August 3, 1987

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Letter.
Original

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Dear
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:

Enclosed is the latest update to the market analysis report, <u>Federal Government
Professional Services Market, 1986-1991</u>, a part of INPUT's Federal Information
Systems and Services Program.

INPUT estimates that the federal government professional services market will
increase from $3.2 billion in 1986 to $5.5 billion by 1991, at an average annual
growth rate of 12%.

The enclosed material is designed to be inserted in your current Professional Services
binder, according to Section and Appendix separators. The material removed may be
discarded. The pages in Sections VII (Market Analysis and Forecast) through X
(Opportunities), "Software and Related Services," may be retained for now but will
be replaced by a new volume shortly.

If you have any questions about this report, please call us.

Sincerely,

John E. Frank
Vice President

JEF:ml

Enclosure

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Sec 1

FEDERAL GOVERNMENT
PROFESSIONAL SERVICES MARKET
1986-1991

JUNE 1987

Federal Information Systems and Services Program (FISSP)

Federal Government Professional Services Market, 1986-1991

FEDERAL GOVERNMENT PROFESSIONAL SERVICES MARKET
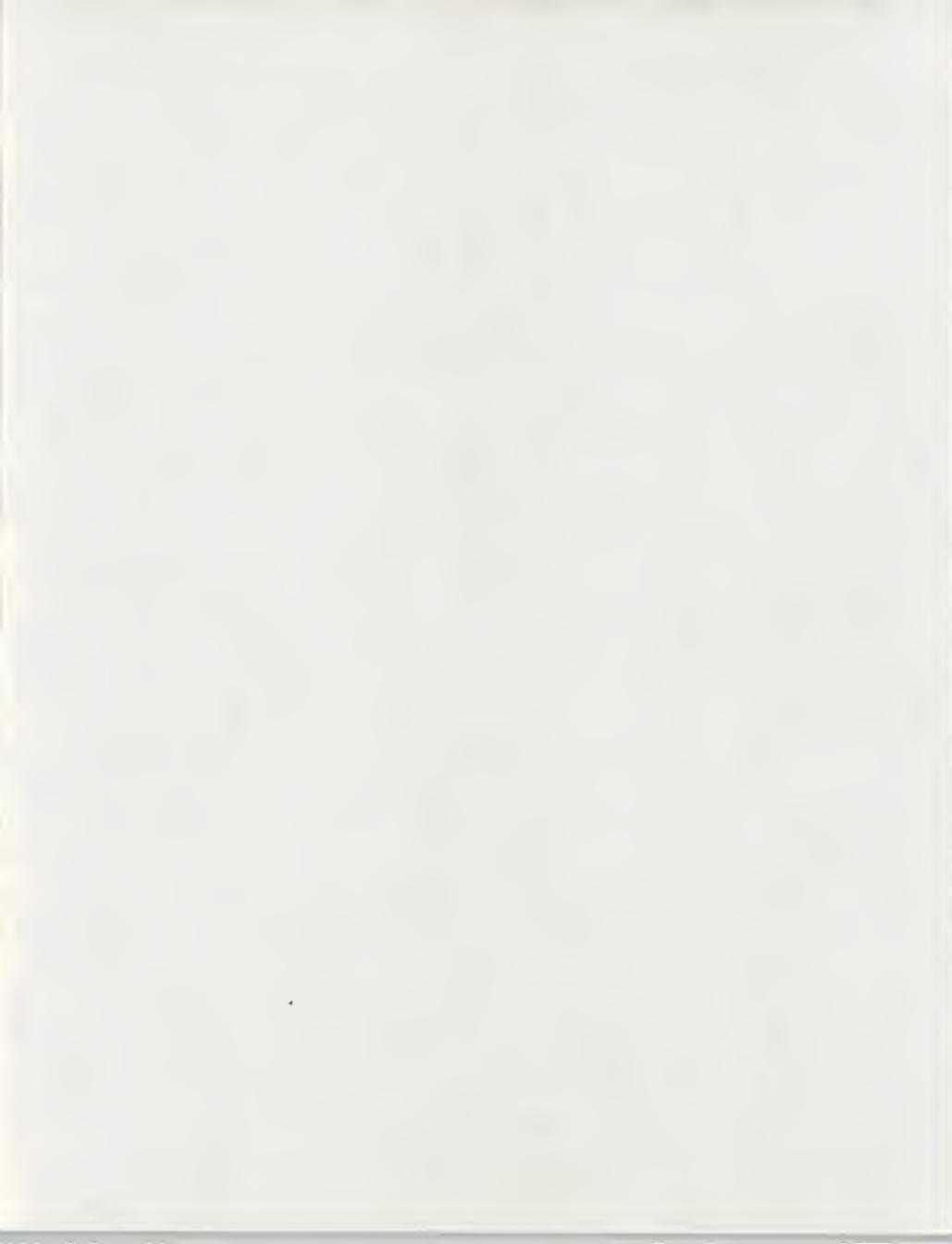## 1986-1991
(Revised)

ABSTRACT

INPUT believes that the federal market demand for professional services will sustain a 12% average annual growth rate in the 1986-1991 forecast period. This market is now expected to increase from $3.2 billion in 1986 to $5.5 billion by 1991.

The federal professional services market has become increasingly competitive in the past few years, with substantial pressure from small business and minority-owned firms as well as aerospace firms. In addition, the market continues to be highly price sensitive, with progressively narrower margins and more tightly controlled overhead. The report analyzes agency plans for future use of professional services. The report also discusses vendor status, future market plans, and selection criteria; vendor performance characteristics; contracting policy and preference; and major contract opportunitites in this period.

This report now contains 206 pages, including 55 exhibits, and is an update of the report of the same title.

FEDERAL GOVERNMENT PROFESSIONAL SERVICES MARKET
1986-1991

CONTENTS

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FEDERAL GOVERNMENT PROFESSIONAL SERVICES MARKET
1986-1991

EXHIBITS

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I INTRODUCTION

- This revised report on computer-related professional services provided to the federal government was prepared as a part of the Federal Information Systems and Services Program (FISSP).

- Research for this report is based upon an analysis of the INPUT Procurement Analysis Reports, previous INPUT research conducted during 1981 through 1986, discussions with FISSP clients, interviews with federal government agencies, and interviews with vendors of professional services who market to the federal government.

A. SCOPE

- This revised report covers those professional services programs listed in the OMB/GSA/NBS Five-Year Plan for government fiscal year (GFY) 1987 to 1991, related federal agency long-range Information Resources Management (IRM) plans, and federal agency GFY 1986 and 1987 Information Technology Budgets.

- The agencies selected for interview were identified in one or more of the above plans as current users of professional services.

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- The vendors selected for interview were identified as contractors of record for ongoing programs or listed as vendors for federal government professional services in INPUT's Company Analysis and Monitoring Service data base for 1986.

- The period of interest is GFY 1986 to 1991.

B.   METHODOLOGY

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

- The available agency Long-Range ADP Plans for GFY 1986-1990 and GFY 1987-1991 were researched to identify plans for major professional services contracts.

- The Federal Government Information Technology Budget requests provided in response to OMB Circular A-11, Sections 43A and 43B, for GFY 1985 to 1987 were analyzed to identify significant spending changes and both leading and lagging agencies for interviews.

- Questionnaires were developed for interviews of both federal agency officials and professional services vendor executives.

  - Federal agency officials selected for interview included:

    - Executives (policy).

    - Contracting officers (buyers).

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. Program managers (users).

- Vendor executives selected for interview included:

    . Company executives.

    . Marketing executives.

- Copies of the agency and vendor (industry) questionnaires are included in Appendices F and G.

    - The agency questionnaire was designed to acquire information about current experience and plans for future use of professional services.

    - The vendor questionnaire was designed to acquire information on industry status and future federal market plans.

    - Both included similar questions about contracting policy and preference, selection criteria, and vendor performance characteristics for comparison.

- The current versions of the Federal Information Resource Management Regulations, Federal Acquisition Regulations, Defense Acquisition Regulation (changes to FAR), and Multiple Agreement Schedule policy were investigated to identify changes which will impact professional services contracts and/or contract performance.

- Releases from the OMB Federal Contract Reporting Center were also reviewed to identify contract sizes, duration, and modification trends and to aid in assessing market shares.

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C.   REPORT ORGANIZATION

- This report has been organized into the following sections:

    - Executive Summary.

    - Market Analysis and Forecast.

    - Federal User Requirements and Trends.

    - Professional Services Competitive Trends.

    - Professional Services Opportunities.

- Several appendices are provided to aid in report use:

    - Interview Profiles.

    - Definitions.

    - Glossary of Federal Acronyms.

    - Related INPUT reports.

    - Questionnaires.

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II   EXECUTIVE OVERVIEW

- This Executive Overview is designed in a presentation format to:

    - Help the busy reader quickly review key findings.

    - Provide a ready-to-go executive presentation, complete with script and visual aids.

- Key points of the entire report are summarized in Exhibits II-1 through II-6. On the left-hand page facing each exhibit is a script explaining the exhibit's contents.

INPUT

A. OVERVIEW

- The federal government professional services market prospects for the next five years continue to be strong. The need for the government to steadily improve both the quality and quantity of ADP-supported services presents a unique opportunity for growth.

