July 18, 1986

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Dear
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:

INPUT is pleased to provide you with the latest in the series of Federal Information Systems and Services Program (FISSP) Market Analysis Reports, <u>Federal Office Information Systems.</u> This new report is based on interviews with agencies on the leading edge of federal Office Information Systems (OIS) and with vendors who supply OIS hardware, software, and services to the federal government.

The report includes an analysis of agency OIS strategies, OIS product and service offerings, recent contract awards, and future opportunities for vendors.

If you have any questions about this information or about the FISSP, please call us.

Sincerely,

John E. Frank
Vice President

JEF:ml

Enclosure

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FEDERAL OFFICE INFORMATION SYSTEMS

MAY 1986

Federal Information Systems and Services Program (FISSP)

Federal Office Information Systems

FEDERAL OFFICE INFORMATION SYSTEMS

ABSTRACT

Through the early 1980s federal agencies were faced with the apparent antithetical requirements of processing more data and information with smaller staffs. One early answer to the need for greater productivity among knowledge workers was found in the use of personal workstations. The rapid expansion of the end user coupled with the need for access to major data bases and users' requirements for "virtual desks" that support a variety of office functions has led to new requirements for office information systems (OIS). These new systems are being designed to link individual workstations to other workstations, minicomputers, and even mainframe computers for the purpose of administrative management, C2, and logistics operations. So pervasive is the need that nearly every ADP-related procurement carries with it a requirement which, in its broadest application, could be considered a component of an office information system.

This report, based on interviews with agencies on the leading edge of federal office information systems and with vendors who supply OIS hardware and services to the federal government, qualifies and quantifies the federal OIS market. Agency strategies and specific procurement opportunities are identified and explained as are vendor product and marketing strategies and vendor successes to date.

This report contains 189 pages, including 35 exhibits.
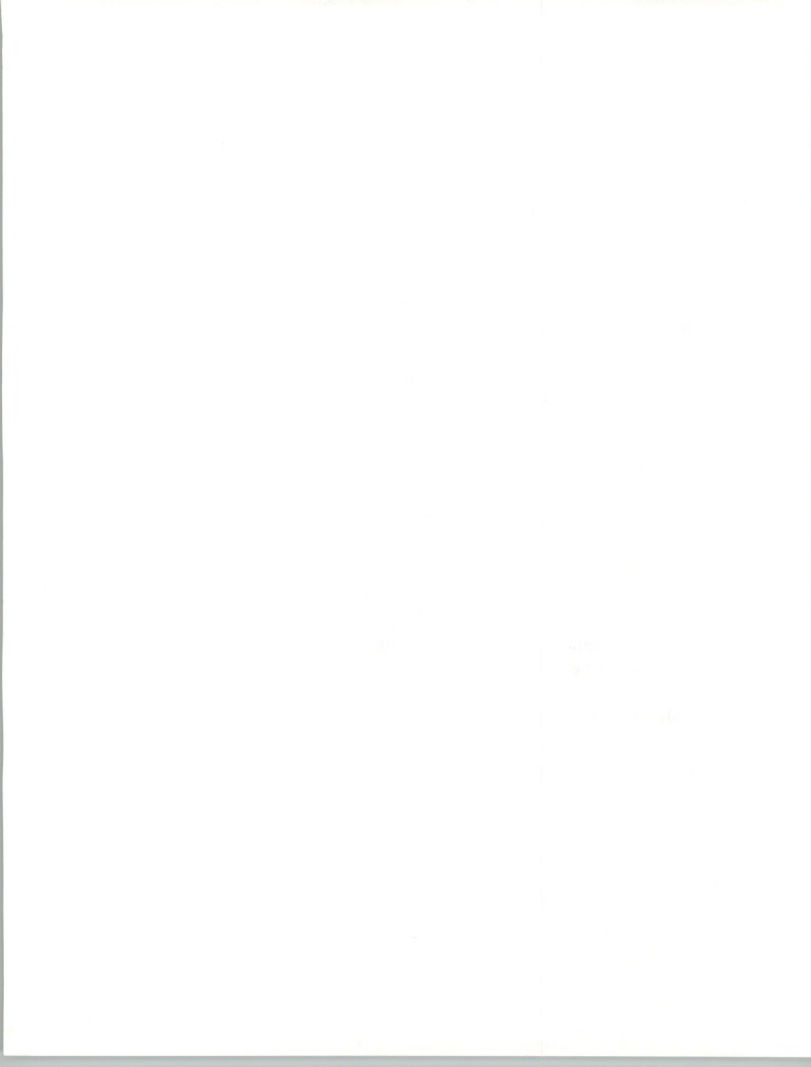
FEDERAL OFFICE INFORMATION SYSTEMS

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FEDERAL OFFICE INFORMATION SYSTEMS

EXHIBITS

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I INTRODUCTION

- This report on Office Information Systems (OIS) in the federal government was prepared as part of the Federal Information Systems and Services Program (FISSP).

- The federal government is, in effect, the nation's largest office, occupying 2.6 billion square feet of office space and employing 1.7 million white-collar workers (80% of the federal work force). It is the largest single producer, consumer, and disseminator of information in the U.S.

    - The size of the effort and the value of government information as a national resource demands a continuing emphasis on information management.

    - But while information must flow freely, the government must minimize the paperwork burden on itself and its constituents while maximizing the usefulness of this same information.

- The "big bang" solution of office automation never occurred even though the government bought thousands of word processors. Nor did it occur with the procurement of over 200,000 microcomputers. Rather, agencies are finding that they cannot buy office support technology in a vacuum, but must look at OIS in a strategic way, incorporating OIS into the information technology in support of the overall mission.

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- Agencies are now in the early stages of this strategic planning for OIS, establishing directions, unifying their office support tools, and procuring the next generation of OIS that will become the basis of an office environment that will carry them into the 1990s.

A.   SCOPE

- This report covers those OIS programs listed in the OMB/GSA/NBS Five-Year Plan for government fiscal years (GFY) 1985-1990, related federal agency long-range automated data processing (ADP) plans, and federal agency GFY 1986 and 1987 information technology budgets.

- The period of interest is GFY 1986 to 1991, although years outside this window are discussed as necessary to provide a complete picture of the development of agency OIS strategies.

- For the purpose of this study, the following definitions were followed.

    - <u>Office Information Systems (OIS)</u> provide for the direct use of computer and communications technology by office workers who are not computer specialists, working alone or in groups, in support of their mission.

        - Direct use of individuals differentiates office automation and the use of office systems from data processing, which generally is high volume and transaction-oriented.

        - The fact that users are not specialists also distinguishes office automation from data processing since the implementation issues generally are more involved with addressing people issues, while data processing implementation issues are more involved

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with system optimization and capacity management. This distinction, however, is blurring rapidly.

- Worker-OIS interaction may occur at any of three levels.

    . Human-machine <u>dyads</u> (standalone systems) focus on the one-to-one relationship between the tool and the person. Examples include personal computers and word processors. This level is oriented to the individual and the human-to-machine interface on a one-person-to-one-machine basis.

    . <u>Work units</u> consist of office workers who are closely related by function and exhibit strong, daily interaction. A research team composed of a manager, several professionals, and a secretarial support staff is an example. Knowledge workers spend much of their time communicating, mostly with people within the same work group. This level is communications-oriented and contains networks of human-to-tool dyads. Examples of tools include PBAX (Private Branch Exchange), electronic mail, video conferencing, and facsimile. These units are multiple dyads that are defined by an existing organizational group that normally has a prescribed and frequently continuing function, or by the short-term need to solve a specific problem or produce a product. The latter may be inter- or intra-organizational.

    . The <u>institution</u> level includes global systems that facilitate the sharing of resources or data. Examples include data base systems, decision support systems, and information centers.

- OIS functions performed by office workers include the following activities and representative set of tools.

INPUT

- **Data/information entry** includes typing or keyboarding of previously prepared documents or data using entry systems such as paper-based manual systems, word processors, or other intelligent or dumb workstations. Entry also may involve the digitization of prepared documents via optical character recognition (OCR) equipment or similar electronic scanners.

- **Data/information storage and retrieval** includes mail handling, document filing and retrieval, logistics, and scheduling/calendaring using paper filing systems, micrographics, multi-functional copiers, image processing systems, and electronic filing systems.

- **Information analysis** includes integrated data base applications, project management, accounting, planning, and modeling. Support tools include data- or knowledge-based systems such as decision support, information centers, and artificial intelligence.

- **Text/document processing** involves the creation, word processing, editing, and duplicating of correspondence and reports.

- **Data/information distribution** involves the communication of informal and formal messages via visual or oral means using such tools/techniques as the telephone, electronic mail, video or computer conferencing, facsimile; and the reproduction of reports for mass distribution via typesetting, printing, or other electronic publishing means.

- All office activities may occur at and be supported by each of the three worker-OIS interaction levels cited above, but the power and flexibility of the support system generally is diminished outside its "natural" level. Exhibit I-1 depicts both the levels of interaction and the activities that typically occur at each level.

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EXHIBIT I-1

LEVELS OF OFFICE INFORMATION SYSTEMS

OFFICE INFORMATION ENVIRONMENTS

LEVEL	PRIMARY FUNCTIONS
Institution	• Integrated Production Applications
	• Data Base Management
	• Information Center Support
	• Electronic Mail
	• Publishing
Work Unit	• Word Processing
	• Electronic Mail
	• Electronic Filing
	• Administrative Support
	• Personal Computing
	• Occupation-Specific Applications
Dyad	• Word Processing
	• Spreadsheet Processing
	• Decision Support
	• Ad Hoc Reporting
	• Graphics Presentations

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B.   METHODOLOGY

- Research for this report is based on research and analysis of information from several sources.

    - INPUT's Procurement Analysis Reports (PAR).

    - Previous INPUT research conducted from 1981 through 1986.

    - Interviews with federal agency officials with active OIS programs.

    - Interviews with leading federal OIS vendors.

- The OMB/GSA/NBS Five-Year Plan analysis for the INPUT Procurement Analysis Reports was reviewed for OIS programs to be initiated during the period of interest.

- The available agency long-range ADP plans for GFY 1985-1990 and GFY 1986-1991 were researched to identify plans for major OIS initiatives.

- Questionnaires (see Appendix F) were developed for interviews of both federal agency officials and OIS vendor executives (see Appendix A for respondent profiles).

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C.   REPORT ORGANIZATION

- This report has been organized into six major sections.

    - I.   Introduction.

    - II.   Executive Summary.

    - III. Market Analysis and Forecast.

    - IV.   Office Information Systems Issues and Trends.

    - V.   Competitive Trends.

    - VI.   Key Opportunities.

- Several appendices are provided to aid in report use.

    - A. Interview Profiles.

    - B. Definitions.

    - C. Glossary.

    - D. Policies, Regulations, and Standards.

    - E. Related INPUT Reports.

    - F. Questionnaires.

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II EXECUTIVE SUMMARY

- This Executive Summary is designed in a presentation format to help the reader review key research findings and recommendations quickly. It also provides an executive presentation complete with script and visual aids to facilitate group communications.

- Key points of the entire report are summarized in Exhibits II-1 through II-8. The left-hand page facing each exhibit contains the script that explains the content of the exhibit.

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A. CONFLICTING PRESSURES IMPACT FEDERAL OIS MARKET

- As the nation's largest office, the federal government is faced with con-
  flicting pressures that are impacting vendor opportunities. The outcome is
  decidedly positive, but the pace of OIS expenditures varies by individual
  agency and even individual offices.

- On the positive side, the need for improved office information systems is
  creating new vendor opportunities.

  - The need for productivity increases among knowledge workers is
    clearly evident. Not only more, but better information resource man-
    agement is being required.

  - An uncontrolled proliferation of office support tools in the form of
    word processors, microcomputers, and other large systems applications
    has created opportunities for integrated OIS solutions.

- However, there are hurdles to overcome.

  - While some agencies have established positions on an agency-wide
    basis, others have fostered decentralization of both planning and
    investing. These latter agencies require vendors to invest heavily in
    market intelligence to ensure that opportunities are not missed.

  - Agencies are reluctant to impose standards that would unduly restrict
    contracting competition, but do require vendors to offer with solutions
    that permit the interoperability of systems in a multivendor environ-
    ment.

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EXHIBIT II-1

CONFLICTING PRESSURES IMPACT FEDERAL OIS MARKET

Productivity
Control

NEEDS

Decentralized   Opportunities
Interoperability
Standards

"ROAD BLOCKS"
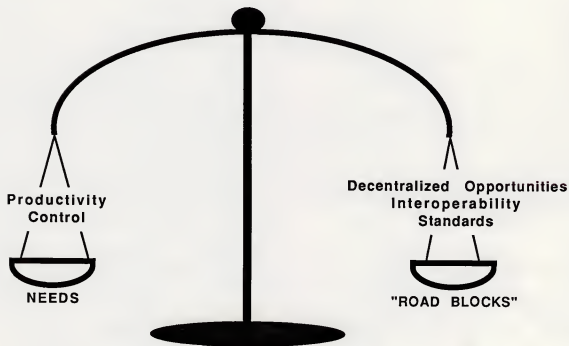
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B.   FEDERAL OIS MARKET FORECAST

- INPUT estimates that the federal government office information systems market will increase from approximately $.8 billion in GFY 1986 to $1.3 billion by 1991, at an Average Annual Growth Rate (AAGR) of 10%. OIS is included in a variety of federal efforts that involve expenditures in excess of this forecast. This forecast includes only OIS-related expenditures while excluding that portion of planned initiatives that does not clearly satisfy the definitions of this report.

- Through the forecast period the expenditures will revolve around the hardware support tools required by office workers. As this base of hardware becomes established the emphasis will shift to professional services and the requirements will entail the establishment of integrated office information systems.

- Turnkey-type solutions will continue to grow at a rate based on the availability of integrated OIS and on the multifunctionality that such systems are now coming to have.

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EXHIBIT II-2

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FEDERAL OIS MARKET FORECAST

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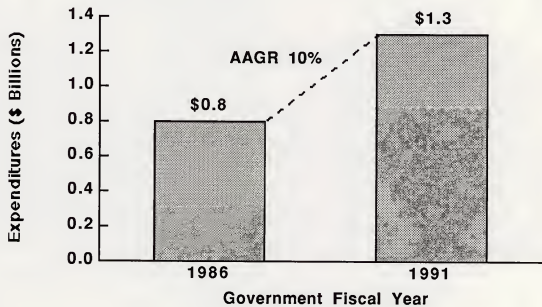
C.   EXTENT OF OIS SUPPORT VARIES BY LOCATION

- While the targets of OIS activity are agency and/or office specific in most cases, they may be generally defined both by the office function to be performed and the location of support for that function.

- By function, storage and retrieval applications, particularly on-line data bases, appear most frequently in initiatives. A secondary grouping of text/document processing, distribution, and analysis highlights the finding that four of the five defined functions represent frequent targets of initiatives.

- The location of support is a function of the centralization of agency initiatives and the natural or logical location of the activity. Information analysis and data/text processing are more solitary kinds of activities and are generally supported on an individual or work unit basis. The storage, retrieval, and distribution of data/information more frequently involve larger audiences and find their support in shared resources. Some agencies have been successful in institutionalizing these functions, providing central facilities and end-user connectivity.

- Most opportunities will target work units or agency-wide groups through the forecast period as agencies seek control over and leverage from both their information resources and computing assets.

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EXHIBIT II-3

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EXTENT OF OIS SUPPORT VARIES
BY LOCATION

Function	Location of Support			
	External	Standalone	Work Unit	Institution
Entry			High	
Storage/ Retrieval			Moderate	Moderate
Analysis		High	Moderate	
Processing		High	Moderate	
Distribution	Moderate			Moderate

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D. THE "IDEAL" OIS STRUCTURE

- The Army's three-tier OIS structure typifies the goal many agencies have for organizing OIS. The structure's key attributes include:

    - The duplication of certain capabilities (e.g., word processing) at each tier with varying degrees of function/capability depending on the specific needs at that tier.

    - The networking employed; that is, sub-LANs to connect individual users in Tier 3, LANs in Tier 2 to connect multiple groups of Tier 3 users, and wide area networks to connect multiple organizations at an agency level.

    - The capacity of the system(s) at each tier with respect to the number of users involved (Tier 3 has the most), processing speed (Tier 1), and storage (Tier 1).

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EXHIBIT II-4

THE "IDEAL" OIS STRUCTURE
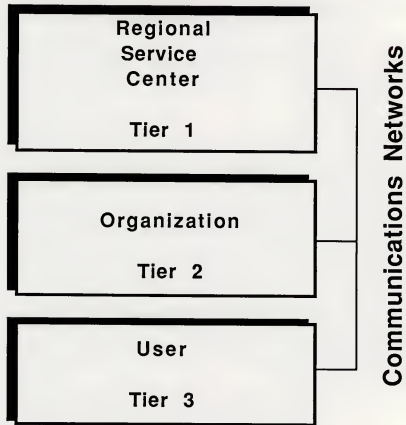
Source: The Army Information Architecture, DA PAM 25-1

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E. STRATEGIC OIS ISSUES

- As agencies drive toward the ideal office information system, they face a host of issues that will impact future programs.

- While OIS development has been fairly autonomous within offices of each agency, management is now grappling with the viability of that autonomy. To allow offices to grow their OIS capabilities on an individual basis probably ensures a better "fit" in the short term, but perpetuates incompatibility in the long term. Centralized planning and implementation should eventually evolve as the norm.

- Related to this, some agencies have yet to decide what standards, if any, to follow and at what level in the organization each standard should be applied. Since agencies do not want to be in the business of telling vendors what technology they should follow and do not want to restrict competition, agencies have opted for "least common denominator" or "must be compatible with..." approaches.

  - Civil agencies will undoubtedly follow industry standards for connectivity and by default use open systems architecture and commercially available data/text interchange formats.

  - Defense agencies have developed their own interconnect standard and will employ DIF for document interchange.

- Rather than suffer the potential liabilities from insisting on system uniformity, agencies will require vendors to provide interoperable capabilities that permit file and document exchanges in a multivendor environment.

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EXHIBIT II-5

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STRATEGIC OIS ISSUES

- ● **Centralization**

- ● **Standardization**

    - **Connectivity**

    - **Data/Text Interchange**

    - **Interoperability**

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F. LEADING FEDERAL OIS VENDORS

- Based on 1985 federal OIS-related revenue, INPUT estimates that much of the current market is controlled by hardware-oriented vendors. There are some vendors in the top ten who are "hardware independent" and known primarily for their integration capabilities.

    - Although Wang had reverses in this market in 1985, their large installed base and attractive integrated office solutions helped them achieve the number one status. Data General, with several recent wins, seems to have included federal OIS in their corporate focus as well.

    - IBM's microcomputer and Digital's minicomputers helped to carry them to leading roles in this market.

    - The integrators, PRC and CSC, have also been recipients of large, OIS-related awards. CSC in particular seems to have developed a capability for integrating OIS via off-the-shelf products from multiple vendors.

    - AT&T's recent co-venture agreement with CSC for the development of AT&T's OIS offerings could move them into a key market role in the coming years.

- While not on INPUT's "Top 10" for 1985 OIS revenue, Zenith Data Systems, with recent large awards from Air Force, IRS, and HHS, is certain to be a contender in future years.

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EXHIBIT II-6

LEADING FEDERAL OIS VENDORS

Rank	Vendor
1	Wang
2	IBM
3	Digital
4	Data General
5	PRC
6	NBI
7	CSC
8	Xerox
9	SDC/Burroughs
10	AT&T

G. STRATEGIC DIRECTIONS OF OIS VENDORS

- Vendors have been actively developing their OIS offerings.

    - In some cases vendors are filling holes through in-house development or ventures with other companies. "Hole filling" strategies appear questionable, at least from the federal perspective, in that agencies seem less inclined to base awards on the completeness of the offering as on its integration.

    - Other vendors are integrating offerings in an attempt to produce a complete set of applications. But some vendors may have missed the mark. IBM's DISOSS architecture, for example, is unlikely to reward vendors who provide it; many agencies do not view it as a viable document interchange format.

- The more successful strategies appear on the marketing front.

    - Vendors who have presence in an agency are finding the argument of system uniformity a key benefit.

    - For different reasons, vendors with requirements contracts are realizing additional sales as other agencies piggyback on existing contracts.

    - Vendors are also winning with discounts. Software vendors in general and microcomputer software suppliers specifically are more frequently pricing on a commodity basis, lowering single copy prices in exchange for volume orders.

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EXHIBIT II-7

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STRATEGIC DIRECTIONS OF OIS VENDORS

- Product Line Extensions

- Product Integration

- Marketing Initiatives

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H.   RECOMMENDATIONS

• Vendor seeking to grow their federal OIS business must be responsive to both the short- and long-term directions of both the immediate buyer and the large organization of which the buyer is a part. This involves a great deal of market intelligence on such issues as centralization of OIS strategies and current and future standards as they are envisioned at different levels of the organization. Vendors who propose solutions to the specific opportunity without assessing the "fit" on the overall strategy are quite likely to be at a disadvantage.

• The solutions that vendors propose must also have a "natural" approach to interoperability both in terms of communications and data/text interchange. It will not be sufficient to bid system uniformity or patchwork protocols in the agency's multivendor environment.

• Related to interoperability, successful vendors will more likely offer approaches that not only solve the current problem but afford flexible approaches to the future OIS needs of the agency. Since for many vendors this could mean "giving away the store," vendors would be well advised to consider whether future business is to come from product or capability "lock-ins."

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EXHIBIT II-8

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RECOMMENDATIONS

- **Understand the Buyer's Strategic Directions**

- **Propose Multi-Vendor Interoperability**

- **Bid "Open-Ended" Solutions**

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III MARKET ANALYSIS AND FORECAST

A. MARKET STRUCTURE

- As an increasing number of federal "knowledge workers" begin to use auto-mated tools, the distinctions between Office Information Systems (OIS) and traditional ADP blurs. Many ADP initiatives that might have been categorized as data processing a few years ago now include a component for information manipulation designed for the front office.

- The location of the intended support is changing as well. A few years ago "office automation" was nearly synonymous with one person working on a standalone machine whereas data processing involved a service provided by one department for another. Today, OIS implies human-computer dyads, work units with users tied together via LANs, and institution-level processing distributed to workstations or work units linked to these larger processors. Many of these OIS automation efforts are influenced by or under the control of ADP.

- For the purpose of this report, OIS includes those office-type functions provided to knowledge workers, regardless of size of machine or type of connectivity or location of the support. These functions generally include data/information entry, data/information storage and retrieval, information analysis, text/document processing, and data/information distribution.

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B.   MARKET FORECAST

1.   MODE FORECAST

- INPUT estimates that $.8 billion will be expended in GFY 1986 for OIS-related information services. By 1991, these expenditures will have grown to $1.3 billion at an Average Annual Growth Rate (AAGR) of 10%. Exhibit III-1 presents the detailed forecast by mode of information services.

- Hardware and hardware systems (when the operating system is supplied with the hardware) will represent two-thirds of the OIS expenditures over the forecast period and grow at the second fastest rate, 11% AAGR. Expenditures will include upgrades or replacement of central processors that support OIS activities, microcomputers that provide intelligent workstations for knowledge workers, and, in some cases, distributed processors that serve as hosts to work units or as file servers and gateways from LANs to mainframes.

- Professional services, the second largest segment in terms of user expenditures, will grow at a modest 7% AAGR, primarily on the strength of consulting contracts that result in the further development of standards or the design of office information systems at a work unit level. Expenditures for software development to implement these designs and education and training to operate these OIS systems should also be expected.

- OIS turnkey systems packaged as a hardware system with OIS applications will enjoy a 13% AAGR, primarily as the result of introduction or replacement of standalone or shared-logic word processing systems.

- Expenditures for packaged applications software products purchased independent of OIS systems will experience a 10% growth. Extensive discounting on the part of vendors and the drive to share software package resources via site licenses will contribute to this rate below the total software industry rate.

