited solicitation to firms requesting copies that were not initially solicited, but only after advising the requester of the determination to limit the solicitation to a specified firm or firms as authorized under Part 6;
>
> (3) Provide copies on a "first-come-first-served" basis, for pickup at the contracting office, to publishers, trade associations, information services, and other members of the public having a legitimate interest . . . ; and
>
> (4) In addition to the methods of disseminating proposed contract information in 5.101(a) and (b), provide upon request to small business concerns, as required by 15 U.S.C. 637(b) –
>
> (i) A copy of the solicitation and specifications;
>
> (ii) The name and telephone number of an employee of the contracting office to answer questions on the solicitation; and
>
> (iii) Adequate citations to each applicable major Federal law or agency rule with which small business concerns must comply in performing the contract.
>
> (5) Retain a copy of the solicitation and other documents for review by and duplication for those requesting copies after the initial number of copies is exhausted.
>
> (6) Agencies may require payment of a fee, not exceeding the actual cost of duplication, for a copy of the solicitation documents. . . .

That FAR section assumes the use of paper solicitations. It is very costly for contracting activities to print "reasonable" numbers of solicitations only to have merely a few copies requested. It is also expensive and time consuming to print too few solicitations and have to reprint and mail additional copies merely to extend the

bid or proposal receipt date to accommodate additional bidders or offerors. Such delays extend procurement administrative leadtime, which drives the inventory model calculations of safety stocks, thereby adding to overall costs.

The paper-based solicitation process has alternatives. An interested party could electronically request solicitations or access an electronic solicitation file. The FAR needs to be revised to recognize electronic solicitations and modern dissemination methods. We recommend revised FAR language in Appendix B.

SOLICITATION MAILING LISTS

Although in the FAR 6.003, full and open competition is defined as permitting "all responsible sources . . . to compete," administrative considerations have limited the number of firms solicited and therefore the number that can fully compete. The administrative burden of a paper-based solicitation system precludes soliciting all responsible sources. Because of the excessive duplication and postal costs required to make solicitations and bid sets (including aperture cards) available to all responsible sources, the FAR permits contracting activities to rotate their solicitation mailing lists. Rotation limits the number of solicitations to a portion of any list deemed to be excessively long. However, beyond the costs of distributing solicitations, the Government also incurs further costs for evaluating the bids or proposals received as a result of the solicitation. If solicitations are provided to large numbers of interested parties, the Government can expect a correspondingly large number of bids or proposals. In a paper-based system, someone has to open, analyze, and record every response. Those actions can be too expensive when weighed against the incremental benefit of each additional bid received.

In FAR 14.205, *Solicitation Mailing Lists*, the use of solicitation mailing lists is authorized to identify all firms capable of filling the requirements. Standard Form (SF) 129, *Solicitation Mailing List Application*, is used for obtaining information from applicants so they can be added to the appropriate list. Under FAR 14.205-4, when mailing lists become excessively long, the Government may use a system of rotation whereby solicitations are issued to the previously successful bidder, the prospective suppliers who were added to the solicitation mailing list since the last solicitation, and suppliers on that segment of the list selected for the specific purchase. Rotation is necessary because it is too costly for the Government to prepare and mail

solicitations to all interested parties when a smaller number will provide adequate competition.

Another method for reducing the administrative burden of mailing complete bid sets is to have the contracting officer issue presolicitation notices to firms on the bidders mailing list. Only if the firm indicates an interest in the acquisition is a complete bid set mailed. That approach is primarily used when large numbers of aperture cards or drawing sets add significantly to the cost of the solicitation process.

The paper-based solicitation mailing list system is plagued with many problems. First, it is expensive for the Government to establish these lists. Clerks must extract information from the SF 129 and enter it onto what is normally an automated mailing list. Second, the Government must constantly update the list to remove unresponsive, suspended, and debarred firms. Third, some of the firms selected to receive the solicitation do not provide the required item or service and are on the list because the information on the SF 129 is not sufficiently specific or detailed about a prospective bidder's interests. When a requirement arises, its supply or service code is used to select the group of firms to be solicited. Requirements and capabilities may not match since the Government does not know the firm's detailed capabilities and the firm does not know precisely what the Government wants.

Electronic commerce technologies can dramatically reduce the administrative burden of preparing and distributing solicitations while improving the timeliness, completeness, and efficiency of issuing the solicitations. Instead of having to print a "sufficient number" of solicitation bid sets for a planned acquisition, the Government could make an electronic document available on an electronic solicitation board or through an EDI/E-mail network to all interested parties. No longer would the Government have to guess how many solicitations to print; no longer would more solicitations have to be printed when demand exceeds supply; and no longer would excess solicitations have to be discarded when the demand was less than expected. The procuring agency could avoid the costs required to establish and maintain a mailing list, print the solicitation, and mail the solicitation. Most important, however, the buying office would not have to extend bid opening and thereby extend procurement administrative leadtime with its negative effect on inventory and safety levels. Also, no longer would solicitations be sent to uninterested firms. Only firms that request the solicitation would receive it.

Several alternative means are possible for improving solicitation information dissemination:

- The Government could use the current paper *Commerce Business Daily* through which interested parties could read synopses of the solicitation and, if interested, could order a hard-copy solicitation using a digital telephone to respond to computerized questions for account number, solicitation number, etc.[9]

- The Government could use the *Commerce Business Daily* as an electronic bulletin board on which interested parties could read synopses of the solicitation and, if interested, could enter an electronic order for a hard-copy (including magnetic/optical media) version of the entire solicitation.[10]

- The Government could use the *Commerce Business Daily* as an electronic bulletin board on which interested parties could read synopses of the solicitation and, if interested, could access the appropriate electronic file on which the entire solicitation is available and download it to their local system.

- The Government could establish a solicitation mailing list that accepts electronic SF 129 applications and electronically passes EDI solicitations to the prospective bidders' electronic addresses. All enrolled bidders would receive an EDI copy of the solicitation; however, rotation of bidders' mailing lists might continue if telecommunications costs were prohibitive.

- The Government could provide electronic solicitations to third-party telecommunications network providers who would forward the solicitation to their customers based on preselected product/service interest profiles.

Solicitation distribution alternatives that direct solicitations to specific bidders must have access to electronic mailing addresses (network and mailbox). One major problem has been the development of an electronic directory service standard known as X.500 and agreement on a name to code/mailbox system. X.500 directory standards are being developed to function with X.400 E-mail, but the telecommunications industry must agree on a mailbox code system.

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[9]Naval Supply Systems Command plans such a system called Solicitation Package Automation (SPA) to limit printing of solicitations to order demand while billing prospective offerors for the solicitation via a 1-900 telephone number.

[10]Supply and Services Canada, the central procuring agency for the Canadian Federal Government, has developed such a system, the Procurement Opportunities Board, for all solicitations greater than $25,000.

MASTER SOLICITATIONS

One method that could be used to minimize the data transmitted with electronic solicitations is the master solicitation. FAR Part 14 provides the following:

> **14.203-3 Master solicitation.**
>
> (a) *Definition.* "Master solicitation," as used in this subsection, means a document containing special clauses and provisions that have been identified as essential for the acquisition of a specific type of supply or service that is acquired repetitively.
>
> (b) *Use.* The master solicitation is provided to potential sources who are requested to retain it for continued and repetitive use. Individual solicitations shall reference the date of the current master solicitation and any changes thereto. Copies of the master solicitation shall be made available on request. Cognizant contract administration activities shall be provided a current copy of the master solicitation. . . .

The EDI trading partner agreement used by a contracting activity could also provide the prospective contractor with a hard-copy master solicitation. The various solicitation EDI transactions will require a means for referencing not only the current trading partner agreement but also the current master solicitation. Changes since issuance of the master solicitation can be referenced in the EDI solicitation transaction. Major changes, however, will eventually require issuance of a revised master solicitation. The master solicitation and EDI trading partner agreement could be updated annually.

SOLICITATION ISSUANCE

In FAR 4.203, the regulation assumes paper documents are used when it authorizes mailing or delivery of solicitations to prospective bidders. We believe that electronic solicitations can be mailed or delivered through other media and that the FAR should be revised to accommodate such a technological capability. We recommend appropriate changes to the FAR in Appendix B.

SOLICITATION MODIFICATION

In FAR 14.208, the regulation authorizes amendments to the IFB when changes are made in the quantity, specification, delivery schedules, opening dates, etc., or when a defective or ambiguous IFB must be corrected. Paper amendments are made through issuance of an SF 30, *Amendment of Solicitation/Modification of Contract.* In

Appendix B, we recommend changes to the FAR to recognize EDI amendments to solicitations.

In fact, electronic transactions or messages are faster and more reliable than the mails. For example, EDI's ability to send transactions and obtain electronic acknowledgement of their receipt could help eliminate one of competitive procurement's more vexing problems. When solicitation amendments are issued, the buyer must rely on the mail and the mail room to get the SF 30 to the prospective offerors. When the bid or offer is submitted, it must reference the solicitation and all its amendments. The amendments often get misplaced. Under sealed bid procedures, a bid that does not acknowledge receipt of a substantive amendment can be considered nonresponsive and rejected. Under competitive proposal procedures, the missing amendment could be resolved through discussions but the proposal might be found inadequate because the preparer did not have the information contained in the missing amendment. If buyers could be assured that amendments are received and understood, fewer problem bids and offers would occur and competition would be increased.

Through EDI, the offeror can generate two types of acknowledgements back to the buyer – a system acknowledgement that says the transaction was received and a functional acknowledgement that says the information was received and is understood. EDI could eliminate the confusion caused by nonreceipt of solicitations and their amendments. If the automated system indicates that a prospective bidder did not receive an electronic amendment, the Government could automatically retransmit it or the buyer could inquire about it.

ELECTRONIC BID BOX

All bids received before bid opening must remain unopened and secured in a locked bid box or safe in compliance with FAR 14.401. With EDI, no hard-copy bids have to be secured, but EDI bids can be opened in the sense they can be read or viewed. The need for security of the competition-sensitive information remains, but the form of the security changes.

The electronic equivalent of the locked bid box is needed to ensure that the bid price itself is secure and that the identity and number of bids received is protected. The secure electronic bid box should receive EDI bids from the telecommunications

network and keep them unopened until bid-opening time. Only at the precise moment of bid opening can the bids be viewed or displayed.

The development of a secure electronic bid box and the perception that it is secure is critical to the success of EDI application to competitive procurement.[11] If such a box cannot be created, bidders will be reluctant to submit their bids. GSA's Federal Supply Service experience in the late 1980s with an EDI bidding system showed that if office furniture manufacturers could not be assured their bids were protected, they simply would not submit EDI bids.

Commercial examples of secure electronic bid boxes are rare since few firms have sealed bidding requirements. However, many public utility companies use sealed bidding procedures to comply with procurement standards imposed by state public utility commissions. Although those utilities do not follow the sealed bidding strictures of FAR Part 14, their bids are similar in that they are sealed, secured, and remain unopened until a predetermined time. At least one utility has developed EDI purchasing applications including an electronic bid box that meets these requirements.[12]

BID CANCELLATION BEFORE OPENING

In FAR 14.209, the Government is permitted to cancel an IFB before sealed bids are opened. It must also prepare a notice of cancellation and send it to all bidders to whom invitations were issued. An EDI cancellation transaction is required to provide the same notification. Also, automated contracting system developers need to program their systems to purge already received bids from the electronic bid box maintained for the canceled solicitation. Since the bid does not physically exist in the same manner as a sealed bid envelope, it is imperative that the electronic equivalent of the bid box be erased and the electronic bid not compromised.

In Appendix B, we present recommended changes to FAR 14.209 to recognize EDI methods.

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[11]In the Lawrence Livermore National Laboratories Intelligent Gateway Processor initiative, plans call for a trusted mailbox capability in which sensitive transactions could be secured until the bid opening time.

[12]Georgia Power Company small business EDI presentation, Data Interchange Standards Association/ASC X12 Conference, Washington, D.C., December 1989.

REJECTED BIDS

According to FAR 14.404-3, the contracting officer must notify each bidder when all bids have been rejected. In an EDI environment, the automated contracting system should provide the capability to generate and transmit such a notice automatically. Development of an EDI transaction is not required for this notification since an acknowledgement transaction could be revised to signify bid rejection.

MISTAKE IN BIDS/OFFERS

If the contractor appears to have made a mistake in a bid, the contracting officer is required to request a verification of the bid from the bidder. In an EDI environment, the automated contracting system should provide the means for generating and transmitting such a notice automatically. EDI transactions need to be developed for requesting bid mistake verification and for the contractor's response. An E-mail message could perform the same function.

CLARIFICATIONS, DISCUSSIONS, AND NEGOTIATIONS

In FAR 15.6, the Government recognizes communications to clarify irregularities or apparent mistakes. FAR 15.610 requires contracting officers to conduct written or oral discourse with all responsible offerors who submit proposals within the competitive range. In practice, discussions are often held over the telephone even though regulations do not mention the telephone. Regulations on written discourse do not mention E-mail, which is an analog of the telephone.

Electronic mail could perform many of the written communication functions required in FAR Parts 14 and 15. For example, considerable opportunities are available to send messages from the contracting officer to clarify alleged mistakes and the offeror's response to those allegations. Specifically, FAR 15.607 says the following:

> (c) When award without discussion is contemplated, the contracting officer shall comply with the following procedure:
>
> (1) If a mistake in a proposal is suspected, the contracting officer shall advise the offeror (pointing out the suspected mistake or otherwise identifying the area of the proposal where the suspected mistake is) and request verification. If the offeror verifies its proposal, award may be made.

(2) If an offeror alleges a mistake in its proposal, the contracting officer shall advise the offeror that it may withdraw the proposal or seek correction in accordance with subparagraph (3) below.

(3) If an offeror requests permission to correct a mistake in its proposal, the agency head (or a designee not below the level of chief of the contracting office) may make a written determination permitting the correction; *provided*, that (i) both the existence of the mistake and the proposal actually intended are established by clear and convincing evidence from the solicitation and the proposal and (ii) legal review is obtained before making the determination.

(4) If the determination under subparagraph (3) above cannot be made, and the contracting officer still contemplates award without discussion, the offeror shall be given a final opportunity to withdraw or to verify its proposal.

(5) Verification, withdrawal, or correction under subparagraphs (1) through (4) above is not considered discussion within the meaning of 15.610. If, however, correction of a mistake requires reference to documents, worksheets, or other data outside the solicitation and proposal in order to establish the existence of the mistake, the proposal intended, or both, the mistake may be corrected only through discussions under 15.610.

The contracting officer can "advise" the offeror through an E-mail message, and the offeror can in turn verify the proposal, allege a mistake, or request permission to correct a mistake in its proposal through E-mail messages. A well-designed electronic messaging system would restrict access to messages pertaining to competition-sensitive matters, require electronic authentication of all critical messages, and archive every transaction and message.