    - The federal workforce is heavily committed to maintaining existing software systems and inadequately staffed to develop new systems.

    - Pressure to reduce the federal budget deficit makes efficiency and innovation key factors.

    - Executive directives require federal agencies to utilize contractors, rather than perform the work in-house, if this is proven to be cost-effective. An example is OMB-A-76.

    - Technology, particularly in the areas of microprocessor hardware and software, supercomputers, and artificial intelligence, is advancing at a rate that requires the importation of private sector expertise to solve problems.

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EXHIBIT II-1

INPUT®

STRONG PROFESSIONAL SERVICES MARKET PROSPECTS

- Federal Commitment to Maintaining Existing Software

- Pressure to Increase Efficiency

- Directives to Use Contractors

- New Solutions Through Technology

INPUT

B. MARKET FORECAST: PROFESSIONAL SERVICES

- INPUT estimates that the federal government professional services market will increase from $3.2 billion in 1986 to $5.5 billion by 1991, at an average annual growth rate (AAGR) of 12%.

    - The growth rate will be fairly constant throughout each of the years.

    - Reductions in maintenance costs resulting from the upgrade of existing ADPE inventory and standardization of higher level languages will probably not have a significant impact during the forecast period.

    - The projected growth rate and outyear (1991) forecast have been lowered from the last forecast to reflect reductions in planned expenditures required by deficit control measures.

- The fastest growing service will be systems integration (16% AAGR). Agencies have a continuing need to build coherent, consolidated systems rapidly. Vendors who are able to assume the risks of these large efforts and develop on time and within budget should prosper.

- Programming and analysis (12% AAGR) will be the only other double digit growth service. Education and training (9%), facilities management (8%), and consulting (6%) round out the forecast picture.

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EXHIBIT II-2

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FEDERAL GOVERNMENT PROFESSIONAL SERVICES MARKET GFY 1986-1991

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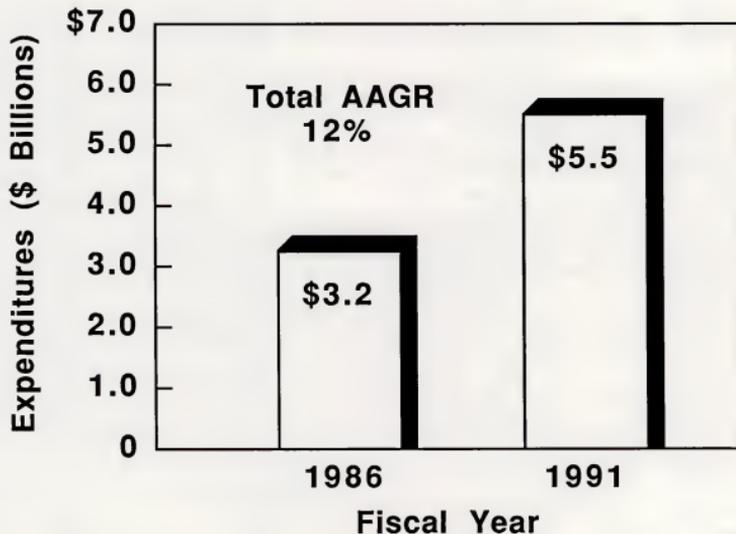
C.   COMPETITIVE FORCES

- The federal government professional services market has become increasingly competitive in the past few years, with substantial pressure from small business and minority-owned firms as well as aerospace firms like Martin Marietta, Boeing, McDonnell Douglas, Grumman, and Lockheed.

- The professional services market has become highly price sensitive. The winners are working with progressively narrower margins, more tightly controlled overhead, and reduced management structures.

- Bid selection reviews now require in-depth presolicitation intelligence gathering and earlier executive management involvement. Companies that have failed to accurately assess their prospects for winning have found themselves wasting proposal budgets on increasing numbers of failures.

INPUT

EXHIBIT II-3

INPUT®

COMPETITIVE FORCES

- New Competitors

  - Small Businesses

  - Minority-Owned Firms

  - Aerospace Companies

- Price Sensitivity

- Presolicitation Intelligence

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D.   AGENCY AND VENDOR RANKINGS OF SELECTION CRITERIA DIFFER

- INPUT recommends that vendors assist potential agency customers with their missions, functions, and problems. Vendors should not modify the problem to meet an available solution.

- INPUT recommends that vendors improve their pre-bid and proposal strategic planning to increase award prospects. They must become more aware of what the federal government is seeking in a professional services vendor and adapt strategies to match.

- There are significant differences of opinion as to the relative importance of vendor characteristics.

    - Government agencies consider application-functional experience an important characteristic. Vendors considered it of lesser importance.

    - The government agencies give the least consideration to agency and federal contract experience while vendors considered hardware experience to be the least important factor.

    - There are other significant differences shown in the table. These differences should be examined in more detail by each vendor.

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EXHIBIT II-4

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RELATIVE IMPORTANCE OF PROFESSIONAL
SERVICES VENDOR CHARACTERISTICS

Comparative Rankings		
Civil Agencies	DoD Agencies	Vendors
Staff Experience	Software Deveopment Experience and Price	Price

INPUT

E. MARKET OPPORTUNITIES

- Several trends in federal government acquisition and application of information services are apparent and supported by the present administration.

- Distributed systems, employing a range of computer sizes and sophisticated networking requests, will experience strong growth, presenting a substantial opportunity to qualified vendors.

- The leading software application prospects are financial and logistic applications, both packaged and customized, with potential for continued growth throughout the remainder of the decade.

- The trend away from custom development and away from one-of-a-kind, nontransferable applications has created an opportunity for federal government professional service vendors who can make efficient use of existing system packages and other means of reducing software development costs.

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EXHIBIT II-5

MARKET OPPORTUNITIES

· **Distributed Systems**

· **Financial Applications and Logistics**

· **Cost-Effective Custom Development**

F. RECOMMENDATIONS

- INPUT recommends that vendors identify the conditions under which they can accept fixed-price contracts since the federal government has a growing preference for fixed-price contracting, a trend that shows no sign of reversal.

- INPUT recommends that vendors emphasize their marketing in areas that are politically popular. In election years, Congress reacts to programs that gain or hold votes.

- Vendors continue to get low marks for being unresponsive to agency needs and constraints. Selling vendor products and capabilities rather than meeting agencies' needs for solutions is the number one cause for low satisfaction levels. Vendors need to increase their understanding of the business objectives of each proposed project and then ask how the vendor will be able to meet these objectives.

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EXHIBIT II-6

INPUT®

RECOMMENDATIONS

- Know Your Risk Levels

- Increase Agency Responsibilities

- Market the Politically Popular

- Identify Required Skills Early

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III MARKET ANALYSIS AND FORECAST

A. MARKET FORECAST, 1986-1991

- The federal government professional services market is expected to grow from $3.22 billion in 1986 to $5.54 billion in 1991, at an average annual growth rate (AAGR) of 12%, as illustrated in Exhibit III-1.

- Professional services are rendered to government agencies under a variety of task names and functions. For consistency within this report and with other INPUT reports on the federal government market, professional services are defined and discussed in the following categories (also see Appendix B):

    - Consulting Services.

    - Education and Training.

    - Programming and Analysis.

    - Facilities Management/Operations and Management; for example, Government-Owned/Contractor-Operated (GOCO) projects.

    - Systems Integration.

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EXHIBIT III-1

FEDERAL GOVERNMENT PROFESSIONAL
SERVICES MARKET GFY 1986-1991

PROFESSIONAL SERVICE CATEGORY	Market Size ($ Billions) Fiscal Year						AVERAGE ANNUAL GROWTH RATE (Percent)
	1986	1987	1988	1989	1990	1991	
Consulting Services	0.35	0.37	0.39	0.43	0.45	0.48	6
Education and Training	0.27	0.30	0.33	0.37	0.40	0.41	9
Programming and Analysis	0.96	1.07	1.22	1.28	1.44	1.65	12
Facilities Management	0.74	0.80	0.86	0.93	0.99	1.07	8
Systems Integration	0.90	0.98	1.19	1.40	1.64	1.93	16
Total	3.33	3.52	3.99	4.41	4.92	5.54	12

INPUT

1.   CONSULTING SERVICES

- Consulting services in the federal market include information systems and/or
  services management consulting, program assistance (technical and/or
  management), feasibility analysis, and cost-effective trade-off studies.
  Examples of government consulting services contracts are:

  - Feasibility studies.

  - ADP requirements analyses.

  - System audits.

  - System Engineering and Technical Direction (SETD).

  - System Engineering and Technical Assistance (SETA).

- Consulting services are expected to increase from $350 million in 1986 to
  $482 million by 1991, at an AAGR of 16%. Agencies frequently need
  assistance in producing the technical justification for planned improvements
  in information technology resources because the agencies are understaffed in
  the technical planning and evaluation areas. Deficit reduction measures and
  increased use of systems integration contractors to provide design services
  have reduced both the level and rate of growth of consulting services.