III-2

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EXHIBIT III-1

FEDERAL GOVERNMENT MARKET FORECAST
OFFICE INFORMATION SYSTEMS
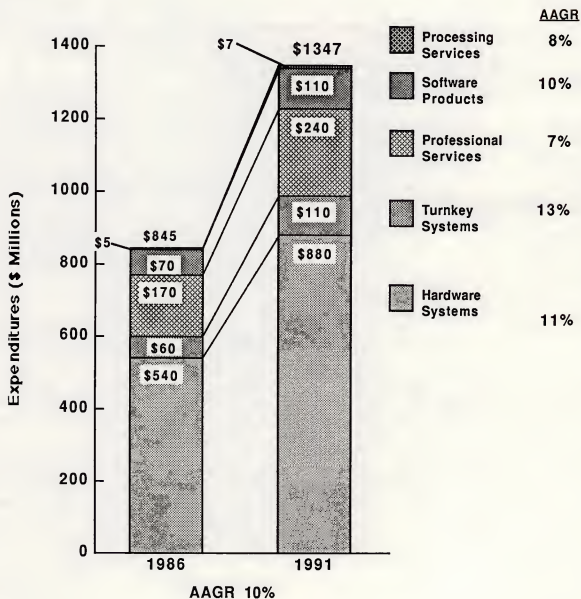
Also, much of the software in use in OIS will be included in larger systems (DBMS, electronic filing, graphics, etc.), only part of which are OIS-related and therefore considered in this forecast.

- Processing services, the smallest segment, will experience the slowest AAGR at 8%. Single problem solving applications-type uses will more cost-effectively be accomplished on microcomputers, and the call for access to large, passive data bases will more readily be satisfied by newer storage technologies such as compact disks (CD-ROM). Only dynamic information systems and network services will remain as dominant parts of processing services, and little of the expenditures for these services are directly related to OIS.

2. AGENCY FORECAST

- The notion that office information systems should have an impact on all knowledge workers is reflected in the similarity of total expenditures and growth rates for OIS by civil and defense agencies (see Exhibit III-2).

    - Differences in size and growth rate of expenditures by service mode exist, but the differences tend to be less significant than the general trend.

        . Civil agencies spend more on outside processing services, primarily on-line data bases for legal research and econometric forecasting, than defense agencies.

        . Civil agencies also have a slightly greater preference for packaged solutions (software products and turnkey systems) than do defense agencies.

        . On the other hand, defense agencies are more inclined to buy the hardware and build the application.

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EXHIBIT III-2

FEDERAL GOVERNMENT OIS FORECAST
BY TYPE OF AGENCY

MODE OF SERVICE	TYPE OF AGENCY					
	CIVIL			DEFENSE		
	1986 ($ Millions)	1991 ($ Millions)	AAGR (Percent)	1986 ($ Millions)	1991 ($ Millions)	AAGR (Percent)
Processing Services	$4	$5	6%	$1	$2	12%
Software Products	$40	$70	12%	$30	$40	6%
Professional Services	$90	$130	8%	$80	$110	7%
Turnkey Systems	$30	$60	15%	$30	$50	12%
Hardware Systems	$270	$460	12%	$270	$420	10%
Total	$434	$725	11%	$411	$622	9%

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- Analysis of the 48 OIS-related proposed initiatives gleaned from the INPUT Procurement Analysis Reports sheds additional light on similarities and differences by type of agency (see Exhibit III-3).

  - Nearly 50% of the identified defense initiatives represent new starts as opposed to 36% for civil agencies. Upgrades and replacements—an indication of improvements planned for initiatives started in earlier years—represent approximately 50% of the civil agency initiatives. DoD did not over-buy early office automation, as did civil agencies, and has exhibited a strategy of "evolving" OIS through the integration of existing and new systems.

  - Over 60% of the total proposed OIS funding in these initiatives was requested by civil agencies, nearly in line with the proportion of total programs (52%) identified for civil agencies.

- The total dollar value of this sample of identified initiatives and INPUT's estimate of the value of the OIS-related portion is presented in Exhibit III-4.

  - With the exception of the Air Force programs, the defense agencies average OIS-related dollar expenditures per initiative are higher; nearly every identified initiative is 100% OIS-related, whereas only 3 of the 25 civil programs are 100% OIS.

  - Many DoD initiatives will result in requirements-type contracts to ensure future compatibility across enlarging OIS arenas.

- But, as mentioned earlier, it is difficult to draw conclusions based solely on top-level numbers. Rather, one must analyze the specific directions of individual agencies, even subagencies. Exhibit III-5 provides a summary of support products or programs in selected agencies (also see Chapter V).

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EXHIBIT III-3

OIS INITIATIVES BY TYPE OF EFFORT

TYPE OF AGENCY	TYPE OF EFFORT				
	NUMBER OF INITIATIVES	UPGRADE (Percent)	EXPANSION (Percent)	REPLACEMENT (Percent)	NEW START (Percent)
Civil Agencies	25	28%	16%	20%	36%
Defense Agencies	23	4%	22%	26%	36%
Total	48	16%	19%	23%	42%

Source: Procurement Analysis Report.

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EXHIBIT III-4

NUMBER AND VALUE OF OIS-RELATED INITIATIVES

| | INITIATIVES | | |
| | | VALUE ($ Millions) | |
AGENCY	NUMBER	TOTAL	OIS PORTION
Civil Agencies			
Agriculture	4	$34	$22
Energy	1	2	1
HHS	1	22	6
Justice	4	356	305
Transportation	4	48	34
Treasury	8	456	336
NASA	1	4	4
SEC	1	5	5
HUD	1	150	38
Subtotal	25	1077	751
Defense Agencies			
Air Force	14	342	126
Army	1	36	36
Navy	4	202	202
USMC	1	29	29
DCAA	1	33	33
DOD	1	2	2
OSD	1	7	4
Subtotal	23	651	432
Total	48	1728	1183

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EXHIBIT III-5

TOOLS SUPPORTING OIS-RELATED ACTIVITIES
IN SELECTED AGENCIES

TARGET AREA: END-USER COMPUTING	
AGENCY	**WORKSTATION "STANDARD"**
<u>Civil</u>	
Justice (Civil Divisions)	Wang
SEC	IBM, IBM-Compatible
VA	Wang
<u>Defense</u>	
OSD	Zenith
Navy	Zenith
Army	Zenith
USMC	Zenith
Air Force	Zenith

Continued

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EXHIBIT III-5 (Cont.)

TOOLS SUPPORTING OIS-RELATED ACTIVITIES
IN SELECTED AGENCIES

TARGET AREA: LOCAL AREA NETWORK		
AGENCY	**SUPPORT PRODUCT**	**PROGRAM**
<u>Civil</u>		
Education	UNK	
Justice (Civil Divisions)	WangNet	
SEC	UNK	
State	WangNet	
VA	WangNet	
<u>Defense</u>		
Navy		DONOACS
USMC		DONOACS
Air Force		ULANA

INPUT

EXHIBIT III-5 (Cont.)

TOOLS SUPPORTING OIS-RELATED ACTIVITIES
IN SELECTED AGENCIES

TARGET AREA: HOST/SUPPORT		
AGENCY	PRODUCT "STANDARD"	PROGRAM
Civil		
USDA	DEPNET	
Education	UNK	In-house Analysis
Energy	DPMODEL	
FEMA	ITT DIALCOM	Analysis (Mitre)
HUD	HTN II (Current)	HIIPS (Future)
Interior		Analysis (Mitre)
NASA	Telenet	
SEC		EDGAR
State		In-house Analysis
VA	VADATS	
Defense		
OSD		DDN
Navy		DDN
Army		DDN
USMC		MCDN, DDN
Air Force		AUTODIN, DDN

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GOIS

- In civil agencies, use of and standardization on microcomputers tends to vary by office within each agency. Defense agencies, on the other hand, have indicated a preference for Zenith.

- Local area networks also vary by office in civil agencies with few agency-wide decisions on either their use or architecture. The Navy and Marines will use DONOACS while Air Force will implement ULANA.

- Institution-level initiatives are evident in the form of requirements analysis studies in some agencies, major programs that include OIS requirements in others, and some limited wide area networks in still other agencies. Defense agencies have selected DDN as their standard agency-wide communications architecture.

3. APPLICATION FORECAST

- The agency respondents identified 127 OIS activities that represent the key targets for improvements through current or planned initiatives. This sample (depicted in Exhibit III-6) again indicates the wide range of applications that constitute OIS in federal agencies.

    - Each of the office function activities categories was cited and, except for data/information entry, the frequency of mentions within each category was within the same range. Storage and retrieval activities were mentioned most often (30% of the mentions) and information analysis the least (20%).

    - Key targets within these categories include:

        . On-line data base (19% of total mentions).

        . Word processing (19%).

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EXHIBIT III-6

DISTRIBUTION OF OIS APPLICATIONS BY TYPE OF ACTIVITY

FUNCTION/ACTIVITY	MENTIONS	
	FREQUENCY	PERCENT
Data/Information Entry		
Digitizing	4	3
Subtotal	4	3
Data/Information Storage & Retrieval		
On-line Data Base	25	19
Calendar/Schedule	6	5
Records Management	7	6
Subtotal	38	30
Information Analysis		
Decision Support	5	4
Spreadsheet	10	8
Project Management	3	2
Financial Management	7	6
Subtotal	25	20
Text/Document Processing		
Word Processing	25	19
Graphics	6	5
Subtotal	31	24
Data/Information Distribution		
Data Communication	4	3
Electronic Mail	20	16
Video Conferencing	3	2
Voice Messaging	2	2
Subtotal	29	23
Grand Total	127	100

INPUT
GOIS

. Electronic mail (16%).

- Other targets that are general knowledge worker functions but which represent secondary activities include:

    . Spreadsheets (8%).

    . Electronic records management (6%).

    . Financial management (6%).

    . Scheduling/calendaring (5%).

    . Graphics (5%).

    . Decision support (4%).

- Still other targets represent specific agency requirements, including digitizing, voice messaging, and video conferencing.

- In general, these office activity targets are attempts to enhance productivity at the individual workstation or local work group level (see Exhibits III-7 and III-8).

    - Information analysis and text/document processing continue to be dyad-type of activities with little intervention or support from outside the local office. Word processing, graphics, and, surprisingly, decision support activities are not being institutionalized.

    - The storage/retrieval and distribution of data and information are moving away from an individual desk function to larger group functions. The definition of the group depends both on the dispersion of the

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EXHIBIT III-7

LOCUS OF SUPPORT BY OIS FUNCTION

FUNCTION	LOCUS OF SUPPORT			
	EXTERNAL (Percent)	STANDALONE (Percent)	WORK UNIT (Percent)	INSTITUTION (Percent)
Data/Information Entry			100%	
Data/Information Storage & Retrieval	3%	16%	40%	39%
Information Analysis		52%	40%	8%
Text/Document Processing		65%	32%	3%
Data/Information Distribution	34%	4%	28%	34%
Grand Total	9%	31%	38%	22%

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GOIS

EXHIBIT III-8

DISTRIBUTION OF OIS APPLICATIONS BY LOCUS OF SUPPORT

FUNCTION/ACTIVITY	LOCUS OF SUPPORT				
	External (Percent)	Standalone (Percent)	Work Unit (Percent)	Institution (Percent)	Total (Percent)
Data/Information Entry					
Digitizing			100%		100%
Data/Information Storage & Retrieval					
On-line Data Base		12%	44%	44%	100%
Calendar/Schedule		33%	50%	17%	100%
Records Management	14%	14%	29%	43%	100%
Information Analysis					
Decision Support		20%	40%	40%	100%
Spreadsheet		80%	20%		100%
Project Management		33%	67%		100%
Financial Management		43%	57%		100%
Text/Document Processing					
Word Processing		64%	32%	4%	100%
Graphics		67%	33%		100%
Data/Information Distribution					
Data Communications		25%	25%	50%	100%
Electronic Mail	40%		30%	30%	100%
Video Conferencing			33%	67%	100%
Voice Messaging	100%				100%
Grand Total	9%	31%	38%	22%	100%

INPUT
GOIS

individuals who need to be involved in this data/information flow and the strategic thrust of the agency with respect to the institutionalization and standardization of data bases and communications. Calendaring/scheduling activities tend to be work group related while data base and records management are more frequently supported at an institutional level.

- Messaging, whether by electronic mail or voice messaging systems, is frequently supported by external sources and represent opportunities for vendors offering network services.

- Overall, some 60% of the office activities involve intelligent workstations as the main source of computing power (see Exhibit III-9). In addition to the standalone activities, respondents noted that nearly 30% of the institution supported activities and 60% of the work unit activities included connections to microcomputers. While it is too early in the agencys' OIS development process to clearly see the LAN versus multiuser direction, this data does not suggest that LANs are more frequently in place now. Further, there is little evidence that distributed processing in the context of a microcomputer-mini-computer-mainframe connection is being acquired at any pace.

  - What is evident is the push toward more productive levels of microcomputer integration. While the current architecture usually involves terminal emulation with communications and data capture via print files and microcomputer conversion, other levels are emerging.

    . Some offices provide direct communications with hosts using formatted files where the end user must formulate the request and then manipulate the data to a useable form.

    . Those agencies that have or are developing LANs of microcomputers and file servers generally have all the functions of the previous levels and, in these cases, the downloaded information is passed to the network.

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EXHIBIT III-9

**DISTRIBUTION OF OIS APPLICATIONS
BY TYPE OF PROCESSING SUPPORT**

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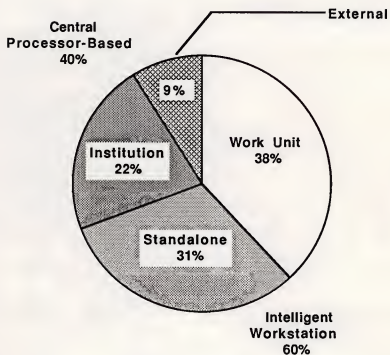
- The highest level of integration yet to be implemented widely is to link local networks to external services.

- The work group/departmental system does represent a natural, cost effective gateway between individual users and wider area services at the office, agency, or external resource level. This system, whether an integrated office or a LAN with file, print, and communications servers, should become the repository of department-oriented information and services appropriate to work group needs.

- Security, both in terms of authorized access and data integrity, in this context was mentioned infrequently. But secure transmission and partitioned data, along with "user friendly" access, are important considerations to be made by agencies as connectivity and resource sharing continue. Vendors should prepare to address these requirements with more than simple ID-type procedures.

C.   FEDERAL MARKET ISSUES

1.   APPROACH-AVOIDANCE CONFLICTS

- The "new" Office Information Systems (OIS) market promises interesting and complete opportunities for vendors. But the need to approach solutions rapidly will be tempered by caution as agencies seek to avoid the consequences that plagued them during and after the "office automation" era. Exhibit III-10 depicts these approach-avoidance conflicts.

  - The federal government is the largest single producer, consumer, and disseminator of information in the U.S., and information activities are growing steadily. But the white-collar work force, now over 1.7 million

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EXHIBIT III-10

APPROACH-AVOIDANCE CONFLICTS DRIVING THE OIS MARKET

"APPROACH" FACTORS

More Work with Fewer Workers

Availability of Knowledge Worker Tools

Work Unit Autonomy

OIS Standards

Short-Term Need

Falling Prices

Availability of Options

Abundant Justifications

"AVOID" FACTORS

Machines for Worker Replacements

ADP Decentralization

Lack of Leverage of ADP Resources

Limiting Competition

Long-Term Inflexibility

Not "Mission Critical"

Incompatibility

Expedient Solution

FEDERAL OIS STRATEGY

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GOIS

persons, has not been able to keep pace with the information require-
ments. Limited funds for personnel will not allow the increases
required. The alternative, machines-for-workers replacements, is
unlikely to occur either as managers realize that control over machines
does not provide the upward mobility and "managerial power" of people
management.

- The ubiquity of the microcomputer has fostered the extension of the
  capabilities of computing to knowledge workers at all levels of federal
  organizations and, in the process, provided another OIS tool without
  extensive intervention of an already overworked ADP function. Decen-
  tralization of computing resources has, however, led to a lack of
  adequate control over this capability by ADP personnel that ensures
  productive use of agency assets.

- Related to this issue, federal agencies are torn between the desire to
  provide OIS autonomy at the bureau or division level and at the same
  time leverage the agency-wide ADP investment in terms of maximizing
  capacity on existing equipment and sharing data/information and
  computing resources.

- Top-level control, however, is achieved by standardization of technical
  and procedural approaches. But careless implementation of standards
  can threaten to limit vendor competition in procurements and violate
  the spirit, if not the letter, of the Competition in Contracting Act
  (CICA).

- Strategic OIS directions take time to develop, yet the need for some
  solutions is immediate. Agencies are frequently forced to address
  short-term needs without provision for longer-term requirements.
  Falling vendor prices, particularly for hardware, only fuel the pressure
  for the expedient solution.

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- While the number of optional products and approaches increases, the inter- and intra-operability of products has not kept the same pace. Consequently, the immediate solution is not always the most advanced, leading to additional cycles of OIS obsolescence.

- As the availability of funds for OIS improvements tightens, some agencies are finding that their OIS needs are secondary to "mission critical" ADP needs, even though the OIS needs are quite justifiable on an impact or savings basis.

- With these conflicting considerations very much in play, the general direction of the federal OIS market is not readily discernible, making it difficult for vendors to plan general sales/marketing and investment strategies. Instead, the market must be segmented by the specifics of each agency or subagency, noting the current OIS environment, anticipated directions, and the varying strength of the mitigating factors cited above.

2. OIS PROCUREMENT METHODS

- Agencies essentially use four methods to procure OIS hardware and services.

- Purchases under $10,000 may be made directly by the agency without a formal procurement process.

- Intention to buy commercial products or services that are valued at over $10,000 must be noted in the Commerce Business Daily (CBD) and a full procurement process, including RFP, must be completed.

- Agencies may also buy from existing GSA Schedules. Contracts greater than $50,000 must be advertised in the CBD.

- Similarly, agencies may buy through existing contracts without a CBD notice so long as the purchase is under $100,000.

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- All of the agencies interviewed reported frequent use of individual contracts with vendors. However, there are notable exceptions.

    - As depicted in Exhibit III-11, agencies spend enormous sums through GSA Schedule contracts. While not all of the dollars represented in this exhibit were spent on OIS, the exhibit does suggest the magnitude of expenditures channeled through this vehicle.

    - Existing contracts are another frequently used procurement vehicle. These contracts provide for indefinite quantity orders at a guaranteed price.

        . All of the Defense Department has announced plans to buy through the Air Force contract with Zenith Data Systems for personal computers to be used, in part, in office information systems.

        . Subagencies within the Veterans Administration are procuring OIS equipment and services via a contract with Wang.

        . Many of the litigating divisions of Justice will buy OIS using the recently signed contract between the Civil Division and Data General.

    - One other variation on use of existing contracts is administered by GSA's Office Technology Plus. In essence, this is a computer store that has established procurement contracts with more than nine micro-computing providers and a far larger number of software vendors.

- Over 90% of the agency respondents indicated that regardless of the contract vehicle, the preference is to buy OIS rather than lease. This trend is particu-larly in evidence for smaller systems (standalone and small multiuser

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EXHIBIT III-11

DOLLAR VOLUME OF SELECTED ADP CONTRACTORS
FROM FEDERAL SUPPLY SCHEDULE, 1985

VENDOR	EQUIPMENT RENTAL & PURCHASE ($ Millions)	EQUIPMENT MAINTENANCE ($ Millions)	SOFTWARE RENTAL, PURCHASE & MAINTENANCE ($ Millions)	TOTAL OIS ($ Millions)
IBM	$119	$41	$28	$188
Wang	140	21	0	161
Digital	38	10	5	53
Xerox	28	6	2	36
CPT	23	8	0	31
NBI	21	7	0	28
Raytheon WP	13	4	0	17
Lanier	11	4	0	15
Datapoint	7	4	0	11
Data General	9	2	0	11
Hewlett-Packard	5	0	1	6
Sperry Univac	2	3	0	6
NCR	2	3	0	5
Four Phase	3	1	0	3
Control Data	2	1	0	3
Systems Development	2	0	0	2
Subtotal	$425	$115	$36	$576
End-User Computing	86	1	7	93
Grand Total	$511	$116	$43	$669

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GOIS

systems), with larger systems leased or, preferably, under lease-to-ownership or lease-to-purchase arrangements. This said, agencies are quick to point out that capital investment funds to purchase hardware and software are limited so the preference for purchase frequently cannot be satisfied.

- While most agency respondents could not readily distribute commercial service expenditures by budget category, several knowledgeable sources did estimate the following distribution for OIS:

    - Hardware, 60%.

    - Software, 30%.

    - Services, 10%.

    This distribution estimate was, in turn, applied to federal government OIS expenditures as part of INPUT's forecasting process.

3. ISSUES SUMMARY

- While the key concepts of the next wave of OIS activity (connectivity and interoperability) are clear, government-wide directions for realizing these needs are not.

    - Conflicting pressures to contain costs by improving in-house OIS capabilities in the face of greatly diminished staffs to handle increasing demands will not readily be resolved across the entire market, but rather selectively by agency and criticality (size) of need. Centralization within decentralization will prevail as a management strategy.

    - Office systems integration with a focus on manager productivity and decision support systems that facilitate "better" decisions is the next step. In the past, office systems have been synonymous with word

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processing, which has been the province of clerks and secretaries. But agencies now realize that these workers account for only a small percentage of the support expense.

- End-user computing demands will consume in-house capacity and force more new medium- and large-size initiatives out-of-house.

- There will continue to be an emphasis on flexibility and tranportability of software. Agencies will look to vendors for unique, progressive architectures that incorporate off-the-shelf solutions.

- There will be numerous opportunities for follow-on professional services work as agencies seek to capitalize on their investment in the vendor's "learning curve."

- From a policy viewpoint, information resource management (IRM) approaches will be increasingly applied to OIS technology as office systems increase in size, cost, and complexity.

D.   FEDERAL OIS VENDORS

- In line with the evolution of OIS from various submarkets, vendors to this market represent a wide variety of products/services that range from complete turnkey OIS systems to transaction-oriented products/services with an OIS component. There are few vendors (Wang, NBI, CPT) who target OIS as a primary line of business. Rather, vendors have become a part of the market because of the central role that OIS has started to assume.

  - General purpose hardware vendors frequently provide OIS applications as secondary, but necessary, components. Mini and microcomputer vendors now find their systems at the heart of many OIS applications.

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Leading federal OIS vendors in this category include Digital, IBM, Honeywell, Data General, Sperry, and Zenith.

- Software and services vendors similarly provide applications for knowledge workers ranging from vendors whose DBMSs serve as repositories of information to communications vendors who tie these workers together and finally to systems integrators who put hardware, software, and services in place. Vendors include Ashton-Tate, Boeing, CSC, Cullinet, Lotus Development, and Systems Development Corporation.

- Vendors are responding to the growth opportunities by extending their OIS-related product lines, integrating products on both an intra- and inter-company basis, and leveraging their federal presence toward even larger shares.

  - Every vendor is planning or implementing product line changes that will increase their ability to offer an integrated office system. But differences in R&D expenditures, liabilities inherent in changing an established base, and the impacts of previous choices all seem to constrain integrated solutions and make for very large differences between vendors' products. Data General, for example, built its Comprehensive Electronic Office (CEO) with emphasis on integrating the application with a file system, but has some difficulty interfacing with other systems. Digital, as another example, has emphasized an open-ended architecture to the "neglect" of local applications integration.

  - By contrast, marketing strategies have, in part, played to agencies' desire to establish interoperability. An installed base of like products encourages agencies to buy more of the same to achieve some level of an "uni-architecture." By building an installed base by discounting and, as necessary, offering products with some basic level of compatibility within a multivendor environment, vendors have been able to leverage the installed base.