Another means for conducting discussions and negotiations is through two-way video conferencing. Video technology quality is improving and the cost is decreasing considerably. Video communications capability is now available between microcomputer workstations. Eventually, such technology will be commonplace, and video communications will be established over networks to trading partners.

BID/OFFER TRANSACTIONS

We recommend that no sealed bid or competitive proposal procedures be eliminated merely to accommodate EDI. Both EDI and a hard-copy process require the same functions to conduct a competition. The only difference is that with EDI, information is no longer exchanged through paper documents but rather electronically.

In the commercial purchasing world, EDI has generally not been used in competitions in which formal procedures are followed to correct mistakes, to reject bids, etc. Evidence that EDI has not been used in such competitions is seen in the fact that only one competition transaction set – the ANSI X12 840 *Request For Quotation* – has been developed. To conduct Government procurement, a whole series of capabilities are needed to perform the procedures required by the FAR. Entirely new transaction sets do not have to be developed in all cases, but as a minimum, the ANSI X12 840 *Request for Quotation* transaction set and ANSI X12 843 *Response to Request for Quotation* transaction set must provide for

- Request for verification of mistake in bid
- Verification of mistake in bid
- Request for bid mistake correction
- Withdrawal of bid notification
- Late bid notification
- Rejection of bid notification
- Modification of bid
- Bid extension request
- No bid or bid declining
- Response to bid extension request
- Request for best and final offer (BAFO)
- BAFO submission
- Qualification of bid by specific limits
- Competitive range notification
- Notifications to unsuccessful offerors
- Notification to successful offeror
- Postponement of bid opening notification
- Minor informalities or irregularities in bids

- Cancellation of IFB
- Notice of intent to negotiate.

We believe separate, dedicated RFP and proposal transactions need to be developed. This need is especially evident when Government-unique proposal requirements are listed. Proposals in response to Government RFPs require not only text describing the proposed approach but also, for example, cost details, small business plans, Government property lists, logistics plans, and representations and certifications.

REPRESENTATION AND CERTIFICATION REQUIREMENTS

In *Uniform Contract Format*, Section K of hard-copy IFB and RFP solicitations, representations, certifications, and other information, requirements are presented, and they must be completed and signed by each prospective contractor and returned with the bid or proposal. Each solicitation and the responding bid or proposal usually contains individual representations and certifications. Those representations and certifications have to be prepared with the appropriate space allotted for entry of the requested information and for signatures.

Development of proposed ASC X12 Transaction Set 838, *Trading Partner Profile*, has been offered as a means for obtaining identification information (e.g., name, address, corporate affiliation, and tax identification number of the prospective contractor) and acceptance of representation and certifications. A more recent idea is to remove representations and certifications capability from the trading partner profile and establish a dedicated transaction set for Government contracting. The proposed transaction set is yet unnumbered but would be called *Government Representations and Certifications*. Such information can be provided by referencing solicitation provision numbers in a predefined data segment of the transaction set and entering a code to signify the proposer's certification. An authenticated electronic signature can be obtained to confirm the selected certifications. This approach requires development of application programs in the contractor's bid and proposal preparation system to signify acceptance of individual representations and certifications. We believe an interim approach is possible, one that uses a variation of the annual representations and certifications, until the proposed *Government Representations and Certifications* transaction set is developed, approved, and implemented. Another alternative is to create a dedicated data segment for representations and certifications within RFP and proposal transaction sets.

FAR 14.213 authorizes submission of representations and certifications on an annual basis as an alternative to the submission of representations and certifications with each solicitation. We recommend that to minimize data transmission, hard-copy representations and certifications be obtained on an annual basis when the EDI trading partner agreement is established or renewed. Under this approach, bidders or offerors will cite the annual representations and certifications by reference and identify any exceptions or changes in the appropriate solicitation provision at FAR 52.214-30, *Annual Representations and Certifications – Sealed Bidding*, or FAR 52.215-35, *Annual Representations and Certifications – Negotiations*, in an EDI transaction set. We further recommend that these reaffirmations of the annual representations and certifications be electronically signed and authenticated to ensure they are legally enforceable.

Another approach is to create master representations and certifications in electronic form and post them on an electronic bulletin board for any prospective contractor to view. When submitting an offer, the contractor would include an EDI transaction that references the master representations and certifications, provides all required data, and includes an authenticated electronic signature.

COMMERCIAL PURCHASING RELEVANCE

Although commercial purchasing offices are experienced with EDI and have proven the effectiveness of electronic purchasing, that experience may not be completely relevant to Government procurement. Commercial purchasing offices are not necessarily concerned with full and open competition or ensuring small business opportunities; Government purchasing offices are required to be concerned. Commercial buyers can base an EDI relationship with a supplier on factors not considered by Government buyers. For example, business data exchanges facilitate development of closer business ties between buyer and seller. These long-term, mutually beneficial relationships that are part of just-in-time inventory concepts are now common in the automobile industry. It is not an adversarial relationship; it is a partnership. Long-term teamwork and reliability are critical; price is secondary. On the other hand, Government buyers are directed to focus on the best deal for the current procurement action.

What is relevant is how commercial purchasing offices demonstrate the capabilities to use EDI and E-mail to conduct business precisely and promptly. They

demonstrate those capabilities particularly when a business relationship has been established. Long-term master purchasing agreements or requirements contracts with prices predetermined through negotiation or competitive bidding permit electronic relationships to be established for placing orders, acknowledging orders, invoicing, posting shipping notices, updating catalog prices, assessing inventory status, and many other transactions. Some firms have developed EDI mechanisms to solicit quotes and even bids from suppliers. Unlike their Government counterparts, however, commercial buyers need only obtain adequate competition if any at all, not necessarily full and open competition.

We are aware of two examples of commercial applications that approach Federal Government competition requirements. First, Georgia Power, a state-government-regulated public utility, has established a competitive EDI bidding system that provides open competition within its utility service area. Although the EDI bidding system is open to all businesses, it prefers to use small and minority contractors.[13] The second example is defense prime contractors who have established EDI and E-mail networks with suppliers for ongoing production programs such as aircraft, electronic components, and jet engines. Reportedly, those networks have been found in compliance with the subcontracting competition requirements of FAR Part 42 during periodic contractor purchasing system reviews.

[13]Ibid.

CHAPTER 5

LEGAL CONSIDERATIONS

Exploiting EDI's potential depends upon our ability to electronically authenticate that the information transmitted is valid and the person approving the action is authorized. In this chapter, we describe the conditions under which electronic signature authentication is legally acceptable.

ELECTRONIC SIGNATURE AUTHENTICATION

Today's prevailing legal view on electronic signatures is that at least two significant requirements must be met before the signature can be legally binding: electronic signatures must be adopted as a person's "unique code signature," and appropriate security measures must exist to ensure that the "code" cannot be accessed by unauthorized individuals.

Since EDI in Government contracting is still in its infancy insofar as legal precedents are concerned, we examined electronic signatures as used in certification of public vouchers. Certification of public vouchers is a statutory requirement under 31 United States Code, Section 3325 and provides that a disbursing official may disburse public money only as provided by a voucher *certified* by the head of the executive agency concerned or by a person to whom such authority has been properly delegated.

With respect to this requirement, the Comptroller General has stated

> The essence of a certification is the assurance or representation that, "some act has or has not been done, or some event occurred, or some legal formality has been complied with."...
>
> ... The signature serves as a guarantee of the authenticity of the certificate....

Does that statement mean that the signature must be handwritten on paper as has been done in the past? Not necessarily. In a formal opinion (B-104590, 12 September 1951), the Comptroller General said

> While certifications of the nature here involved ordinarily are accomplished by handwritten signatures, the obvious burden that would

> result by requiring same affords a basis for the adoption of an alternate means, if otherwise proper. In this regard, the Courts have held that a signature consists of the writing of one's name and of the intention that it authenticate the instrument, and, therefore, any symbol adopted as one's signature when affixed with his knowledge and consent is a *binding and legal signature*. [Emphasis supplied] The use of a stamp has been held by the courts to be a good signature when the statute requires an instrument to be signed.[1]

Of course, the General Accounting Office (GAO) has long recognized facsimile signatures and machine-made signatures as legally binding. The GAO concluded in B-216035, 20 September 1984 "... an appropriate symbol may be adopted by a certifying officer as his signature for the purpose of voucher certification."

These GAO opinions agree with the authoritative *Black's Law Dictionary*, which defines signature and specifies that

> ... A "signature" may be written by hand, printed, stamped, typewritten, engraved, photographed, or cut from one instrument and attached to another, and a signature lithographed on an instrument by a party is sufficient for the purpose of signing it; it being immaterial with what kind of instrument a signature is made. . . . And whatever mark, symbol, or device one may choose to employ as representative of himself is sufficient. . . .

In any event, courts uniformly hold that with respect to legally binding signature, the operative condition is the "intent" to use a marking or other discrete authentication code as one's signature rather than the marking or code itself. To establish binding legality, we must show that the maker of the "symbolic signature" intended to be legally bound. That requirement can be easily dealt with in the basic agreement or trading partner agreement.

For an electronic signature to gain enforceable stature, it must be afforded a measure of security sufficient to ensure that unauthorized individuals do not have access to the code itself. If the size or importance of the transaction warrants, public key encryption could be used to add the ultimate security in protecting a symbolic signature. Public key encryption using digitized signatures has made huge advances

[1]Citing 13 Comp. Dec. 749; 1 Op. Atty. Gen. 670.

in recent years.[2] Previously, it was expensive and did not provide efficient security features that satisfactorily ensured authentication, nonrepudiation, authorization, and provability. These shortcomings tended to limit the use of EDI to well-known trading partners using secure channels.

Today, however, public key encryption is available to provide the needed security. Among its features are the following:

- It requires no ongoing business relationship between the sender and receiver.
- It allows provable responsibility for authorizations.
- It allows signatures and authorizations to be proved at a future time in the event of a dispute.
- It allows and equally secures cosignatures and countersignatures.
- It forecloses frivolous repudiation.
- It eliminates the onerous burden of administering secret address keys.
- It is compatible with X.509 standards (in electronic directory services).

In May 1990, the National Archives and Records Administration (NARA) – the Government agency responsible for establishing records management standards – issued final regulations on electronic record management. Those regulations contain further guidance on security features to ensure the admissibility of electronic documentation in Courts and Boards.

> Electronic records may be admitted in evidence to Federal courts for use in court proceedings [Federal Rules of Evidence 803(8)] if trustworthiness is established by thoroughly documenting the recordkeeping system's operation and the controls imposed upon it. Agencies should implement the following procedures to enhance the legal admissibility of electronic records.
>
> (a) Document that similar kinds of records generated and stored electronically are created by the same processes each time and have a standardized retrieval approach.

[2]Public key encryption has been around for about 10 years and has made huge technological advances so that it now provides good computer security. It is based upon algorithms that separate the capacities for encryption and decryption, allowing for a public key and a private key. The public key is disclosed in a directory (avoiding the expensive method of secret keys that required couriers, etc.) and the private key is held in confidence by each user. Public key encryption has advanced computer security, making networks with thousands of subscribers secure and making it possible for a user to "sign" a purely digital message providing exact authentication.

(b) Substantiate that security procedures prevent unauthorized addition, modification or deletion of a record and ensure system protection against such problems as power interruptions.

(c) Identify the electronic media on which records are stored throughout their life cycle, the maximum time span that records remain on each storage medium, and the NARA-approved disposition of all records.

(d) Coordinate all of the above with legal counsel and senior IRM [information resource management] and records management staff.

The obvious advantage of the new regulation is that it affords electronic records maintenance a legitimacy heretofore missing. These procedures are certainly instructive from the standpoint of the kinds of practical measures acceptable to the appropriate rule-making officials in establishing reasonable security procedures to ensure the admissibility of records (and signatures) in the Federal court system.

An example of how the GSA accommodated the requirement for a "writing" and "signature" to the new electronic commerce technology may prove instructive. Without the necessity of a statutory change, GSA accommodated EDI in the transportation industry by amending its regulation 41 Code of Federal Regulations (CFR) Part 101-41 by redefining the traditional definition of "writing" and "signature" requirements for bills of lading, audit, and payment. The pertinent part of the regulation now reads as follows:

(c) Electronic data interchange (EDI) means the electronic exchange of transportation information in lieu of a paper document. Also "signature," in this case of EDI transmission, means a discrete authenticating code intended to bind the parties to the terms and conditions of a contract.

The signature serves the same purpose in Government contracting: it should be given equal dignity in contract formation whether by usage or formal change in the regulations.

ELECTRONIC REPRESENTATIONS AND CERTIFICATIONS

Government contracting and private contracting are largely based on the same set of common law principles, i.e., offer and acceptance, consideration, "meeting of the minds," etc. They differ significantly, however, when it comes to the many representations and certifications that contracting officers are required to obtain from contractors and potential contractors, whether for supplies, services, or construction, etc. More than 100 different forms and representations are required by

the acquisition regulations although any given purchase entails only a fraction of them.

Representations and certifications have proved rather cumbersome in the past, and their administration is quite labor-intensive. They generate a good deal of litigation in Government acquisition. Efforts over the past years to streamline their execution and administration have largely been futile. We believe electronic commerce can remove much of the labor intensity and problems associated with administering a manual system, i.e., timeliness, mail delays, and errors.

A review of decisions by the GAO and the Armed Services Board of Contract Appeals shows that the signature itself is seldom an issue; issues are such things as dates, timeliness, errors, and authority to authenticate the document. In addition, some representations and certifications are required by statute, some others are required by the FAR, and still others are required by the various echelons within the Federal Departments; thus, the difficulty in administration is apparent. In some cases, civil and criminal sanctions may be imposed for false representation or certification, and that could involve the Department of Justice or the U.S. Attorney. Any radical departure from the traditional hard-copy approach involving these representations and certifications should be taken only after receiving the Department of Justice's advice if not its coordination. In most cases, false representations and certifications evoke only contractual and administrative sanctions. In those instances, agencies outside DoD (the Department of Justice, for example) do not become involved in enforcement and outside coordination would not be essential to change the practice.

A major reason for using paper-based representations and certifications is the perception of the ease in gathering and presenting proof if a contract dispute arises. After all, who will question the document they have manually signed and its contents? Still, such documents are often questioned.

We view representations and certifications as terms and conditions that are offered and accepted as any other provision in a contract. They are not negotiable as many other terms and conditions but rather are imposed either by law or regulation in Government contracts. What remains to be done is to remove the difficulty from their execution and administration.