2.   EDUCATION AND TRAINING

- Education and training services relate to information systems and services for
  the user, including CAI (computer-aided instruction), CBE (computer-based
  education), and vendor instruction of user personnel in operations,
  programming, and software maintenance. The government normally contracts
  for:

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- Training programs.

- Books and manuals.

- Seminars.

- Automated training systems.

- This submode is expected to attain an AAGR of only 9% over the 1986-1991 period, reflecting substantial budget cuts of the Gramm-Rudman-Hollings Act (GRH) in 1986-1988. The principal focus of training will be the large number of fourth generation replacement systems for ADP architectures of the IBM 360-370 era. The dynamics of end-user computing, local area networks, distributed processing, and new software will require retraining of more than half of the current federal government ADP work force.

3. PROGRAMMING AND ANALYSIS

- Programming and analysis services, also called software development, include system design, contract or custom programming, code conversion, independent verification and validation (also called IV&V), benchmarking, and software maintenance. The government usually contracts for:

- Hardware and/or software system design.

- Custom software development.

- Modification of off-the-shelf software products.

- Software testing of both custom-developed and commercial packages.

- Software conversion.

INPUT

- Maintenance of both operating and applications software.

- Independent verification and validation of software packages.

- This service mode is expected to be the second fastest growing during this period, at an AAGR of 12%, substantially less than the 22% rate of two years ago. Program rescheduling and reductions in ongoing contracts reflect agency efforts to retain in-house staffs. The shortfall in programming skills of the federal government sector will continue to be the most significant factor behind the projected growth in the out years. Government staff limits and the backlog of software maintenance tasks at most government data centers also contribute to the demand for vendor assistance in this service mode.

4. FACILITIES MANAGEMENT/OPERATIONS AND MAINTENANCE

- Professional services facilities management (PSFM) is also referred to as GOCO (Government-Owned/Contractor-Operated) ADP. The computing equipment is owned or leased by the government, not the PSFM vendor; the vendor provides the staff to operate, maintain, and manage the government's facility. GOCO also includes operations and maintenance (O&M) contracts, which differ from PSFM in that they have less or no direct management/control of the facility. Both second- and third-party maintenance is included. Typical contract tasks in this submode include:

- Operation and management.

- Hardware maintenance.

- Software maintenance.

- Site preparation and installation.

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- This submode is not expected to grow faster than the rest of professional services because it is a mature market in the federal government. The currently projected AAGR of 8% between 1986 and 1991, reaching just over the $1 billion level in 1991, is the result of task reductions by agencies to save in-house staff under pressure from GRH and moves toward mission-style contracting.

- Standalone maintenance contracts for both hardware and software have been included in the submode.

  - Most maintenance and repair activities are funded through the operations, maintenance, and repair (OM&R) budgets of the agencies.

  - OM&R budget requests are not supported by detailed documentation, as are major new and replacement ADP/telecommunication systems.

- The facilities management market is treated in greater detail in a companion INPUT FISSP report, <u>Federal ADP Facilities Management and On-Site Operation and Maintenance Services Markets</u>.

5. SYSTEMS INTEGRATION

- Systems integration services are associated with the design and implementation of ADP/telecommunications systems by separately contracted vendors rather than by a prime contractor as in turnkey systems products. Typical tasks that may be contracted in this submode include:

  - Systems Engineering and Integration (SE&I).

  - Systems Engineering and Technical Assistance (SETA).

  - Systems work packages (SWP).

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- Computer hardware and operating system software.

- Commercial software products and education/training services that are not contracted separately.

- This service mode is the fastest growing segment of the professional services industry and is projected to become the largest share of federal expenditures by the year 1991. The OMB Circular A-11 submissions for the five-year 1986-1991 Information Technology Budget forecast indicated a probable AAGR of 16%, to reach $1.9 billion by 1991.

  - For systems with life cycle costs (LCC) in excess of $20-30 million, agencies are using multiple contractors to spread the risk.

  - For systems with LCCs that are less than $5-10 million, agencies are planning to use a single prime contractor or a packaged turnkey system supplier.

  - Agencies are frequently undecided about the appropriate contracting route for systems between $5 and $30 million LCC.

  - The forecast is based on funding needed to satisfy the system upgrade or replacement requirements for an ADP inventory that is rapidly exceeding the current six-year lifetime of third generation systems.

- This market is treated in greater detail in INPUT's FISSP report, _Federal Systems Integration Market,_ revised in June 1986.

INPUT

B.   THE PROFESSIONAL SERVICES INDUSTRY

- Professional services vendors have been dependent on three important factors for their growth and success:

    - Agency demand for automation.

    - The technical knowledge and performance levels of their personnel.

    - Availability of their staffs to meet customer shortages in in-house technical expertise or manpower.

- Most of the largest vendors of professional services to the government derive a significant percentage of their total professional services revenue either directly from the federal government or as subcontractors to other companies performing work under government contracts.

    - This dependency upon the federal government has had a profound effect upon vendors' earnings, management, organizational structure, employees, and the commercial market.

    - Government vendors of professional services tend to attract and recruit into their management ranks a high proportion of ex-government employees who understand how to navigate the complexities and deal with the competitiveness of government procurements.

- Government vendors enjoy a high rate of systems enhancements, extensions, and maintenance contract awards associated with initial awards. Many of these follow-on contracts are awarded on a sole-source, noncompetitive basis due to the vendors' unique experience and knowledge of the recently completed system.

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C. VENDORS OF PROFESSIONAL SERVICES TO THE GOVERNMENT

- Exhibit III-2 lists the largest professional services vendors to the federal government. While the listed vendors do not fluctuate dramatically from year-to-year, rankings do. The continually changing demands for different services and the patterns of vendor teams for different programs make a complicated competitive structure. Very frequently, today's bidding partners are tomorrow's competitors.

- This market is dominated by systems houses and computer hardware firms. These vendors make available a broad range of skills to meet planning, development, integration, and implementation requirements.

  - A sizable additional portion of hardware manufacturers' revenue is derived from the maintenance of equipment they sell to the government. Maintenance of ADPE by the original manufacturer is not included in this report except where it falls under a professional services facilities management contract.

  - Systems house vendors offer services that can include the acquisition, assembly, and integration of hardware, communications, and software. These vendors do not typically manufacture hardware. Representative vendors include Computer Sciences, Electronic Data Systems, BDM International, Planning Research Corporation, Systemhouse, and DBA Systems. This group also includes firms that have been spun off from parent organizations not in the information services industry (e.g., Boeing Computer Services, Martin Marietta, and Grumman Data Systems).

- A growing force in the market is the professional services activities of tax/audit firms. Active "Big Eight" accounting firms include Arthur Andersen; Peat, Marwick Mitchell; Price Waterhouse, Coopers and Lybrand; Deloitte, Hoskins and Sells.

III-9

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EXHIBIT III-2

LARGEST FEDERAL GOVERNMENT PROFESSIONAL
SERVICES VENDORS, 1986

VENDOR	USER EXPENDITURES ($ Millions)	MARKET SHARE (Percent)
Computer Sciences Corp.	301	11
Martin Marietta Data Systems	237	9
General Motors/Electronic Data Systems	181	7
Planning Research Corp.	118	4
BDM International	112	4
International Business Machines (IBM)	102	4
Sperry Computer Corp.	100	4
Burroughs/Systems Development Corp.	72	3
Science Applications International Corp.	69	2
American Management Systems	58	2

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- "Not-for-profit" organizations, including corporations such as MITRE and Sandialan (an AT&T subsidiary) and colleges and universities (e.g., Carnegie Mellon, University of California, Batelle Memorial Institute), compete with private industry for professional services work from the federal government.

- Finally, some government data centers with unique skills and/or available capacity also compete with private industry for government contracts. Government agencies have the choice of whether to contract outside or to use available government centers, including capabilities in other agencies. In many cases the cost may be the same, but by staying "in-house," the agency saves the time and effort required to put a contract into place competitively.

D.   MARKET SIZE BY AGENCY

- The information presented in Exhibit III-3 presents FY 86 and FY 87 budget data extracted from the Office of Management and Budget Circular A-11 agency reports. Exhibit III-3 does not cover the entire federal government, but does include those agencies surveyed by INPUT.

    - Army is the largest user of consulting, education, and training. Among the civil agencies, DOE is the largest user, followed by GSA and the Department of Energy.

    - The Air Force is the largest defense agency user of programming and analysis servcies. Large civil users are the Department of Energy, NASA, and GSA.

    - NASA is the largest single agency user of operations and maintenance services within the federal government. DOE and Health and Human Services are also large users among civil agencies while the Army, Air Force, and Navy report substantial O&M budgets on the defense side.