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- As agencies increase their requirements for interoperability and as vendors open up their architectures to provide more compatibility, the OIS market evolves toward a goal where standards are a non-issue. In ths scenario, vendors that offer products/services with demonstrable office productivity solutions will gain market share over vendors stuck in the "compatible with..." syndrome.

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IV OFFICE INFORMATION SYSTEMS ISSUES AND TRENDS

A. THE "IDEAL" OFFICE SYSTEM

- The strategic OIS directions of federal agencies, when pieced together, suggest an office information system of the future that consists of various, diverse products including computers, word processors, applications software, and communications networks linked to allow the processing and manipulation of data in every form—text, data, voice, graphics, and image.

- This "ideal" system is the repository of departmental work unit-oriented information and services (see Exhibit IV-1).

    - Information can be downloaded from a central data base or created by individuals within the group. It includes personal files which may or may not be shared within the group.

    - The services can be resident on an integrated system or on file servers accessible by each personal computer linked via a LAN. The key is that the services are standard and appropriate to the needs of the work group.

    - Architecturally, the system provides the interconnection between the individual and higher levels of services (see Exhibit IV-2). It serves as a natural gateway between a LAN and a wider area network.

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EXHIBIT IV-1

WORK GROUP SYSTEM
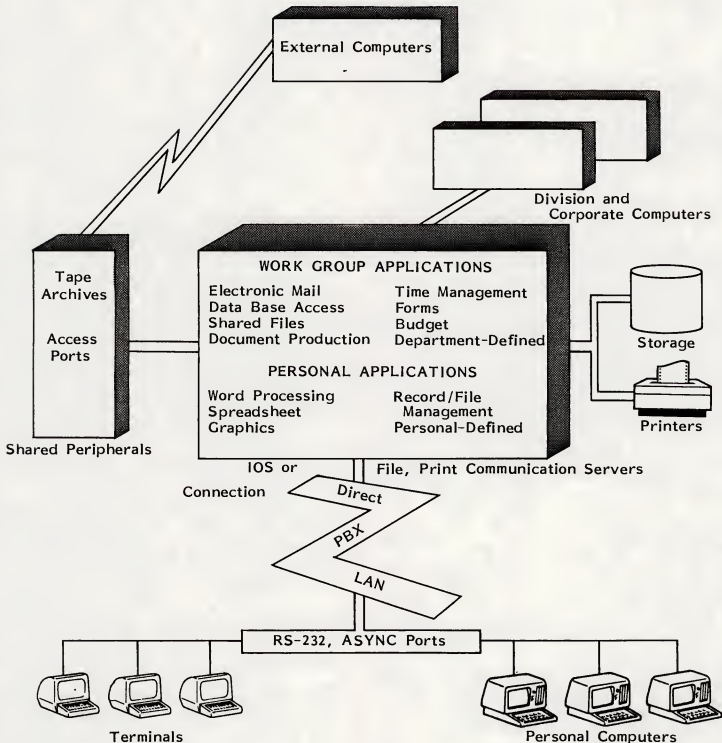
EXHIBIT IV-2

DATA/SERVICES ARCHITECTURE

EXTERNAL SERVICES

Dow Jones   Specialized Data Bases   Dun&Bradstreet   Electronic Mail   Dialog

Specialized Programs   Associated Press

CORPORATE INFORMATION AND SERVICES

Accounting   Customer   Financial   Marketing   Personnel   Payroll

Manufacturing   Inventory   Electronic Mail   Claims   Library

Demand Deposit   Data Base Management   Project Management   Policy Holder

DIVISION INFORMATION AND SERVICES

Document Production   Data Base Management   Division Data

Graphics   Library   Protocol Translations   Telecommunications

WORK GROUP/DEPARTMENT INFORMATION AND SERVICES

Word Processing   Modeling   Departmental Data

Budget   Project Control   Statistical Analysis

PERSONAL INFORMATION AND SERVICES

Word Processing   Spreadsheet   Graphics

Help Services   Dictionary   Personal Files

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- System capabilities include word processing, electronic mail/message handling, spreadsheet and graphics, electronic filing, record/file processing, electronic calendar.

- It may also include a voice store-and-forward application and can be configured to handle teleconferencing, PBX-type voice telephone operations, image processing, access security, and time-and-attendance monitoring.

- Other features include transparent access to a community or their users; transparent access to personal, work group/departmental, and larger data bases; document file management which supports collaborative efforts while maintaining the integrity of shared resources; a common user interface which is easy to learn and use (menus, command sets, help aids, system prompts); and the integration of applications so that documents/files can be easily moved from one function or system to another.

- It is clear that the government's goal is to move to a paper-reduced system during the 1990s, minimizing the number of forms on which information appear, reducing the number of personnel while still getting the job done, and avoiding the unnecessary duplication of resources and effort in the process.

- OIS has the potential for meeting this goal since:

  - It shortens the time needed for a task or allows more tasks to be done in a given amount of time, thus increasing efficiency.

  - It restructures the work so there is less need for support and less nonproductive work, so effectiveness is increased.

INPUT

- But, far from the ideal, OIS remains the federal government's ragged edge technologically--largely a proliferation of "homegrown" networks and piece-meal components of workstations, microcomputers, word processing packages, and spreadsheets. Many systems are obsolete in that they do not represent cost-effective technology, requiring repeated patching and modifications, having limited on-line processing capabilities, and resulting in high mainte-nance costs.

B.   APPROACHING THE IDEAL

- With a notion of the potential of OIS in mind, federal agencies have embarked on a set of overlapping strategies to better plan, acquire, and manage OIS (see Exhibit IV-3). Not every agency or work unit is following the same develop-ment path nor, for that matter, is one discernible in some units, but the following discussion provides a fair representation of federal directions. Individual units are identified where known.

I.   PLANNING THE "PROPER" AMOUNT OF CENTRALIZATION

- Agencies are grappling with two distinct issues of centralization.

    - What is the proper place of OIS in the automated support environment?

    - What role should top level agency management assume in establishing agency-wide OIS directions?

    a.   ADP and OIS?

- Until recently, end-user computing, office information systems, and produc-tion data processing have been evolving in separate arenas. Separate staffs, separate environments, and for the most part, separate vendors have charac-

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EXHIBIT IV-3

STRATEGIC DIRECTIONS OF FEDERAL OIS ACTIVITIES

- Establish "Proper" Amount of Centralization

- Establish "Standard" for:

    - Connectivity

    - Data/Text Interchange

    - Interoperability

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terized these three systems. While end-user computing and OIS <u>complement</u> a professional's performance, data processing traditionally has <u>substituted</u> computing power for labor.

- Personal computers, brought into many departments by managers disillusioned with data processing department solutions and wanting more than a word processor, were not selected for their ability to connect but with specific local applications in mind.

- Early word processors were standalone, shared logic, or cluster word processing systems selected for document production and generally without regard for connectivity.

- Production data processing focused on transaction-oriented business systems with little regard for data analysis.

- These information functions are converging to form an integrated delivery system for the creation, storage, retrieval, and distribution of data, text, image, and voice information. Future information systems will integrate these functions and, where possible, share resources with single workstations capable of handling all types of information.

  - Decision support aspects of information systems are being distributed to end users through microcomputers. These individual systems, unlike the transaction-oriented business systems, are focused on data analysis. Building and analyzing sophisticated business models from production data is an independent activity which can be accomplished by individual end users through microcomputer decision support software and downloaded corporate data.

  - LANs, as a logical extension, enable workers to share resources (peripherals and data). The need to develop corporate strategies for automation has led to even larger networks.

IV-7

INPUT

- Agencies expect a "natural" integration of resources as end users and office information personnel look for more powerful tools and access to existing data bases and as ADP attempts to achieve greater control over the automation of functions. In this scenario, ADP will be the focus and guardian of resources (data and shared peripherals) to which workers will have access.

- These systems will focus on providing users with more flexibility and autonomy in the development of individual solutions while, at the same time, developing institutional information applications. Both require host-work-station linkages, appropriate software, and custom solutions for users.

   - From a workstation, a user will be able to access specific elements of data from institutional data bases transparently and transfer data to decision support systems to perform such functions as report preparation, modeling, statistical analyses, and graphics presentations.

   - Mid-level (departmental) processors will, in many cases, handle office information systems, decision support systems, and some production data processing in support of the host. Primary functions will be data collecting, ad hoc reporting, and work-unit applications.

   b. <u>Centralized versus Decentralized Planning, Acquisition, and Management</u>

- One difference between OIS and DP that is emerging is the attempt to centralize OIS planning, if not its related acquisition and management. While DP requirements are highly specific to the overall environments of individual agencies and subagencies, OIS targets a generic set of applications that are common to subagencies and agencies alike.

- While work units have had wide latitude regarding OIS, agency management is now moving toward a more coordinated effort.

INPUT

- For Civil agencies:

    - FEMA, SEC, HHS, HUD, and State report agency-wide planning, acquisition, and management of OIS.

    - Justice, Interior, and Agriculture report centralized planning, but decentralized acquisition and management.

    - FAA, Education, and NASA allow individual subagencies their own planning, but do provide centralized acquisition and management support.

    - Treasury has centralized OIS by subagency, but currently follows no agency-wide practices.

    - Commerce, Energy, and Transportation appear to be completely decentralized, although each agency appears poised to pull some OIS activities into a centralized function.

- The Defense agencies, on the other hand, are attempting to centralize planning and hardware acquisition and permit individual facilities to acquire and manage software and professional services. OSD has taken a particularly important step in extending life cycle management to end-user computing, in effect requiring reviews of microcomputer systems.

- With few exceptions, then, agencies are attempting to coordinate OIS initiatives, particularly those that have an agency-wide impact (electronic mail or telecommunications capabilities) or afford economics of scale via large buys, while allowing individual work units freedom to plan, acquire, and manage applications that support the specific needs and requirements of the work unit.

INPUT

- For vendors, this unfolding scenario suggests that there is no single point of contact for policy making, buying decisions, or user requirements. Rather, vendors must understand both the agency-wide strategy, if there is one, and the realization of that strategy as applied by the individual work units, which may be numerous for any given subagency.

2. PLANNING FOR STANDARDS

- Coordination of OIS brings with it the issue of establishing standards which, in turn, has the potential of limiting competition. Agencies are well aware of the benefits and even more sensitive to the potential liabilities. Accordingly, agencies are implementing strategies that are, at once, broad enough to address the diversity of applications but limited enough to achieve some economics of scale and containment of OIS expenditures.

    - One strategy is to foster vertical integration at the bureau or division level with few restrictions on individual work unit approach. This seems to be the direction at Energy, Transportation, and Treasury.

    - Treasury, Agriculture, Interior, FEMA, HHS, and Army are planning or conducting requirements studies agency-wide to determine directions.

        . While Treasury reports such a study is at least one year away, Interior and FEMA have already contracted with MITRE for this analysis.

        . HHS is conducting an in-house audit of their end-user computing now and will next look at surveying their overall hardware environment. One particular problem in HHS will involve the interface of Social Security's Wang hardware with the rest of HHS hardware, which is primarily IBM.

INPUT

- Army, although they have set several agency-wide policies, will undertake a fresh look at records management.

- The Executive Office of the President is reviewing their requirements after no vendor bid on a 1985 OIS RFP.

- Interior has included two major OIS initiatives in their 1987 Long Range Plan.

  - The National Parks Service proposes funding of $57.5 million for hardware, software, and related support for parks, regional offices, and Washington headquarters starting in 1987.

  - The Bureau of Reclamation proposes a bureau-wide project that includes purchase and upgrade of equipment, maintenance, and support totaling $109.2 million.

- For some agencies, an OIS strategic implementation is already underway as a part of a larger ADP procurement.

  - The Customs Service in Treasury is unifying their field-level OIS via a contract with AT&T/EDS. Custom's Network, CNET, will provide mainframe connections to tie work units to management and could expand to a Treasury-wide network.

  - SEC's effort is a part of Electronic Data Gathering Analysis and Retrieval (EDGAR), now in pilot testing.

  - HUD's OIS is part of HUD Integrated Information Processing System (HIIPS).

  - State's future strategy will be driven by the Foreign Affairs Information System (FAIS).

INPUT

- The major directions of several other agencies are to continue the drive for intelligent workstations, LANs, and host-level support.

  - FEMA, Agriculture, Army, and Air Force are all particularly active in developing end-user computing.

  - FEMA, Education, State, Army, and Air Force are developing LANs.

  - Education, State, Commerce, Justice, Army, and Air Force are also equipping host processors with "institutional-level" applications or tools. Education, for example, is developing electronic mail and filing on Data General equipment connected to 300 Compucare and 250 IBM-compatible microcomputers. The Pell Grant Integrated System (PEGIS) will provide Education's OIS structure.

a. Employees/Computer Ratio

- Agencies have made considerable progress in terms of their end-user computing strategies. As of the start of FY 1986, the federal government had 2,116,000 full-time equivalent employees (1,034,000 in defense agencies and 1,082,000 in civil agencies, excluding Postal Service workers). The government estimates that as many as 80% of these employees are white collar workers who could conceivably have a need for direct access to automated data information management equipment. Two recent GSA-sponsored tabulations of word processing equipment (1983) and microcomputers (1985) yielded estimates of 82,000 dedicated word processing stations in place, 100,000 microcomputers acquired, and another 200,000 microcomputer acquisitions approved.

INPUT

- Assuming these estimates are "in the ballpark," the ratio of white collar employees to intelligent workstations available for office information functions ranges from a conservative nine employees per workstation to four employees per workstation.

    - The above estimates vary, of course, by the management level of the worker, the specific function(s) for which this equipment is used, and both the type of agency and subagency.

        . Machines, both word processing and microcomputers, are installed mostly at the secretarial and mid-management levels with less activity at higher executive levels due to, among other things, deficient typing skills among the managerial ranks. Department of Transportation estimated, for example, that the ratio of employees to workstations at the senior manager level was "many" to one, 3:1 at the mid-manager level, and 1:1 at the clerical and technical levels.

        . Government-sponsored surveys also indicate that, while word processing equipment is generally reserved for word processing functions, microcomputers have found a variety of uses.

            - Thirty-two percent of the installed base is used for ADP.

            - Twenty-two percent are used by agencies providing services.

            - Twenty-two percent are used for analyses.

            - Twenty-four percent are used for management training and policy development.

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- DoD is by far the largest user of office automation equipment, with over two-thirds of the inventory. DoD also has the largest white collar work force with 40% of all white collar workers. For DoD, then, the ratio of white collar workers to OIS hardware is 1.68.

- Civil agencies exhibit wider variations than DoD at both inter- and intra-agency levels (see Exhibit IV-4).

  - Education, for example, runs from 30:1 in some subagencies to 2:1 in others.

  - Justice reports a 2.5:1 ratio for its litigative divisions, but much of that is from 1.2 workstations per employee in the Civil divisions.

  - Treasury has reached a 1:1 ratio in the field after posting a 10:1 ratio a few years ago; the national office is 4:1 and Customs is 5:1.

  b. Standards for Connectivity

- While the goal of most agencies is to link various sizes of hardware into integrated office systems in such a way as to connect office to office, headquarters to field offices, and agencies to external sources, it is not at all clear how agencies will set the communications standards to accomplish the goal.

- Most agencies are concurrently developing standards for connectivity, data/text interchange, and interoperability. The goal of these efforts is to provide the appropriate users, wherever they are in an organization and whatever type their workstation, with the capability of securing the resources they need for their work in a manner that is essentially transparent to them.

- As depicted in Exhibit IV-5, agencies have approached the solution in a variety of ways.

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EXHIBIT IV-4

CURRENT AND PROJECTED EMPLOYEES-TO-INTELLIGENT
WORKSTATIONS IN REPRESENTATIVE CIVIL AGENCIES

AGENCY	EMPLOYEES-TO- WORKSTATION RATIO							
	>15:1	15:1	10:1	5:1	4:1	3:1	2:1	1:1
Education								
Transportation								
Justice								
HUD								
Interior								
Commerce								
Treasurry								
Agriculture								
FEMA								
SEC								
HHS								
FAA								
NASA								
State								

Current Ratio   Projected Ratio

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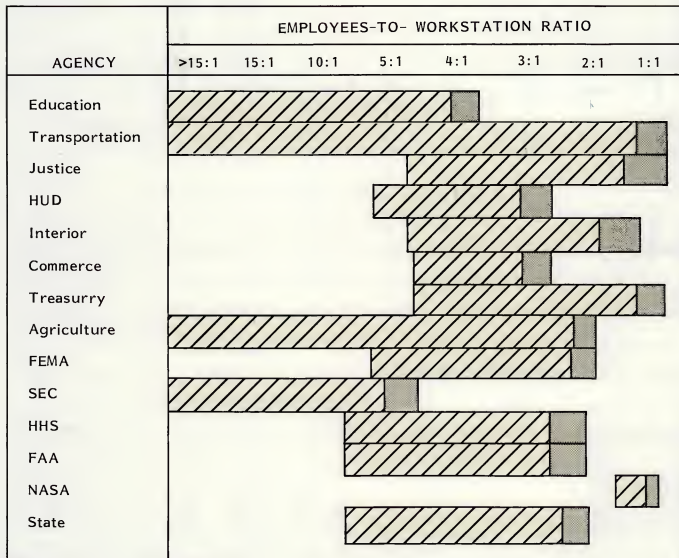
EXHIBIT IV-5

CONNECTIVITY STANDARDS AT SELECTED FEDERAL AGENCIES

AGENCY	STANDARDS	
	CURRENT	FUTURE
Civil Agencies		
Agriculture	RS-232	
NASA	SNA	X.25
Treasury	RS-232	
FAA		X.25
FEMA	FIPS	X.25
Education	FIPS	X.25
Treasury/Customs Service	SNA	X.25
Commerce		X.25
HSS		X.25
Justice	XODIAC/HYPERBUS	X.25
VA	WangNet	
Justice/FBI	RS-422 Fiber Optic Modem	
Defense Agencies		
Navy	Interface=TCP/IP	LAN=IEEE 802.3 X.25
OSD	FIPS	
Army		X.25
Air Force	WangNet FIPS	ULANA X.25

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- Most agencies prefer to follow developing industry standards for connectivity but face the dilemma of meeting needs quickly versus longer-range standards development. This is particularly evident in the Open Systems Interconnect (OSI) model of the International Standards Organization. Supported in part by the National Bureau of Standards (NBS), the ISO is encouraging industry's acceptance and implementation of OSI. But the OSI standards have developed slowly and industry has been even slower in developing full implementation of the standards that have been developed. Most agencies are meeting connectivity needs with currently available solutions and pay little regard for longer-term developments.

- The exception to this trend is evident in the direction of the Air Force. Their Unified Local Area Network Architecture (ULANA), developed by the Electronic Systems Division, will apparently become the Air Force LAN standard and subsume most of the OSI standards. Since the Air Force is DoD executive agent on standards, their efforts may well represent the next generation of connectivity standards for all of Defense.

- Related to the issue of connectivity is the issue of LANs versus multiuser systems. Multiuser systems, either minicomputer-based or multiuser microcomputers, have been slow to develop because of the low price of microcomputers. GSA, for one, predicts that minicomputer-based multiuser systems may yet emerge as processor prices continue to fall and provide greater capabilities with terminals that are less expensive than standalone microcomputers.

- The decision may become moot, however, as minicomputer users push toward LANs because of poor response time, downtime, and lack of applications software, and as standalone microcomputer users push toward LANs because of the proliferation of microcomputers, the inherent lack of control, I/O deficiencies, the need to share data and peripheral resources, and the need for work unit applications.

INPUT

c.   Standards for Data/Text Interchange

- Almost nothing is more frustrating to agencies than the incompatibility of data/text protocols and the seemingly constant rekeying of data/text into different systems. It is in this area that agencies may take their most aggressive position on standards and "encourage," if not force, industry to provide interchange capability.

    - Several agencies, most notably Defense agencies, will require the Document Interchange Format (DIF) originally supported by Navy. NASA hopes to adopt DIF by 1990, and the Justice litigating divisions would have adopted it except for the need for handling footnotes, a requirement that DIF does not readily support. They selected an ASCII print image protocol instead.

    - While IBM's DIStributed Office Support System (DISOSS), including Document Interchange Architecture (DIA) and Document Content Architecture (DCA), provides rules for exchanging and storing documents, some agencies feel it is far more a direction than a standard. Actual implementation of a standard text conversion facility may be available before the end of the decade. To be fully effective, DISOSS needs to be implemented at a work unit level with a better DBMS and a more efficient operating system, including a full integration of SNA across all DISOSS supported products.

- In the short term, agencies plan to use many protocol converters ("black boxes") and/or a limited set of applications software. (See Exhibit IV-6 for a representative list of acceptable packages.)

INPUT

EXHIBIT IV-6

DATA/TEXT INTERCHANGE STANDARDS AT SELECTED FEDERAL AGENCIES

AGENCY	INTERCHANGE STANDARD			
	DOCUMENT	DATA BASE	SPREADSHEET	OTHER
Civil Agencies				
Agriculture		IDMS, FOCUS	123	SAS
NASA	DIF (by 1990)			
Treasury	XED, Zilog Wordstar, Multimate Samna Word III (IRS)	DBase III (Micros) Informix (Minis)	123	
HUD	Samna Word III			
Justice	ASCII Print Image Word Product (Civil Div.)			Multiplan (Civil Div.)
VA	Wang OIS, Wang Office			
Defense Agencies				
Marines	DIF, Samna Word			
OSD	DIF DOD 7935:1			DOD 5000.31 (Interim List of Approved Higher-Order Languages)
DLA				"IBM-Compatible" Tools
Air Force	DIF Samna Word Wordstar, Multimate	DBase III	Enable	Windows

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d. Standards for Interoperability

- Agencies would prefer to have system uniformity and may, in fact, move toward a 1990s realization of that goal. But for now agencies will settle for interoperability--the capability of exchanging files and documents between systems in a multivendor environment. But even the short-term obejctive is difficult to achieve without either setting standards that are unrealistic in the vendor community or specifying procurement requirements that threaten allegations of lack of competitiveness. So, agencies seem to be falling behind a "current suite compatibility" caveat that allows them to build on the current hardware environment.

- As depicted in Exhibit IV-7, nearly every agency speaks of interoperability in terms of their current hardware. Even upcoming procurements will carry a "must be compatible with..." requirement. The Department of State, for example, currently uses Wang hardware and will specify in the procurement to be recompeted in the fourth quarter of GFY 1986 that the new system must be "Wang-compatible."

- In addition to MSDOS and PCDOS, Unix was cited by some agencies as an operating environment with potential as a solution in a multivendor environment.

  - Unix is transportable and so allows the integration of equipment. It gives flexibility in hardware and software decisions and could drive costs down. Other features include multi-tasking for concurrent execution and user familiarity through training center exposure.

  - The liabilities, however, seem to outweigh these advantages in the current view of agencies. Its scientific focus has created difficulty in transforming it to the business world in the forms of limited applications available, user unfriendliness, and/or inefficiency when it is made friendlier. The technical documentation only adds to its

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EXHIBIT IV-7

INTEROPERABILITY STANDARDS AT SELECTED FEDERAL AGENCIES
CIVIL AGENCIES

AGENCY	HARDWARE 'STANDARDS'
Agriculture/Forest	Data General
Agriculture/Soil Conservation	IBM System 36
NASA	64 Vendors, including NBI, DEC, NCR, Wang, IBM
Treasury	Zilog (Microcomputers)
Treasury (Field Offices)	Zenith
Treasury/Customs Service	AT&T
FAA	IBM-Compatible
Transportation	IBM (Workstation)
Energy	IBM (Workstation)*
SEC	IBM
Education	IBM-Compatible (Workstation)
Commerce	IBM-Compatible
HHS	IBM, Wang
HUD	IBM, Sperry**
Interior	Burroughs, Honeywell, CDC, Amdahl, IBM
Justice	IBM-Compatible
Justice/Civil Division	Data General
State	IBM, Wang
VA	Wang
Navy	Zenith (Microcomputer)†
Army	Zenith (Microcomputer)†
Air Force	Zenith (Microcomputer), Wang VS85 and VS100, Wang Professional Computer

*IBM won this contract for 2100 workstations but Computer Consoles is protesting.
**Future systems depend on HIIPS contract.
†Agency will be buying through the Air Force requirements contract.