The offeror executes many representations and certifications simply by checking a box on the bid or proposal. Those documents should be among the first converted to electronic commerce format. Some representations and certifications, such as the certificate of current cost and pricing data, need to be tailored to contractor, subcontractor, and vendor data. Others, such as the certificate required by the Procurement Integrity Act, may entail so much disclosure that electronic transmission is not practicable. All, however, require a "signature" by an appropriate company official. With the growing use and acceptance of electronic signatures in Government, the company officer's signature requirement should create little problem.

We see a number of possibilities for using electronic commerce techniques to meet the statutory and regulatory requirements in obtaining, administering, and enforcing representations and certifications. The FAR was changed as follows in November 1989 to provide for annual representations and certifications (see 54 Fed. Reg. 48978, 28 November 1989):

> (a) Submission of offeror representations and certifications on an annual basis, as an alternative to submission in each solicitation, may be authorized by agencies subject to the requirements of this section. The decision to use annual representations and certifications shall be made in accordance with agency procedures.
>
> (b) In accordance with agency procedures, each contracting office utilizing annual representations and certifications shall establish procedures and assign responsibilities for centrally requesting, receiving, storing, verifying and updating offeror's annual submissions. Generally, the representations and certifications shall be effective for a period of 1 year from date of signature.
>
> (c) The contracting officer shall not include in individual solicitations the full text of provisions that are contained in the annual representations and certifications.

That change in the FAR is a step in the right direction. An annual procedure has been used for years in requiring bid bonds in construction contracting, and most problems encountered with bid bonds were not usually encountered by those filing annually. Even though the annual procedure is a good move, it is still labor-intensive.

An alternate procedure is to incorporate the representations and certifications by reference. That procedure also raises problems, however, since many contracts are modified frequently. With our approach, using either a master agreement or a

trading partner agreement, the opportunity to update the representations and certifications would be less cumbersome. Then too, not all representations and certifications are a matter of public knowledge since they all do not become operative by virtue of the public rule-making regime.

In a mature electronic commerce environment, the optimal procedure would be to take advantage of the full potential of EDI. Standard codes representing the various certifications would be published in the *Federal Register* or in the FAR. The codes could then simply be referenced in the trailer or other appropriate part of the ANSI X12 transaction set and automatically incorporated by reference. Further, DoD could begin an effort with the ANSI ASC X12 to develop appropriate transaction sets for certificates and representations.

The concept of incorporation by reference or even incorporation by operation of law should invoke little legal resistance, at least with those representations and certifications that are required by statute and/or the FAR and that, therefore, become public knowledge. All Government contracts must contain the required provisions. Even, in a rare instance, when such a representation or certification is omitted, in all likelihood if a dispute arises over its absence, it will be deemed to have been incorporated by operation of law. [See G. L. Christian and Assoc. versus United States, 312 7 2d 418 (Ct. CL. 1963).]

The ideal way to administer representations and certifications is to use public key encryption. Available software will permit their transmission even in those cases in which file text is necessary. Contractors may forward them in the clear with an encrypted signature or may encrypt both the certificate language and the signature. Software is also available to assure the receiver that the contents of the transmission have not been tampered with, that the authentication is valid, and that the person signing electronically has the proper authorization.

FREEDOM OF INFORMATION ACT (80 STAT 250)

The DoD implements the Freedom of Information Act (FOIA) at 32 CFR 286. In a recent amendment, the CFR contain, for the first time, guidance on releasing electronic data to the public under the FOIA, 55 Fed. Reg. 53104, 26 December 1990. One can expect requests from the public and, indeed, competitors for electronic files that may contain "company-confidential" or proprietary information entitled to protection from disclosure. When processing such requests, contracting personnel

should be mindful of this requirement and at the same time aware of the need not to disclose procurement information that might jeopardize the successful completion of a given procurement.

In its policy, DoD states that it will conduct its activities in an open manner and provide the public with a maximum amount of accurate and timely information on its activities, consistent always with the legitimate interests of the American people. When someone requests a DoD record within the rules established by proper authority in DoD, that record will not be withheld unless it is exempt from mandatory public disclosure under the FOIA.

A DoD record is defined as follows:

> The products of data compilation, such as all books, papers, maps, and photographs, machine readable materials or other documentary materials, regardless of physical form or characteristics, made or received by an agency . . . in connection with the transaction of public business and in DoD's possession and control at the time the FOIA request is made.

When reaching a decision or releasing information to the public, DoD officials must first determine whether the requested information is a record (under the law) and second whether it is valuable property. These determinations are especially important when the request entails intellectual property.

Administrative tools – computer software, source code, object code, listings of source and object code, etc. – are used to create, store, and retrieve records and are not normally considered to be records. However, they do include the underlying data that are processed and produced by the software. In some instances, those data may be actually stored with the software.

Sometimes computer software may, by necessity, be treated as an agency record and processed under the FOIA procedures. Such treatment should occur rather infrequently; one instance could be a situation in which the data are embedded in the software and cannot be extracted without the software. In other instances, the software may reveal information about DoD policies, procedures, or decisions, such as a computer model that forecasts budgetary outlays. In those instances, the request must be considered on a case-by-case basis. The record custodian will invariably need the assistance of both legal counsel and the information specialist in the decision to release or withhold such information from the public.

If information is stored in a computer and no computer program is available to retrieve it, the custodian is not obliged to develop a program to fulfill the request.

The record custodian must also be sensitive to a request for electronically stored data that would reveal company-confidential information. That sensitivity is especially necessary since the reinstatement of the Procurement Integrity Act. In every instance in which any doubt exists, the record custodian must obtain legal advice before releasing the information.

MATERIAL INSPECTION AND RECEIVING REPORT (DD FORM 250)

If DoD is to realize the full benefits of employing electronic commerce in procurement, all related activities must be organized into a unified system. The inspection and receiving function (reported on DD Form 250) is an important component of such a system.

Historical problems with administering the DD Form 250 should not be minimized. Inspection and acceptance is important to any successful acquisition and is the basis of most acquisition litigation. The legal problems associated with inspection and acceptance will not be eliminated by automating the DD Form 250 function. However, the ability of electronic commerce to make available crucial information in real time to the appropriate parties should eliminate most delays and misunderstandings that tend to spawn litigation.

The inspection and receiving function does not contain the statutory regimen that we see in contract formation and funds transfer. Therefore, most restrictions are regulatory and can readily be modified when necessary to accommodate automation.

Historically, the signature plays an important role in the DD Form 250 process since it provides in hard copy a manual signature that is very difficult to disavow at a later date should the authenticating official subsequently decide the goods or services do not conform to the contract requirement. Electronic commerce and the proposed DD Form 250 transaction set can provide the kind of evidence of inspection that the hard-copy manual signature provided. The critical action is to maintain a record or audit trail for a court or Board of Contract Appeals.

The evidence that is necessary is a record of the following:

- When acceptance occurred
- When goods were shipped
- When goods/services were received
- Whether the goods/services conform to those specified in the contract and if they do not, whether discrepancies were annotated
- Traceability.

Electronic data interchange transaction sets can meet these rather fundamental requirements with little or no problem. EDI also provides real-time information to the appropriate parties automatically. Furthermore, an EDI-based system would permit the quality assurance representative (QAR) to "sign-off" and distribute the information at the same time rather than having the contractor distribute the information after the QAR signed off. This procedure should give the Government a better measure of control and should speed the distribution, reduce errors, and minimize misunderstandings.

We see no reason for a manual hard-copy signature for the material inspection and receiving report function. Of course, the appropriate levels of security and authentication must be met. Rarely, if ever, should the need arise to employ data encryption security measures in executing the function with the appropriate ANSI X12 transaction set.

CHAPTER 6

SMALL BUSINESS CONSIDERATIONS

Electronic concepts applied to Government procurement cannot exactly imitate commercial purchasing's EDI practices since the competition and small business requirements are different. In this chapter, we address several issues critical to electronic commerce success with small business.

Public law and acquisition regulations impose stringent requirements on Government contracting officials to ensure opportunities for small business. For example, 10 United States Code 2301 states, "It is the policy of Congress that a fair proportion of the purchases and contracts entered into under this chapter be placed with small business concerns." FAR 19.202-3 requires, "The contracting officer shall, to the extent practicable, encourage maximum participation by small business concerns, small disadvantaged business concerns, and woman-owned business concerns in acquisitions."

The common misperception is that electronic commerce will erect technological and cost barriers to small business. We believe that computer hardware, software, and telecommunications requirements will not be impediments to small business participation in Government contracting. On the contrary, electronic commerce concepts will enable small businesses to compete on a more equal basis with their larger competitors. Access to heretofore poorly disseminated information will generate greater opportunities. The electronic commerce small business procurement strategy must ensure access to solicitation information and participation in the procurement process.

TECHNOLOGY DEVELOPMENT AND DIFFUSION

The development and adoption of information technology and its impact on business is not new. The invention of paper and writing instruments expedited commerce. The availability of paper and the ability to write allowed governments to require that important agreements be documented to be enforceable. The availability of reliable postal service permitted long-distance communication and fostered commerce. The telegraph and the telephone also fostered commerce.

Although at first telephones must have been intimidating, they are now absolutely essential tools in business.

Other relative new information devices such as facsimile machines and PCs are in similar processes of diffusion. Devices that a few years ago were uncommon are now taken for granted. We believe that EDI and other components of electronic commerce will also eventually become commonplace.

Some electronic commerce technologies such as electronic bulletin boards and EDI are moderately disseminated throughout the business world and newer technologies such as OSI and CALS are now emerging. Small businesses have already accepted some of these technologies, and they will accept others as more are offered and become more and more affordable.

Selection among the various electronic commerce technologies requires an understanding of how technology becomes available and is disseminated throughout society, Government, and business. Older technologies for conveying or storing information, such as telephones and floppy disks, are currently better received than EDI and optical discs. A technology's acceptance and availability are important from the perspective of communication formats and appropriate hardware and software and also because small businesses must understand and be able to use such technologies to remain competitive. The selection of an electronic commerce technology and the timing of its application is critically dependent on how diffuse each electronic commerce technology is among small business firms. While facsimile machines have existed for many years, they only became commonplace when the International Standards Organization Group III facsimile standards were developed and accepted. Today, most small businesses own or have access to a facsimile machine. The same widespread acceptance of electronic commerce technology will be required.

Some industries have seen the benefits of EDI and use it widely. Among firms in the food, transportation, automotive equipment, and apparel industries, EDI is the primary means for communicating repetitive business information. However, its application to defense contracting is limited to several DLA initiatives and to aerospace subcontracting.

Access to solicitation information is crucial to small businesses. To require telecommunication media that are neither known nor understood by small businesses

effectively denies them contracting opportunities. Properly applied and disseminated, electronic commerce technology should increase small business contracting opportunities.

As efforts to promote electronic commerce concepts in defense contracting continue, the Federal Government must address the following issues:

- Mandatory use of electronic interfaces by small businesses
- EDI software availability to small businesses
- Small business electronic commerce outreach and training.

MANDATORY ELECTRONIC INTERFACE REQUIREMENTS

One approach to electronic commerce implementation is to require any contractor who wishes to do business with DoD to maintain an electronic interface with a Government office. Some solicitations now require such interfaces for requisitioning or accounting for Government-furnished material/property.

When the Government first required computer communications with contractors, its buying activities furnished the contractors with equipment, installed the communications line, and provided the training. It provided such assistance because small businesses might not have the required computer equipment and might be intimidated by the requirement.

Times have changed. Computer equipment and telecommunications interface standards are readily available and understood by virtually all prospective contractors. Government buying activities now require contractors to furnish equipment and services to maintain electronic interfaces. The following is a solicitation provision used by the Air Force Logistics Command's San Antonio Air Logistics Center (SA-ALC) to establish necessary telecommunications link for the electronic transmission of requisitions:

> **CONTRACTOR COMMUNICATIONS NETWORK (CCN):**
>
> a. The Contractor shall furnish the following equipment and/or services at his own expense to facilitate reporting of G009 format transactions and submission of GFM requisitions. This equipment and/or services are such as would be included in the contractor's inventory of equipment and/or services required in the normal course of doing business.
>
> 1. An IBM PC, XT, AT, PS/2 computer or IBM compatible computer. The contractor's system shall have as a minimum 256K RAM,

hard disk drive, DOS V2.0 or higher and have an IBM Basic, G-W Basic or BASICA interpreter V2.0 or higher. Tandon PC systems shall run with GW-BASICA interpreter 3.2.

2. A Hayes or Hayes compatible 1200 baud autodial modem, an asynchronous communications port and the modem shall be connected via direct dial telephone circuit. Also, a DAMES Bysynchronous System which shall have the AST-3780 RJE package from AST Research, Inc. except in the case of an IBM PS/2 system which requires the AST-3780A RJE package. The package also contains 2780/3780 communications software that DAMES uses. Additional capability for 2400 baud requires an external Bell 201-C or compatible modem and for 4800 baud an external Bell 208-B or compatible modem is required.

Procurement personnel at SA-ALC report that such a solicitation requirement raises few objections from prospective offerors; it is considered a normal means of conducting business. Today, a requirement to establish and maintain an electronic interface is not seen as a barrier to doing business with the Government since the appropriate computer equipment, software, and telecommunications standards are readily available.

We recommend that the electronic commerce Executive Agent establish a plan to better diffuse EDI technology, train small businesses, and set a conversion schedule with target date for required EDI usage. The electronic commerce Executive Agent should establish a policy that by the date to be determined by the Executive Agent, all business purchase orders, invoices, remittance advice, etc., will be conducted electronically in selected industry or commodity groups. For example, the grocery/commissary industry, because of its extensive automation and wide use of EDI, would be a prime candidate.[1] Such policy decisions and industry schedules should be announced in the *Federal Register*. Those announcements will permit public rule-making requirements of the Paperwork Reduction Act and Regulatory Flexibility Act to be applied. Once they are successfully applied, businesses cannot say that they were not informed nor given an opportunity to comment.

Under the Executive Agent's proposed policy, all interested parties will be put on notice and their comments obtained to better develop electronic commerce policy and implementation schedule. The interested parties are not so much the individual small businesses but rather their representative trade associations. Prior to the final

[1]The grocery industry generally adheres to the Uniform Communications Standard (UCS). UCS is in the process of adapting ANSI X12 syntax to the specific needs of the retail industry. The UCS implementation of ANSI X12 is called VICS (Voluntary Interindustry Communications Standard).

date, a transition from paper to facsimile to EDI/E-mail might be permitted to gradually increase small business knowledge of, and experience with, those electronic commerce technologies. Eventually, on the scheduled date, electronic commerce techniques will be used to solicit business in the selected industry. At some time, firms will have to adopt electronic commerce or not be considered for Government contracts.