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EXHIBIT III-3

FEDERAL GOVERNMENT AGENCY PROFESSIONAL
SERVICES BUDGETS GFY 1986 AND 1987

PROFESSIONAL SERVICES BUDGETS ($ MILLIONS)						
CONSULTING, EDUCATION AND TRAINING*		PROGRAMMING AND ANALYSIS*		OPERATING AND MAINTENANCE**		
GFY 1986	GFY 1987	GFY 1986	GFY 1987	GFY 1986	GFY 1987	AGENCY
16.9	15.5	24.2	20.5	36.1	42.8	USDA
51.8	73.9	16.3	17.8	55.1	59.9	DOC
3.3	3.5	8.6	9.1	30.0	33.0	ED
47.9	48.5	236.4	259.4	170.0	187.6	DOE
45.4	49.5	150.2	163.5	22.4	23.7	GSA
30.3	22.7	152.3	160.3	161.9	173.5	HHS
0.4	0.01	7.2	10.8	10.6	12.9	HUD
6.9	7.5	18.3	21.7	36.9	40.4	INT
18.2	16.2	9.1	9.5	53.5	60.1	JUSTICE
2.3	2.7	13.7	9.3	22.1	26.2	DOL
45.0	42.0	240.2	246.6	322.7	355.9	NASA
7.3	7.0	39.4	49.7	34.9	46.6	DOT
29.4	31.9	34.0	36.9	85.7	102.1	TREAS
39.8	29.6	381.4	445.2	244.9	289.4	USAF
32.7	36.7	217.4	232.4	227.7	279.3	NAVY
82.5	101.2	111.0	123.2	261.9	299.6	ARMY
29.0	32.1	0.40	0.43	32.0	45.3	DLA

* Systems Integration included in both Columns.

** Includes Facilities Management and Third-Party Maintenance (TPM)

Source: GFY 1986 OMB A-11 Agency Budget Requests.

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- According to the OMB A-11 agency budget requests, DoD continues to lead civil agencies in growth of expenditures for professional services for new information systems.

  - DoD reported a 9% growth in requests for studies that frequently are precursors to implementation of advanced technology. Civil agencies reported a 7% decline in such requests.

  - Anticipated growth of systems design and engineering requests, the funding for specific implementation analyses, was stronger in civil agencies, 20% compared to 12% for DoD. Civil agencies not only contract for more of these services to cover the in-house shortfall, but are now also spending faster to make the advances DoD has already made.

  - Actual implementation expenditure growth (i.e., systems analysis and programming) is moderately faster in DoD, once again reflecting their stage of development.

  - Finally, operation and maintenance, a partial reflection of the extent of implemented systems, is stronger in DoD, 20% versus 13% for civil.

E.   FEDERAL MARKET ISSUES

- The FARs (Federal Acquisition Regulations) replaced all prior procurement and acquisition regulations governmentwide in 1984.

  - The FARs regulate the acquisition (purchasing procedures) of all professional services for ADP and communications that are not included under FIRMR (see below).

III-13

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- The FARs apply to professional services to support:

    - Mission-Critical Computer Resources of DoD, including special-purpose and embedded computer systems or subsystems.

    - Air traffic control system of the FAA.

    - Biomedical systems of the Veterans' Administration.

    - Classified systems of the intelligence community.

- Use of the FARs was expected to expedite the acquisition process. Instead, the defense and civil agency councils have introduced a number of changes that reinstituted some of the barriers of the earlier regulations and generated some new rules opposed vigorously by industry.

- The new FIRMR--1984 (Federal Information Resource Management Regulations) also became effective April 1, 1984, replacing the earlier FPRs (Federal Procurement Regulations), FPMRs (Federal Property Management Regulations), and DARs (Defense Acquisition Regulations) that applied to general purpose ADP and conventional communications.

    - While the new FAR regulates only the acquisition process, the FIRMR provides a single regulation for the acquisition, management, and use of information technology by federal agencies.

    - The 1984 version of FIRMRs were titled "INTERIM REGULATIONS," indicating that revisions intended to further simplify and expedite acquisition would follow. A number of revisions were introduced in 1985 and 1986:

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- The thresholds, the level above which agencies are required to request procurement authority from GSA, were experimentally raised to $10 million for several agencies.

- Services were included along with equipment and software under the regulations.

- Agencies were authorized to select a method of system acceptance for a given level of risk, other than the earlier mandated benchmark process.

  - Professional services to support general purpose ADP applications (not listed above under FARs) are now purchased under the FIRMR.

- The number of OMB Policy A-109 acquisitions continued to decline and were used for only the larger ($100 to $550 million) or more controversial system acquisitions. Some agencies try to avoid application of A-109 procedures completely.

  - The A-109 system acquisition procedure requires early participation of potential prime bidders and some of the principal first-tier subcontractors.

  - The policy recommends an "up front" investment of at least 10% of program value for design and trade-off efforts.

  - Non-A-109-type system acquisitions use professional services vendors in a variety of tasks that do not require prior involvement:

    - System engineering and integration.

    - Code conversion.

INPUT

- System implementation.

- Independent verification and validation.

- New software development.

  - Agencies and vendors opposed to the application of the A-109 procedures offer several arguments:

    - They are perceived as unnecessarily delaying the implementation of the system to satisfy the frequent reviews.

    - The procedures expose the designs and rationale of the bidders to a wider audience of reviewers.

    - They allow the vendor to define the next step in the process as part of the phased deliverables.

- OMB Policy A-76 recommends government reliance on the private sector for goods and services. This policy was supplemented in 1983 and 1985 to put even more emphasis on the use of the private sector.

  - The policy requires conduct of a comparison of the cost of in-house staff versus contractor performance of services (including professional services) whenever an agency plans a major upgrade, replacement, or new start of ADP resources.

  - To gain efficiency, the policy supports transition from the earlier "body-shop type" professional services support to "mission-type" contracting. Under the latter, the vendor determines the staffing needs and skills mix to perform the tasks.

INPUT

- OMB A-76 comparisons are usually applied to facilities management and on-site operation and maintenance contracts and rarely to system design and software development projects.

- OMB asked for verification of the efficiency of using in-house ADP personnel for about 50,000 positions in the FY 1987-1988 budget reviews.

- The federal employee unions have increased their public opposition to A-76 in late 1986 and early 1987 because its application will erode their membership base.

- The congressional ADPE "Buy-not-Lease" mandate to DoD in the FY 84 budget was expected to have far-reaching implications. More than $2.1 billion of ADPE leased to the DoD was to have been replaced in three years.

  - The mandate dictated competitive acquisition of replacing systems where the purchase option would acquire obsolete equipment. Professional services vendors could be asked to bid system design and system integration opportunities.

  - Competitive replacement of leased systems could offer opportunities for code conversion, new software development, and training.

  - The mandate was not supported by sufficient funding. Congress authorized about $150 million per year in the following fiscal year's Industrial Funds for replacement, substantially less than needed to meet the objectives.

  - The moves toward use of the GSA ADP fund for economic purchase and lease-to-purchase plans by agencies and accelerated ADPE replacement funding are accomplishing the same objective.

INPUT

- Reduced emphasis on the use of small business, in particular the 8(a) program, has eroded the small-business share of government business, most notably with the drastic decline of contracting by the Departments of Education, Health and Human Services and Labor according to the House Small-Business Committee.

  - Concurrent with presidential election strategy, this committee is expected to negotiate a larger share of "Big Ticket" programs for small business firms.

  - The inclusion of a firm small business (sub)contracting plan in large ADP system bids is required by DoD, NASA, and Transportation.

  - Major vendors emphasize that they are alert to beneficial and long-term relations with reliable small business suppliers. Contract officers rate prime bidders by the duration of the subcontractor relationships.

INPUT

IV   FEDERAL USER REQUIREMENTS AND TRENDS

A.   SIGNIFICANT PROBLEMS/ISSUES

- The federal government has a continuous need to steadily improve the quality and quantity of ADP services, within the confines of budget deficit reduction measures, at the same time it is overcoming the handicap of a rapidly aging ADP inventory and escalating software costs.

I.   BUDGET AND PERSONNEL CONSTRAINTS

- The federal government does not currently have the in-house staff required to support the quality or quantity of ADP-supported services demanded by the Congress and by the American people. When the federal government does not have the capability to perform work with in-house personnel, the government contracts the work to services vendors.

- Because of budget constraints, personnel hiring restrictions imposed by the Office of Personnel Management, inadequate in-house expertise, and OMB Circular A-76, there are strong indications that the government will make extensive use of professional services and other support services contracts well into the next decade.

- The Gramm-Rudman-Hollings Act imposed cuts in agency expenditures in 1986 and 1987 that resulted in limitations in the growth of the professional

INPUT

services market. Relief from this and other deficit control measures is expected by mid-1988.

2.   ADPE INVENTORY UPGRADE

- Upgrade of the existing inventory of ADPE will initially result in reduced software maintenance costs. However, INPUT has no indication that this will have any significant impact on overall software expenditures before the end of the 1980s.

    -    The impact of the ADPE purchase-versus-lease directives is not clear at this time. Because of the additional funding that would be directed toward purchase of equipment, one possibility is a slowdown in the upgrading process to new, more modern equipment and an increase in the amount of maintenance required to keep obsolete equipment (and the software designed to run on that equipment) operational until it is replaced.

    -    The GAO has estimated that 70% of life cycle software costs are related to maintenance. As more custom software is developed by the government, more maintenance labor will be required to keep that software functional, including interim upgrades to expand the applications of the host computers.

3.   PERSONAL COMPUTERS

- The rapidly escalating rate of acquisition of personal computers by government personnel has highlighted major problems of accessibility to the government's numerous data bases.