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unfriendliness. Further, the many versions (now over 25 available) have created some incompatibility that stands to defeat its very appeal.

-   It seems unlikely that agencies will adopt Unix on a large scale in the near future. Rather, they are likely to wait until acceptance in the commercial world has grown and some of the limitations mentioned above are removed.

C.   ENABLING TECHNOLOGY

-   When asked to identify technology-related factors that will impact the way agencies conduct their OIS business, the respondents offered items that generally fit into the categories listed in Exhibit IV-8. In some instances "wish list" items appeared because they are the "leading edge" of technology, but, more often than not, items were mentioned because agencies view these items as current solutions to nagging problems. Further, the list seems to reflect a desire that these available solutions be offered by major vendors who have the service reputation and financial stability characteristics that accompany less risky procurements.

-   As discussed earlier, agencies desire a higher level of compatibility between data and document formats and between existing systems (hardware and software) and new systems. They do not like the result that each procurement further limits their future options or requires substantial conversion of both software and data. Many agency representatives called specifically for adoption of DIF and OSI standards.

-   Enhancing features are really extensions of current products that add use-ability by solving specific agency problems.

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EXHIBIT IV-8

ENABLING TECHNOLOGY IMPACTS

- **Integration Capabilities**

  - **Document Interchange Format**

  - **Multivendor Systems Interfaces**

  - **Fully Integrated Applications**

- **Enhancing Product Features**

  - **"Virtual Desk"**

  - **Image Processing**

  - **Data Storage and Retrieval**

  - **Embedded Security**

- **Convenience Features**

  - **"Easy to Learn"**

  - **"Easy to Use"**

  - **Flexible Software**

  - **Ergonomic Designs**

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- The "virtual desk," for example, represents a concept that puts all of the information worker's tools in a single box with the power of a small mainframe. Such a workstation will include integrated voice/data/image technology and, at some point, portability without loss of features or functions.

- Image processing, including use of facsimile, intelligent copiers, large-scale OCR, and other image capture technologies, represents a request to do to image manipulation what has been done to text and data manipulation.

- Data storage and retrieval technologies will help agencies develop more cost effective storage and provide more sophisticated methods for records management. These technologies include optical disks, data computation methods, library-type retrieval approaches, and the use of institutional data base machines, DBMSs, and fourth generation languages that provide natural language-based retrieval.

- Embedded security, specifically mentioned by the Defense agencies, will make access and data integrity issues less of a problem. Secure fiber optics is viewed as a partial solution.

- Convenience features address the individual needs of users in a variety of ways.

  - Better training methods, including use of optical disks and documentation that is sensitive to individual differences, help agencies by reducing the training requirements inherent in every system change.

  - Systems that are easy to use have transparent interfaces and are easily tailored to individual applications. Related to the latter, off-the-shelf software that fits government practices could save money over software that requires practices to change to fit the software.

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- Similarly, ergonomic designs, especially more appropriate keyboard designs and safer displays, will address fatigue and health issues related to extended use of workstations.

D. NON-TECHNICAL IMPEDING FACTORS

- For all the strategizing discussed above, agencies may not be able to achieve their OIS goals if funding levels become more restrictive, if the standards issues are not resolved, if skilled personnel remain in short supply, or if the distribution of data/information/knowledge within an agency is not managed (see Exhibit IV-9).

1. RESTRICTIVE FUNDING LEVELS

- Large in its physical plant, the federal government is equally large in both its revenue receipts and revenue shortfall against those receipts. If left unchecked, that shortfall could top $200 billion in 1986.

- The proposed 1987 budget, according to one administration official, is designed to "stop signing our children's names to IOUs for our own pocket money, ensure a stable, secure nation and world by modernizing our defensive forces, and provide the scientific and human resources to maintain the nation's leadership in an increasingly competitive marketplace."

- Gramm-Rudman-Hollings (GRH) requires elimination of the federal deficit by 1991. To meet this goal, spending in 1986 must be reduced by 4.3% for civilian programs and 5% for all military programs except the Strategic Defense Initiative ("Star Wars").

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EXHIBIT IV-9

NON-TECHNICAL IMPEDING FACTORS

- Restrictive Funding Levels

- Lack of Standards

- Shortage of Skilled Personnel

- Management of Data/Integration/Knowledge

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- While the final destiny of the Balanced Budget and Emergency Deficit Control Act of 1985, better known as GRH--the latest congressional attempt to exert some control over the deficit--has yet to be determined, federal services indicate some likely directions with respect to information technology obligations.

    - At the very least, GRH signals a halt to acquisition of new hardware "because it's there." Agency managers at all levels will now be required to rethink their productivity improvement plans and prepare to provide credible evidence to a top level review council that the proposed acquisitions will indeed provide benefits (read "cost savings") that could not as readily be achieved via other strategies.

        . The specifics of the justification will likely differ by agency. DoD, for example, will likely seek savings through initiatives that offer to reduce the work force. Civil agencies, on the other hand, may prefer initiatives that preserve an already reduced staff. In either case, short-term dollar savings will tend to precede long-term impacts, regardless of the consequences.

        . Agencies do feel that OIS initiatives are quite defensible, particularly given the lower dollar expenditures that are required. But respondents also acknowledge that "paper pushing power" may continue to take a back seat to traditional functions. Office information systems targeted at professionals are not easy to cost-justify. These systems are analysis- and communications-based and primarily generate intangible benefits--improved productivity, increased quality, better decisions. Tangible benefits include cost displacement, reduced personnel costs, and reduced backlogs.

        . In an attempt to quantify benefits, the key assumption is made that time is of value and time savings represent potential

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benefits. Unlike the factory where it is openly recognized that automation reduces the number of employees, in the office the impact of automation on white collar workers is considered a sensitive issue, thus the emphasis on productivity versus cost savings.

. Benefits usually take one or more of the following forms: expanding labor input, but at a rate less than the growth of output; similarly, holding labor input constant but increasing the quality of the output; reducing labor input and holding the output constant; or reducing input at a rate greater than the cutback of output.

. This justification will include risk analysis and trade-off studies that represent new opportunities for commercial service vendors. For "product" vendors these studies could represent additional marketing investments. In fact, many of the agencies interviewed expressed an intent in having vendors provide these benefit statements.

- For some agencies, meeting GRH deficit reduction levels will require spending cuts of varying magnitude, from travel restrictions and training and support reductions to limitations in the number of planned equipment purchases on a given contract. Agencies believe this latter approach could impact the progress agencies have made in reducing employee-to-workstation ratios. Specifically, they feel that GRH could result in fewer microcomputers and workstation buys made from indefinite quantity requirements contracts.

- A third response may be to stretch out programs and/or combine second-tier programs with other, more beneficial first-tier programs. This approach will be embraced particularly for initiatives that meet deficit reduction objectives but do not deliver the short-term

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benefits. A variation on this approach may result in the restructuring of proposed initiatives. Several agencies stated that they are now considering restrictions of their current hardware suite and/or scaling back the hardware component of initiatives that are about to get under way.

- Agencies do not seem to have made procurement cancellation decisions at this point. The cloud surrounding GRH, both in terms of the constitutionality of its provisions and the specific dollar reductions required at the subagency level, has led to a "wait and see" posture. As one respondent put it, "given time, Gramm-Rudman may go away, and if it doesn't, at least the reduction requirements wil be clear."

2. LACK OF STANDARDS

- While the adoption of standards benefits agencies by helping them control their systems and more readily approach long-term goals, the imposition of standards does have its downsides.

    - Standards have the potential for limiting completion.

    - Standards can be a threat to vendor innovation.

    - Standards can restrict users' options as new technology emerges.

- Agencies have yet to develop a comfortable position with respect to issuing and following standards, nor are they likely to in the near future. More likely, agencies will follow the industry standards as they develop and, at the same time, impose non-restrictive standards on procurements when possible. A most interesting development is the potential for de facto standards through requirements-type contracts. Several agencies have used this vehicle for OIS and microcomputer workstation buys and are likely to continue to do so. For winning vendors this means very large contracts and offers the potential for

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the vendor to become a deep-rooted incumbent because of the large and pervasive installed base.

3. SHORTAGE OF SKILLED PERSONNEL

- Several factors have come together to make this a serious concern of agencies:

  - Staffs have been cut.

  - Government salary levels are not sufficient for the remaining "cream of the crop."

  - Technology is rapidly changing and creating large training requirements.

  - Training is expensive and frequently ineffective.

- Many agencies expressed concern over these developments, but few seem committed to fully address the problems. Primarily the reason is money, for training requires ADP to take a triple-barrel hit: the cost of training, the salary of the trainee during training, and the cost of replacing or doing without the work the trainees would have done were he/she not in training.

- Again, no easy solution is emerging. Agencies are likely to require more from vendors in the way of training and, at the same time, limit procurement options that require extensive (re)training.

- One other personnel-related issue that must be mentioned is the potential impact of automation on the way information workers perform these tasks. Agencies and vendors may be overlooking the discrepancy between the skills and attitudes of the paper-based worker and the skill and attitude requirements of the worker with automated tools.

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- Every issue, from typing skills and attitudes toward automation to the assessment of quality of output in an essentially quantitative environment, must be explored and provided for via training or reassignment.

4. MANAGEMENT OF DATA/INFORMATION/KNOWLEDGE

- The distribution of data/information/knowledge over the computer/communications network has been sporadic and uncontrolled. Too much attention has been placed on the technology and too little attention placed on the management application of the technology.

- Information is seen by agencies as an important asset, but no one can place a value on it because it is one of quality, not quantity; more gigabytes of data do not add value.

- Valid and reliable assessments of productivity increases through OIS have not been developed in this environment. Justification based on a simplistic more-input-equals-more-output model may leave OIS without the support it deserves.

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V COMPETITIVE TRENDS

A. VENDOR MARKET PRESENCE

- Office information systems are supplied to the federal government by three general categories of vendors based both on the extent to which the product is OIS-focused and the extent to which the product/service is a complete, "turnkey-like" office system. Examples of vendors in each category are presented in Exhibit V-1. To be sure, many of the major OIS vendors could arguably be placed in other categories, but for the purpose of this discussion, these categories will be used.

- As noted in the exhibit, there are few federal suppliers of office information systems who target OIS as the primary application. More often than not, vendors find themselves in this market because of the centrality of their product or service to the OIS functions.

    - General purpose hardware vendors, for example, frequently provide word processing software as a secondary, but necessary, component of their product offerings.

    - Minicomputer vendors and, more so, microcomputer vendors have found their systems at the heart of an office support environment. Yet, except for the traditional office systems suppliers (i.e., Wang, Harris/Lanier, IBM, NBI, etc.), most did not target this application.

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EXHIBIT V-1

FEDERAL OIS VENDORS CATEGORIZED BY OIS FOCUS

- **Primary Focus on OIS Hardware Systems**

IBM	Datapoint
Wang	Lanier
Xerox	NBI
Kodak	CPT

- **Primary Focus on OIS Support Services and Products**

Lotus Development	AT&T	MSA
IBM	Dow Jones	McDonnell Douglas
Ashton-Tate	MCI	Zenith

- **Primary Focus on Non-OIS Specific Services and Products**

Control Data	Prime	Comshare
Amdahl	Convergent Technology	NCR
Digital	Sperry	Hewlett-Packard
Data General	Boeing	EDS
Cullinet	ADR/Ameritech	CSC
SDC/Burroughs	Cincom	PRC
Honeywell	Federal Data	CDC
CCA		

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But with the rapid rise in use of microcomputers by knowledge workers with office information systems applications and the need for work unit support, these vendors have become key.

- Even vendors coming from a DBMS orientation have become a part of this market. Cullinet, Ameritech/Applied Data Research, Cincom, and Software AG--to name a few major vendors--have supplied not only the data base systems that serve as repositories for knowledge workers' products, but also the links to tie these workers to the data base.

- The most removed group in terms of planned OIS initiatives is, perhaps, systems integrators. Except for the occasional assignment that calls for the development and implementation of an office information system, most integration jobs are traditional ADP-applications with, in some instances, an OIS requirement.

● The point of this discussion is that there are many vendors in the federal OIS market and most have come to the market from other orientations. But as the line between traditional ADP and OIS has blurred, so too has the line between vendor revenue that is OIS-related and that which is not. To see through this cloud in terms of OIS market share, INPUT analyzed each vendor's federal information services revenue and estimated the extent to which the revenue was derived from the fulfillment of OIS requirements. Admittedly, as the focus moves from "OIS-specific" to "OIS-related" the level of market share accuracy declines. Share data are, then, an attempt to gauge the relative size of market participants rather than provide a definitive ranking.

● INPUT's estimates of the 1985 OIS-related revenue of leading vendors is presented in Exhibit V-2. Vendors noted for their hardware-oriented products/services are listed separately from vendors with a software or professional services orientation. As discussed earlier, this market has been heavily hardware-oriented as agencies strive to meet the first priority of

EXHIBIT V-2

RANK ORDER OF LEADING FEDERAL OIS VENDORS

CATEGORY/ VENDOR	1985 FEDERAL OIS* REVENUE ($ Millions)
Hardware Orientation	
Wang	$152
IBM	135
Digital	60
Data General	36
Sperry	12
NBI	24
CPT	20
Xerox	15
Honeywell	10
AT&T	10
Software & Services Orientation	
PRC	28
CSC	22
SDC/Burroughs	12
Cullinet	10
Boeing	10
Lotus	8
McDonnell Douglas	6
EDS	4
Ashton-Tate	4
ADR	2

*INPUT Estimate.

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providing processors to knowledge workers. As the hardware is put in place, INPUT expects the orientation to shift gradually, first to software and then to systems integration as agencies seek work group and institutional level inter-operability of OIS.

- Perhaps as telling about vendor presence are recent OIS-related awards. Several are listed in Chapter VI. Additional information is provided below:

    - Bionetics Corporation manages the teleconferencing system at the federal center in St. Louis. The system, designed in 1983 by Army's AUSCOM, uses electronic blackboards and microcomputer-generated graphics to enhance presentations. Savings are estimated at over $90,000 annually.

    - Computer Corporation of America was awarded a subcontract for up to 500 copies of its Model 204 DBMS through the systems integrator, GTE, for an Air Force Worldwide Military Command and Control System initiative.

    - Computer Sciences Corporation has recently been awarded several contracts with OIS components.

        . The Local On-Line Networking System (LONS) is a $186 million systems integration project to acquire OIS for parts of the Air Force using off-the-shelf office support products.

        . With Kodak, CSC is developing an electronic records management system for the National Flood Insurance Program. Based on the Kodak Image Management System and using a LAN, the system will be able to retrieve and display microfilmed records within 45 seconds instead of two days under the current paper-based system. The product of the joint effort will become available commercially in 1987.

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- CSC won a $15 million OIS integration project for NASA's Kennedy Space Center. The completed system will include a distributed network of advanced automation host processors and broadband LAN for 1,000 intelligent workstations. A similar system at the Johnson Space Center is also being designed and installed by CSC.

- With AT&T, CSC is developing a Consolidated Network for Customs that will carry OIS traffic. This project is valued at $282 million.

- Cullinet has recently sold a variety of its data base management system products to Justice, Treasury, and the U.S. Postal Service. Some of the systems will, purportedly, include Goldengate or Infogate links between the DBMS and the individual users.

- Data General is a subcontractor to the integrator, Tisoft (Fairfax, VA), on AMICUS II for Civil Division of Justice.

  - This initiative will include telecommunications, word processing, electronic mail, and case management and tracking for the division's 900 lawyers. The total configuration consists of more than 35 Eclipse 32-bit MV superminis, 1,000 portable and stand-alone workstations, Wordperfect, Mathplan (Satellite Systems), and Xodiac and HYPERbus (Network Systems) LANs.

  - Data General also has OIS installations in the U.S. Senate (Eclipse MV/4000, MV/8000 II, MV/10000, and Comprehensive Electronic Office) and NASA's Marshall Space Flight Center (MV/1000 and CEO).

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- EDS, trying to add OIS capabilities to its extensive list of successes, recently encountered problems in using AT&T computers in both Customs and USDA.

- Honeywell has DPS 6 hardware and its OAS software installed in the U.S. Senate. Other awards may have been impacted by the four-week closing and 120 layoffs in the Small Computer and Office Systems Group.

- IBM's strong presence in the OIS market was recently bumped by a protest from Computer Consoles over an award for 2,100 workstations for Energy. Apparently on the basis of IBM's significant modifications of the specifications, Energy has been required to reconsider the proposals of the two finalists. CPT, a third bidder, will not be included in the reevaluation.

- PRC's integration successes are noteworthy.

    - $380 million contract from the Patent and Trademark Office.

    - $6 million nationwide office automation in Agriculture.

    - $30 million to develop, install, and maintain an office auto-mation and management reporting system for 100 Army Inspector General offices worldwide.

    - A local area network for the Executive Office of the President to control the proliferation of microcomputers.

- Samna Word word processing software is now used by Secret Service, HUD, IRS, Air Force, and some Navy and Marine locations. Samna has also been bid on a 90,000 package Air Force contract that would also allow DLA and Army to acquire the software.

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- Wang's successes include:

    - An Air Force contract valued at $480 million for 32-bit VS-based management information systems using Wang's professional microcomputers, office automation software, and networking--Wang beat IBM's 4361-based bid.

    - A Veterans Administration award ($60 million) to install and support integrated information processing systems that include VS minis, professional computers, local and remote WangNet, and Wang Office.

    - An HHS contract for $14 million for VS computers, terminals, peripherals, and office software for HHS headquarters and 52 offices associated with the Office of the Secretary and Assistant Secretaries for Personnel Administration and Human Development.

    - A $32 million contract with the Joint Chiefs.

    - A $17 million Army contract for 3,500 Wang microcomputers and WangPIC image processors.

- Zenith is perhaps the most surprising new entrant with recent awards from IRS and Air Force.

    - The IRS award is part of the Automated Examination System and calls for laptop computers with associated notepad and calendaring software. The value of the contract is $27.6 million.

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- The Zenith package for the Air Force includes Z171 micro-computers (manufactured by Morrow Design, San Leandro, CA), Windows (Microsoft), dBase (Ashton-Tate), Wordstar (MicroPro), and Multimate (Ashton-Tate). Total award value is estimated at $242 million.

B. VENDOR STRATEGIES

- Several interrelated strategic directions are emerging as vendors seek to establish or reinforce their presence in the federal OIS market. Exhibit V-3 depicts these key strategies.

1. PRODUCT LINE EXTENSIONS

    a. In-House Developed Products

- Cincom is offering a relational DBMS, SUPRA.

- Cullinet has added to its product line with a microcomputer link to their mainframe DBMS, Trendspotter, and an executive-level decision support system.

- Data General's Dasher/One now extends the functionality of CEO to MS/DOS. It is an intelligent workstation for integration into distributed processing or agency computing environments. It is Eclipse-compatible.

    - Data General has also added Technical Electronic Office (TEO) which includes OIS-type functions for engineers.

    - Data General's 32-bit Eclipse MV/2000 computer is designed for 4-24 users in a departmental operating system. The MV/2000 Model 2 (aka Viking) is a 10 MIPS dyadic supermini.

INPUT

EXHIBIT V-3

STRATEGIC DIRECTIONS OF FEDERAL OIS VENDORS

- **Product Line Extensions**
  - **In-house Developed Products**
  - **Co-ventures**

- **Product Integration**
  - **Intra-company**
  - **Inter-company**

- **Pricing**

INPUT
GOIS

- Digital has added fourth generation language products including VAX Teamdata, VAX Rally, and VAX Cobol.

    - Digital has announced a 200,000-page optical disk storage system for MicroVAX and VAX stations.

    - Digital is providing A-to-Z, an integrated system for OEMs to use to migrate software to MicroVAX.

    - Digital is replacing their VAX 11/780 with a VAX 8200 uniprocessor and two dual processors, the 8300 and 8800. All-In-One will eventually be offered on the 8800.

- Hewlett-Packard offers users a choice of relational or networking methods for DBMS in its Allbase/XL product.

    - Hewlett-Packard's Personal Productivity Center is a departmental processor using either PC LAN or H-P's Vectra for electronic mail, data base access, and communications with the IBM environment.

- IBM now offers DisplayWrite/370 for its mainframe, signaling its standardization on that word processing system.

- Northern Telecom offers switching capabilities, voice annotation, and voice store and forward within an integrated PBX OIS environment.

- Prime has repackaged its 2655 for office and CAD applications. The new machine is aimed at the VAX market.

- Sperry offers Q-Office on the Series 5000 Unix system for word processing, text composition, electronic mail, and windowing.

INPUT

- Wang's multicomputer is the Resource Sharing Facility (RSF) for Release 7 of the VS operating system. It creates and permits access to a data base at the departmental level for 800-1000 users. RSF also allows up to four VS super-minis to co-exist.

- Xerox Documenter System is a Xerox 6085 professional computer workstation directly linked to one of several printers, including the 4045 CP laser printer.

- Vendors that aggregate and/or disseminate external information have also expanded product lines.

  - Information/Handling Service, Institute for Scientific Information, Disclosure, Find/SVP, Information on Demand, InfoStore, and Information Retailers all provide aggregation and distribution of specific types of information.

  - Dow Jones News/Retrieval, Lockheed's Dialog, Mead Data Central, Source Telecomputing, and Bibliographic Retrieval Service all provide electronic information distribution.

b. Co-Ventures

- CSC has signed a multimillion dollar contract with AT&T to provide market research, software design, turnkey software development, and the use of certain existing software to develop AT&T's OIS product. The software will run on Unix System V and take advantage of AT&T's 3B processor and digital PBX.

- AT&T is supplying Genicom laser printers as the first step in its desktop publishing effort.

- Data General has acquired an interest in Dama Telecommunications (Parsippany, NJ). Dama makes digital voice/data communications and private network gear.

INPUT

- Honeywell is purportedly working with NEC on the development of large processors.

- Wang has joined with Hartford Technology to develop Professional Office Creation Environment, an applications development system that includes an IBM mainframe link, electronic mail, and text processing.

- Wang teamed with Telenova (Los Gatos, CA) for voice/data PBX tied to VS. The switch has an 18 MIPS Ethernet that can handle 120 handset/PC pairs.

2. PRODUCT INTEGRATION

   a. <u>Intra-Company</u>

- Comshare's Executive Information System (EIS) is a high-level language for custom menu development, micro-host communications, administration and distribution of reports and charts, and a relational decision support system for analysis and report creation.

- CSC has developed an OIS system that integrates host processors and bit-mapped graphics workstations from different manufacturers through the use of standardized, high-level communications opreating under Unix with off-the-shelf OIS software.

- Convergent Technologies provides voice/data document integration in its Voice Processor.

- Data General now offers a voice/data terminal, Dasher D555, that operates in the CEO office environment and supports voice annotated text.

- Datapoint provides a video/voice/data desktop workstation, MINX.

INPUT

- Digital has over 2,500 VAX Clusters installed. This multicomputer cluster strategy is designed for very large systems using a common data base.

    - Digital's All-In-One is geared to departmental OIS and includes word processing, electronic mail, time/resource management, information management, and business-specific applications.

- IBM has a four-layer integration strategy: PC Network, VM Professional Office with electronic mail and document exchange, IBM 370 with DISOSS and Personal Services Document Distribution (PSDD) connecting PCs, and PC-S/36 using DisplayWrite 3.