EDI BUSINESS APPLICATION SOFTWARE AVAILABILITY

The availability of EDI-capable business application software to small businesses is a major concern. Although large firms have the resources to develop their own automated systems or to custom design packaged automated business applications that include EDI translation software, the typical small business firm has neither the knowledge nor the resources to install EDI in their systems. Although value-added networks can provide the additional service of translating EDI transactions, application software developers need to provide EDI capability as an added feature of the business application software typically used by small contractors. For example, some developers of commercial purchasing software cite electronic interface capabilities in their literature and some even provide seminars on "EDI For Purchasing."

However, we found that EDI business software is not similarly available to small or moderate-size defense contractors. Typically, the basic business software package acquired by a small business is an automated accounting package. Advances in computer technology and software are such that developers can now provide automated applications that process accounts payable/accounts receivable, general ledger posting, payroll, job costing, time and billing, and purchasing transactions; and prepare financial statements. Integrated accounting procedures such as complicated inventory pricing and purchase commitments that are accumulated and accounted for by individual project cost and material management accounts are also now automated. Automated generation of printed orders, shipping reports, and invoices are provided.

We reviewed 38 automated accounting systems (12 bookkeeping systems and 26 integrated accounting systems) and found that few systems have EDI capabilities to either electronically receive purchase orders or electronically generate invoices.

Bookkeeping systems perform simple journalkeeping, posting data entry for accounts payable and accounts receivable and simple financial statements to the general ledger. Those systems can keep a set of books, print financial statements, and enter and track basic vendor and customer invoicing information. Some bookkeeping systems have limited integrated capabilities, i.e., inventory, payroll, purchase order. Bookkeeping systems are generally appropriate for businesses with annual revenues under $1 million.

Integrated systems tie all modules of the business system together. They can provide shared common files, complex billing procedures, fixed asset management, comprehensive inventory pricing, multidivisional budget and reporting requirements, and on-screen viewing of financial statements. For example, by sharing common files and records, an integrated system can take a contract order received from a client, enter the order within the system, assign a job order number, commit inventory or issue a purchase order cited to a project number, receive goods or product information, and invoice the client for services or goods rendered. Normally, only the larger accounting applications developers have the resources to develop, maintain, and continually enhance software with that range of capability. Integrated applications typically cost between $600 to $900 per module and between $5,000 to $20,000 per system.

None of the bookkeeping systems we reviewed had ANSI X12 EDI capability nor did any of the developers plan such an enhancement within the next 12 months. Only 3 of the 26 integrated systems provided a utility for EDI with choices of ANSI X12, Automotive Industry Action Group, Transportation Data Coordinating Committee, Uniform Communications Standard (UCS), Voluntary Interindustry Communications Standard (VICS), and Warehousing Information Network System standards. All three contracted with the same EDI translation utility developer. These three companies have accounting systems more closely related to commercial business than accounting systems required by firms who have specialized Government contractor needs, e.g., Defense Contract Audit Agency, Cost Accounting Standard Board, and Defense Contract Management Command requirements. Major end users of these three systems are reportedly national retailers who are in an industry that is highly automated with point-of-sales systems and quick-response EDI techniques.

All 26 integrated accounting systems can support small manufacturing businesses with job order accounting, and each system also contains a purchasing module. The integrated systems with EDI capability support ANSI X12 transaction sets, e.g., 840 – *Request For Quotation*, 850 – *Purchase Order*, 856 – *Ship Notice/Manifest*, and 861 – *Receiving Advice*.

Five of the 26 firms generate almost all their revenues from Federal Government contractors. None of their systems currently has an EDI capability. Integrated system developers have raised three principal issues to explain their reluctance to incorporate EDI capabilities in their systems:

- ANSI X12 standards are constantly changing and small software developers do not have the resources to keep abreast of those changes.
- Transaction standards are not available for Government standard forms. Specifically mentioned were the SF 1034 – *Public Voucher for Purchases and Services*, SF 26 – *Award/Contract*, and SF 33 – *Solicitation, Offer and Award*.
- Currently, and most likely for the next several years, the market will have no demand for conformity to ANSI X12 standards.

Initially, EDI will only be applied to large-volume relationships with fairly large businesses that can afford to install EDI translation software. As EDI becomes more sophisticated, more small firms will have neither the knowledge nor the experience to enable them to install a dedicated translator; the unfortunate circumstance is that neither will their application software vendor and developer.

The DoD Executive Agent for electronic commerce needs to conduct an outreach program for small businesses and their software vendors. If those software vendors understand the dimensions of the DoD electronic commerce market, they may through competitive forces provide EDI capability. If their reluctance persists, the Executive Agent for electronic commerce should consider establishing the market by issuing business application software development contracts that include EDI capabilities. Once developed, small businesses could obtain software as Government-furnished property under a Federal Supply Catalog requisition authorized by a blanket purchase agreement, IDC, or BOA that includes EDI provisions.

SMALL BUSINESS OUTREACH AND TRAINING

The DoD Executive Agent for electronic commerce should not attempt to train or outfit small businesses to perform electronic commerce since the marketplace is better equipped to supply hardware, software, and training. What the Executive Agent for electronic commerce should provide is standards and training documentation to SBA-sponsored SBDCs and DoD-sponsored PTAP centers. One SBDC or PTAP center could provide training material development for all other training sites.

More than 700 SBDCs and subcenters are dispersed throughout the United States. If small businesses need knowledge of electronic commerce to be included along with general business knowledge, the SBDCs are well placed and motivated to provide training. In a recent GAO study, approximately 20 percent of all SBDCs were oriented to Government procurement training.[2] Others provide general business training. PTAPs specialize in helping small businesses obtain DoD contracts.

Data from 1985 show computer usage by small business increases as the number of employees increases.[3] The fewer employees a firm has, the lower the reported use of computers. That statistic indicates the acceptance of computer technology may be closely related to company size and success. However, smaller small businesses will need extensive familiarization with PCs, application software, etc. The SBDC/PTAP centers providing procurement training are well positioned to additionally offer electronic commerce training and even computer access to those small firms who do not yet possess the necessary equipment and software.

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[2]U.S. GAO, *Small Business: Development Centers Meet Counseling Needs of Most Clients*, GAO/RCED-90-38BR, November 1989.

[3]*State of Small Business: A Report Of The President Transmitted To The Congress*, U.S. SBA, 1988, pg. 55.

GLOSSARY

AFSC	=	Air Force Systems Command
ALC	=	Air Logistics Center
AMSC	=	Acquisition Method Suffix Code
ANSI	=	American National Standards Institute
ASC	=	Accredited Standards Committee
ASD	=	Aeronautical Systems Division
BAFO	=	best and final offer
BOA	=	basic ordering agreement
CALS	=	Computer-aided Acquisition and Logistic Support
CFR	=	Code of Federal Regulations
CICA	=	Competition in Contracting Act
CIM	=	corporate information management
DFARS	=	DoD FAR Supplement
DLA	=	Defense Logistics Agency
DO	=	delivery order
DoD	=	Department of Defense
EASE	=	Electronically Assisted Solicitation Exchange
EDI	=	electronic data interchange
E-mail	=	electronic mail
FAR	=	Federal Acquisition Regulation
FOIA	=	Freedom of Information Act
GAO	=	General Accounting Office
GOSIP	=	Government Open Systems Interconnection Profile

GSA	=	General Services Administration
IDC	=	indefinite delivery-type contract
IFB	=	invitation for bid
LMI	=	Logistics Management Institute
NARA	=	The National Archives and Records Administration
OSI	=	Open Systems Interconnectivity
PC	=	personal computer
PTAP	=	Procurement Technical Assistance Program
QAR	=	quality assurance representative
RFP	=	request for proposals
RFQ	=	request for quotations
SA-ALC	=	San Antonio Air Logistics Center
SBA	=	Small Business Administration
SBDC	=	small business development center
SF	=	Standard Form
UCS	=	Uniform Communications Standard
VICS	=	Voluntary Interindustry Communications Standard

APPENDIX A

ELECTRONIC COMMERCE IMPLEMENTATION STRATEGY

To help overcome regulatory, procedural, and practical barriers to electronic commerce, we have developed an implementation strategy. We recommend a gradual approach to preparing contracting activities and contractors for electronic commerce by taking these steps:

- Establish and publish a transition schedule for converting DoD procurement to electronic commerce. The schedule should be developed by
  - Identifying electronic commerce opportunities by analyzing purchasing activity and contractor relationships and capabilities
  - Initially emphasizing small purchase and delivery order applications at those buying activities at which transaction volumes are highest [e.g., by establishing electronic data interchange (EDI) relationships between the major central supply contracting activities and their major trading partners]
  - Focusing EDI efforts on industries already using EDI in commercial purchasing or in defense subcontracting (e.g., commissary supplies, medical supplies, electronics, aerospace).
- Begin by using EDI for simple competitive supply procurements not requiring transmission of large technical data packages while delaying use of EDI for complex procurements until suitable transaction standards and telecommunications capacity are available.
- Initially use pre-established paper documents such as annual representations and certifications and master solicitations, that can be electronically referenced or reaffirmed in the electronic offer; later, master solicitations, master representations and certifications, and their amendments can be posted on electronic bulletin boards so all prospective offerors can acquire them and signify acceptance by an EDI transaction with an authenticated electronic signature.
- Support development of dedicated EDI transactions for representations and certifications, requests for proposals, and contract awards.
- Follow a mixed-media strategy that initially permits paper and electronic interfaces while moving buying activities and contractors toward exclusive use of electronic commerce on the basis of the Executive Agent's publicized

schedule. By directing electronic commerce implementation to those industries currently using EDI and focusing electronic commerce small business assistance and training on those few firms not using electronic commerce techniques, the transition to a paperless environment will be more rapid.

- Foster acceptance of electronic commerce technologies and concepts by using existing small business training and assistance programs to provide computer network access and educate small businesses.

- Conduct electronic commerce outreach programs for DoD buying activities and prospective trading partners and also for small business training providers, business application software developers, and telecommunication service providers.

APPENDIX B

RECOMMENDED FEDERAL ACQUISITION REGULATION CHANGES TO RECOGNIZE ELECTRONIC DATA INTERCHANGE

This appendix sets forth suggested modifications to the Federal Acquisition Regulation (FAR) to facilitate the use of electronic techniques for providing contracting opportunities, solicitation notices, and solicitations to interested parties and permitting them to submit bids. Please note that Appendix B of our previous report, PL904R1, *Electronic Data Interchange in Procurement*, April 1990, recommended regulatory changes to recognize electronic techniques for small purchases and orders.

1. Revise FAR Part 5, *Publicizing Contract Actions*, Subpart 5.1, *Dissemination of Information*, as follows:

5.101 Methods of disseminating information.

. . . . . .

(a) As required by the Small Business Act (15 U.S.C. 637(e)) and the Office of Federal Procurement Policy Act (41 U.S.C. 416), contracting officers shall disseminate information on proposed contract actions as follows:

. . . . . .

(2) For proposed contract actions expected to exceed $10,000 ($5,000 for Defense activities), but not expected to exceed $25,000, by displaying in a public place at the contracting office issuing the solicitation, an unclassified notice of the solicitation or a copy of the solicitation satisfying the requirements of 5.207(c) and (f). (Solicitation notices and solicitations displayed on electronic bulletin boards or in electronic data interchange systems meet this public display requirement if all interested parties are granted use of a computer terminal at the contracting office to access them.) Such information shall be

posted not later than the date the solicitation is issued and remain posted for at least 10 days regardless of the date of award. Such information shall remain posted until after offers have been opened.

. . . . . .

(b) In addition, one or more of the following methods may be used:

. . . . . .

(5) Posting notices of contracting opportunities and future requirements on electronic bulletin boards maintained by small business development centers, local chambers of commerce, or local economic opportunity agencies.

5.102 Availability of solicitations.

. . . . . .

(c) In addition to paragraph (a) above, the contracting officer may provide electronic copies of solicitations through electronic bulletin boards, electronic mail, and electronic data interchange.

2. Revise FAR Part 14, *Sealed Bidding*, Subpart 14.2, *Solicitation of Bids*, Subpart 14.3, *Submission of Bids*, and Subpart 14.4, *Opening of Bids and Award of Contract*, as follows:

A. Add the following new subsection:

14.202-8 Electronic data interchange bids.

Contracting officers may authorize electronic data interchange (EDI) bids in accordance with this section. EDI transactions shall be in accordance with 16.704.

B. Modify 14.203-1 as follows:

14.203-1 Mailing or delivery to prospective bidders.

Invitations for bids or presolicitation notices shall be mailed or delivered to prospective bidders as specified in 14.205, and shall be provided to

others in accordance with 5.102. Delivery of solicitations through EDI transactions is authorized and shall be in accordance with 16.704. When a contracting office is located in the United States, any solicitation sent to a prospective bidder located at a foreign address shall be sent by international air mail if security classification permits.

C. Modify the first sentence of 14.208 as follows:

14.208 Amendment of invitation for bids.

(a) If it becomes necessary to make changes in quantity, specifications, delivery schedules, opening dates, etc., or to correct a defective or ambiguous invitation, such changes shall be accomplished by amendment of the invitation for bids using Standard Form 30, Amendment of Solicitation/Modification of Contract, or by EDI transaction.

D. Add two sentences to 14.209 as follows:

14.209 Cancellation of invitations before opening.

. . . . . .

(b) When an invitation is canceled, bids that have been received shall be returned unopened to the bidders and a notice of cancellation shall be sent to all prospective bidders to whom invitations were issued. Upon cancellation of an EDI invitation for bids, an electronic transaction providing notification of the cancellation shall be transmitted to all prospective bidders to whom EDI invitations were issued. In this case, EDI bids received shall be purged from the electronic bidding system without being displayed, stored, or viewed.

. . . . . .

E. Add a paragraph to 14.213 as follows:

14.213 Annual submission of representations and certifications.

. . . . . .

(e) Annual representations and certifications may be used with EDI procurement methods to minimize the amount of data transmitted between the Government and offerors. Hard-copy representations and certifications may be requested and obtained in conjunction with the periodic establishment or renewal of the EDI Trading Partner Agreement (see 16.704). EDI bid transactions submitted should cite the current annual representations and certifications in the provision at 52.214-30, Annual Representations and Certifications – Sealed Bidding, and affirm their currency or state exceptions while using an authenticated electronic signature.

F. Modify the first sentence of 14.303 as follows:

14.303 Modification or withdrawal of bids.

(a) Bids may be modified or withdrawn by written, telegraphic, or electronic data interchange (EDI) notice received in the office designated in the invitation for bids not later than the exact time set for opening of bids. . . .

G. Add a new subparagraph and a new paragraph to 14.304-1 as follows:

14.304-1 General.

. . . . . .

(a) A late bid, modification of bid, or withdrawal of bid shall not be considered unless received before contract award, and either –

. . . . . .