    -    Acquiring significant data manually or re-encoding data from large computer printouts that should have been available electronically can require substantial effort, cause delays in data availability, or lead to inaccurate conclusions.

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- Implementation of newer technology ADPE with more efficient software imposes an additional technical problem—how to recover information from the tapes of earlier systems, especially when the file codes and procedures are inadequately documented.

- Security risks escalate with proliferation of sensitive data in PCs that are not adequately protected during absence of the user.

4. EMBEDDED COMPUTERS

- Embedded computers are digital computers that are applied in real time military equipment operations to solve tactical, strategic, and operational problems. An embedded computer is capable of accepting information and providing the results of these processes.

  - The projected average growth through 1990 of the number of embedded computers in the DoD is 11% per year.

  - The growth of embedded computers must be supported by professional services in the areas of consulting, training and education, software maintenance, and, in some cases, operations and maintenance contracts. In addition, there will be significant hardware maintenance functions.

B. CIVIL AND DOD AGENCY USERS

- The government agencies surveyed by INPUT anticipate moderate increases in use of professional services in almost all categories, as shown in Exhibit IV-1.

  - The primary reason for the increases in the number of agencies planning to use professional services is the emphasis on new and

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EXHIBIT IV-1

TYPE OF PROFESSIONAL SERVICES USED BY
FEDERAL GOVERNMENT AGENCIES

PROFESSIONAL SERVICE CATEGORY	CIVIL AGENCIES		DOD AGENCIES	
	USE NOW (Percent)	PLAN TO USE* (Percent)	USE NOW (Percent)	PLAN TO USE* (Percent)
Consulting Services	65**	68	80	80
Education and Training	79	82	80	90
Programming and Analysis	89	89	80	80
Operations and Maintenance	86	89	80	90
Hardware Maintenance	93	96	80	90
Software Maintenance	86	89	70	100
Systems Integration	72	82	70	100

* Over Next Five Years

** As a Percent of Total Respondents in Each Category

Updated 1987

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expanded data services that exceeds current staff capacity or, to a lesser extent, capabilities.

- Other reasons for increases are new requirements and the impact of OMB Circular A-76. The latter is having a particularly strong impact on both hardware and software maintenance expenditures, especially in DoD.

- While use of consulting and education/training services will increase, there is considerable pressure to contain expenditure growth. Education/training may be hardest hit by this pressure. In fact, several respondents expressed a belief that the agency would conduct education/training only as required for new systems and only to the extent that the service is offered by the systems supplier. Thus, education/training would be pulled in-house and occasionally limited to on-the-job experience.

- The big winner, as reported by respondents, will be systems integration services due to the need to tie divergent systems together as a means of avoiding systems redundancy and incompatibility.

I. PROFESSIONAL SERVICES BUDGET DISTRIBUTION

- The results of INPUT's analysis revealed that there are significant differences in the distribution of the professional services budgets of the DoD and of the civil agencies, as shown in Exhibits IV-2 and IV-3.

    - Budget allotment distributions for consulting and education/training are similar for both types of agencies and represent approximately 20% of the professional services budgets.

    - FM services in civil agencies reflect the continuing need to cover the larger staffing shortfalls in personnel. Similarly contracted programming and analysis activities represent a larger proportion of the civil agencies' professional services budget.

IV-5

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EXHIBIT IV-2

PROFESSIONAL SERVICES BUDGET DISTRIBUTION
BY SERVICE CATEGORY
CIVIL AGENCIES

FACILITIES
MANAGEMENT

25%

PROGRAMMING
AND
ANALYSIS

35%

CONSULTING

11%

EDUCATION/
TRAINING

8%

SYSTEMS
INTEGRATION

21%
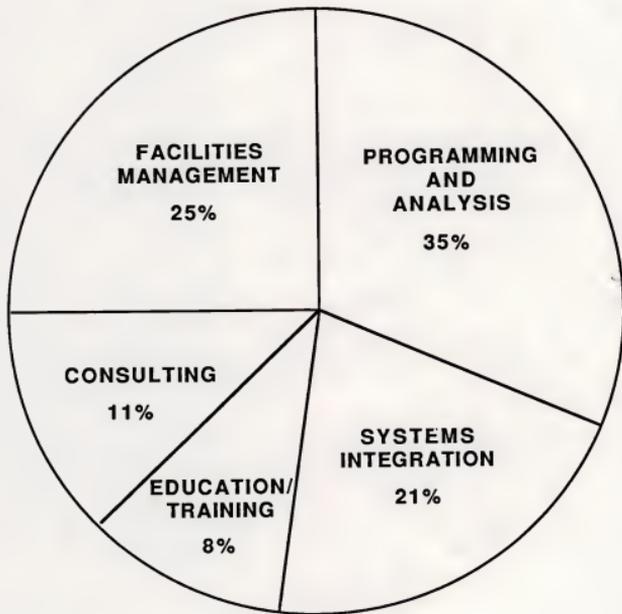
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EXHIBIT IV-3

PROFESSIONAL SERVICES BUDGET DISTRIBUTION
BY SERVICE CATEGORY
DEFENSE AGENCIES

FACILITIES MANAGEMENT
20%

PROGRAMMING AND ANALYSIS
27%

CONSULTING
10%

SYSTEMS INTEGRATION
34%

EDUCATION/ TRAINING
9%

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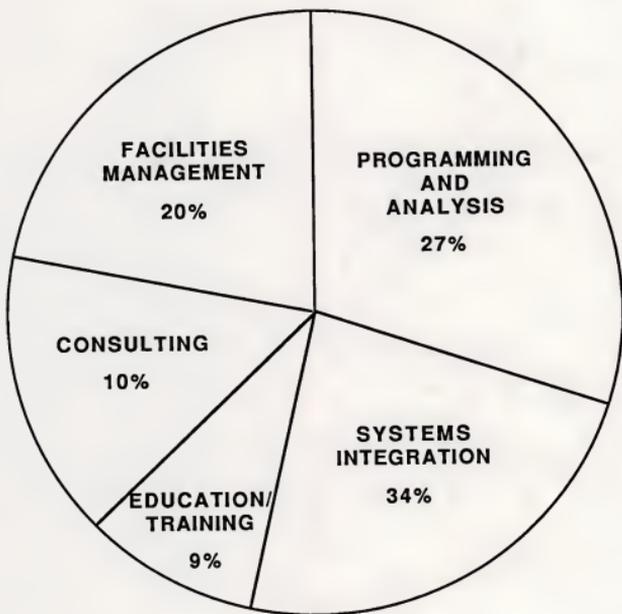
- Systems integration expenditures, as a percent of this budget, are far larger in defense agencies. Their early use of "total solutions" services has continued at an accelerated pace.

2. APPLICATION AREAS

- The various government agencies surveyed utilize professional services contracting for many different applications. INPUT categorized the responses into several broad categories for analysis and presentation (see Exhibit IV-4).

  - In both DoD and civil agencies, the predominant applications for which professional services are contracted are those associated with general data processing in support of management/administrative requirements.

  - Financial applications and logistics comprise the largest specific applications. Other applications cover a range of information systems and appear unique to the individual needs of each agency. Mentioned systems do frequently include such tactical directions as LANs, distributed processing, and centralized data bases.

  - While still a less frequent target, office automation continues to be an application for which agencies buy professional services.

  - Applications tend not to be esoteric in nature, but rather "plain vanilla" systems that serve as the backbone of each agency.

  - Specific technical applications, such as those identified as scientific, comprise a rather small portion of the professional services work.

- Besides technical/scientific applications, the federal government agencies have many specific "mission"-oriented applications that require custom software development. Agencies are now subject to administrative pressures

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EXHIBIT IV-4

FEDERAL GOVERNMENT PROFESSIONAL SERVICES
APPLICATION AREAS
CIVIL AGENCIES

Office Automation 10%

Administration and Logistics 25%

Scientific 8%

Computer Operations 14%

MIS 15%

Data Management 10%

Financial 18%

Updated 1987

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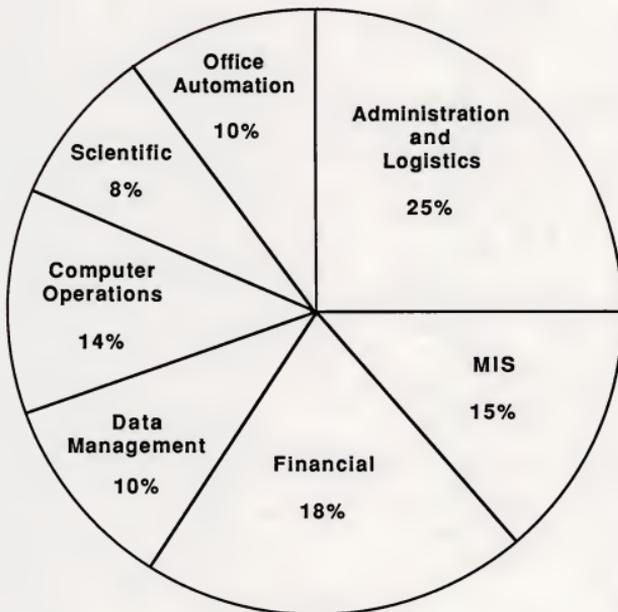
EXHIBIT IV-4 (Cont.)