    - IBM is positioning the System 36 as the departmental computer to be used in integrated offices. Recent product announcements permit information exchange among PC, System 36, and System 370 users.

    - IBM's SNA offers peer-to-peer communication and document distribution across dissimilar IBM office hardware. IBM does not have full integration of SNA across all DISOSS-supported products.

- Sperry uses SperryLink PC on the Series 1100 mainframe and DOPS/20 departmental system. MS/DOS and SperryLink files can be converted reciprocally, essentially making an electronic mail offering.

- WangOffice is an integrated system of electronic mail, calendaring/scheduling, and data base access. The WangOffice Assistant supports multitasking.

    b.   Inter-Company

- AT&T is developing a command-structured language for describing formatted pages that it hopes will be a new standard for documents.

V-14

INPUT

- Boeing uses DISOSS in Boeing Information Exchange, a multivendor network for Wang, Xerox, Hewlett-Packard, and IBM systems. Boeing has also been instrumental in advancing a Technical Office Protocol (TOP), along with the more noted Manufacturing Automation Protocol standard.

- Data General's AOS/VS operating environment supports X.25, SNA, IEEE 802, MAP, and IBM's DIA/DCA.

  - Data General's Advanced Operating System/Distributed Virtual Storage (AOS/DVS) supports Ethernet, and IEEE 802.3.

  - Data General's CEOWrite word processing software is now available under MS/DOS for Dasher/One, DG/One, and IBM/PC.

  - Data General's Xodiac Transport Service/SNA (XTS/SNA) links distributed processing systems into the SNA network.

- Digital is selling its networking capability with the claim that it can do more with off-the-shelf products.

  - Digital's DECNET DOS VI.1 allows the IBM/AT to connect directly with Ethernet. The entire Digital Network Architecture is based on DECNET protocol which, in turn, is based on the OSI model for use in multivendor environments.

  - Digital's External Document Exchange facility can access and edit DISOSS-type documents.

- Harris sells Concept 4300, a multiuser, multitasking office automation system that runs Xenix or PC/DOS 3.1 connected via its Perspective product which supports IBM's NETBIOS and, in effect, integration.

INPUT

- Hewlett-Packard offers SNA Server, an interface between SNA/MVS and HP 3000, in both interactive and batch modes.

- Honeywell's Office Management System (OMS) 22, 40, and 90 product lines have office processing capabilities and Docu-Link to share DISOSS-type formats in an SNA environment.

  - Honeywell's line of microcomputers, the XP and AP, are IBM-compatible.

- IBM offers several products which support most functions of the OSI Reference Model. An X.400 messaging standard is reportedly in the works.

- NCR's Comten and Office Systems Divisions are developing interfaces to DISOSS and PROFS.

- Wang supports 10 MIPS 802.3-standard Ethernet and IBM/PC Network on its broadband WangNet. Wang's Professional Computer is IBM-compatible.

- Xerox now offers Ethernet for SNA and Digital environments.

- Many vendors have also developed Unix systems as a solution to multivendor environments.

  - AT&T proclaimed Unix System V as a standard.

  - Burroughs has the EX series.

  - Data General has DG/UX for Exlipse.

  - DEC has Ultrix on MicroVAX II as well as a version for its PDP-11 line.

INPUT

- IBM has PC/IX (from Interactive Systems) or Xenix (Microsoft). Series/I runs IX or CPIX. Mainframes run VM/IX or IX/370. IBM's "Sailboat" project uses Unix System V in a RISC workstation, principally designed for engineering, ranging from 1 MIPS to 25 MIPS, and priced in the $15-70,000 range.

- NCR's Unix is Tower.

- Sperry, using NCR, Computer Consoles, or Areta Systems Unix versions, has Unix on its 5000 and 7000 product lines.

- Wang's only Unix machine is the Advanced Professional Computer, which is IBM PC/AT compatible.

3. PRICING

- In an attempt to develop an installed base or switch from one-time sales to recurring revenues, vendors, especially packaged software suppliers, have been offering enticing discounts.

  - IBM has been offering six free months or no initial charge (valued at $16,000) to new DB2 users.

  - ADR recently cut the price on its Datacom/DB data base management system.

- Microcomputer software firms have been most active in discounting.

  - Recent government contracts have carried such prices as Microsoft's $700 Cobol Compiler for $13, Enable (Software Shop) down from $695 retail to $87, and Ashton-Tate's Multimate ($495) for $148.

INPUT

- Zenith Data System's Air Force contract lists Breakthrough Software's project management package ($495) for $53.

C. ISSUES

- As evidenced by the preceeding discussion, OIS vendors are actively pursuing product development strategies that are designed to provide federal users with an even wider list of alternative components with which to build a complete OIS solution. Missing for the most part, however, are the solutions themselves, particularly as they must be realized in a multivendor environment. The creation of unity out of diverse technologies that affords the timely delivery of office services has yet to evolve.

  - Microcomputer penetration has increased most vendors' level of OIS support, but most vendors do not have a standard operating environment that would reduce the current limited distribution of functions across various sizes and types of machines.

  - Similarly, data/information exchange in a multivendor environment is restricted by the lack of standardization of data/text protocols. What is needed, for example, is a vehicle for moving from IBM's PROFS to Digital's All-In-One, or from Data General's CEO to WangOffice.

  - In the absence of such capabilities, agencies are being forced to require a least common denominator (e.g., Justice's ASCII print image protocol requirement), force a standard on suppliers (e.g., Navy's DIF), or use contracting vehicles (e.g., the Air Force requirements contract with Zenith Data Systems) to acquire a single vendor's product on an agency-wide basis.

INPUT

- While agencies are reluctant to force standards on the industry, there is cause for the vendor community to adopt standards that would make compatibility a non-issue.

- While some "deal making" is occurring between agencies and vendors using price as the vehicle, there undoubtedly will be more.

  - The growing desire of agencies to increase efficiency and productivity will increase demand for OIS support and, in turn, put upward pressure on prices.

  - However, price-sensitive agencies will require more proof of a vendor's products as cost-effective solutions and the assumption of more risks on the part of the vendor.

  - Foreign competitors and required use of small/minority businesses, particularly in microcomputer acquisitions, will also limit growth via price increases, especially in non-critical and non-sensitive procurements.

  - With the ratio of software to hardware costs shifting to the software side, vendors will need to overcome the user mentality that the cost of the software cannot be more than the cost of the hardware. Part of the solution may be an increased emphasis on custom modifications of packaged software.

- Vendors who choose to provide products and services to the federal government suffer both indirectly as the result of requirements placed on agencies and directly as a consequence of regulations.

  - The Paperwork Reduction Act, for example, requires that agencies consider information, including that generated by OIS, as a resource to be managed through a total life cycle from collection to dissemination. As elaborated in Circular A-130 agencies are to:

INPUT

- Create or collect only necessary information and only after planning for its processing, transmission, dissemination, use, storage, and disposition.

- Seek to satisfy new information needs through resources before creating or collecting new information.

- Establish multiyear strategic plans for acquiring and operating information technology and establish systems of management control.

- Meet needs through interagency sharing and commercial resources before acquiring new processing capability.

- Ensure that existing and planned information systems do not unnecessarily duplicate systems in the private sector.

- Acquire off-the-shelf software unless the cost effectiveness of developing custom software is clear and has been documented.

- Acquire or develop systems in a manner that facilitates necessary compatibility.

- Use Federal Information Processing and Telecommunications standards except where it can be demonstrated that doing so exceeds the benefits or will impede accomplishment of the mission.

- The Brooks Act (1965) gave GSA sole authority to procure or authorize the requesting agency to acquire ADP systems. Although premised on large systems, if OIS equipment contains data processing components it must be procured under GSA standards and rules governing competitiveness.

INPUT

- GAO reports have faulted agencies for:

    - Not studying alternative methods of acquisition.

    - Leasing rather than purchasing.

    - Using vendor-specified programming languages.

    - Not consolidating small-volume orders, purchasing in excess of need, and not using word processing to reduce cost and size of work force.

    - Not realizing maximum productivity gains.

    - Use of untested technology.

- In short, elaborate and rigid procurement procedures designed to safeguard against contracting violations often are at odds with the need to solve problems quickly and efficiently. As a result, technology developments outrun the procurement process and often result in the procurement of outdated equipment.

    - Overspecification is a related issue caused by non-technical contracting officers.

    - It is difficult to be both competitive in procurement practices and meet compatibility requirements, especially with a large base of installed equipment.

INPUT

D. RECOMMENDATIONS

- Vendors seeking to grow their federal OIS-related business must be sensitive to the evolving nature of the market and responsive to both short-term requirements and long-term directions of agencies (see Exhibit V-4).

- Operationally, this suggests they can neither focus exclusively on the current opportunity nor on the strategic thrust of the agency. Rather, vendors must respond to multiple levels of concern.

  - As pointed out in previous discussions, agencies differ in terms of their level of centralization of planning and degree of standardization. A specific requirement may be laden with these pressures, and the unknowing vendor could find the proposed solution at odds with one or both.

  - The marketing intelligence required to understand opportunities at these levels, however, requires a level of investment in staff that many vendors may not be able to afford.

  - The solution it seems is to select opportunities carefully in an attempt to maximize the effectiveness of the effort. INPUT has suggested that this is one market where a successful bidder will likely enjoy much follow-on work, particularly professional services which could substantially reward the investing vendor.

  - Vendors should carefully review the information in this report and identify opportunities for which they are well qualified and which seem to be pivotal agency initiatives. These are the programs that vendors can not only win, but grow.

INPUT

EXHIBIT V-4

VENDOR RECOMMENDATIONS

- Understand the Evolving Agency OIS Environment

- Develop Interoperable Offerings

- Bid Solutions with Future Applicability

INPUT
GOIS

- Agency knowledge without acceptable offerings will not win contracts, however. This marketing intelligence must be backed up by products and services that enhance agency flexibility, not diminish it. In large part this means that vendors must prepare to offer interoperability--products must fit the networking architecture and exist in a multivendor environment.

  - For many of the current federal OIS vendors this notion has meant the development of interfaces, either on a communications protocol level or on a data/text/image format basis. While these efforts make for attractive features, vendors are being forced into selecting targets with which to interface. The resulting list of "compatible with..." statements becomes more a function of the development investments vendors are willing and able to accomplish, rather than a function of strategic direction based on technological insights.

  - Perhaps in the short run vendors have no choice but to open portions of their systems while protecting other portions as proprietary. However, contractors need to be mindful of probable federal OIS requirements which, in many cases, are different from commercial targets. Digital and Wang equipment would seem to be likely targets in this market, with "IBM-compatibility" a necessity in the microcomputer arena.

  - Long term, Unix may provide the operating environment solution, although there is no rush evident in the federal market.

- Agencies are looking for "open ended" solutions that meet current require-ments while offering gateways to the future. Agencies are increasingly unwilling to buy short-term solutions that only reduce an already inflexible OIS environment.

  - Vendors need to continue to develop strategies within their product lines that benefit multivendor environments. Even more important, vendors need to develop relationships with other vendors that permit

INPUT

offerings in line with requirements, rather than in line with the vendor's own product lines.

- The successes of CSC are of particular note in this regard. Both the Air Force LONS award and the joint venture with AT&T play to CSC's capability of delivering integrated OIS solutions using off-the-shelf products from multiple vendors.

• The federal OIS marketplace, for all its nuances, shows every sign of emerging as a dynamic growth opportunity for vendors willing to make expedient moves while investing in long-term development and willing to sacrifice some proprietary products for larger rewards found through selling capability.

INPUT

VI KEY OPPORTUNITIES

- This section describes specific opportunities in the federal office information systems (OIS) market. Two lists of programs are provided.

    - Recent Awards.

    - Future Opportunities.

    Although neither list is all-inclusive, both consist of major programs which are typical of the federal OIS market.

- The list of opportunities becomes smaller after FY87 because new programs have not yet been identified or initially approved by the responsible agency. Subsequent issues of this report and the INPUT Procurement Analysis Reports will include additional programs and detailed program information for the FY88–FY91 timeframe.

A. PRESENT AND FUTURE PROGRAMS

- New OIS programs that are larger than $1-2 million are listed in at least one of the following federal government documents.

INPUT

- OMB/GSA Five-Year Plan, which is developed from agency budget requests submitted in compliance with OMB Circular A-11.

- Agency long-range information resource plans developed to meet the reporting requirements of the Paperwork Reduction Act of 1980.

- Agency annual operating budget requests submitted to both congressional oversight and appropriations committees based on the OMB A-11 information.

- Commerce Business Daily for specific ADP and telecommunications opportunities, for qualification as a bidder, and to obtain a copy of an RFP or RFQ.

- Five-Year Defense Plan, which is not publicly available, and the supporting documentation of the separate military departments and agencies.

- Classified program documentation available to qualified DoD contractors.

- Agencies may or may not explicitly identify OIS programs in these documents.

  - Larger program initiatives frequently include OIS capabilities such as spreadsheets or word processing.

  - Agency-wide hardware requirements contracts serve both OIS and general purpose computing needs.

- Agencies use a variety of definitions and acronyms in reference to OIS programs.

  - GSA, Navy, and Commerce use OIS.

INPUT

- Air Force, Transportation, and Interior use Executive Information System (EIS).

- HHS, Justice, and Labor use Decision Support System (DSS).

- Other agencies use the more traditional term, Office Automation (OA).

• All funding proposals are based on cost data of the year submitted with inflation factors dictated by the Administration as part of its fiscal policy and subject to revision, reduction, or spread to future years in response to Congressional direction. Some additional reductions will be likely in FY87 and beyond due to the deficit reduction constraints of the Gramm-Rudman-Hollings Act.

INPUT

B.   RECENT OIS AWARDS

AGENCY/PROGRAM (PAR REFERENCE)	CONTRACTOR(S)	VALUE ($M)
Air Force Minicomputer Multi User (AMMUS) (V-1-19)	Wang	480.0
Local On-Line Networking System (LONS)	CSC	186.4
Small TEMPEST Computer Requirements Contract (V-1-58)	Zenith	99.8
Initial Computer Support - Accounting and Finance Office of the Future (V-1-75)	Sperry	26.0
DEPARTMENT OF DEFENSE - DEFENSE LOGISTICS AGENCY		
Engineering Drawing Automated Storage and Retrieval Equipment (EDASRE) (V-4A-7)	Infodetics	8.0
CIVIL - AGRICULTURE		
Automation of State and County Offices (VI-5-3)	IBM	110.0
Electronic Management and Dissemination of Information (VI-5-5)	MMDS	0.8
Microcomputer Contract	EDS AT&T	223.0
Forest Service ADP/WP Equipment Operations and Maintenance (VI-5-15)	Data General	18.3
CIVIL - COMMERCE		
PTO Workstations and User Services (VI-6-10	SDC PRC MITRE	2.4 280.0 0.3

INPUT

CIVIL - HEALTH AND HUMAN SERVICES

Replacement Procurement for all AOS Equipment (VII-8-23)	Wang	9.1

CIVIL - JUSTICE

U.S. Attorney - Case Management Equipment Lease (VII-10-3)	Lanier Prime	9.0 16.0
Automated Management Information Civil User System (AMICUS) (VII-10-8)	Four Phase	5.5

CIVIL - TRANSPORTATION

Technical Support and ADP Audit (VII-11-21)	Grid	2.0

CIVIL - TREASURY

Information Return Processing - Management Information System (IRP - MIS) (VII-12-19)	Vanguard	UNK
IRS Mini/Micro Computer Contract (VII-11-21)	M/A COM Sigma Data Zenith	10.0 27.0

CIVIL - EDUCATION

Minicomputer Procurement (VII-13-3)	Concept Systems	5.0

CIVIL - GENERAL SERVICES ADMINISTRATION

Office Automation Project (VIII-14-6)	C^3	73.6

CIVIL - NASA

Kennedy Space Center Integrated Office Information System (VIII-15-56)	CSC Racal Milgo	15.0 2.0

CIVIL - VETERANS ADMINISTRATION

Purchase of Office Automation Systems	Wang	60.0

INPUT

C. OIS OPPORTUNITIES BY AGENCY

AGENCY/PROGRAM	PAR REFERENCE	SCHEDULE	FY85-FY90 FUNDING ($M)
Air Force MAJCOM Information System - AFMIS	V-1-2		57.5
Distributed Processing for Contractual Information	V-1-12		6.9
Command Budget Automated System	V-1-21		6.3
Depot Maintenance Managemnt Information System (DMMIS)	V-1-37	RFP 5/86	7.6
Technical Repair Center Technical Order Distribution (TRCTOD)	V-1-53		9.6
ATC Branch Level Training Management	V-1-60		4.2
TAC Office Information Processing	V-1-65		3.3
Inspection and Safety Information System	V-1-72		2.9
First Information Systems Group Improved Service Program	V-1-78		52.9
Standard Multi-User Small Computer Requirements Contract	V-1-83	RFP FY87	28.1
FLITE Conversion to On-Line System	V-1-90	RFP FY86	6.8
MAC Information Processing System	V-1-101	RFP 8/86	121.3
Unified Local Area Network Architecture (ULANA) Phase I	V-1-102		30.0
DEPARTMENT OF DEFENSE - ARMY			
USAMSSA Headquarters Integrated Office System (HIOS)	V-2-22		36.2

INPUT

DEPARTMENT OF DEFENSE - NAVY

NALTOACS	V-3-1	RFPs FY86	161.3
DONOACS	V-3-3	RFP 3QFY86	9.7
Printing Resources Management Information System (PRMIS) II	V-3-34	RFP 3QFY86	112.8
NAVSUP Headquarters Project (Integrated Information System)	V-3-76	RFP 4QFY86	17.7

DEPARTMENT OF DEFENSE - MARINE CORPS

End User Computing (EUC)	V-3A-5	AWD 9/86	29.0

DEPARTMENT OF DEFENSE - DEFENSE CONTRACT AUDIT AGENCY

DCAA Integrated Information System	V-4C-1		33.0

DEPARTMENT OF DEFENSE - WASHINGTON HEADQUARTERS SERVICES

Document Storage and Retrieval System	V-4E-3	RFPs 4QFY86	1.7

DEPARTMENT OF DEFENSE - DoD DEPENDENT SCHOOLS

DoDDS Managemnt Information System	V-4F-1	RFP 3QFY86	7.0

CIVIL - AGRICULTURE

Food Safety ADP/Office Automation Systems	VI-5-19	RFP FY87	1.7
Inspection Resources and Information System (IRIS)	VI-5-20	RFP 3QFY86	.2
Laboratory O/A	VI-5-22	RFPs FY86	24.0
Automated Administration Management System	VI-5-24	FY88	8.1

INPUT

CIVIL - ENERGY

Management Information, Data Base Computer	VI-7-23		2.0

CIVIL - HEALTH AND HUMAN SERVICES

Decision Support System	VII-8-7		22.1

CIVIL - HOUSING AND URBAN DEVELOPMENT

Integrated Information Processing System (HIIPS)	VII-9B-4	RFP 11/86	150.0

CIVIL - JUSTICE

FBI Field Office Information Management System (FOIMS)	VII-10-2		259.0
Automated Information Systems Plan Implementation	VII-10-10		22.2
Acquisition of New Data Center in Dallas	VII-10-13	RFP FY86	44.2

CIVIL - TRANSPORTATION

USCG Automatic Requisition Management System	VII-11-9	FY87-FY88 (Recompetition)	2.0
USCG Expanded ADP Capability	VII-11-16		8.5
Department Accounting and Financial Information System	VII-11-20	RFP 9/86	17.2
FAA Word Processing/Microprocessors			20.5

CIVIL - TREASURY:

IRS Automated Examination System	VII-12-5		240.7
IRS Federal Area Records Center Data Link	VII-12-10		4.9

INPUT

CIVIL - SECURITIES AND EXCHANGE COMMISSION:

INPUT

APPENDIX A: INTERVIEW PROFILES

A. FEDERAL AGENCY RESPONDENT PROFILE

I. CONTACT SUMMARY

- Contacts with agencies were made both by telephone and through on-site visits. On-site interviews were conducted primarily at the department level with officials in the Office of Information Resources Management who are responsible for office systems policy and planning.

- The distribution of job classifications among individual agency respondents was as follows:

	Policy	Buyers	Users	Total
Respondents	22	5	6	33

2. LIST OF AGENCIES INTERVIEWED

- Respondents represented the agencies listed below, with the number in parentheses indicating the number of different contacts within the agency.

    - Department of Defense.

        . Air Force.

INPUT

- Army (3).

- Navy (2).

- Marine Corps.

- Defense Logistics Agency.

- Defense Nuclear Agency.

- Office of the Secretary.

- Civilian Agencies.

  - Department of Agriculture (2).

  - Department of Commerce.

  - Department of Education.

  - Department of Energy.

  - Federal Emergency Management Agency.

  - General Services Administration (2).

  - Department of Health and Human Services.

  - Department of Housing and Urban Development.

  - Department of Interior.

INPUT

- Department of Justice.

- National Aeronautics and Space Administration.

- Securities and Exchange Commission.

- Department of State.

- Department of Transportation (2).

- Department of the Treasury (3).

B.   VENDOR RESPONDENT PROFILE

- INPUT contacted a representative sample of vendors who provide office information systems to the federal government.

- All contacts with vendor personnel were made by telephone.

- Vendor interviews were supplemented from secondary data maintained in INPUT's extensive vendor files.

INPUT

APPENDIX B: DEFINITIONS

- To accommodate the range of Office Information Systems (OIS) programs described in the OMB Five-Year Plan and agency long-range information technology plans, the definitions in this Appendix include hardware, software, services, and telecommunications categories.

- Alternate service mode terminology employed by the federal government in its procurement process is defined along with INPUT's regular terms of reference, as shown in Exhibit B-1.

- The federal government's unique nontechnical terminology that is associated with applications, documentation, budgets, authorization, and the procurement/acquisition process is included in Appendix C, Glossary.

A.   SERVICE MODES

1.   PROCESSING SERVICES

- Processing services include remote computing services, batch services, and processing facilities management.

- <u>REMOTE COMPUTING SERVICES (RCS)</u> - Provision of data processing to a user by means of terminals at the user's site(s). Terminals are connected by a

INPUT

Telecomm Services
- Switched Networks
  - Common Carrier
  - Value Added Networks
- Dedicated Networks
  - Local Area Networks
  - Remote Networks

Hardware (Systems)
- Mainframe
  - Operating Software
  - Mass Storage
- Micro-Computer
- Front-end Processor
- Back-end Processor
- Peripherals
  - Printer
  - Plotter
  - MODEM
  - Tape Drive
  - Disk Drive
  - Encryption Equipment
  - Terminal W/WO CRT
  - Screen Display

Integrated Systems
- Hardware
  - System Software
  - Word Processor
  - Maintenance
- Application Software
  - Installation
  - Maintenance

Professional Services
- Facilities Management
  - On-site Operation
  - Software Maintenance
  - Hardware Maintenance
- Programming & Analysis
  - Systems Design
  - Contract Programming
  - Software Conversion
  - Software Maintenance
  - Verification & Validation
- Education & Training
- Consult/ Study

Software Products
- Application Products
  - Cross Industry
  - Industry Specific
  - CAD/CAM
  - Word Processing
- System Products
  - Systems Control
  - Data Center Management
  - Application Development

Processing Services
- Facilities Management
- Remote Computing Services
  - Special Purpose
  - General Purpose
  - Interactive
  - Remote Batch
  - User Site Hardware Services
  - Proprietary Data Base
- Batch
  - Data Entry
  - Data Output
  - COM
  - Videotex

data communications network to the vendor's central computer. The most frequent contract vehicle for RCS in the federal government is GSA's Tele-processing Services Program (TSP). RCS includes four submodes.

- <u>INTERACTIVE (timesharing)</u> - Characterized by the interaction of the user with the system, primarily for problem-solving timesharing, but also for data entry and transaction processing; the user is on-line to the program/files.