(4) It was sent by EDI transaction and it is determined by the Government that the late receipt was due solely to mishandling by the Government after receipt at the Government installation.

. . . . . .

(f) The only acceptable evidence to establish the time of receipt of an EDI transaction in the Government electronic bid box is the

electronic time/date stamp programmed into the electronic bidding system's software.

H. Add a sentence to 14.304-2 as follows:

14.304-2 Notification to late bidders.

When a bid, modification of bid, or withdrawal of bid is received late and it is clear from available information that it cannot be considered, the contracting officer shall promptly notify the bidder accordingly. For EDI bids, such notification shall be made through an EDI transaction. . . .

I. Add a paragraph to 14.304-3 as follows:

14.304-3 Disposition of late submissions.

(a) Late bids, modification of bids, or withdrawal of bids that are not considered for award shall be held unopened, unless opened for identification, until after award and then retained with other unsuccessful bids. However, any bid bond or guarantee shall be returned.

(b) Late EDI submissions shall not be displayed, stored, or viewed. After award, the late submission shall be purged from the electronic bidding system and not retained.

J. Add a sentence at the end of 14.304-4 as follows:

14.304-4 Records.

. . . . . .

With respect to any EDI late bid, modification of bid, or withdrawal of bid, the electronic bid box transaction log indicating the date and hour of receipt shall be retained.

K. Modify 14.401 by adding a new paragraph as follows:

14.401 Receipt and safeguarding of bids.

(a) All bids (including modifications) received before the time set for the opening of bids shall be kept secure. Except as provided in

paragraphs (b) and (c) below, the bids shall remain unopened in a locked bid box or safe. . . .

. . . . . .

(c) When electronic data interchange (EDI) bids are authorized, they shall be received from the external telecommunications network and stored in an electronic bid box secure from all external and internal access. A time-release software program shall open the electronic bid box at the exact time and date set for bid opening stated in the solicitation. Automated buying programs may not access or analyze bids until electronic opening of the electronic bid box.

L. Modify 14.402 as follows:

14.402 Opening of bids.

14.402-1 Unclassified bids.

(a) Except as provided in paragraph (d) below, the bid opening officer shall decide when the time set for opening bids has arrived and shall inform those present of that decision. . . .

. . . . . .

(d) EDI bids shall be automatically opened upon time release of the electronic bid box. They may be individually viewed or displayed at computer terminals or in computerized buying systems, analyzed, and arrayed in a bid abstract immediately upon bid opening.

14.402-2 Classified bids.

. . . . . .

[add as the last sentence] Classified bids may use EDI techniques only when telecommunications and automated data processing equipment security adequate for the level of security classification is maintained.

14.402-3 Postponement of openings.

(a) A bid opening may be postponed even after the time scheduled for bid opening (but otherwise in accordance with 14.208) when –

(1) The contracting officer has reason to believe that the bids of an important segment of bidders have been delayed in the mails (or, in the case of EDI bids, the telecommunications system) for causes beyond their control and without their fault or negligence (e.g., flood, fire, accident, weather conditions, or strikes); or . . . .

. . . . . .

M. Modify 14.403 by adding a new paragraph as follows:

14.403 Recording of bids.

(a) Except as provided in paragraph (e) below, Standard Form 1409 . . . .

. . . . . .

(e) Automated buying programs, coupled with EDI bidding systems, may automatically analyze and array bids in a bid abstract that can be displayed at a computer video display terminal or printed as a paper document. Automated bid abstracts shall maintain the same data elements and functionality as the forms described in paragraph (a) above. Bid abstract certification may be accomplished through electronic signature means.

N. Modify 14.404-1(d) as follows:

14.404 Rejection of bids.

14.404-1 Cancellation of invitations after opening.

. . . . . .

(d) Should administrative difficulties be encountered after bid opening that may delay award beyond bidders' acceptance periods, the several lowest bidders whose bids have not expired (irrespective of

the acceptance period specified in the bid) should be requested, before expiration of their bids, to extend in writing – or, in the case of EDI bids, by means of an EDI transaction – the bid acceptance period (with consent of the sureties, if any) in order to avoid the need for resoliciting.

. . . . . .

O. Modify 14.406-2 and add a new paragraph as follows:

14.406-2 Apparent clerical mistakes.

. . . . . .

(b) Correction of paper bids shall be effected by attaching the verification to the original bid and a copy of the verification to the duplicate bid. Correction shall not be made on the face of the bid; however, it shall be reflected in the award document.

(c) Correction of EDI bids shall be effected by including in the solicitation file an electronic copy of the original bid, an electronic copy of the verification request, and an electronic copy of the bid verification. For audit trail purposes, time and date of transmission or receipt, as appropriate, shall be recorded in the electronic bid box transaction log for each electronic copy.

P. Add a new paragraph to 14.406-3 as follows:

14.406-3 Other mistakes disclosed before award.

. . . . . .

(j) Requests to correct bid mistakes, verify bids, or withdraw bids may, at the contracting officer's discretion, be made through EDI transactions or electronic messaging techniques. Electronic records of mistake determinations may be maintained in electronic files.

Q. Add a new sentence to 14.406-4(f) as follows:

14.406-4 Mistakes after award.

. . . . . .

(f) Each agency shall include in the contract file a record of (1) all determinations made in accordance with this 14.406-4, (2) the facts involved, and (3) the action taken in each case. Electronic records of mistake determinations may be maintained in electronic files.

R. Modify 14.407-1(c)(1) and (d)(1) as follows:

14.407 Award.

14.407-1 General.

. . . . . .

(c)(1) Award shall be made by mailing, sending by EDI transaction, or otherwise furnishing a properly executed award document to the successful bidder. . . .

. . . . . .

(d)(1) Award is generally made by using the Award portion of Standard Form (SF) 33, Solicitation, Offer and Award; by using SF 1447, Solicitation/Contract (see 53.214); or by transmitting the appropriate EDI contract award transaction. If an offer from an SF 33 leads to further changes, the resulting contract shall be prepared as a bilateral document on SF 26, Award/Contract. . . .

. . . . . .

3. Revise FAR Part 16, *Types of Contracts*, Subpart 16.7, *Agreements*, by adding a new section as follows:

16.704 Electronic data interchange (EDI) agreements.

(a) *Description.* An EDI trading partner agreement is a written instrument of understanding negotiated between a contracting

activity or contracting office and a contractor. Such an agreement, which is not a contract, shall specify –

(1) Acceptability of electronic documents in lieu of paper documents;

(2) Acceptability of electronic signatures in lieu of manually written signatures;

(3) The EDI implementation guide that applies to the transactions communicated;

(4) Each party's telecommunications networks mailbox addresses and routings;

(5) Telecommunications timing and cost responsibilities;

(6) Responsibilities as to transaction and system errors;

(7) Responsibilities and contingencies as to system failures;

(8) The types of transactions (e.g., bids, quotations, awards, orders, invoices) that may be transmitted; and

(9) Each party's electronic recordkeeping responsibilities.

(b) *Application.* An EDI trading partner agreement is used to define the conditions and responsibilities of contracting parties exchanging electronic transactions in lieu of paper documents. EDI concepts are most beneficial when large volumes of repetitive transactions (e.g., supply or service line items, invoices, or shipping notices) must be passed between Government and contractor automated systems.

(c) *Limitations.* An EDI trading partner agreement shall not –

(1) Cite appropriations or obligate funds;

(2) State or imply any agreement by the Government to place future contracts or orders with the contractor except when minimum order requirements are stated in indefinite-delivery contracts; or

(3) Be used in any manner to restrict competition.

(d) *Contractual instruments incorporating EDI trading partner agreements.* (1) The EDI trading partner agreement shall be incorporated in the following types of contractual instruments when electronic placement of orders is authorized:

(i) Indefinite-delivery contracts.

(ii) Federal Supply Schedule contracts.

(iii) Blanket purchase agreements.

(iv) Basic ordering agreements.

(2) An EDI trading partner agreement may be established as a separate agreement that permits electronic exchanges of EDI transactions.

(e) *Contract clause.* The contracting officer shall insert the clause at 52.216-____, EDI Trading Partner Agreement, in solicitations and contracts when use of electronic data interchange is contemplated.

4. Revise FAR Part 52, *Solicitation Provisions and Contract Clauses*, to recognize EDI invitations for bids and bids and to provide for an EDI trading partner agreement.

A. Revise paragraph (b) of the provision at 52.214-3, *Amendments to Invitations for Bids*, as follows:

. . . . . .

(b) Bidders shall acknowledge receipt of any amendments to this solicitation (1) by signing and returning the amendment, (2) by identifying the amendment number and date in the space provided for this purpose on the form for submitting a bid, (3) by letter or telegram, (4) by facsimile, if facsimile bids are authorized in the solicitation, or (5) by electronic data interchange (EDI) transaction, if EDI transactions are authorized in the solicitation. The Government must receive the acknowledgment by the time and at

the place (including an electronic mailbox address) specified for receipt of bids.

(End of provision)

B. Add a paragraph to the provision at 52.214-5, *Submission of Bids*, as follows:

. . . . . .

(d) Electronic data interchange (EDI) bids, modifications, or withdrawals will not be considered unless authorized by the solicitation.

(End of provision)

C. Revise the provision at 52.214-7, *Late Submissions, Modifications, and Withdrawals of Bids*, as follows:

. . . . . .

(a) (2) Was sent by mail or, if authorized by the solicitation, was sent by telegram, via facsimile, or via electronic data interchange (EDI), and it is determined by the Government that the late receipt was due solely to mishandling by the Government after receipt at the Government installation (or in the case of EDI, the Government's electronic mailbox that might reside on a third-party value added network (VAN) telecommunications service); or . . . .

. . . . . .

(g) Bids may be withdrawn by written notice or telegram (including mailgram) received at any time before the exact time set for receipt of bids. If the solicitation authorizes facsimile bids, bids may be withdrawn via facsimile received at any time before the exact time set for receipt of bids, subject to the conditions specified in the provision entitled "Facsimile Bids." If the solicitation authorizes EDI bids, bids may be withdrawn via EDI transaction received at any time before the exact time set for receipt of bids. A bid may be

withdrawn in person by a bidder or its authorized representative if, before the exact time set for receipt of bids, the identity of the person requesting withdrawal is established and the person signs receipt for the bid.

(End of provision)

D. Revise the provision at 52.214-9, *Failure to Submit Bid*, as follows:

Recipients of this solicitation not responding with a bid should not return this solicitation, unless it specifies otherwise. Instead, they should advise the issuing office by letter, postcard, or electronic data interchange (EDI) transaction, if the solicitation was issued via EDI, whether they want to receive future solicitations for similar requirements. . . .

. . . . . .

E. Revise paragraph (b) of the provision at 52.214-12, *Preparation of Bids*, as follows:

. . . . . .

(b) Each bidder shall furnish the information required by the solicitation.

(1) In the case of paper bid documents, the bidder shall sign the bid and print or type its name on the Schedule and each continuation sheet on which it makes an entry. Erasures or other changes must be initialed by the person signing the bid. Bids signed by an agent shall be accompanied by evidence of that agent's authority, unless that evidence has been previously furnished to the issuing office.

(2) In the case of electronic data interchange (EDI) bid transactions, the bidder shall electronically sign the bid and provide electronic authentication of the signature through public key encryption (PKE) techniques.

. . . . . .

F. Add the following new provision to 52.214:

52.214-____ Electronic Data Interchange (EDI) Bids.

ELECTRONIC DATA INTERCHANGE (EDI) BIDS (MMM 199X)

(a) "EDI bid," as used in this solicitation, means a bid, a modification of a bid, or a withdrawal of a bid that is transmitted to and received by the Government using electronic data interchange (EDI) transactions via electronic telecommunications.

(b) Bidders may submit EDI bids as responses to this solicitation. These responses must arrive at the place, and by the time, specified in the solicitation.

(c) EDI bids shall include a transaction that affirms acceptance of annual representations and certifications and provides information for individual representations and certifications required by this solicitation.

(d) Any individual EDI representations and certifications transaction and the affirmation of the annual representation and certification shall be electronically signed and authenticated.

(e) The bid document is a predefined electronic format in accordance with FAR 16.704, Electronic data interchange (EDI) agreements.

(End of provision)

G. Establish a new clause at 52.216-____ as follows:

52.216-____ EDI Trading Partner Agreement.

As prescribed in 16.704(e), insert the following clause in solicitations and contracts when use of electronic data interchange is contemplated:

EDI TRADING PARTNER AGREEMENT (MMM 199X)

If the Contractor executes the EDI trading partner agreement furnished in connection with this contract, the Contractor agrees to be bound by that agreement's terms and conditions governing any transactions with the

Government through electronic data interchange (EDI), in addition to the terms and conditions of this contract.

(End of clause)

APPENDIX C

ELECTRONIC SOLICITATION OPPORTUNITIES BASED ON ACQUISITION METHOD SUFFIX CODE

At San Antonio Air Logistics Center (SA-ALC) we interviewed engineering drawing repository personnel who described the average "bid set" as having 64 aperture cards. In electronic solicitations, 64 views of a set of parts would have to be electronically transmitted. Our calculations indicate one E-size engineering drawing would require 140 to 150 minutes of transmission time over a 19.2 Kilobit telephone line. Such transmission speeds are obviously unacceptable for the average bid set and for the average bidder, and high-speed telecommunications to all potential bidders is cost prohibitive.

We believe that those limitations would severely restrict the competitive potential of electronic data interchange (EDI). We recognize that EDI opportunities will still be available in sole-source contracting, but our research on what appear to be restrictions on EDI competitive procurements shows many competitive procurements do not provide prospective bidders or offerors with technical data bid sets, thereby avoiding the current transmission problem. By analyzing Acquisition Method Code (AMC) and Acquisition Method Suffix Code (AMSC) definitions in the DoD FAR [Federal Acquisition Regulation] Supplement (DFARS) No. 6, *DoD Spare Parts Breakout Program*, we believe supply items coded with the following AMSCs are possible competitive EDI candidates as either small or large purchases:

- AMSC B – Manufacturing Source Control

  A part with this code must be acquired from a manufacturing source(s) specified on a source control or selected item drawing as defined by the current version of DoD-STD-100. Suitable technical data, Government data rights, or manufacturing knowledge are not available to permit acquisition from other sources; furthermore, neither qualification testing of another part nor use of a second source part in the intended application is possible. Although, by DoD-STD-100 definition, altered and selected items must have an adequate technical data package, data review discloses that required data or data rights are not in Government possession and cannot be

economically obtained. If one source is available, AMCs 3, 4, or 5 are valid. If at least two sources exist, AMCs 1 or 2 are valid.[1]

- AMSC C – Engineering Source Approval

  A part with this code requires engineering source approval by the design control activity to maintain the quality of the part. Because of unique design capability, engineering skills, and manufacturing knowledge by the qualified source(s) the part must be acquired from the approved source(s). The approved source(s) retain data rights, manufacturing knowledge, or technical data that are not economically available to the Government, and such data or knowledge is essential to maintaining the quality of the part. An alternative source must qualify in accordance with the design control activity's procedures, as approved by the cognizant Government engineering activity. The qualification procedures must be approved by the Government engineering activity having jurisdiction over the part in the intended application. If one source is approved, AMCs 3, 4, or 5 are valid. If at least two sources are approved or if data are adequate for an alternative source to qualify in accordance with the design control activity's procedures, AMCs 1 or 2 are valid.