FEDERAL GOVERNMENT PROFESSIONAL SERVICES
APPLICATION AREAS
DOD AGENCIES

Office Automation 10%

MIS 22%

Financial 10%

Administration and Logistics 17%

Data Manangement 22%

Scientific 19%

Updated 1987

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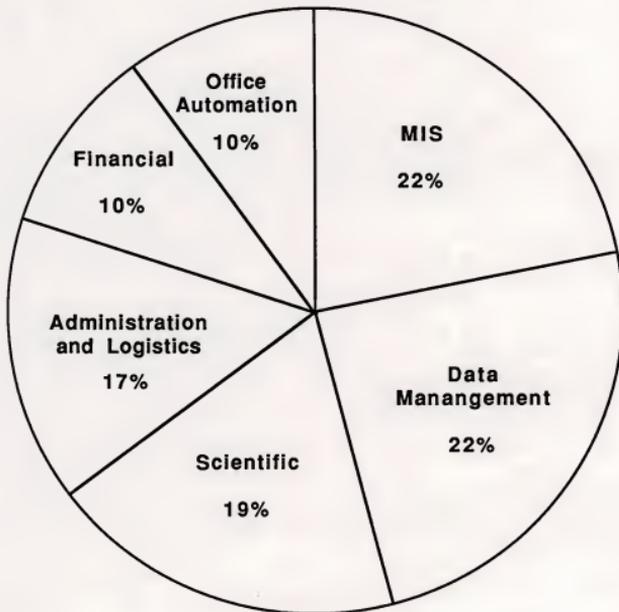
to use commercial software packages when possible to support these applications.

- However, due to the "specialized" nature of so many of these applications, agencies are still seeking custom software to satisfy their needs.

- INPUT's survey found that over half of the applications for which software is acquired by the agencies are categorized as unique to the government's operations/applications and not having a commercial counterpart, as shown in Exhibit IV-5. Some 86% of the civil agencies and 60% of the DoD agencies have plans to continue their use of custom software over the next two to five years.

- Exhibit IV-5 also indicates that a majority of the agency respondents currently, or plan to, use a commerical or customized DBMS for a variety of applications.

- While this "uniqueness" continues to support custom software development, there are growing indications that, at the same time, vendors are offering more packaged features and users are devaluing this uniqueness. Both moves serve to strengthen the role of the packaged software offering.

- The agency's ADP workforce will continue to require education and training as changes in end-user computing and new software systems are introduced into their computer operations.

- Exhibit IV-6 ranks the types of education and training requirements that would affect future spending for government services. System users and operations and applications software training were the two highest rated factors by both groups of respondents. Similar to the applications themselves, requirements are for more, not advanced, topics.

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EXHIBIT IV-5

AGENCY UTILIZATION OF CUSTOM SOFTWARE

FACTOR	PERCENT OF RESPONDENTS	
	▨ CIVIL AGENCIES	▨ DOD AGENCIES
Custom Software Applications Unique to Government	59	50
Custom Software Continued Usage	86	60
Commercial/ Customized DBMS Usage	82	80

0   20   40   60   80   100

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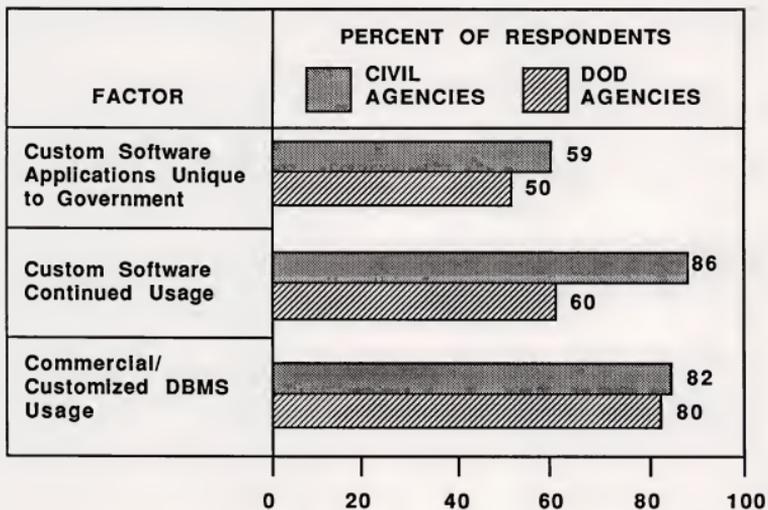
EXHIBIT IV-6

EDUCATION AND TRAINING REQUIREMENTS

FACTOR	CIVIL AGENCY RANK*	DOD AGENCY RANK*
Training for System Users	1	2
Training for Operations and Applications Software	2	1
Training for Data Base Management	3	4
Training for Fourth/Generation Languages	4	5
Training for Programmers	5	3

* Rank based on frequency of mention by respondents.

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- Education requirements have increased over the last five years in 80% or more of the agencies (see Exhibit IV-7). While 70% of the agencies foresee their education and training requirements will increase over the next five years, overall requirements are declining as the current systems are put in place.

- There are three main sources for funding of the agencies' educational and training programs—general budget funding, user funding, and separate program/package funding. Each method of funding is utilized in different proportions by the civil and DoD agencies (see Exhibit IV-8. The majority of funding for education and training is derived through the general budget funding.

    . General budget funding suggests that many of the education/training needs are not directly associated with specific new systems but relate to training for continuing operations. Independent vendors may find significant opportunities in this arena.

    . Some education/training, especially in DoD, is attached to specific program buys. While some of these buys may be for standalone training, much of it is related to new systems acquisitions. A vendor offering the new system generally offers training on the system as "customer support," a separately negotiated item, or as a subcontract.

- The program of standardizing languages is aimed at reduced software costs by reversing the proliferation of languages of the past two decades.

    - The transition of ADP systems to Ada will require significant investment of resources that will be supported by professional services vendors with the capability to design, program, and maintain systems written in Ada.

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EXHIBIT IV-7

GROWTH OF EDUCATION AND TRAINING REQUIREMENTS

FACTOR	PERCENT OF RESPONDENTS		
	CIVIL AGENCIES	DOD AGENCIES	
Educational Requirements Increased over Last Five Years	85	80	
Educational Requirements Increase over Next Five Years	74	70	

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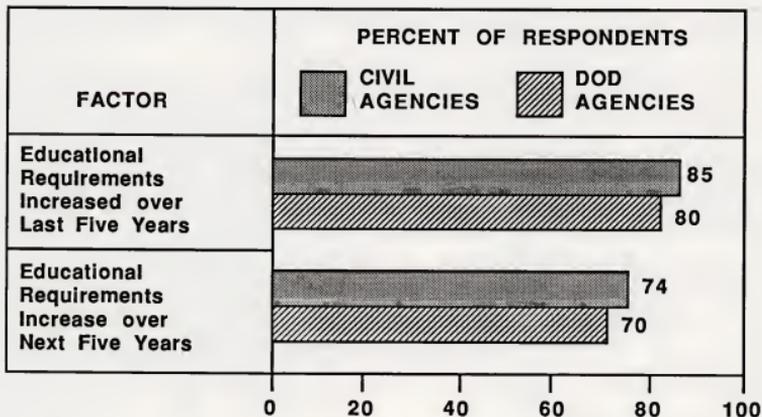
EXHIBIT IV-8

FUNDING SOURCES FOR EDUCATION
AND TRAINING REQUIREMENTS

FACTOR	PERCENT OF RESPONDENTS
	CIVIL AGENCIES / DOD AGENCIES
General Budget Funding	64 / 50
User Funding	20 / 10
Separate Program/ Package Funding	16 / 40

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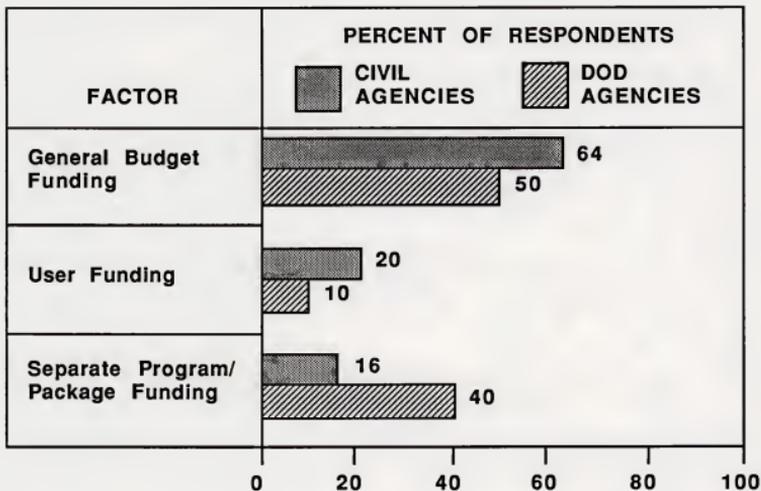
- That transition, however, has been slower than expected. As depicted in Exhibit IV-9, extensive use is still made of "early generation" languages (Cobol, Fortran) by both civil and DoD agencies.

- DoD agencies have taken stronger positions in both fourth generation languages and Ada, but each is far from becoming the dominant development tool. The investment required to move to these language standards will likely occur over an extended period of time.