- <u>REMOTE BATCH</u> - Where the user hands over control of a job to the vendor's computer which schedules job execution according to priorities and resource requirements.

- <u>PROPRIETARY DATA BASE</u> - Characterized by the retrieval and processing of information from a vendor-maintained data base. The data base may be owned by the vendor or by a third party.

- <u>USER SITE HARDWARE SERVICES (USHS)</u> - These offerings provided by RCS vendors place programmable hardware at the user's site rather than the vendor's data center. Some vendors in the federal government market provide this service under the label of distributed data services. USHS offers:

  - Access to a communications network.

  - Access through the network to the RCS vendor's larger computers.

  - Local management and storage of a data base subset that will service local terminal users via the connection of a data base processor to the network.

  - Significant software as part of the service.

B-3

INPUT

- <u>BATCH SERVICES</u> - These include data processing performed at vendors' sites for user programs and/or data that are physically transported (as opposed to transported electronically by telecommunications media) to and/or from those sites. Data entry and data output services, such as keypunching and computer output microfilm processing, are also included. Batch services include expenditures by users who take their data to a vendor site that has a terminal connected to a remote computer for the actual processing.

- <u>PROCESSING FACILITIES MANAGEMENT (PFM)</u> - Also referred to as "Resource Management," "Systems Management," or "COCO" (Contractor-Owned, Contractor-Operated). The management of all or part of a user's data processing functions under a long-term contract of not less than one year. This would include remote computing and batch services. To qualify as PFM, the contractor must directly control, operate, and own the facility provided to the user, either on-site, through communications lines, or in a mixed mode.

2. PROFESSIONAL SERVICES

- Professional services include consulting, education and training, programming and analysis, some facilities management, and systems integration as defined below.

- <u>CONSULTING SERVICES</u> - Information systems and/or services management consulting, program assistance (technical and/or management), feasibility analyses, and cost-effectiveness trade-off studies.

- <u>EDUCATION AND TRAINING</u> - Products and/or services related to information systems and services for the user, including computer-aided instruction (CAI), computer-based education (CBE), and vendor instruction of user personnel in operations, programming, and maintenance.

INPUT

- **PROGRAMMING AND ANALYSIS** - Also known as software development services, includes system design, contract or custom programming, code conversion, independent verification and validation (IV&V), and bench-marking. These services may also include follow-on and software mainte-nance.

- **PROFESSIONAL SERVICES FACILITIES MANAGEMENT (PSFM)** - Also referred to as GOCO (Government-Owned, Contractor-Operated). The computing equipment is owned or leased by the government, not by the vendor. The vendor provides the staff to operate, maintain, and manage the government's facility. Submodes include:

    - **OPERATION AND MAINTENANCE (O&M)** - Vendor operation and maintenance of government-owned ADP/telecommunications equip-ment in a government-owned/leased facility (on-site) without vendor management of the facility.

    - **HARDWARE AND/OR SOFTWARE MAINTENANCE** - Vendor-furnished services provided after installation and acceptance by the government, where the vendor may not be the original supplier (third-party mainte-nance or TPM), and may use either on-site or on-call personnel to perform services.

- **SYSTEMS INTEGRATION** - Services associated with systems design and integration, and installation and government acceptance of ADP/telecom-munications systems may be provided with related engineering activities such as Systems Engineering and Integration (SE&I) or Systems Engineering and Technical Assistance (SETA).

INPUT

3. INTEGRATED SYSTEMS

- Also known as turnkey systems, integrated systems include systems and applications software packaged with hardware as a single entity. Most CAD/CAM systems and many small business systems are integrated systems. This mode does not include specialized hardware systems such as word processors, cash registers, and process control systems.

4. SOFTWARE PRODUCTS

- Software products include user purchases of applications and systems packages for in-house computer systems. Included are lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement and maintain the package at the user's sites. Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. There are several subcategories of software products, as indicated below and shown in detail in Exhibit B-2.

- APPLICATION PRODUCTS - Software that performs processing that services user functions. The products can be:

  - CROSS-INDUSTRY PRODUCTS - Used in multiple industry applications as well as in federal government sectors. Examples are payroll, inventory control, and financial planning.

  - INDUSTRY-SPECIALIZED PRODUCTS - Used in a specific federal government sector, such as planning, resource utilization, aircraft flight planning, military personnel training, and others. May also include some products designed to work in an industry other than the federal government but applicable to specific government-performed commercial/industrial services, such as hospital information, vehicular fleet scheduling, electrical power generation and distribution, CAD/CAM, and others.

INPUT

SOFTWARE PRODUCTS

Software Products

Systems Software

Applications Software

Systems Control
- Access Control
- Communications Monitors
- Encryption Systems
- Operating Systems
- Point-to-Point Control
- System Library Control
- Other

Data Center Management
- Capacity Management
- Computer Operations Scheduling
- Data Center Management
- Disk Management
- Downtime/Repair Monitoring Management
- Job Accounting
- Performance Monitors
- Tape Management
- Utilities
- Other

Applications Development

Program Development and Production Tools
- Application Generators
- Assemblers
- Automatic Documentation
- Compilers
- Debugging Aids
- Languages
- Project Control & Management Systems
- Retrieval Systems
- Spreadsheet Systems
- Translators
- Other

Data Base Management Systems
- Data Base Management Systems
- Data Dictionaries
- Other

Cross-Industry

Industry Specific
- Education
- Federal Government
- Insurance
- Medical
- Process Manufacturing
- Services
- State & Local Government
- Transportation
- Utilities
- Other

Accounting
- Accounts Payable
- Accounts Receivable
- Fixed Assets
- General Ledger
- Purchasing
- Other

Human Resources
- Benefits
- Payroll
- Personnel
- Training & Education
- Other

Information Analysis
- Budgeting
- Decision Support Systems
- Financial Planning
- Forecasting
- Modeling
- Other

Logistics Distribution
- Distribution Accounting
- Inventory
- Invoicing/Billing
- Mailing List
- Order Entry
- Procurement
- Other

Word Processing
- Document Generators
- Text Editors
- Word Processing
- Other

Graphics
- Character Graphics
- Line Graphics
- Picture Graphics
- Other

Other
- Administrative Services
- Executive Services
- Operations Research
- Project Control & Planning
- Scientific Engineering & Technical Support
- Other

- <u>SYSTEMS PRODUCTS</u> - Software that enables the computer/communications system to perform basic functions. These products include:

  - <u>SYSTEM CONTROL PRODUCTS</u> - Function during applications program execution to manage the computer system resources. Examples include operating systems, communication monitors, emulators, and spoolers.

  - <u>DATA CENTER MANAGEMENT PRODUCTS</u> - Used by operations personnel to manage the computer systems resources and personnel more effectively. Examples include performance measurement, job accounting, computer operations scheduling, and utilities.

  - <u>APPLICATIONS DEVELOPMENT PRODUCTS</u> - Used to prepare applications for execution by assisting in designing, programming, testing, and related functions. Examples include languages, sorts, productivity aids, compilers, data dictionaries, data base management systems, report writers, project control systems, and retrieval systems.

5. HARDWARE AND HARDWARE SYSTEMS

- Hardware includes all ADP and telecommunications equipment that can be separately acquired by the government with or without installation by the vendor and not acquired as part of an integrated system. For the purpose of this report, hardware is grouped in three major categories: peripherals, terminals, and hardware systems (processors).

- <u>PERIPHERALS</u> - Includes all input, output, communications, and storage devices other than main memory that can be connected locally to the main processor and generally cannot be included in other categories such as terminals.

INPUT

- <u>INPUT DEVICES</u> - Includes keyboards, numeric pads, card readers, light pens and track balls, tape readers, position and motion sensors, and analog-to-digital converters.

- <u>OUTPUT DEVICES</u> - Includes printers, CRTs, projection television screens, micrographics processors, digital graphics, and plotters.

- <u>COMMUNICATION DEVICES</u> - Modems, encryption equipment, special interfaces, and error control.

- <u>STORAGE DEVICES</u> - Includes magnetic tape (reel, cartridge, and cassette), floppy and hard disks, drums, solid state (integrated circuits), and bubble and optical memories.

- <u>TERMINALS</u> - Federal government systems use three types of terminals as described below.

  - <u>USER-PROGRAMMABLE</u> - Also called intelligent terminals, including:

    - Single-station or standalone.

    - Multi-station shared processor.

    - Teleprinter.

    - Remote batch.

  - <u>NON-PROGRAMMABLE</u> - Also called "dumb" terminals, including:

    - Single-station.

    - Multi-station shared processor.

INPUT

. Teleprinter.

- <u>LIMITED FUNCTION</u> - Originally developed for specific needs, such as point-of-sale (POS), inventory data collection, controlled access, and other applications.

- <u>HARDWARE SYSTEMS</u> - Includes all processors from microcomputers to supercomputers. Hardware systems may require type- or model-unique operating software to be functional, but this category excludes applications software and peripheral devices, other than main memory and processors or CPUs not provided as part of an integrated (turnkey) system.

    - <u>MICROCOMPUTER</u> - Combines all of the CPU, memory, and peripheral functions of an 8- or 16-bit computer on a chip in the form of:

        . Integrated circuit package.

        . Plug-in board with more memory and peripheral circuits.

        . Console including keyboard and interfacing connectors.

        . Personal computer with at least one external storage device directly addressable by the CPU.

        . An embedded computer which may take a number of shapes or configurations.

    - <u>MINICOMPUTER</u> - Usually a 12-, 16-, or 32-bit computer which may be provided with limited applications software and support and may represent a portion of a complete large system.

        . Personal business computer.

INPUT

- Small laboratory computer.

- Nodal computer in a distributed data network, remote data collection network, or connected to remote microcomputers.

- <u>MIDICOMPUTER</u> - Typically a 32- or 64-bit computer with extensive applications software and a number of peripherals in standalone or multiple-CPU configurations for business (administrative, personnel, and logistics) applications; also called a general purpose computer.

- <u>LARGE COMPUTER</u> - Presently centered around storage controllers but likely to become bus-oriented and to consist of multiple processors or parallel processors. Intended for structured mathematical and signal processing and typically used with general purpose, von-Neumann-type processors for system control.

- <u>SUPERCOMPUTER</u> - High-powered processors with numerical processing throughput that is significantly greater than the fastest general purpose computers, with capacities in the 10-50 million floating point operations per second (MFLOPS) range. Newer supercomputers, with burst modes approaching 300 MFLOPS, main storage size up to 10 million words, and on-line storage in the one-to-three gigabyte class, are labeled Class IV to Class VII in agency long-range plans. Supercomputers fit in one of two categories.

  - REAL TIME - Generally used for signal processing in military applications.

  - NON-REAL TIME - For scientific use in one of three configurations:

    - Parallel processors.

INPUT

- Pipeline processor.

- Vector processor.

- <u>EMBEDDED COMPUTER</u> - Dedicated computer system designed and implemented as an integral part of a weapon, weapon system, or platform; critical to a military or intelligence mission such as command and control, cryptological activities, or intelligence activities. Characterized by military specifications (MIL SPEC) appearance and operation, limited but reprogrammable applications software, and permanent or semi-permanent interfaces. May vary in capacity from microcomputers to parallel processor computer systems.

6. TELECOMMUNICATIONS

- <u>NETWORKS</u> - Electronic interconnection between sites or locations which may incorporate links between central computer sites and remote locations and switching and/or regional data processing nodes. Network services typically are provided on a leased basis by a vendor to move data, voice, video, or textual information between locations. Networks can be categorized in several different ways.

    - <u>COMMON CARRIER NETWORK</u> - A public access network, such as provided by AT&T, consisting of conventional voice-grade circuits and regular switching facilities accessed through dial-up calling with leased or user-owned modems for transfer rates between 150 and 1,200 baud.

    - <u>VALUE-ADDED NETWORK (VAN)</u> - Provided by vendors through common carrier or special-purpose transmission facilities with special features not available in the voice-grade switched public network. These include:

INPUT

- **DEDICATED NETWORK** - Also known as a private network, established and operated for one user or user organization using dedicated circuits to establish permanent connections between two or more stations.

- **PACKET SWITCHING** - Real time network routing, transmitting, and receiving data in the form of addressed packets, each of which may be part of a message or include several messages without exclusive use of a network circuit by the transmitting and receiving stations.

- **MESSAGE SWITCHING** - Non-real time process for routing messages through a network where a user message is received, stored, and forwarded from switch to switch through the network without an end-to-end circuit between sending and receiving stations; used primarily for data.

- **LOCAL AREA NETWORK (LAN)** - Limited-access network between computing resources in a relatively small (but not necessarily contiguous) area, such as a building, complex of buildings, or buildings distributed within a metropolitan area. Uses one of two signalling methods.

  - **BASEBAND** - Signaling using digital waveforms on a single frequency band, usually at voice frequencies, and bandwidth, limited to a single sender at any given moment. When used for local area networks, typically implemented with TDM to permit multiple access.

  - **BROADBAND** - Transmission facilities that use frequencies greater than normal voice-grade, supported in local area networks with RF modems and AC signaling. Also known as wideband. Employs multiplexing techniques that increase carrier frequency between terminals to provide:

INPUT

- Multiple channels through FDM or TDM.

- High-speed data transfer via parallel mode at rates of up
to 96,000 baud.

- **TRANSMISSION FACILITIES** - Includes wire, carrier, coaxial cable, micro-
wave, optical fiber, satellites, cellular radio, and marine cable operating in
one of two modes depending on the vendor and the distribution of the network.

- **MODE** - may be either:

- ANALOG - Transmission or signal with continuous waveform
representation, typified by AT&T's predominantly voice-grade
DDD network and most telephone operating company distribu-
tion systems.

- DIGITAL - Transmission or signal using discontinuous, discrete
quantities to represent data, which may be voice, data, record,
video, or text, in binary form.

- **MEDIA** - May be any of the following:

- WIRE - Varies from earlier single-line teletype networks, to
two-wire standard telephone (twisted pair), to four-wire full-
duplex balanced lines.

- CARRIER - A wave, pulse train, or other signal suitable for
modulation by an information-bearing signal to be transmitted
over a communications system, used in multiplexing applications
to increase network capacity.

B-14

INPUT

- COAXIAL CABLE - A cable consisting of an insulated central conductor surrounded by a cylindrical conductor with additional insulation on the outside and covered with an outer sheath used in HF (high frequency) and VHF (very high frequency), single frequency, or carrier-based systems; requires frequent reamplification (repeaters) to carry the signal any distance.

- MICROWAVE - UHF (ultra-high frequency) multi-channel, point-to-point, repeated radio transmission, also capable of wide frequency channels.

- OPTICAL FIBER - Local signal distribution systems employed in limited areas, using light-transmitting glass fibers and TDM for multi-channel applications.

- COMMUNICATIONS SATELLITES - Synchronous earth-orbiting systems that provide point-to-point, two-way service over significant distances without intermediate amplification (repeaters), but requiring suitable groundstation facilities for up- and down-link operation.

- CELLULAR RADIO - Network of fixed, low-powered two-way radios that are linked by a computer system to track mobile phone/data set units. Each radio serves a small area called a cell. The computer switches service connection to the mobile unit from cell to cell.

B.   GENERAL DEFINITIONS

- <u>103/113</u> - Bell standard modem for low-speed transmission up to 300 bps, asynchronous, half or full duplex.

INPUT

- <u>212</u> - Bell standard for medium-speed transmission at 1200 bps, asynchronous or synchronous, half or full duplex.

- <u>ASCII</u> - American National Standard Code for Information Interchange--eight-bit code with seven data bits and one parity bit.

- <u>ASYNCHRONOUS</u> - Communications operation (such as transmission) without continuous timing signals. Synchronization is accomplished through appending of signal elements to the data.

- <u>BANDWIDTH</u> - Range of transmission frequencies that can be carried on a communications path; used as a measure of capacity.

- <u>BAUD</u> - Number of signal events (discrete conditions) per second. Typically used to measure modem or terminal transmission speed.

- <u>BENCHMARK</u> - Method of testing proposed ADP system solutions for a specified set of functions (applications) employing simulated or real data inputs under simulated operating conditions.

- <u>BPS</u> - Bits per second--also mbps and kbps, million bits per second and thousand bits per second, respectively.

- <u>BSC</u> - IBM's binary synchronous communications data link protocol. First introduced in 1968 for use on point-to-point and multipoint communications channels. Frequently referenced as "bisync."

- <u>BYTE</u> - Usually equivalent to the storage required for one alphanumeric character (i.e., one letter or number).

- <u>CBX</u> - Computerized Branch Exchange--a PABX based on a computer system, implying programmability and usually voice and data capabilities.

INPUT

- <u>CENTRAL PROCESSING UNIT (CPU)</u> - The arithmetic and control portion of a computer; i.e., the circuits controlling the interpretation and execution of computer instructions.

- <u>CENTREX</u> - Central office telephone service that permits local circuit switching without installation of customer premises equipment. Could be described as shared PBX service.

- <u>CIRCUIT SWITCHING</u> - A process that, usually on demand, connects two or more network stations and permits exclusive circuit use until the connection is released. Typical of the voice telephone network where a circuit is established between the caller and the called party.

- <u>CO</u> - Central Office—local telco site for one or more exchanges.

- <u>CODEC</u> - Coder/decoder, equivalent to modem for digital devices.

- <u>CONSTANT DOLLARS</u> - Growth forecasts in constant dollars make no allowance for inflation or recession. Dollar value based on the year of the forecast unless otherwise indicated.

- <u>COMPUTER SYSTEM</u> - The combination of computing resources required to perform the designed functions and which may include one or more CPUs, machine room peripherals, storage systems, and/or applications software.

- <u>CPE</u> - Customer Premises Equipment—DCE or DTE located at a customer site rather than at a carrier site such as the local telephone company CO. May include switchboards, PBX, data terminals, and telephone answering devices.

- <u>CSMA/CD</u> - Carrier Sense Multiple Access/Collision Detect. Contention protocol used in local-area networks, typically with a multi-point configuration.

INPUT

- <u>CURRENT DOLLARS</u> - Estimates or values expressed in current-year dollars which, for forecasts, would include an allowance for inflation.

- <u>DATA ENCRYPTION STANDARD (DES)</u> - 56-bit key, one-way encryption algorithm adopted by NBS in 1977, implemented through hardware ("S-boxes") or software. Designed by IBM with NSA guidance.

- <u>DATAGRAM</u> - A self-contained packet of information with a finite length that does not depend on the contents of preceding or following packets.

- <u>DCA</u> - IBM's Document Content Architecture--protocols for specifying document (text) format which are consistent across a variety of hardware and software systems within IBM's DISOSS.

- <u>DCE</u> - Data Circuit-terminating Equipment--interface hardware that couples DTE to a transmission circuit or channel by providing functions to establish, maintain, and terminate a connection, including signal conversion and coding.

- <u>DDCMP</u> - Digital Data Communications Message Protocol--data-link protocol used in Digital Equipment Company's DECNET.

- <u>DECNET</u> - Digital Equipment Company's network architecture.

- <u>DEDICATED CIRCUIT</u> - A permanently established network connection between two or more stations; contrast with switched circuit.

- <u>DEMS</u> - Digital Electronic Message Service--nationwide common carrier digital networks which provide high-speed, end-to-end, two-way transmission of digitally-encoded information using the 10.6 GHz band.

- <u>DIA</u> - IBM's Document Interchange Architecture--protocols for transfer of documents (text) between different hardware and software systems within IBM's DISOSS.

- <u>DISOSS</u> - IBM's DIStributed Office Support System—office automation environment, based on DCA and DIA, which permits document (text) transfer between different hardware and software systems without requiring subsequent format or content revision.

- <u>DISTRIBUTED DATA PROCESSING</u> - The development of programmable intelligence in order to perform a data processing function where it can be accomplished most effectively through computers and terminals arranged in a telecommunications network adapted to the user's characteristics.

- <u>DTE</u> - Data Terminal Equipment—hardware which is a data source or sink or both, such as video display terminals that convert user information into data for transmission and reconvert data signals into user information.

- <u>EBCDIC</u> - Extended Binary Coded Decimal Interchange Code—eight-bit code typically used in IBM mainframe environments.

- <u>EFT</u> - Electronic funds transfer.

- <u>ENCRYPTION</u> - Electrical, code-based conversion of transmitted data to provide security and/or privacy of data between authorized access points.

- <u>END USER</u> - One who is using a product or service to accomplish his own functions. The end user may buy a system from the hardware supplier(s) and do his own programming, interfacing, and installation. Alternately, the end user may buy a turnkey system from a systems house or hardware integrator, or may buy a service from an in-house department or external vendor.

- <u>ENGINEERING CHANGE NOTICE (ECN)</u> - Product changes to improve the product after it has been released to production.

INPUT

- **ENGINEERING CHANGE ORDER (ECO)** - The follow-up to ECNs--they include parts and a bill of materials to effect the change in the hardware.

- **EQUIPMENT OPERATORS** - Individuals operating computer control consoles and/or peripheral equipment (BLS definition).

- **ETHERNET** - Local area network developed by Xerox PARC using baseband signaling, CSMA/CD protocol, and coaxial cable to achieve a 10 mbps data rate.

- **FACSIMILE** - Transmission and reception of data in graphic form, usually fixed images of documents, through scanning and conversion of a picture signal.

- **FDM** - Frequency Division Multiplexing--a multiplexing method that permits multiple access by assigning different frequencies of the available bandwidth to different channels.

- **FEP** - Front-End Processor--communications concentrator such as the IBM 3725 or COMTEN 3690 used to interface communications lines to host computers.

- **FIELD ENGINEER (FE)** - Field engineer, customer engineer, serviceperson, and maintenance person are used interchangeably and refer to the individual who responds to a user's service call to repair a device or system.

- **FULL-DUPLEX** - Bi-directional communications with simultaneous two-way transmission.

- **GENERAL PURPOSE COMPUTER SYSTEM** - A computer designed to handle a wide variety of problems. Includes machine room peripherals, systems software, and small business systems.

INPUT

- **HALF-DUPLEX** - Bi-directional communications, but only in one direction at a time.

- **HARDWARE INTEGRATOR** - Develops system interface electronics and controllers for the CPU, sensors, peripherals, and all other ancillary hardware components. The hardware integrator also may develop control system software in addition to installing the entire system at the end-user site.

- **HDLC** - High-level Data Link Control.

- **HERTZ** - Number of signal oscillations (cycles) per second—abbreviated Hz.

- **IBM TOKEN RING** - IBM's local area network using baseband signalling and operating at 4 mbps on twisted-pair copper wire. Actually a combination of star and ring topologies—IEEE 802.5-compatible.

- **IDN** - Integrated Digital Network—digital switching and transmission; part of the evolution to ISDN.

- **INDEPENDENT SUPPLIERS** - Suppliers of machine room peripherals—usually do not supply general purpose computer systems.

- **INFORMATION PROCESSING** - Data processing as a whole, including use of business and scientific computers.

- **INSTALLED BASE** - Cumulative number or value (cost when new) of computers in use.

- **INTERCONNECTION** - Physical linkage between devices on a network.

- **INTEROPERABILITY** - The capability to operate with other devices on a network. To be contrasted with interconnection, which merely guarantees a physical network interface.

INPUT

- <u>ISDN</u> - Integrated Services Digital Network--integrated voice and non-voice public network service which is completely digital. Not clearly defined through any existing standards although FCC and other federal agencies are participating in the development of CCITT recommendations.

- <u>KEYPUNCH OPERATORS</u> - Individuals operating keypunch machines (similar in operation to electric typewriters) to transcribe data from source materials onto punch cards.

- <u>LEASED LINE</u> - Permanent connection between two network stations. Also known as dedicated or non-switched line.

- <u>MACHINE REPAIRERS</u> - Individuals who install and periodically service computer systems.

- <u>MACHINE ROOM PERIPHERALS</u> - Peripheral equipment that is generally located close to the central processing unit.