- AMSC K – Class 1 Forgings/Castings

  A part with this code must be produced from Class 1 castings and similar type forgings as approved (controlled) by procedures contained in the current version of MIL-STD-2175. If one source has such castings and cannot provide them to other sources, AMCs 3, 4, or 5 are valid. If at least two sources have such castings or they can be provided to other sources, AMCs 1 or 2 are valid.

- AMSC M – Master Tooling

  Manufacture of a part with this code requires use of master or coordinated tooling. If only one set of tooling exists and cannot be made available to another source for manufacture of this part, AMCs 3, 4, or 5 are valid. When the availability of existent or refurbishable tooling is available to two or more sources, then AMCs 1 or 2 are valid.

- AMSC P – Data Rights

  The rights to use the data needed to purchase a part with this code from additional source(s) are not owned by the Government and cannot be purchased, developed, or otherwise obtained. It is uneconomical to reverse engineer a part with this code. This code is used in situations in which the Government has the data but does not own the rights to the data. If only one

[1] DFARS No. 6, *DoD Spare Parts Breakout Program*, Section S6-201.2, "Acquisition Method Suffix Codes."

source has the rights or data to manufacture this item, AMCs 3, 4, or 5 are valid. If two or more sources have the rights or data to manufacture this item, AMCs 1 or 2 are valid.

- AMSC R – Data Rights Not Acquired

  The Government does not own the data or the rights to the data needed to purchase a part with this code from additional sources, and it is uneconomical to buy the data or rights to the data or to reverse engineer the part. This code is used because the Government did not initially purchase the data and/or rights. If only one source has the rights or data to manufacture this item, AMCs 3, 4, or 5 are valid. If two or more sources have the rights or data to manufacture this item, AMCs 1 or 2 are valid.

- AMSC T – Qualified Products List

  Acquisition of a part with this code is controlled by qualified products list (QPL) procedures. Competition for this part is limited to sources listed on the QPL or qualified for listing on it at the time of award (see FAR Part 9 and DFARS Part 209). AMCs 1 or 2 are valid.

- AMSC Z – Commercial Product

  A part with this code is a commercial, nondevelopmental, or off-the-shelf-item. Commercial item descriptions, commercial vendor catalog or price lists, or commercial manuals assigned a technical manual number apply. If one source is available, AMCs 3, 4, or 5 are valid. If at least two sources are available, AMCs 1 or 2 are valid.

We believe prospective contractors solicited for these AMSC items know the manufacturing requirements for them and do not need manufacturing drawings. They already have the necessary drawings, standards, and specifications to manufacture them. Interviews of SA-ALC contracting personnel validated our finding for AMSC C (Engineering Source Approval), T (Qualified Products List), and Z (Commercial Product). The other AMSCs should also be considered as EDI candidate items not requiring technical data bid sets.

As of June 1990, these EDI candidate items represent less than 20 percent of the 5 million items DoD manages as part of its supply system. Table C-1 breaks out candidate AMSCs by number of items.

At some activities, candidate AMSC items might represent a larger percentage of items actually procured. From the SA-ALC Director of Procurement and Manufacturing we obtained FY90 data on the number of items procured by AMC and

TABLE C-1

EDI CANDIDATE AMSC ITEMS
IN DoD SUPPLY SYSTEM

AMSC	Items
B	61,126
C	338,139
K	802
M	13,793
P	63,634
R	25,029
T	185,034
Z	7,130
Total	694,687

Source: Item Management Statistical Summary (IMSS)-11, dated June 1990, Defense Logistics Service Center, Battle Creek, MI.

AMSC. We are only concerned with competitive procurements because we assume that in almost all cases sole-source or follow-on selected-source buys do not require transmission of technical data. The exception is transmission of configuration change drawings, but such transmissions should be limited to a few replacement drawings.

Table C-2 displays SA-ALC's FY90 procurement history by AMC and AMSC. Competitive buys are shown under AMC 1 and 2 for items with AMSCs B, C, K, M, T, and Z; they totaled 1,341 procurement actions. All competitive procurements equaled 4,722 actions. Therefore, 28.5 percent of all competitive buys need not be provided a technical data package as part of the specific solicitation. Additionally, if the noncompetitive buys totaling 9,189 procurement actions are added to the candidate AMSC buys, 10,530 (out of 13,911) procurement actions or 80.2 percent appear not to require technical data in the solicitation.

Our assumption developed in this study is that the Government contracting officer does not need to transmit technical data. If that assumption is valid and if the data provided by SA-ALC are representative of a major DoD supply activity, we

TABLE C-2

FY90 SA-ALC PURCHASES BY AMSC/AMC CODES

(Number of buys/thousands of dollars)

AMSC		Acquisition method code					Total
		1	2	3	4	5	
A	Buys	33	71	833	33	20	990
	Value	$ 868	$ 2,994	$ 40,174	$ 660	$ 933	$ 45,629
B	Buys	98	126	419	24	0	667
	Value	$ 8,800	$ 6,440	$ 30,868	$ 225	0	$ 46,333
C	Buys	424	484	632	69	4	1,613
	Value	$ 68,193	$ 62,886	$ 89,787	$ 920	$ 3,016	$ 224,802
G	Buys	1,544	1,230	0	0	0	2,774
	Value	$ 49,198	$ 9,987	0	0	0	$ 59,185
H	Buys	122	361	2,547	896	184	4,110
	Value	$ 17,964	$ 50,917	$ 124,537	$ 19,972	$ 36,598	$ 249,988
K	Buys	6	19	0	0	0	25
	Value	$ 147	$ 139	0	0	0	$ 286
L	Buys	2	0	2,469	0	0	2,471
	Value	$ 5	0	$ 11,395	0	0	$ 11,400
M	Buys	4	5	51	0	0	60
	Value	$ 96	$ 2,174	$ 654	0	0	$ 2,924
P	Buys	1	8	59	0	0	68
	Value	$ 16	$ 374	$ 7,773	0	0	$ 8,163
Q	Buys	0	1	13	0	0	14
	Value	0	$ 19	$ 171	0	0	$ 190
R	Buys	1	3	29	1	0	34
	Value	$ 4	$ 85	$ 3,039	$ 2	0	$ 3,130
T	Buys	51	19	0	0	0	70
	Value	$ 6,757	$ 856	0	0	0	$ 7,613
U	Buys	0	4	128	279	210	621
	Value	0	$ 19	$ 435	$ 619	$ 491	$ 1,564
Y	Buys	0	0	4	0	0	4
	Value	0	00	$ 1,192	0	0	$ 1,192
Z	Buys	30	75	205	78	2	390
	Value	$ 1,055	$ 748	$ 2,684	$ 491	$ 38	$ 5,016
Total	Buys	2,316	2,406	7,389	1,380	420	13,911
	Value	$ 153,103	$ 137,638	$ 312,709	$ 22,889	$ 41,076	$ 667,415

Source: SA-ALC J018 data.

believe that EDI could be used for the majority of supply line item procurements without the slow and costly transmission of technical data.

APPENDIX D

ELECTRONIC CONTRACTING SYSTEMS, FORMATS, AND TECHNOLOGIES

AUTOMATED CONTRACTING SYSTEMS

Over the past 30 years, the Military Services and Defense agencies have gradually applied computer technology to procurement and contract administration functions. Today's typical automated contracting system uses computer-based software to process and print hard-copy solicitation and contract documents. Generally, such a system collects information needed to complete standard procurement forms, select contract clauses appropriate for the type of procurement action, and print paper documents on standard or departmental forms with special provisions, statements of work, specifications, and data requirement lists attached. A generalized automated paper-based contract writing system is illustrated in Figure D-1. It produces hard-copy paper procurement documents from a print file and, in some systems, provides a data file to create a contract data base for tracking and query purposes.

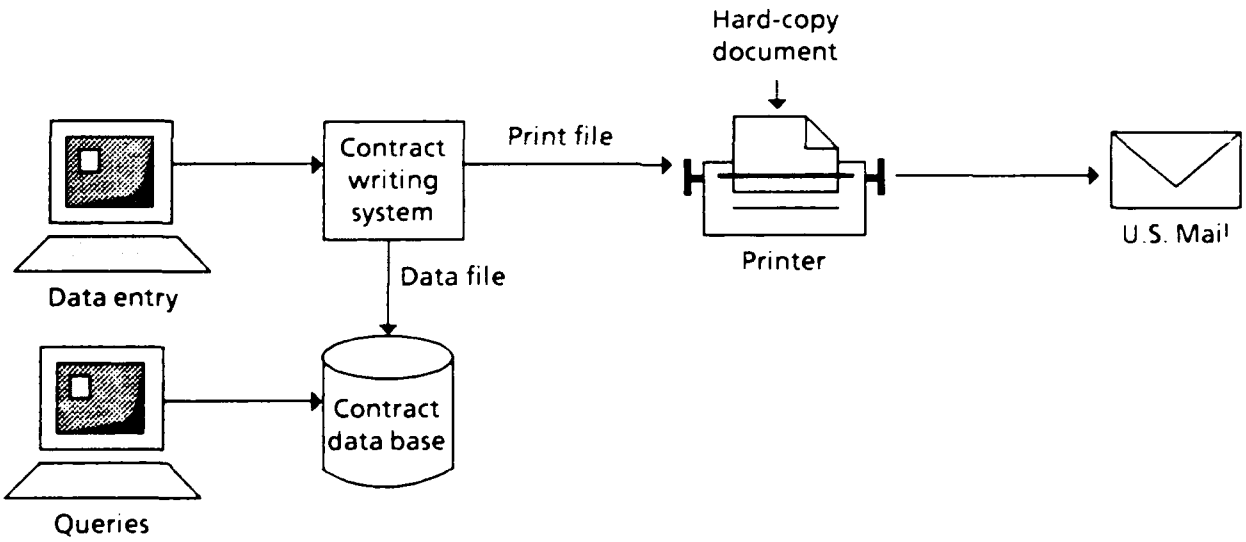

FIG. D-1. AUTOMATED PAPER-BASED CONTRACT WRITING SYSTEM

Currently, a variety of automated contracting systems serve DoD's diverse procurement communities.[1] The DoD has at least three separate contracting environments, each with its own automated systems. Those automated systems' capabilities differ greatly, but all systems support the preparation of automated contract document writing. The systems focus on automation of paper documents since that is what technology heretofore provided and the Federal Acquisition Regulation (FAR) authorized (with minor exceptions).[2]

With the notable exception of the Defense Logistics Agency's (DLA's) Standard Automated Materiel Management System (SAMMS) with its paperless order placement system (POPS) and SAMMS procurement by electronic data exchange (SPEDE) subsystems, few automated contracting systems are capable of issuing electronic solicitations or placing electronic orders. Granted some magnetic tape exchanges of spare parts line item data exist, several electronic bulletin boards prototypes are available, and nascent interest exists in American National Standards Institute (ANSI) Accredited Standards Committee (ASC) X12 electronic data interchange (EDI) capabilities, but Government procurement is still paper-based.

The typical automated contracting system produces solicitation and contract instruments containing information from many other functional areas. For example, the packaging specification, statement of work, and contract data requirements list are normally prepared in another functional area and sent to contracting individually or as a paper attachment to the purchase request. If these documents were prepared on word processing systems or automated list managers, they could be transferred electronically to the contracting system. However, dissimilar computer systems many times inhibit the use of such magnetic media (floppy disk or tape) or electronic file [local area network (LAN)] transfers.

Contractors also use many different hardware and software combinations to support their proposal preparation and contract management functions. Major contractors' proposal preparation teams are also beset by a variety of dissimilar

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[1]*Greater Buyer Effectiveness Through Automation*, Logistics Management Institute (LMI) Report PL804R1, Daniel J. Drake, January 1989, identifies many of these systems.

[2]Exceptions to paper procurement documents are found primarily in FAR Part 13 – *Small Purchase and Other Simplified Purchase Procedures*.

computers and operating systems.[3] For example, engineers might be using computer-aided design (CAD) workstations on their department's LAN at the same time cost estimators are using customized electronic spreadsheets on personal computers (PCs) networked to cost accounting data on the central mainframe, proposal managers are preparing text on stand-alone PCs, and the accounting/finance manager is using a specialized cost accounting package on the central mainframe computer. Possibly, none of these systems are compatible nor integrated.

Although many of these systems have different hardware configurations, operating systems, and even data definitions and structures, the extent of automation in both Government and industry is encouraging. Since electronic commerce must link automated contracting applications between Government and contractor, automated contracting, proposal, and accounting systems need to be available to generate and receive electronic data.

When electronic commerce techniques are applied to today's automated contracting systems, Government buying activities and contractors will be able to transmit or access solicitations and bids/proposals electronically. The primary application of electronic commerce to solicitations will be through EDI transactions because of its relatively wide use and its ability to generate and receive machine-readable business documents with little human intervention. For routine transactions, requests for quotations (RFQs) or invitations for bids (IFBs) could be generated, processed, and received as EDI transactions.

As illustrated in Figure D-2, EDI-capable contract writing systems will prepare solicitations and contract documents. Instead of producing only a print file for the printer, the EDI system will create a data file that can either be directly translated into an EDI transaction or extracted from a data base for translation. If a data file is not created, the print file can be converted to data by stripping out the printer control characters. Print file conversion will be needed for those contract writing systems that are based on word processing as opposed to data processing.

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[3]Council of Defense and Space Industry Associations/United States Air Force Integrated Product Development RFP [request for proposals] Project, *Industry Survey*, December 1990, found that aerospace contractors who were preparing proposals in response to RFPs from Air Force Systems Command's Aeronautical Systems Division were using automation but were beset with data-sharing problems similar to those of their Government counterparts.