C. AGENCY PERCEPTIONS OF PROFESSIONAL SERVICES

I. ADVANTAGES/BENEFITS OF PROFESSIONAL SERVICES

- The major reason for civil agencies and DoD use of professional services contracts is because the contractors provide experience and expertise that are not available internally to the agency, as shown in Exhibit IV-10.

    - Professional services contracts are also used because they give the agency the ability to balance workloads without increasing or decreasing government staff as requirements are added and/or removed.

    - Some government respondents believe that contractor labor is less expensive than performing the same task with government employees; in addition, fixed-price contracting enables the government to put a ceiling on the overall cost. This in particular was considered an advantage by DoD respondents.

    - Objectivity, which includes the ability of the contractor to take an unbiased approach to a problem without being affected by internal agency politics, is a less important benefit.

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EXHIBIT IV-9

COMPUTER LANGUAGE USAGE

LANGUAGE	RESPONSES (Percent)		
	CIVIL	DEFENSE	TOTAL
Early Generation	71	50	65
Fourth Generation	18	30	22
Ada	11	20	13

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EXHIBIT IV-10

AGENCY VIEWS OF ADVANTAGES/BENEFITS
OF PROFESSIONAL SERVICES

ADVANTAGE/ BENEFIT	PERCENT OF RESPONDENTS	
	CIVIL AGENCIES	DOD AGENCIES
Expertise and Staff Skills	66	44
Balance Staff Workload	34	28
Cost-Effective/ Cost Savings	32	28
Experience	20	6
Staff Flexibility	15	17
Advance Technology	14	12
Staff Experience	10	6
Other	7	6

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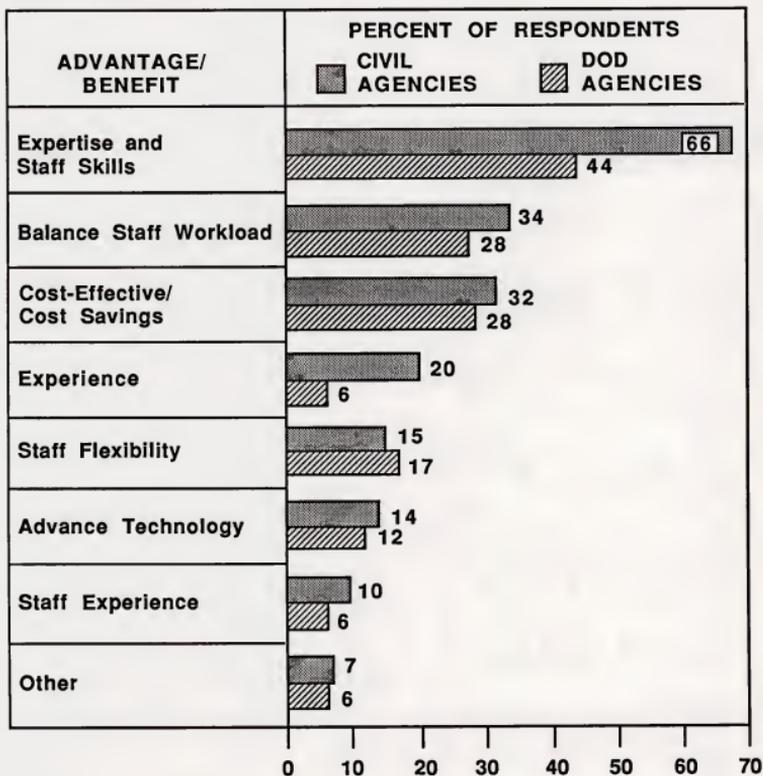
- The civil agencies consider expediency advantageous. Expediency can be measured in terms of accelerated schedules as well as in terms of fewer problems with government rules, regulations, and policies than if the work were to be performed in-house.

2. DISADVANTAGES/LIABILITIES OF PROFESSIONAL SERVICES

- The difficulty in managing contracts for professional services was the number one disadvantage described by both the civil agencies and by the DoD, as shown in Exhibit IV-11. This factor was by far the major liability according to DoD respondents.

  - Performance risk, or the concern on the part of government agencies that the contractor would not deliver or would deliver an unacceptable product, was considered a significant liability by civil agencies.

  - The problems associated with procurement, including the long lead time required for contracting and the risk of protest by losing bidders, was considered a disadvantage by the DoD and civil agencies.

  - The learning curve, or the time it takes contractors to "come up to speed" on the problem, was considered a disadvantage by 22% of the civil agencies and by 11% of the DoD respondents.

- Although, as described in the previous section of this report, the agencies could not accomplish all of their assigned work without contractor support, it is considered by some to be a disadvantage to become dependent on a contractor. The consensus of those who considered this a disadvantage was that contracting for professional services weakened agency ability to do further work because the contractor ended up with most of the expertise in this area of work.

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EXHIBIT IV-11

AGENCY VIEWS OF DISADVANTAGES/LIABILITIES OF PROFESSIONAL SERVICES

DISADVANTAGE/ LIABILITY	RELATIVE IMPORTANCE (Percent) CIVIL AGENCIES / DOD AGENCIES
Contract Management	Civil: 27 / DOD: 33
Procurement Process	Civil: 24 / DOD: 22
Contractor Learning Curve	Civil: 22 / DOD: 11
Performance Risk	Civil: 24 / DOD: 6
Cost Growth	Civil: 11 / DOD: 11
Contractor Dependence	Civil: 10 / DOD: 11
Loss of Staff Experience	Civil: 10 / DOD: 6

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IV-21

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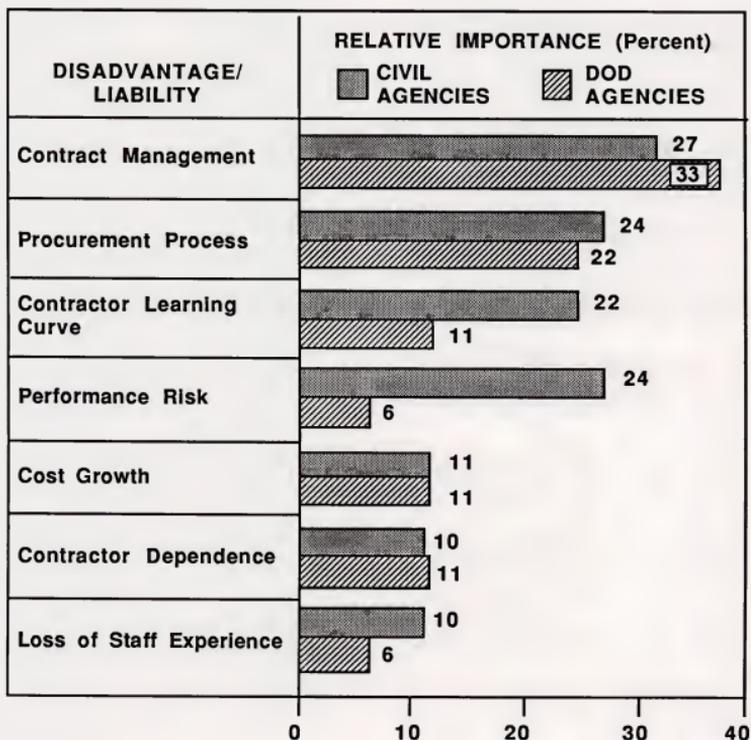
3.   AGENCY SATISFACTION LEVEL WITH PROFESSIONAL SERVICES

• The overall level of satisfaction of agency respondents with professional
  services still remains quite low in both absolute terms and in comparison with
  previous surveys.

  - In the earlier survey of agency respondents, the DoD agencies gave
    overall ratings below the 3.0 range, while the civil agencies' lowest
    rating was 3.1. The present survey results reflect an increased
    satisfaction on behalf of the DoD agencies and a reduction by the civil
    agencies to no higher than 2.8, as shown in Exhibit IV-12. (Vendor's
    ratings on these same factors are discussed in Section V.)

• In all categories, DoD respondents were more satisfied with professional
  services vendors than were the civil agencies. The greatest variation is in the
  area of cost, which was the characteristic ranked highest by the DoD and
  nearly lowest by the civil agencies.

D.   PROCUREMENT PRACTICES

1.   CHARACTERISTICS OF A SUCCESSFUL CONTRACTOR

• The civil agencies and DoD totally disagree on what is the most important
  characteristic for a successful contractor, as shown in Exhibit IV-13. The
  DoD ranks price and software development experience as most important,
  while the civil agencies rank staff experience as number one and price as
  number two. This reflects the differences in emphasis that vendors must use
  in preparing bids.

  - Price and software development experience are of critical importance
    in DoD bids, as shown by their very high rating of 4.2 each in Exhibit
    IV-14.