- <u>MAINFRAME</u> - The central processing unit (CPU or units in a parallel processor) of a computer that interprets and executes computer (software) instructions of 32 bits or more.

- <u>MAP</u> - Manufacturing Automation Protocol--seven-layer communications standard for factory environments promoted by General Motors/EDS. Adopts IEEE 802.2 and IEEE 802.4 standards plus OSI protocols for other layers of the architecture.

- <u>MEAN TIME TO REPAIR</u> - The mean of elapsed times from the arrival of the field engineer on the user's site until the device is repaired and returned to user service.

- **MEAN TIME TO RESPOND** - The mean of elapsed times from the user call for service and the arrival of the field engineer on the user's site.

- **MESSAGE** - A communication intended to be read by a person. The quality of the received document need not be high, only readable. Graphic materials are not included.

- **MMFS** - Manufacturing Messaging Format Standard—application-level protocol included within MAP.

- **MODEM** - A device that encodes information into electronically transmittable form (MOdulator) and restores it to original analog form (DEModulator).

- **NCP** - Network Control Program—software used in IBM 3705/3725 FEPs for control of SNA networks.

- **NODE** - Connection point of three or more independent transmission points which may provide switching or data collection.

- **OFF-LINE** - Pertaining to equipment or devices that can function without direct control of the central processing unit.

- **ON-LINE** - Pertaining to equipment or devices under direct control of the central processing unit.

- **OSI** - ISO reference model for Open Systems Interconnection—seven-layer architecture for application, presentation, session, transport, network, data link, and physical services and equipment.

- **OSI APPLICATION LAYER** - Layer 7, providing end-user applications services for data processing.

INPUT

- <u>OSI DATA LINK LAYER</u> - Layer 2, providing transmission protocols, including frame management, link flow control, and link initiation/release.

- <u>OSI NETWORK LAYER</u> - Layer 3, providing call establishment and clearing control through the network nodes.

- <u>OSI PHYSICAL LAYER</u> - Layer 1, providing the mechanical, electrical, functional, and procedural characteristics to establish, maintain, and release physical connections to the network.

- <u>OSI PRESENTATION LAYER</u> - Layer 6, providing data formats and information such as data translation, data encoding/decoding, and command translation.

- <u>OSI SESSION LAYER</u> - Layer 5, establishes, maintains, and terminates logical connections for the transfer of data between processes.

- <u>OSI TRANSPORT LAYER</u> - Layer 4, providing end-to-end terminal control signals such as acknowledgements.

- <u>OVERSEAS</u> - Not within the geographical limits of the continental United States, Alaska, Hawaii, and U.S. possessions.

- <u>PABX</u> - Private Automated Branch Exchange--hardware that provides automatic (electro-mechanical or electronic) local circuit switching on a customer's premises.

- <u>PAD</u> - Packet Assembler-Disassembler--a device that enables DTE not equipped for packet switching operation to operate on a packet switched network.

- <u>PBX</u> - Private Branch Exchange--hardware which provides local circuit switching on the customer premise.

INPUT

- **PCM** - Pulse-Code Modulation—modulation involving conversion of a waveform from analog to digital form through coding.

- **PDN** - Public Data Network—a network established and operated by a recognized private operating agency, a telecommunications administration, or other agency for the specific purpose of providing data transmission services to the public.

- **PERIPHERALS** - Any unit of input/output equipment in a computer system, exclusive of the central processing unit.

- **PPM** - Pulse Position Modulation.

- **PRIVATE NETWORK** - A network established and operated for one user or user organization.

- **PROGRAMMERS** - Persons mainly involved in designing, writing, and testing of computer software programs.

- **PROTOCOLS** - The rules for communication system operation that must be followed if communication is to be effected. Protocols may govern portions of a network or service. In digital networks, protocols are digitally encoded as instructions to computerized equipment.

- **PUBLIC NETWORK** - A network established and operated for more than one user with shared access, usually available on a subscription basis. See related international definition of PDN.

- **SCIENTIFIC COMPUTER SYSTEM** - A computer system designed to process structured mathematics, such as Fast Fourier Transforms, and complex, highly redundant information, such as seismic data, sonar data, and radar, with large on-line memories and very high capacity throughput.

INPUT

- <u>SDLC</u> - Synchronous Data Link Control--IBM's data link control for SNA. Supports a subset of HDLC modes.

- <u>SDN</u> - Software-Defined Network.

- <u>SECURITY</u> - Physical, electrical, and computer (digital) coding procedures to protect the contents of computer files and data transmission from inadvertent or unauthorized disclosure to meet the requirements of the Privacy Act and national classified information regulations.

- <u>SERVICE DELIVERY POINT</u> - The location of the physical interface between a network and customer/user equipment.

- <u>SIMPLEX</u> - Undirectional communications.

- <u>SMART BOX</u> - A device for adapting existing DTE to new network standards such as OSI. Includes PADs and protocol convertors, for example.

- <u>SNA</u> - Systems Network Architecture--seven-layer communications architecture designed by IBM. Layers correspond roughly but not exactly to OSI model.

- <u>SOFTWARE</u> - Computer programs.

- <u>SUPPLIES</u> - Includes materials associated with the use or operations of computer systems, such as printer paper, keypunch cards, disk packs, and tapes.

- <u>SWITCHED CIRCUIT</u> - Temporary connection between two network stations established through dial-up procedures.

- **SYNCHRONOUS** - Communications operation with separate, continuous clocking at both sending and receiving stations.

- **SYSTEMS ANALYST** - Individual who analyzes problems to be converted to a programmable form for application to computer systems.

- **SYSTEMS HOUSE** - Vendor that acquires, assembles, and integrates hardware and software into a total turnkey system to satisfy the data processing requirements of an end user. The vendor also may develop systems software products for license to end users. The systems house vendor does not manufacture mainframes.

- **SYSTEMS INTEGRATOR** - Systems house vendor that develops systems interface electronics, applications software, and controllers for the CPU, peripherals, and ancillary subsystems that may have been provided by a contractor or the government (GFE). This vendor may either supervise or perform the installation and testing of the completed system.

- **T1** - Bell System designation for 1.544 mbps carrier capable of handling 24 PCM voice channels.

- **TDM** - Time Division Multiplexing---a multiplexing method that interleaves multiple transmissions on a single circuit by assigning a different time slot to each channel.

- **TOKEN PASSING** - Local area network protocol which allows a station to transmit only when it has the "token," an empty slot on the carrier.

- **TOP** - Technical Office Protocol---protocol developed by Boeing Computer Services to support administrative and office operations as complementary functions to factory automation implemented under MAP.

INPUT

- **TURNKEY SYSTEM** - System composed of hardware and software integrated into a total system designed to completely fulfill the processing requirements of a single application.

- **TWISTED-PAIR CABLE** - Communications cabling consisting of pairs of single-strand metallic electrical conductors, such as copper wires, typically used in building telephone wiring and some LANs.

- **VERIFICATION AND VALIDATION** - Process for examining and testing applications and special systems software to verify that it operates on the target CPU and performs all of the functions specified by the user.

- **VOICE-GRADE** - Circuit or signal in the 300-3300 Hz bandwidth typical of the public telephone system--nominally a 4 KHz circuit.

- **VTAM** - Virtual Telecommunications Access Method--host-resident communications software for SNA networks.

C.   OTHER CONSIDERATIONS

- When questions arise as to the proper place to count certain user expenditures, INPUT addresses the questions from the user viewpoint. Expenditures then are categorized according to what the users perceive they are buying.

INPUT

APPENDIX C: GLOSSARY OF FEDERAL ACRONYMS

- The federal government's procurement language uses a combination of acronyms, phrases, and words that is complicated by different agency definitions and interpretations. The government also uses terms of accounting, business, economics, engineering, and law with new applications and technology.

- Acronyms and contract terms that INPUT encountered most often in program documentation and interviews for this report are included here, but this glossary should not be considered all-inclusive. Federal procurement regulations (DAR, FPR, FAR, FIRMR, FPMR) and contract terms listed in RFIs, RFPs, and RFQs provide applicable terms and definitions.

- Federal agency acronyms have been included to the extent they are employed in this report.

A.   ACRONYMS

- AAS   Automatic Addressing System.
- AATMS   Advanced Air Traffic Management System.
- ACO   Administrative Contracting Offices (DCAS).
- ACS   Advanced Communications Satellite (formerly NASA 30/20 GH_z Satellite Program).

INPUT

- ACT-I — Advanced Computer Techniques (Air Force).
- Ada — DoD High-Order Language.
- ADA — Airborne Data Acquisition.
- ADL — Authorized Data List.
- ADS — Automatic Digital Switches (DCS).
- AFA — Air Force Association.
- AFCEA — Armed Forces Communications Electronics Association.
- AGE — Aerospace Ground Equipment.
- AIP — Array Information Processing.
- AMPE — Automated Message Processing Equipment.
- AMPS — Automated Message Processing System.
- AMSL — Acquisition Management Systems List.
- AP(P) — Advance Procurement Plan.
- Appropriation — Congressionally approved funding for authorized programs and activities of the Executive Branch.
- APR — Agency Procurement Request.
- ARPANET — DARPA network of scientific computers.
- ATLAS — Abbreviated Test Language for All Systems (for ATE -Automated Test Equipment).
- Authorization — In the legislative process programs, staffing, and other routine activities must be approved by Oversight Committees before the Appropriations Committee will approve the money from the budget.
- AUSA — Association of the U.S. Army.
- AUTODIN — AUTOmatic DIgital Network of the Defense Communications System.
- AUTOVON — AUTOmatic VOice Network of the Defense Communications System.

- BA — Basic Agreement.
- BAFO — Best And Final Offer.
- Base level — Procurement, purchasing, and contracting at the military installation level.

INPUT

- **BCA**   Board of Contract Appeals.
- **Benchmark**   Method of evaluating ability of a candidate computer system to meet user requirements.
- **Bid protest**   Objection (in writing, before or after contract award) to some aspect of a solicitation by a valid bidder.
- **BML**   Bidders Mailing List - qualified vendor information filed annually with federal agencies to automatically receive RFPs and RFQs in areas of claimed competence.
- **BOA**   Basic Ordering Agreement.
- **B&P**   Bid and Proposal - vendor activities in response to government solicitation/specific overhead allowance.
- **BPA**   Blanked Purchase Agreement.
- **Budget**   Federal Budget, proposed by the President and subject to Congressional review.

- C^2 Command and Control.
- C^3 Command, Control, and Communications.
- C^4 Command, Control, Communications, and Computers.
- C^3I Command, Control, Communications, and Intelligence.
- **CAB**   Contract Adjustment Board or Contract Appeals Board.
- **CADE**   Computer-Aided Design and Engineering.
- **CADS**   Computer-Assisted Display Systems.
- **CAIS**   Computer-Assisted Instruction System.
- **CAPS**   Command Automation Procurement Systems.
- **CAS**   Contract Administration Services or Cost Accounting Standards.
- **CASB**   Cost Accounting Standards Board.
- **CASP**   Computer-Assisted Search Planning.
- **CBD**   Commerce Business Daily - U.S. Department of Commerce publication listing government contract opportunities and awards.
- **CBO**   Congressional Budget Office.
- **CCDR**   Contractor Cost Data Reporting.

INPUT

- CCN — Contract Change Notice.
- CCPDS — Command Center Processing and Display Systems.
- CCPO — Central Civilian Personnel Office.
- CCTC — Command and Control Technical Center (JCS).
- CDR — Critical Design Review.
- CDRL — Contractor Data Requirements List.
- CFE — Contractor-Furnished Equipment.
- CFR — Code of Federal Regulations.
- CIG — Computerized Interactive Graphics.
- CIR — Cost Information Reports.
- CM — Configuration Management.
- CMI — Computer-Managed Instruction.
- CNI — Communications, Navigation, and Identification.
- CO — Contracting Office, Contract Offices, or Change Order.
- COC — Certificate of Competency (administered by the Small Business Administration).
- COCO — Contractor-Owned, Contractor-Operated.
- CODSIA — Council of Defense and Space Industry Associations.
- COMSTAT — Communications Satellite Corporation.
- CONUS — CONtinental United States.
- COP — Capability Objectives Package.
- COTR — Contracting Officer's Technical Representative.
- CP — Communications Processor.
- CPAF — Cost-Plus-Award-Fee Contract.
- CPFF — Cost-Plus-Fixed-Fee Contract.
- CPIF — Cost-Plus-Incentive-Fee Contract.
- CPR — Cost Performance Reports.
- CPSR — Contractor Procurement System Review.
- CR — Cost Reimbursement (Cost Plus Contract).
- CSA — Combat or Computer Systems Architecture.
- C/SCSC — Cost/Schedule Control System Criteria (also called "C-Spec").
- CWAS — Contractor Weighted Average Share in Cost Risk.

INPUT

- DAL — Data Accession List.
- DAR — Defense Acquisition Regulations.
- DARPA — Defense Advanced Research Projects Agency.
- DAS — Data Acquisition System.
- DBHS — Data Base Handling System.
- DCA — Defense Communications Agency.
- DCAA — Defense Contract Audit Agency.
- DCAS — Defense Contract Administration Services.
- DCASR — DCAS Region.
- DCC — Digital Control Computer.
- DCP — Development Concept Paper (DoD).
- DCS — Defense Communications System.
- DCTN — Defense Commercial Telecommunications Network
- DDA — Dynamic Demand Assessment (Delta Modulation).
- DDC — Defense Documentation Center.
- DDL — Digital Data Link - A segment of a communications network used for data transmission in digital form.
- DDN — Defense Data Network.
- DDS — Dynamic Diagnostics System.
- D&F — Determination and Findings - required documentation for approval of a negotiated procurement.
- DIA — Defense Intelligence Agency.
- DIF — Document Interchange Format, Navy-sponsored word processing standard.
- DHHS — Department of Health and Human Services.
- DIDS — Defense Integrated Data Systems.
- DISC — Defense Industrial Supply Center.
- DLA — Defense Logistics Agency.
- DMA — Defense Mapping Agency.
- DNA — Defense Nuclear Agency.
- DO — Delivery Order.
- DOA — Department of Agriculture (also USDA).

INPUT

- DOC — Department of Commerce.
- DOE — Department of Energy.
- DOI — Department of Interior.
- DOJ — Department of Justice.
- DOS — Department of State.
- DOT — Department of Transportation.
- DPA — Delegation of Procurement Authority (granted by GSA under FPRs).
- DPC — Defense Procurement Circular.
- DQ — Definite Quantity Contract.
- DQ/PL — Definite Quantity Price List Contract.
- DR — Deficiency Report.
- DSN — Defense Switched Network.
- DSP — Defense Support Program (WWMCCS).
- DSS — Defense Supply Service.
- DTC — Design-To-Cost.

- ECP — Engineering Change Proposal.
- ED — Department of Education.
- EEO — Equal Employment Opportunity.
- 8(a) Set-Aside — Agency awards direct to Small Business Administration for direct placement with a socially/economically disadvantaged company.
- EMC — Electro-Magnetic Compatibility.
- EMCS — Energy Monitoring and Control System.
- EO — Executive Order - Order issued by the President.
- EOQ — Economic Ordering Quantity.
- EPA — Economic Price Adjustment.
- EPA — Environmental Protection Agency.
- EPMR — Estimated Peak Monthly Requirement.
- EPS — Emergency Procurement Service (GSA) or Emergency Power System.
- EUC — End User Computing, especially in DoD.

INPUT

- FA — Formal Advertising.
- FAC — Facility Contract.
- FAR — Federal Acquisition Regulations.
- FCA — Functional Configuration Audit.
- FCC — Federal Communications Commission.
- FCDC — Federal Contract Data Center.
- FCRC — Federal Contract Research Center.
- FDPC — Federal Data Processing Center.
- FEDSIM — Federal (Computer) Simulation Center (GSA).
- FEMA — Federal Emergency Management Agency.
- FFP — Firm Fixed-Price Contract (also Lump Sum Contract).
- FIPS — NBS Federal Information Processing Standard.
- FIPS PUBS — FIPS Publications.
- FIRMR — Federal Information Resource Management Regulations.
- FMS — Foreign Military Sales.
- FOC — Final Operating Capability.
- FOIA — Freedom of Information Act.
- FP — Fixed-Price Contract.
- FP-L/H — Fixed-Price - Labor/Hour Contract.
- FP-LOE — Fixed-Price - Level-Of-Effort Contract.
- FPMR — Federal Property Management Regulations.
- FPR — Federal Procurement Regulations.
- FSC — Federal Supply Classification.
- FSG — Federal Supply Group.
- FSN — Federal Supply Number.
- FSS — Federal Supply Schedule or Federal Supply Service (GSA).
- FSTS — Federal Secure Telecommunications System.
- FT Fund — A revolving fund, designated as the Federal Telecommunications Fund, used by GSA to pay for GSA-provided common-user services, specifically including the current FTS and proposed FTS 2000 services.

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INPUT

- FTPS   Federal Telecommunications Standards Program administered by NCS; Standards are published by GSA.
- FTS   Federal Telecommunications System.
- FTS 2000   Proposed replacement for the Federal Telecommunications System.
- FY   Fiscal Year.
- FYDP   Five-Year Defense Plan.

- GAO   General Accounting Office.
- GFE   Government-Furnished Equipment.
- GFM   Government-Furnished Material.
- GFY   Government Fiscal Year (October to September).
- GIDEP   Government-Industry Data Exchange Program.
- GOCO   Government Owned - Contractor Operated.
- GOGO   Government Owned - Government Operated.
- GPO   Government Printing Office.
- GPS   Global Positioning System.
- GS   General Schedule.
- GSA   General Services Administration.

- HPA   Head of Procuring Activity.
- HSDP   High-Speed Data Processors.
- HUD   (Department of) Housing and Urban Development.

- ICA   Independent Cost Analysis.
- ICAM   Integrated Computer-Aided Manufacturing.
- ICE   Independent Cost Estimate.
- ICP   Inventory Control Point.
- ICST   Institute for Computer Sciences and Technology, National Bureau of Standards, Department of Commerce.
- IDAMS   Image Display And Manipulation System.
- IDEP   Interservice Data Exchange Program.
- IDN   Integrated Data Network.

- IFB — Invitation For Bids.
- IOC — Initial Operating Capability.
- IOI — Internal Operating Instructions.
- IQ — Indefinite Quantity Contract.
- IR&D — Independent Research & Development.
- IRM — Information Resource Manager.
- IXS — Information Exchange System.

- JOCIT — Jovial Compiler Implementation Tool.
- JSIPS — Joint Systems Integration Planning Staff.
- JSOP — Joint Strategic Objectives Plan.
- JSOR — Joint Service Operational Requirement.
- JUMPS — Joint Uniform Military Pay System.

- LC — Letter Contract.
- LCC — Life Cycle Costing.
- LCMP — Life Cycle Management Procedures (DD7920.1).
- LCMS — Life Cycle Management System.
- L-H — Labor-Hour Contract.
- LOI — Letters of Interest.
- LRPE — Long-Range Procurement Estimate.

- MAISRC — Major Automated Information Systems Review Council (DoD).
- MANTECH — MANufacturing TECHnology.
- MAPS — Multiple Address Processing System.
- MASC — Multiple Award Schedule Contract.
- MDA — Multiplexed Data Accumulator.
- MENS — Mission Element Need Statement or Mission Essential Need Statement (see DD-5000.1 Major Systems Acquisition).
- MILSCAP — Military Standard Contract Administration Procedures.
- MIL SPEC — Military Specification.
- MIL STD — Military Standard.

C-9

INPUT

- MIPR — Military Interdepartmental Purchase Request.
- MOD — Modification.
- MOL — Maximum Ordering Limit (Federal Supply Service).
- MPC — Military Procurement Code.
- MYP — Multi-Year Procurement.

- NARDIC — Navy Research and Development Information Center.
- NASA — National Aeronautics and Space Administration.
- NBS — National Bureau of Standards.
- NCMA — National Contract Management Association.
- NCS — National Communications System; responsible for setting U.S. Government standards administered by GSA; also holds primary responsibility for emergency communications planning.
- NICRAD — Navy-Industry Cooperative Research and Development.
- NIP — Notice of Intent to Purchase.
- NMCS — National Military Command System.
- NSA — National Security Agency.
- NSEP — National Security and Emergency Preparedness.
- NSF — National Science Foundation.
- NSIA — National Security Industrial Association.
- NTIA — National Telecommunications and Information Administration of the Department of Commerce; replaced the Office of Telecommunications Policy in 1970 as planner and coordinator for government communications programs; primarily responsible for radio.
- NTIS — National Technical Information Service.

- Obligation — "Earmarking" of specific funding for a contract from committed agency funds.
- OCS — Office of Contract Settlement.
- OFCC — Office of Federal Contract Compliance.
- Off-Site — Services to be provided near but not in government facilities.

INPUT

- OFMP   Office of Federal Management Policy (GSA).
- OFPP   Office of Federal Procurement Policy.
- OIRM   Office of Information Resources Management.
- O&M   Operations & Maintenance.
- OMB   Office of Management and Budget.
- O,M&R   Operations, Maintenance, and Repair.
- On-Site   Services to be performed on a government installation or in a specified building.
- OPM   Office of Procurement Management (GSA) or Office of Personnel Management.
- Options   Sole-source additions to the base contract for services or goods to be exercised at the government's discretion.
- OSHA   Occupational Safety and Health Act.
- OSP   Offshore Procurement.
- OTA   Office of Technology Assessment (Congress).
- Out-Year   Proposed funding for fiscal years beyond the Budget Year (next fiscal year).

- P-1   FY Defense Production Budget.
- P^3I Pre-Planned Product Improvement (program in DoD).
- PAR   Procurement Authorization Request or Procurement Action Report.
- PAS   Pre-Award Survey.
- PASS   Procurement Automated Source System.
- PCO   Procurement Contracting Officer.
- PDA   Principal Development Agency.
- PDM   Program Decision Memorandum.
- PDR   Preliminary Design Review.
- PIR   Procurement Information Reporting.
- PME   Performance Monitoring Equipment.
- PMP   Purchase Management Plan.
- PO   Purchase Order or Program Office.
- POM   Program Objective Memorandum.

INPUT

- PPBS — Planning, Programming, Budgeting System.
- PR — Purchase Request or Procurement Requisition.
- PS — Performance Specification - alternative to a Statement of Work, when work to be performed can be clearly specified.

- QA — Quality Assurance.
- QAO — Quality Assurance Office.
- QMCS — Quality Monitoring and Control System (DoD software).
- QMR — Qualitative Material Requirement (Army).
- QPL — Qualified Products List.
- QRC — Quick Reaction Capability.
- QRI — Quick Reaction Inquiry.

- R-1 — FY RDT&E Budget.
- RAM — Reliability, Availability, and Maintainability.
- RC — Requirements Contract.
- R&D — Research and Development.
- RDA — Research, Development, and Acquisition.
- RDD — Required Delivery Date.
- RD&E — Research, Development, and Engineering.
- RDF — Rapid Deployment Force.
- RDT&E — Research, Development, Test, and Engineering.
- RFI — Request For Information.
- RFP — Request For Proposal.
- RFQ — Request For Quotation.
- RFTP — Request For Technical Proposals (Two-Step).
- ROC — Required Operational Capability.
- ROI — Return On Investment.
- RTAS — Real Time Analysis System.
- RTDS — Real Time Display System.

- SA — Supplemental Agreement.
- SBA — Small Business Administration.