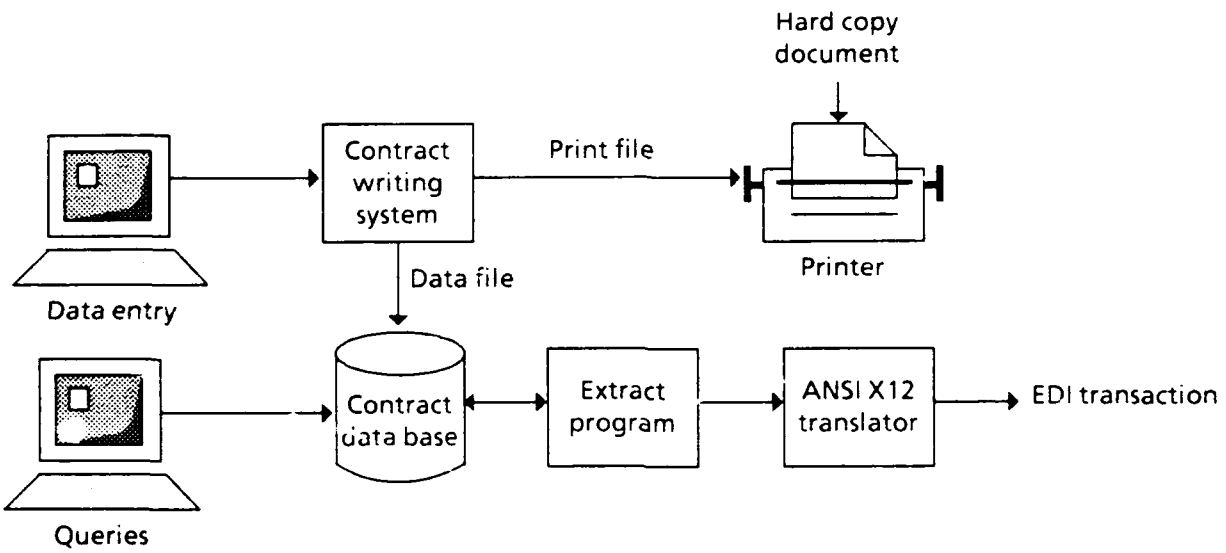

FIG. D-2. EDI-CAPABLE CONTRACT WRITING SYSTEM

EDI TRANSACTION SETS

The EDI standards (or transaction sets) create a common document format that can be interpreted by any system whose EDI translation software complies with the EDI standard and convention guidelines. Even if communicating systems use different names for the same information, the common data contained within the EDI transaction acts as a bridge. EDI transactions form a common format between dissimilar systems and data bases.

Originally, electronic data were transmitted from one computer to another using proprietary data formats worked out between two firms. When more firms began exchanging data, an industry standard format had to be developed. As industries began communicating among themselves and some firms conducted business in multiple industries, the need for a widely accepted national standard arose. The EDI standard preferred by the Government for American domestic transactions is the ANSI X12.[4]

[4]Federal Information Processing Specification (FIPS) Publication 161, *Electronic Data Interchange*, effective date 30 September 1991, requires ANSI X12 transaction sets within the United States and EDI for Administration, Commerce and Transport (EDIFACT) for foreign transactions.

Since ANSI X12 transactions originated in commercial industry, not all Government documents and forms are represented. The ANSI X12 standards (or transaction sets) were developed to provide such a public standard for exchanging business documents. Today, hundreds of transaction sets are available for a wide range of industry applications. Table D-1 is a list of current and proposed ANSI ASC X12 EDI transaction sets of interest to Government procurement. Several of the released transaction sets have been mapped by DoD contracting activities to procurement and contract administration documents. Most notable are the ANSI X12 transaction sets 850 – *Purchase Order*, 840 – *Request For Quotation*, and 843 – *Response to Request for Quotation*.[5] ASC X12 transaction sets under development that have DoD contracting applications include 805 – *Contractor Cost Proposal*, 838 – *Trading Partner Profile*, 839 – *Project Plan and Status Report*, and 841 – *Specifications/Technical Information*. A broad, in-depth analysis of all Government procurement and contract administration documents and their relationship to ASC X12 transaction sets should be undertaken by the electronic commerce Executive Agent. In some cases, new transaction sets may need to be developed. In other cases, existing transaction sets can be modified.

For example, the ANSI X12 Transaction Set 836 – *Contract Award* is a notification and not a complete transmission of the contract document. Transaction Set 850 is sufficient for Government purchase orders and delivery orders but not for complex contracts. A complete contract transaction set is required to go beyond the limited detail of the purchase order transaction set.

We believe that Transaction Set 840 – *Request for Quotation*, despite its title, can be adapted to transmit simple IFB solicitations minus the technical data package. Likewise, Transaction Set 843 – *Response to Request for Quotation*, should be acceptable not only for quotes but for bids. However, it is doubtful that Transaction Set 840 alone can transmit complex IFB/request for proposals (RFP) transactions with large amounts of textual data such as statements of work, special provisions, and instructions to offerors. EDI was not originally designed to transmit extensive textual or technical data. However, standards such as Transaction Set 841 are being developed to move such data along with Transaction Set 840. Also, owing to the requirement for some representations and certifications to be made on the

[5]*DoD Implementation Guidelines for Electronic Data Interchange (EDI)*, April 1991, DoD EC/EDI/PLUS [protection of logistics unclassified/sensitive (data or systems)] Executive Agent

TABLE D-1

PROCUREMENT-RELEVANT ASC X12 TRANSACTION SETS

Transaction set identification number	Transaction set title	Status	Government application
805	Contractor Cost Proposal	In development	Cost details of proposed price
816	Organization Relationship	In development	Contract eligibility
832	Price Sales Catalog	Released	Price catalog details
836	Contract Award	Released	Notification of contract award
838	Trading Partner Profile	In development	Identification and description of contractor
839	Project Plan and Status Report	In development	Cost and schedule reports
840	Request for Quotation	Released	RFQ/IFB
841	Specifications/Technical Information	In development	Engineering drawings and specifications
843	Response to Request for Quotation	Released	Quote/bid
850	Purchase Order	Released	Purchase order or delivery order
855	Purchase Order Acknowledgment	Released	Acceptance of order
860	Purchase Order Change	Released	Contract/order modification
864	Text	Released	Messages, explanation, contract clauses
865	Purchase Order Change Acknowledgment	Released	Acceptance of modification

Source: ASC X12 Status Report: *Standards Development and Maintenance Activities*, June 1991

instant offer as opposed to a periodic (i.e., annual) representation and certification, a Government representation and certification transaction is proposed.[6]

CURRENT EDI TRANSACTION SETS

We recommend development of dedicated RFP and proposal transaction sets optimized for textual and graphic data. The RFP is looking for a more complex response than merely a price quote or bid. It is requesting proposals containing, at a minimum, both price and detailed cost and pricing data in support of the offered price. The proposal needs to contain large amounts of textual and graphic data material explaining the prospective contractor's proposed approach. These proposals are referred to as "compound documents" because they contain both business data in

[6]Certifications required on an individual basis at submission of an offer are, for example, the current cost and pricing and the procurement integrity certificates.

EDI format and graphic or textual data in a Computer-aided Acquisition and Logistic Support (CALS) format.

The DoD CALS program has developed or is developing a series of common formats for representing various forms of data. Table D-2 shows the format specifications issued for each document type. ASC X12 Transaction Set 841 *Specifications/Technical Information*, is an EDI standard that could be used to transmit large solicitation documents in CALS formats to prospective offerors. Transaction Set 841 could also convey proposal data files from offerors to the Government.

TABLE D-2

CALS SPECIFICATIONS

Document type	Specifications
Text data SGML - Standardized Generalized Markup Language	MIL-M-28001
Computer-aided design (CAD) data IGES – Initial Graphics Exchange Specifications	MIL-D-28000
Graphics without CAD data CGM – Computer Graphics Metafile	MIL-D-28003
Data in raster format	MIL-R-28002
Product data PDES – Product Data Exchange Specification	Under development

TRANSMITTING GRAPHIC AND TEXTUAL DATA THROUGH EDI AND E-MAIL

One approach to handling graphic and textual data is under development by the Automotive Industry Action Group (AIAG). AIAG serves as the central clearing house for paperless information exchange among the automobile and truck manufacturers and their suppliers. Computer-aided technologies are playing an increasing role in automotive design. CAD and computer-aided manufacturing (CAM) applications are now common. Industry needs to send product development

data between CAD/CAM systems used by design teams and between manufacturers and parts suppliers. Also, information such as manufacturing specifications, pricing details, design documentation, and tooling requirements is passed between the parts designer and parts manufacturers.

Current communications methods such as mail, courier, and facsimile are too slow and require data reentry on the receiving end. Product design changes frequently during development. Delays in communication and data entry mean greater costs and missed marketing opportunities.

The AIAG believes EDI can be adapted to product development. Specifically, it can be used to exchange design parameters, product specifications, engineering change proposals, design change requests, status reports, and test results. The AIAG's EDI approach uses the proposed Transaction Set 841 – *Specifications/ Technical Information* to transmit those documents which generally consist of binary data files. When CAD/CAM data are transmitted, one of several data exchange standards is used to describe engineering drawing information and geometric product models so dissimilar CAD/CAM systems can communicate files.[7]

The DoD procurement and contract administration EDI application could emulate AIAG's use of Transaction Set 841 for transmitting the following documents:

- Engineering drawings
- Technical data packages
- Design change notices
- Advance change study notices
- Engineering change proposals.

When Transaction Set 841 is used to transmit the solicitation's technical data in conjunction with the Transaction Set 840 – *Request for Quotation* containing the solicitation's business requirements (item, part number, quarterly, schedule), a compound document is formed. With the compound Transaction Set 841 and

[7]See AIAG's White Paper Report, *CAD Data Exchange Within the North American Automotive Industry*, Southfield, Mich., October 1988, for a discussion of the various data exchange standards and their applications.

840 transaction sets, EDI trading partners can exchange a complete or partial technical description over the same path as the business data.

However, the ASC X12 841 *Specifications/Technical Information* transaction is but an interim method of transmitting large data files until more advance techniques are developed. The costs of transmitting large files limit the ASC X12 841 transaction to trading partner relationships where dedicated high-speed data lines are available. The automotive industry can form singular relationships with one supplier/developer. The Government and its suppliers must pursue broad competitive relationships.

The Aerospace Industries Association (AIA) has tested Transaction Set 841 and found transmission costs excessive. AIA firms and many telecommunication providers are moving toward an advance form of electronic mail (E-mail) using X.435 standards whereby EDI business transactions reference an accompanying technical data file. The detailed business data (in an ANSI X12 format) and the technical data (in a CALS format) form a compound document within an E-mail X.435 envelope. X.435 is the EDI-specific protocol that allows E-mail messages to carry EDI data, CAD/CAM data, and text data, etc. One of the advantages of X.435 is how it organizes an electronic message into body parts to separate different data types. This separation makes it easier and less expensive to process and communicate various data.[8] This new E-mail protocol along with the electronic directory service standard X.500 holds great promise for organizing and routing electronic documents.[9]

Although the concept of compound transactions is being developed, there is a considerable barrier to its immediate application. The technical data provided can include graphics, text, parametric, tabular, image, spectral, or audio data. However, such data files are quite large and take considerable time to transmit given the slowness of the available data transmission lines and transmission time equates to cost. Assuming a relatively fast 9.6 Kilobits per second transmission (top speed for telephone lines used with facsimile machines), approximately 140 to 150 minutes would be required to transmit one E-size engineering drawing. Faster speeds require

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[8]For detailed discussion of X.435, see "The Benefits of X.400 for EDI Users," *EDI Forum: The Journal of Electronic Data Interchange*, Vol. 4, 1991 Issue, No. 1, pg. 126.

[9]X.500 electronic directory service is an international standard of the Consultative Committee on International Telephony and Telegraphy. The North American Directory Forum has proposed using Dun & Bradstreet's code system to identify EDI users and their E-mail addresses in X.500 directories. The result should be an electronic telephone white pages for locating E-mail addresses.

dedicated data lines, which can be very expensive for small firms that only occasionally will receive electronic solicitations. The eventual solution is X.435 protocols, high-speed fiber optic lines, and better data compression utilities.

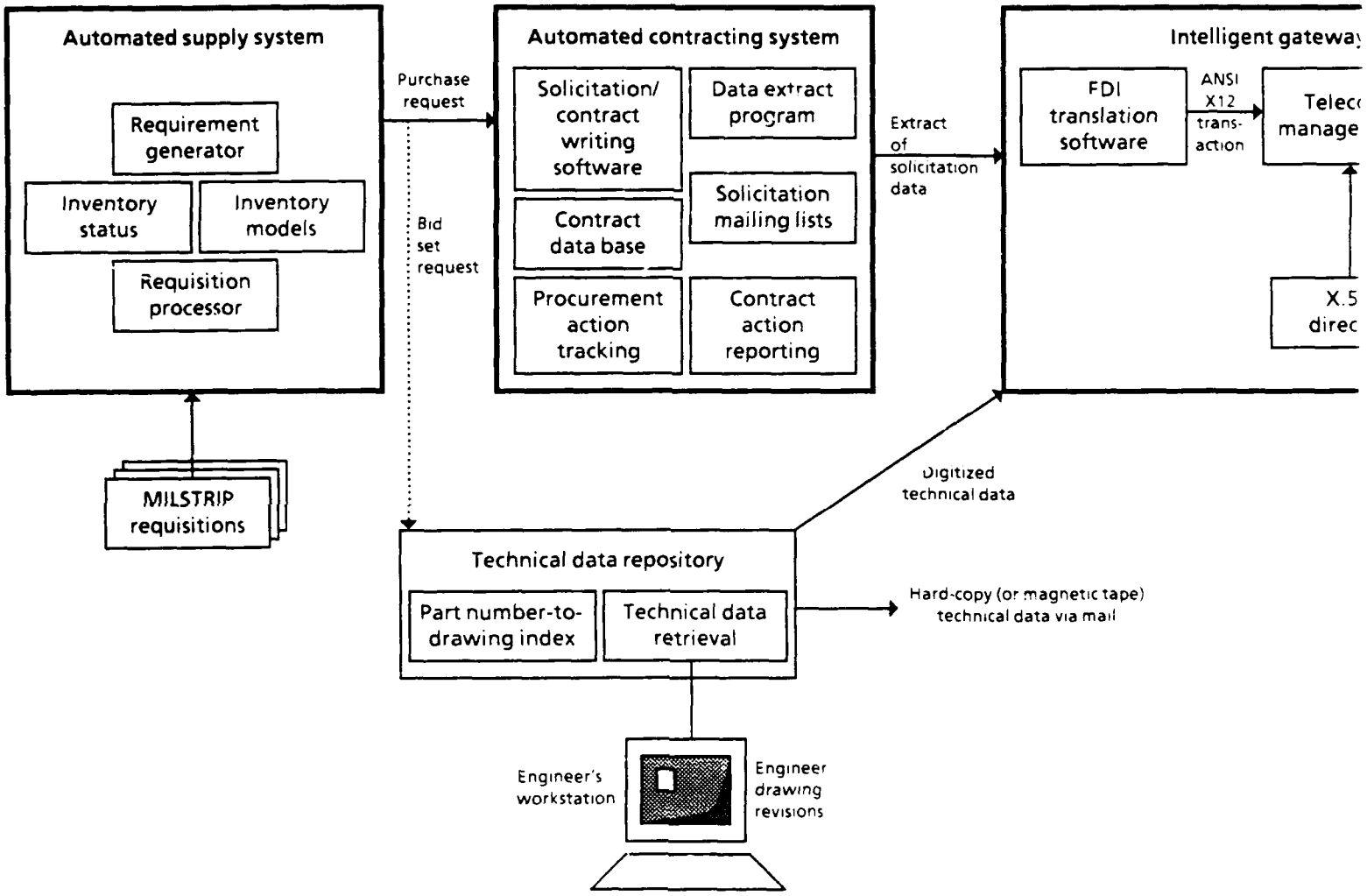
ELECTRONIC SOLICITATION PREPARATION

In Figure D-3, we illustrate how electronic commerce can be applied to competitive procurement. In that figure, we present a possible electronic commerce configuration for automated contracting systems for supply procurements. The network we show is based on the assumption that business data obtained from the purchase request and additional information input by the buyer can be combined with technical data provided by the technical data repository and the engineer to form a compound document. Instead of aperture cards or paper blueprints, engineering drawings are now stored in digital form on automated engineering data repositories such as the Air Force's Engineering Data Cataloging and Retrieval System (EDCARS) or the Navy/DLA's Engineering Data Management Information Control System (EDMICS). Such proprietary format graphic data can be converted to a raster image format that can be included in Transaction Set 841, CALS data in an X.435 E-mail envelope, or a facsimile transmission depending on the prospective contractor's communications capabilities. Of course, over time the number of hard-copy technical data packages that need to be printed will decrease but a few offerors may still require hard-copy drawings or magnetic media via the mail.