- **SB Set-Aside**   Small Business Set-Aside contract opportunities with bidders limited to certified small businesses.
- **SCA**   Service Contract Act (1964 as amended).
- **SCN**   Specification Change Notice.
- **SDN**   Secure Data Network.
- **SEC**   Securities and Exchange Commission.
- **SE&I**   Systems Engineering and Integration.
- **SETA**   Systems Engineering/Technical Assistance.
- **SETS**   Systems Engineering/Technical Support.
- **SIBAC**   Simplified Intragovernmental Billing and Collection System.
- **SIMP**   Systems Integration Master Plan.
- **SIOP**   Single Integrated Operations Plan.
- **SNAP**   Shipboard Nontactical ADP Program.
- **Sole Source**   Contract award without competition.
- **Solicitation**   Invitation to submit a bid.
- **SOR**   Specific Operational Requirement.
- **SOW**   Statement of Work.
- **SSA**   Source Selection Authority (DoD).
- **SSAC**   Source Selection Advisory Council.
- **SSEB**   Source Selection Evaluation Board.
- **SSO**   Source Selection Official (NASA).
- **STINFO**   Scientific and Technical INFOrmation Program - Air Force/NASA.
- **STU**   Secure Telephone Unit.
- **SWO**   Stop-Work Order.
- **Synopsis**   Brief description of contract opportunity in CBD after D&F and before release of solicitation.

- **TA/AS**   Technical Assistance/Analyst Services.
- **TEMPEST**   Studies, inspections, and tests of unintentional electromagnetic radiation from computer, communication, command, and control equipment that may cause unauthorized disclosure of information; usually applied to DoD and security agency testing programs.

INPUT

- TILO   Qualified Requirements Information Program - Army.
- TM   Time and Materials contract.
- TOA   Total Obligational Authority (Defense).
- TOD   Technical Objective Document.
- TR   Temporary Regulation (added to FPR, FAR).
- TRACE   Total Risk Assessing Cost Estimate.
- TRCO   Technical Representative of the Contracting Offices.
- TREAS   Department of Treasury.
- TRP   Technical Resources Plan.
- TSP   GSA's Teleprocessing Services Program.
- TVA   Tennessee Valley Authority.

- UCAS   Uniform Cost Accounting System.
- USA   U.S. Army.
- USAF   U.S. Air Force.
- USCG   U.S. Coast Guard.
- USMC   U.S. Marine Corps.
- USN   U.S. Navy.
- U.S.C.   United States Code.
- USPS   United States Postal Service.
- USRRB   United States Railroad Retirement Board.

- VA   Veterans Administration.
- VE   Value Engineering.
- VHSIC   Very High Speed Integrated Circuits.
- VIABLE   Vertical Installation Automation BaseLine (Army).
- VICI   Voice Input Code Identifier.

- WBS   Work Breakdown Structure.
- WGM   Weighted Guidelines Method.
- WIN   WWMCCS Intercomputer Network.
- WIS   WWMCCS Information Systems.

INPUT

	WS	Work Statement - Offerer's description of the work to be done (proposal or contract).
	WWMCCS	World-Wide Military Command and Control System.

B.   GENERAL AND INDUSTRY

	ADP	Automatic Data Processing.
	ADPE	Automatic Data Processing Equipment.
	ANSI	American National Standards Institute.
	CAD	Computer-Aided Design.
	CAM	Computer-Aided Manufacturing.
	CBEMA	Computer and Business Equipment Manufacturers Association.
	CCITT	Comite Consultaif Internationale de Telegraphique et Telephonique; Committee of the International Telecommunication Union.
	COBOL	COmmon Business-Oriented Language.
	CPU	Central Processor Unit.
	DBMS	Data Base Management System.
	EIA	Electronic Industries Association.
	IEEE	Institute of Electrical and Electronics Engineers.
	ISO	International Organization for Standardization; voluntary international standards organization and member of CCITT.
	ITU	International Telecommunication Union.
	LSI	Large-Scale Integration.
	PROM	Programmable Read-Only Memory.

INPUT

- UPS   Uninterruptable Power Source.

- VLSI   Very Large Scale Integration.

INPUT

APPENDIX D: POLICIES, REGULATIONS, AND STANDARDS

A. OMB CIRCULARS

- A-11   Preparation and Submission of Budget Estimates.
- A-49   Use of Management and Operating Contracts.
- A-71   Responsibilities for the Administration and Management of Automatic Data Processing Activities.
- A-76   Policies for Acquiring Commercial or Industrial Products and Services Needed by the Government.
- A-109   Major Systems Acquisitions.
- A-120   Guidelines for the Use of Consulting Services.
- A-121   Cost Accounting, Cost Recovery, and Integrated Sharing of Data Processing Facilities.
- A-130   Management of Federal Information Resources.

B. GSA PUBLICATIONS

- The FIRMR as published by GSA is the primary regulation for use by federal agencies in the management, acquisition, and use of both ADP and telecommunications information resources.

INPUT

- Certain parts of the FIRMR are particularly applicable to federal office information systems. These include:

    - 201-8   Implementation and Use of Federal Standards.
    - 201-22   Records Management Programs.
    - 201-45   Management of Records.

- The following Bulletins in Appendix B of the FIRMR provide additional guidance.

    - 6   Office Technology Plus.
    - 23   Electronic Record Keeping.
    - 30   Use of Small Government-Owned Computers Off-Site and Use of Personally Owned Computers in Federal Offices.
    - 34   Microcomputer Security.

C. DoD DIRECTIVES

- DD-5000.1   Major System Acquisitions.
- DD-5000.2   Major System Acquisition Process.
- DD-5000.11   DoD Data Elements and Data Codes Standardization Program.
- DD-5000.31   Interim List of DoD-Approved High-Order Languages.
- DD-5000.35   Defense Acquisition Regulatory Systems.
- DD-5200.1   DoD Information Security Program.
- DD-5200.28   Security Requirements for Automatic Data Processing (ADP) Systems.
- DD-5200.28-M   Manual of Techniques and Procedures for Implementing, Deactivating, Testing, and Evaluating Secure Resource Sharing ADP Systems.
- DD-7920.1   Life Cycle Management of Automated Information (AIS).
- DD-7920.2   Major Automated Information Systems Approval Process.
- DD-7935   Automated Data Systems (ADS) Documentation.

INPUT

D.   STANDARDS

- ADCCP

  Advanced Data Communications Control Procedures; ANSI standard X3.66 of 1979; also NBS FIPS 71.

- CCITT G.711

  International PCM standard.

- CCITT T.0

  International standard for classification of facsimile apparatus for document transmission over telephone-type circuits.

- DEA-1

  Proposed ISO standard for data encryption based on the NBS DES.

- EIA RS-170

  Monochrome video standard.

- EIA RS-170A

  Color video standard.

- EIA RS-464

  EIA PBX standards.

- EIA RS-465

  Standard for Group III facsimile.

- EIA RS-466

  Facsimile standard; procedures for document transmission in the general switched telephone network.

- EIA RS-232-C

  EIA DCE to DTE interface standard using a 25-pin connector; similar to CCITT V.24.

- EIA RS-449

  New EIA standard DTE to DCE interface which replaces RS-232-C.

- FED-STD 1000

  Proposed Federal Standard for adoption of the full OSI reference model.

- FED-STD 1026

  Federal Data Encryption Standard (DES) adopted in 1983; also FIPS 46.

- FED-STD 1041

  Equivalent to FIPS 100.

- FED-STD 1061

  Group II facsimile standard (1981).

- FED-STD 1062

  Federal standard for Group III facsimile; equivalent to EIA RS-465.

INPUT

- FED-STD 1063 — Federal facsimile standard equivalent to EIA RS-466.
- FED-STDs 1005, 1005A – 1008 — Federal standards for DCE coding and modulation.
- FIPS 46 — NBS Data Encryption Standard (DES).
- FIPS 81 — DES Modes of Operation.
- FIPS 100 — NBS standard for packet switched networks; subset of 1980 CCITT X.25.
- FIPS 107 — NBS standard for local area networks, similar to IEEE 802.2 and 802.3.

- IEEE 802.2 — OSI-compatible IEEE standard for data-link control in local area networks.
- IEEE 802.3 — Local area network standard similar to Ethernet.
- IEEE 802.4 — OSI-compatible standard for token-bus local area networks.
- IEEE 802.5 — Local area network standard for token-ring networks.

- MIL-STD-188-114C — Physical interface protocol similar to RS-232 and RS-449.
- MIL-STD-1777 — IP - Internet Protocol.
- MIL-STD-1778 — TCP - Transmission Control Protocol.
- MIL-STD-1780 — File Transfer Protocol.
- MIL-STD-1781 — Simple Mail Transfer Protocol (electronic mail).
- MIL-STD-1782 — TELNET - virtual terminal protocol.

- X.21 — CCIT standard for interface between DTE and DCE for synchronous operation on public data networks.
- X.25 — CCITT standard for interface between DTE and DCE for terminals operating in the packet mode on public data networks.
- X.75 — CCITT standard for links that interface different packet networks.
- X.400 — ISO application-level standard for the electronic transfer of messages (electronic mail).

D-4

INPUT

APPENDIX E: RELATED INPUT REPORTS

A. ANNUAL MARKET ANALYSES

- Procurement Analysis Reports, GFY 1985-1990.

- U.S. Information Services Vertical Markets, 1985-1990.

- U.S. Information Services Cross-Industry Markets, 1985-1990.

B. INDUSTRY SURVEYS

- Directory of Leading U.S. Information Services Vendors.

- Eighteenth Annual ADAPSO Survey of the Computer Services Industry, 1984.

- Information Services Industry Reports, 1985.

C. OFFICE INFORMATION SYSTEMS MARKET REPORTS

- Analysis of User Requirements for Office Products, 1983.

INPUT

- Management, Technology, and Strategy for Office Products, 1983.

- Micro Software Support Strategies, 1984.

- Office Products Vendor Competitive Analysis, 1983.

- Office Systems Service Market Analysis and Forecast, 1985-1990.

- Selling Personal Computer Software to Corporate America, 1985.

- U.S. Personal Computer Software Market, 1984-1989.

D.   OFFICE INFORMATION SYSTEMS PLANNING

- Cost/Benefit Analysis for Office Systems, 1983.

- Decision Support Systems: Experience and Outlook, 1985.

- Decision Support Systems and Beyond, 1984.

- Executive Workstations: Problems and Outlook, 1984.

- Integrating Office Systems into the Organization, 1985.

- Intelligent Workstations: Connecting the End User, 1985.

- Local Area Networks: Directions and Opportunities, 1983.

- Training: Prerequisite to Successful End-User Computing, 1985.

INPUT

APPENDIX F: INTERVIEW QUESTIONNAIRES

A. OFFICE INFORMATION SYSTEMS - AGENCY

1.a. Based on our review of your agency's A-11 submissions, the
     following new or improved office information systems (see
     attached list) have been proposed for implementation over
     the next 5 years. Is this list current and complete?

               _____ YES   _____ NO

  b. (If NO) What programs should be added or removed?

  c. Which of these programs are ongoing?   Expansions?   Up-
     grades? Replacements? New?

  d. Have the budget forecasts for any of these programs changed
     since May 1985?

               _____ YES   _____ NO

  e. (If YES) In what ways?

  f. In your opinion, are any of these programs likely to be
     delayed or cancelled as a result of Gramm-Rudman-Hollings?

2. In terms of the general budget categories used in the A-11 summary, what percentage of OIS program funding typically falls in each category?

A-11 Category	%
Capital Investment	
Hardware	
Software and other peripherals	
Leased Equipment	
Commercial Services	
ADPE time	
Leased Telecommunications	
Operation and Maintenance	
System Analysis and Programming	
System Design and Engineering	
Studies and Other	
Other (Personnel, Facilities, etc.)	
Total (should be 100%)	

3. Does your agency currently have a preference for leasing or purchasing OIS hardware? Future preference?

	Current	Future
Lease		
Lease-to-Purchase		
Lease-to-Ownership		
Purchase		
No Preference		

4. What percentage of your agency's OIS requirements will be met through the following sources?

Source	%
Federal Supply Schedule	
GSA Stores	
GSA Office Technology Plus	
Commercial Contract	

NOTE: Questions 5, 6, and 7 will be used to fill in a matrix of OIS applications by tools/support identifications.

5.   What are your major OIS applications?   (The following application prompts may be used.)

Data/Information Entry
    Digitizing
    Scanning (e.g., OCR)

Data/Information Storage and Retrieval
    On-line Data Base
    Electronic Filing
    Logistics
    Records Management
    Scheduling/Calendaring

Information Analysis
    Accounting
    Decision Support
    Engineering/Scientific
    Information Center
    Modelling
    Planning
    Project Management

Text/Document Processing
    Document Composition/Formatting
    Electronic Publishing
    Graphics
    Image Processing
    Word Processing

Data/Information Distribution
    Computer Conferencing
    Document Distribution
    Electronic Mail
    Message Distribution
    Printing
    Report Distribution
    Typesetting
    Video Conferencing
    Voice Communications

6.   What tools/services do you use to support each application?   (Potential prompts follow.)

Accounting Software Package
Data Base Services or RCS
DBMS - micro
DBMS - mini
DBMS - mainframe

Decision Support System
Electronic Mail
Facsimile Equipment
Fourth Generation Language
Local area Network
Micrographics
Modems
Operating System Software
Optical Character Recognition (OCR) Equipment
Optical Disk
PBX
Personal Computers
Plotters
Printers
Project Management Software Package
Spreadsheet
Statistical Software Package
Terminals or Workstations
Telecommunications Networks
Telephone Equipment (Other than PBX)
Voice Messaging System
Word Processing Equipment
Word Processing Software

7. Is the support centralized or distributed? If distributed, is it standalone or linked? If linked, is it linked at a work unit (office) or an institutional level?

NOTE: Question 8 also will be a part of the matrix.

8.a. Does your agency now use, or plan in the future to employ standards for ensuring compatibility of the OIS applications and tools mentioned above?

_____ YES   _____ NO

b. (If YES) What are the current and planned standards for the following types of OIS tools?

OIS Tools	Current	Future
Terminals or Workstations		
Personal Computers		
Word Processing Equipment		
Operating System Software		
Word Processing Software		

Document Interchange _____ _____

Micro DBMS _____ _____

Mini DBMS _____ _____

Mainframe DBMS _____ _____

Decision Support Systems _____ _____

Spreadsheets _____ _____

Telecommunications Networks _____ _____

Local-area Networks _____ _____

Other (list): _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

9. How are OIS planned, acquired, and managed in your agency?

	Centralized	Decentralized
Planning	_____	_____
Acquisition	_____	_____
Management	_____	_____

10.a. Is OIS included in your current long range information resources plan?

_____ YES   _____ NO

b. (If NO) Do you currently have a long range plan specifically for OIS?

_____ YES   _____ NO

c. (If YES to either 9.a or 9.b) What are the key objectives
    and strategies of the plan for OIS? That is, what con-
    cerns are driving the plan and how do you hope to solve
    them?

    _____

    _____

    _____

    _____

    _____

d. May we see the plan or obtain a copy?

    _____ YES   _____ NO

e. Where and when?

    _____

    _____

    _____

11. What should vendors provide during the next 5 years to
     make their OIS products more valuable to your agency?

    _____

    _____

    _____

    _____

    _____

12. What technological changes might alter the way your agency
     meets its OIS requirements?

    _____

    _____

    _____

    _____

    _____

13. Other than the budget, could you identify any non-technical factors that would have a significant impact on your agency's OIS plans?

_____
_____
_____
_____
_____

14. Who else in your agency should we interview to gain a better understanding of your OIS requirements?

_____
_____
_____
_____
_____

B.   OFFICE INFORMATION SYSTEMS - VENDOR

COMPANY BACKGROUND DATA

Company Name: _____

    Address 1: _____
    Address 2: _____
    Address 3: _____
         City: _____ State: __ Zip: _____
    CEO's Name: _____ Title: _____
    Telephone: (___) _____

Parent Organization: _____
    Address 1: _____
    Address 2: _____
    Address 3: _____
         City: _____ State: __ Zip: _____
    CEO's Name: _____ Title: _____
    Telephone: (___) _____
Relationship: Subsidiary ( ) Division ( ) Other _____

Full-Time Employees: NUMBER   % OF TIME   EQUIVALENT
                                       FEDERAL   FEDERAL

    Product/Service: _____   _____   _____
    Sales/Marketing: _____   _____   _____
     General/Admin.: _____   _____   _____

ORGANIZATION CHART

(Names and titles of at least 3 layers of organization
beginning with top management and including the federal
group(s). Include other layers to show where OIS fits
within federal and overall organization.)

AGENCY EXPERIENCE AND CURRENT CONTRACTS

Agency	Prev-ious	Description	Award Date	Length Options	Dollar Value
ARMY	—	_____	__/__	__/__	_____
NAVY	—	_____	__/__	__/__	_____
AIR FORCE	—	_____	__/__	__/__	_____
Defense	—	_____	__/__	__/__	_____
NASA	—	_____	__/__	__/__	_____
HUD	—	_____	__/__	__/__	_____
HHS	—	_____	__/__	__/__	_____
Commerce	—	_____	__/__	__/__	_____
Energy	—	_____	__/__	__/__	_____
Education	—	_____	__/__	__/__	_____
Interior	—	_____	__/__	__/__	_____
Trans.	—	_____	__/__	__/__	_____
State	—	_____	__/__	__/__	_____
Justice	—	_____	__/__	__/__	_____
Treasury	—	_____	__/__	__/__	_____
Labor	—	_____	__/__	__/__	_____

PRINCIPAL BUSINESS ACTIVITIES / REVENUE

Fiscal Year End (Month): _____

	REVENUE ($Millions)		
	1983	1984	1985
Total Company	____	____	____
Information Systems and Services	____	____	____
Non-Captive Information Systems and Services	____	____	____
Non-Federal OIS Applications	____	____	____
Federal Information Systems and Services	____	____	____
Federal OIS Applications	____	____	____

MODE	KEY PRODUCT/SERVICE	APPLICATION	% FED	% OIS
Processing				
Remote				
Batch	_____	_____	__	__
Data Base	_____	_____	__	__
Fac. Mgmt.	_____	_____	__	__
Software				
Systems	_____	_____	__	__
Applic.	_____	_____	__	__
Prof.Serv.				
S/W Dev.	_____	_____	__	__
Consult	_____	_____	__	__
Educ/Train	_____	_____	__	__
Fac. Mgmt.	_____	_____	__	__
Sys. Int.	_____	_____	__	__
Turnkey Sys.				
Systems	_____	_____	__	__
Support	_____	_____	__	__
H/W, H/W Sys.	_____	_____	__	__
Telecomm.				
Network	_____	_____	__	__
LAN	_____	_____	__	__

(If there are no "hits" on OIS)
Do you provide any OIS products or services?
YES _____ NO _____

    If YES, what? _____

          _____

    If NO, do you plan to offer OIS products or services?
        YES _____ NO _____
        If YES, what? _____

                _____

        If NO, end interview.

FEDERAL OIS STRATEGIES

Which of your company characteristics do you think agencies find most attractive?

_____
_____
_____
_____
_____

Which of your company's OIS capabilities do you think agencies find most attractive?

_____
_____
_____
_____
_____

In your opinion, which agencies provide the most attractive opportunities for you for OIS applications?

_____
_____
_____
_____
_____

What differences do you see between the implementation of OIS in commercial markets versus the federal government?

_____
_____
_____
_____
_____

Why do these differences exist? (Prompts: Technical, Regulatory, Funding, etc.)

_____
_____
_____
_____
_____

How are you addressing federal government requirements for:
Compatibility?_____
_____
_____

Security?_____
_____
_____

Integration?_____
_____
_____

What federal government standards, if any, are you following?
_____
_____
_____

If none, to what extent have agencies accepted your standards?
_____
_____
_____

What "new" technologies do you think will affect major federal
OIS procurements in the next 5 years?
_____
_____
_____
_____
_____

What do you believe vendors need to do over the next 5 years to
make their OIS offerings more valuable to the federal government?
_____
_____
_____
_____
_____

ABOUT INPUT

Company Profile

Founded in 1974, INPUT has become a leading international planning services firm. Clients include over 200 of the world's largest and most technically advanced companies.

Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, office systems, and information services. Clients receive reports, presentations, access to data on which analyses are based, and continuous client support.

INPUT is a service company. Through advisory/research subscription services, multiclient studies, and proprietary consulting, INPUT serves clients' on-going planning information needs.

INPUT Planning Services

INPUT offers five continuous information services addressing U.S. markets and two programs covering Western European markets:

- **Market Analysis and Planning Service (MAPS)** provides up-to-date market analyses, five-year forecasts, trend analyses, and sound recommendations for action. MAPS is designed to satisfy planning and marketing requirements of information services vendors.

- **Company Analysis and Monitoring Service (CAMS)** is a comprehensive reference service covering more than 4,000 U.S. information services vendor organizations. CAMS is often used for competitive analysis and pre-screening of acquisition and joint venture candidates.

- **Information Systems Program (ISP)** is designed for executives of large information systems organizations and provides crucial information for planning, procurement, and management decision making. The program examines new service offerings, technological advances, user requirements for systems and services, MIS spending patterns, and more. ISP is widely used by both user and vendor organizations.

- **Customer Service Program (CSP)** provides senior customer service organization management with data and analysis needed for marketing, technical, financial, and organizational planning. The program pinpoints user perceptions of service received, presents vendor-by-vendor service comparisons, and analyzes and forecasts the following markets:

- Large systems service.
- Small systems service.
- Telecommunications systems service.
- Software maintenance.
- Third-party maintenance.

- **Federal Information Systems and Services Program (FISSP)** presents highly specific information on federal procurement practices, identifies vendor opportunities, and provides guidance from INPUT's experienced Washington professionals to help clients maximize sales effectiveness in the government marketplace.

- **Western European Customer Service Program** parallels the U.S. Customer Service Program, dealing with comparable issues in European markets.

- **Western European Software and Services Planning Service (SSPS)** analyzes and forecasts information for European information services markets. Clients receive timely planning information through research-based studies, conferences, client meetings, and continuous client support.

Proprietary Services

The combination of INPUT's planning services and staff expertise provides clients with a uniquely qualified resource for custom research. These proprietary studies take two forms: **multiclient research services,** or in-depth analyses of issues common to multiple clients; and **custom consulting** for a single client. Some of the recent and more frequent topics are:

- Strategy planning and support.
- Service evaluation.
- Market penetration planning.
- Due diligence analysis and support.
- Customer attitude surveys.
- Acquisition research and support.
- Sales and marketing audits.

Clients also benefit from secondary research performed by INPUT for other programs and from INPUT's concentration on the information services industry in general.

Staff Profile

INPUT's professional staff have backgrounds in marketing, planning, information processing, and market research. Educational backgrounds include both technical and business specializations, and many INPUT staff hold advanced degrees.

Many of INPUT's professional staff have held executive positions in the following business sectors:

- Computer systems
- Software
- Turnkey systems
- Field service
  (customer service)

- Processing services
- Professional services
- Data processing
- Network services
- Communications

About INPUT...

- More than 5,000 organizations, worldwide, have charted business directions based on INPUT's research and analysis.

- Many clients invest more than $50,000 each year to receive INPUT's recommendations and planning information.

- INPUT conducts proprietary research, regularly, for some of the largest companies in the world.

- INPUT has developed and maintains one of the most complete information industry libraries in the world (access is granted to all INPUT clients).

- INPUT clients control an estimated 70% of the total information industry market.

- INPUT analyses and forecasts are founded upon years of practical experience, knowledge of historical industry performance, continual tracking of day-to-day industry events, knowledge of user and vendor plans, and business savvy.

- INPUT analysts accurately predicted the growth of the information services market—at a time when most research organizations deemed it a transient market. INPUT predicted the growth of the microcomputer market in 1980 and accurately forecasted its slowdown in 1984.

For More Information...

INPUT offers products and services that can improve productivity, sales, and ultimately profit, in your firm. Please give us a call today. Our representatives will be happy to send you further information on our services or to arrange a formal presentation at your offices.

For details on delivery schedules, client service entitlement, or **Hotline support simply call your nearest INPUT office (listed on the next page);** our customer support group will be available to answer your questions.

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