The intelligent gateway processor (IGP) manages the connections with the many possible interfaces and routings of the data. It knows the target system's interface requirements and adjusts to them. It can process E-mail, EDI, EDI within E-mail, or facsimile transmissions through the contractor-designated value-added network or directly to the contractor. Within the IGP, the X.500 directory provides the current electronic address of the firm being solicited based upon solicitation mailing list enrollment data. Public key encryption can be used to encode sensitive data elements and to authenticate electronic signatures and transactions.

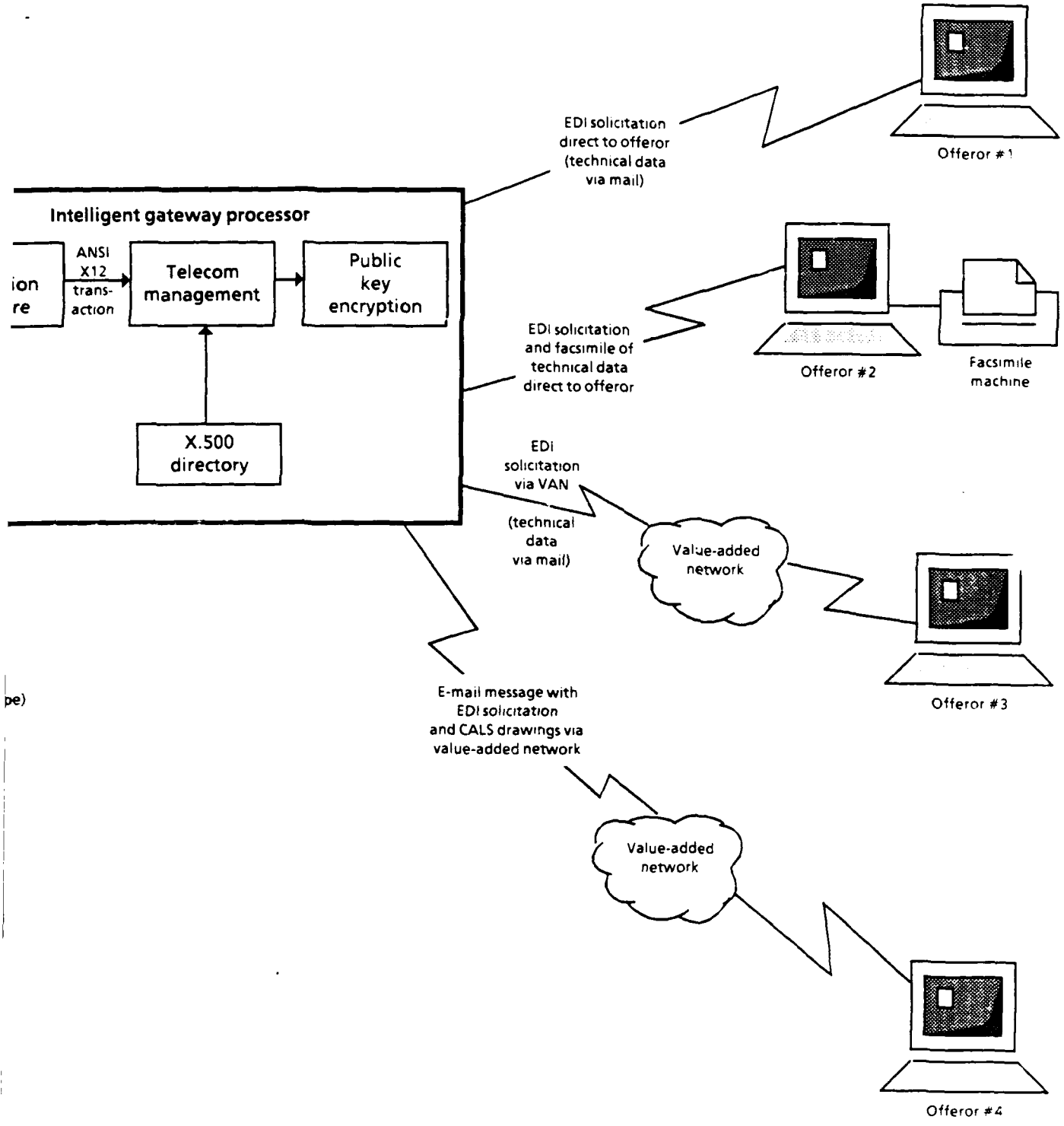
ELECTRONIC PROPOSAL ORGANIZATION

The integration of various electronic interchange formats in one electronic document is best illustrated by development of the electronic proposal. FAR 15.406-5(b) allows proposals organized by parts, such as (1) management, (2) technical, and (3) cost. Organization by parts facilitates separation of technical



Note: MILSTRIP = Military Standard Requisition and Issue Procedure

FIG. D-3. ELECTRONIC SOLICITATION SYSTEM AF



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OLICITATION SYSTEM APPLICATION

and cost or pricing data during evaluation. One application for the electronic proposal is the large numbers of contract change proposals and engineering change proposals on major contracts. The amount of data transmitted in these change proposals may be small enough to warrant electronic transmission methods.

A joint Defense Contract Management Command/AIA team is developing an EDI transaction set for the Standard Form (SF) 1411, *Contract Pricing Proposal Cover Sheet*, and its supporting cost details. This new EDI transaction set, the ASC X12 805 – *Contractor Cost Proposal*, is designed to handle detailed cost data contained in the proposal's cost volume. It is not capable of handling large text files contained in the management volume or engineering data contained in the technical volume. Specialized data exchange formats are required for these volumes – such as standardized graphic markup language (SGML) for text and product data exchange specification (PDES) for engineering data. Figure D-4 illustrates the electronic proposal with its volumes by data exchange standards.[10] The resulting electronic proposal would be a true compound document containing business and technical data within one electronic document.

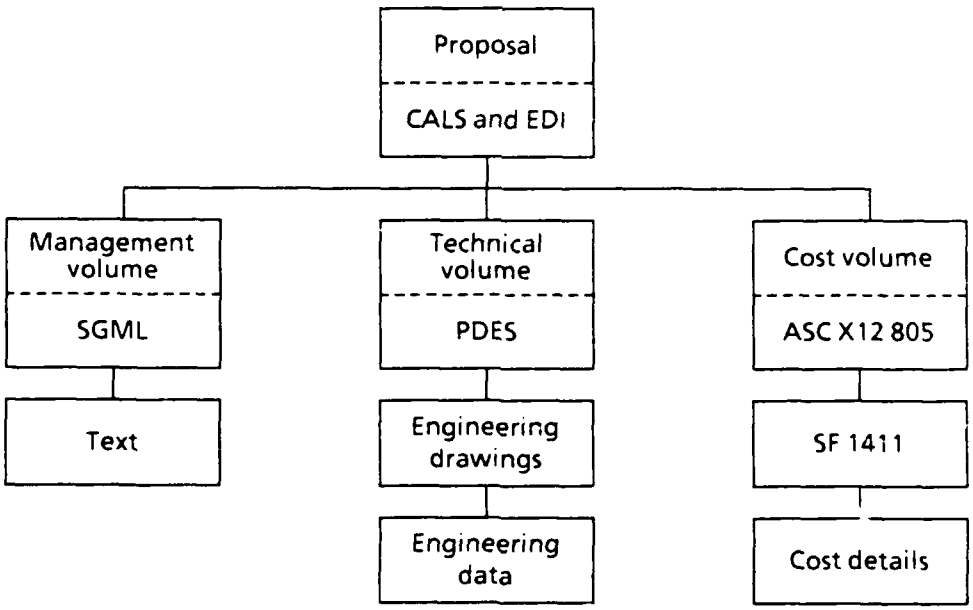

FIG. D-4. ELECTRONIC PROPOSAL ORGANIZATION

[10]The general organization of the electronic proposal was presented on 3 May 1991 at the DoD EDI Conference at the National Institute of Standards and Technology, Gaithersburg, Md., in a briefing entitled "EDI Standard for Contractor Cost Proposals" by Dwayne Eriksen.

We believe the next step in the evaluation of the electronic proposal concept is a dedicated proposal transaction set to organize the business data submitted along with text and graphic data in an X.435 E-mail proposal. For example, cost data, representations and certifications, and property lists could be within one EDI transaction set in one body part of the X.435 envelope, and CALS-formatted text and graphic data would be in other X.435 body parts.

ELECTRONIC SOLICITATION REQUIREMENTS

Communicating electronic solicitations requires a range of techniques and formats. In Table D-3, we identify functional requirements for electronic solicitations and suggest electronic commerce approaches for complying with these requirements in an electronic environment.

TABLE D-3

ELECTRONIC COMMERCE REQUIREMENTS FOR ELECTRONIC SOLICITATION/OFFER FUNCTIONAL REQUIREMENTS

Solicitation/offer requirement	Electronic commerce approach
Identify solicitation provisions • Standard provisions • Specialized provisions	**Alternative 1** • Post a master solicitation with standard provisions on an electronic bulletin board • Reference in the specific solicitation's EDI transaction the master solicitation's issuing agency, number, and date, e.g., Defense Electronics Supply Center, 92-2, 17 Mar 92 **Alternative 2** • Reference in the specific solicitation's EDI transaction every provision by regulation, provision, date, e.g., DoD FAR Supplement (DFARS) 252.215-3 (Apr 1989) • Transmit text of special (nonstandard) provisions in an EDI text transaction **Alternative 3** • Transmit full text of every provision using SGML formats

Describe the requirement
• Supply item
  ▸ Part number, etc.
  ▸ Quantity
  ▸ Ship-to point
  ▸ Delivery date
• Service item
  ▸ Service description
  ▸ Task order
  ▸ Specification number
	Alternative 1
	• Transmit EDI transaction stating all requirement details
	Alternative 2
	• Transmit EDI transaction to reference predetermined task, e.g., overhaul generator in accordance with Specification XXX
	Alternative 3
	• Transmit full text of statement of work in SGML format

Instruction to offerors	• EDI transaction to reference standard instructions • SGML to transmit nonstandard text

Protect source-selection-sensitive information
• Bid prices
• Proposed prices
• Rates and factors
• Number of hours
• Labor categories
	• Public key encryption of transaction
	• Electronic bid box for storage
	  ▸ Time/date opening control
	  ▸ Time extensions
	  ▸ Canceled bids

TABLE D-3

ELECTRONIC COMMERCE REQUIREMENTS FOR ELECTRONIC SOLICITATION/OFFER FUNCTIONAL REQUIREMENTS (Continued)

Solicitation/offer requirement	Electronic commerce approach
Clarifications, discussions, and negotiations	• Telephone conversations • E-mail messages • Two-way video conferencing
Bid notifications to provide for • Mistakes in bid • Withdrawal of bids • Late bid • Rejection of bid • Bid extension request • No bid/bid declination • BAFO request • Competition range notification	• EDI transactions • E-mail messages
Source-selection documentation	• Audit trail ▸ Transaction log with time/date • Unalterable media ▸ WORM compact disk
Representations and certifications • General (periodic representations and certifications) • Instant (current offer)	**Alternative 1** • Master representations and certifications on paper document or on electronic bulletin board • EDI transaction referencing master representations and certifications • Signature authentication **Alternative 2** • Master representations and certifications contained in application software. • EDI transaction conveying responses to instant representations and certifications. • Signature authentication. **Alternative 3** • Dedicated EDI transaction set for entire representations and certifications • Signature authentication **Alternative 4** • Representations and certifications data segments in an EDI RFP and proposal transaction sets to be developed • Signature authentication

Note: BAFO = best and final offer; WORM = write once, read many.

TABLE D-3

ELECTRONIC COMMERCE REQUIREMENTS FOR ELECTRONIC SOLICITATION/OFFER FUNCTIONAL REQUIREMENTS (Continued)

Solicitation/offer requirement	Electronic commerce approach
Technical data • Drawings • Specifications • Standards • Process descriptions • Technical manual illustrations	• EDI transaction to reference ▸ Drawing number ▸ Specification ▸ Standard ▸ Process sheet • Prepositioned or mailed media ▸ Actual drawings ▸ Microform ▸ Compact disk ▸ Magnetic disks/tapes • EDI transaction (ASC X12 841) ▸ MIL-STD-1840 formatted drawing ▸ MIL-R-28002 raster scan image ▸ MIL-D-28000 CAD vector format ▸ MIL-D-28003 CGM vector format ▸ Product Data Exchange using STEP (PDES) CAD vector scan with logistics data
Cost data • SF 1411 • Cost details	• EDI transaction (ASC X12 805) • Cost data elements in an EDI proposal transaction set to be developed
Convey an offer/bid • Authority to represent or negotiate • Timeliness of offer/bid	• Public key encryption with signature authentication • Transaction time certification

Note: CGM = Computer Graphics Metafile; STEP = the French initials for Standard for the Exchanging of Product Definitions