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EXHIBIT IV-12

LEVEL OF FEDERAL AGENCY SATISFACTION WITH PROFESSIONAL SERVICES VENDORS

DISADVANTAGE/ LIABILITY	RELATIVE IMPORTANCE		VENDOR RATING
	CIVIL	DOD	
Responsiveness to Agency Needs	3.3	3.8	1
Quantity of Work	3.4	4.0	2
Quality of Work	3.4	3.7	3
Development Visibility	3.1	3.6	5
Project Management	2.9	3.4	5
Delivery Schedule	2.8	3.3	7
Cost	2.9	3.8	3

1   2   3   4   5

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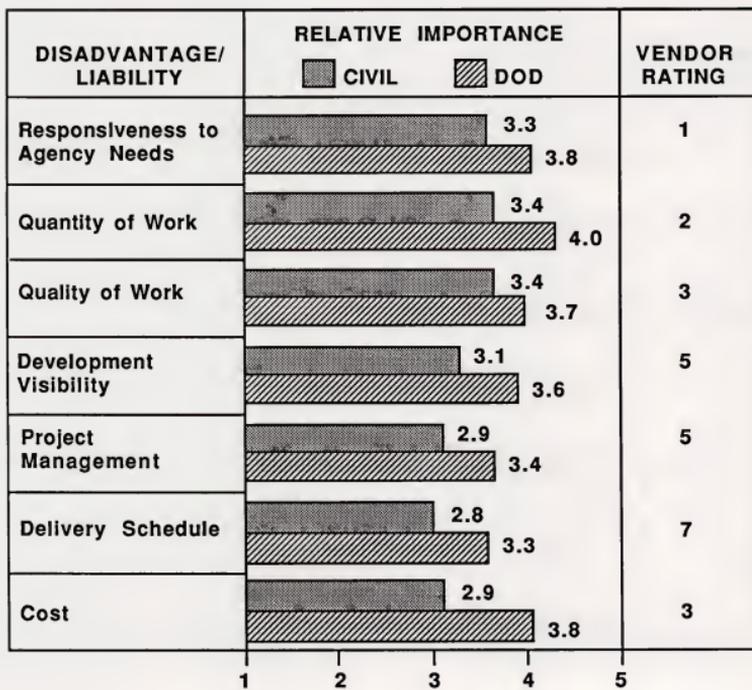
EXHIBIT IV-13

RANKINGS OF CHARACTERISTICS
OF SUCCESSFUL CONTRACTORS

	RANKING		
CHARACTERISTIC	**CIVIL AGENCIES**	**DOD AGENCIES**	**VENDORS**
Price	2	☐1	☐1
Support	4	6	◯9
Staff Experience	☐1	7	2
Software Development Experience	3	☐1	3
Application/Functional Experience	4	3	7
Hardware Experience	6	5	◯9
Integration Experience	6	4	4
Federal Contract Experience	8	◯9	5
Agency Experience	9	7	5

Rating: 1 = Most Important (☐), 9 = Least Important (◯)

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EXHIBIT IV-14

AGENCY RATINGS OF THE CHARACTERISTICS OF
A SUCCESSFUL PROFESSIONAL SERVICES CONTRACTOR

CHARACTERISTIC	RELATIVE IMPORTANCE	
	CIVIL AGENCIES	DOD AGENCIES
Price	3.9	4.2
Support	3.7	3.4
Staff Experience	4.0	3.2
Software Development Experience	3.8	4.2
Application Functional Experience	3.7	4.0
Hardware Experience	3.3	3.5
Integration Experience	3.3	3.7
Federal Contract Experience	2.9	3.0
Agency Experience	2.7	3.2

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IV-25

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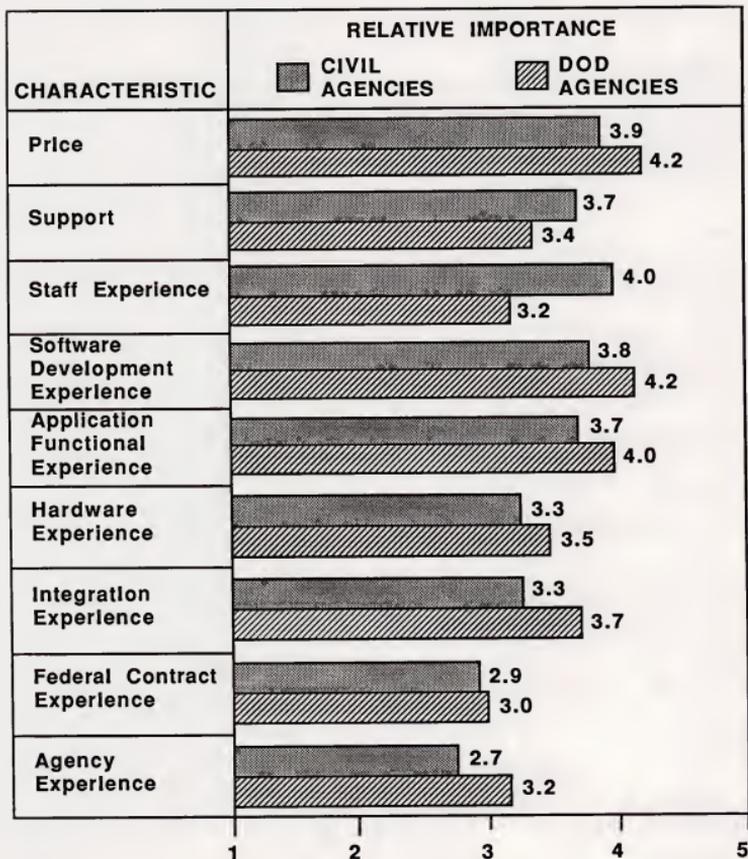
- Both the civil agencies and the DoD concur that application functional experience is an important characteristic, whereas vendors consider it of lesser importance.

- Differences in ratings for federal contract experience and agency experience exist between the agencies and vendors. Vendors assign an important rating to both factors, while the agencies themselves give these factors the lowest ratings for importance.

2. SELECTION CRITERIA

- The process of selecting a vendor for a professional services contract is one of professional evaluation. The criteria used to select a winning vendor are the same, but the relative importance of these criteria to the DoD and to the civil agencies is slightly different, as shown in Exhibit IV-15. Both the DoD and the civil agencies agree that the most important criterion is the proposed technical solution, even though price (cost) was ranked the second most important criterion for success as a contractor by DoD respondents.

3. PREFERENCE FOR TYPE OF VENDORS

- Both civil and DoD agencies were asked which type of vendor appears more desirable for performing their required professional services (see Exhibit IV-16).

  - Over 50% of the agencies preferred systems houses and stated that these vendors were more responsive to meeting a variety of needs and are more knowledgeable in specialized applications.

  - A larger share of the civil agencies than DoD agencies preferred software products vendors. Their main reason for selection of this type of organization was the software vendor's experience and suitability for certain types of professional service projects.

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EXHIBIT IV-15

RELATIVE RANKING OF CRITERIA USED IN SELECTING
A PROFESSIONAL SERVICES VENDOR

	RANKING	
SELECTION CRITERIA	**CIVIL AGENCIES**	**DOD AGENCIES**
Proposed Technical Solution	1	1
Cost	3	2
Vendor Reputation	2	3
Risk Containment Procedure	4	4
Contract Type	5	5

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EXHIBIT IV-16

FEDERAL AGENCY VENDOR TYPE PREFERENCE
FOR PROFESSIONAL SERVICES

VENDOR/ORGANIZATION TYPE	PERCENT	
	CIVIL AGENCIES	DOD AGENCIES
Mainframe Manufacturer	16	15
Systems House (Non-Hardware)	55	69
Not-for-Profit	9	8
Software Products Vendors	20	8
TOTAL	100	100

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- Presumably, agencies do not believe that all services vendors are capable in all areas. Rather, they view vendors according to the vendor's own focus and prefer to match that focus to the requirements of the project. Manufacturers come to the fore when the professional services requirements are closely tied to a hardware system, systems houses lead when a "total solution" is required, and software products vendors have the edge when the services are tied to a software package. Vendors face a "Catch 22" in that a niche is required, but the niche may preclude the vendor from other markets.

4. CONTRACT TYPES

- Both the civil and DoD agencies indicated a clear preference for fixed-price contracts for professional services, as shown in Exhibit IV-17.

    - The second most preferred approach is a mixture of cost-plus and fixed-price contracts. The civil agencies also noted a preference for other types of contracts including incentive, fixed labor, and indefinite delivery contracts.

    - Many respondents recognize the inherent difficulties of pricing programming and analysis projects by preferring "cost-plus" or "level-of-effort" contracts in this area.

E. PROJECTED TRENDS IN THE USE OF PROFESSIONAL SERVICES

1. INCREASES/DECREASES IN CONTRACTING

- INPUT's survey revealed that in all but one of the professional services categories a majority of both the civil and DoD respondents expect no change in the amount of services they plan to use in the next five years, as shown in

EXHIBIT IV-17

FEDERAL AGENCY CONTRACT TYPE PREFERENCE
FOR PROFESSIONAL SERVICES

CONTRACT TYPE	RESPONDENTS	
	CIVIL (Percent)	DEFENSE (Percent)
Cost-Plus	13	—
Fixed-Price	49	70
Mixed	25	30
Other	13	0

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IV-30

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Exhibit IV-18. In addition, a small percentage of respondents expect decreases in the use of professional services.

- A similar percentage of civil and DoD respondents anticipated an increase in the use of professional services. The estimated increase in the amount of professional services was higher in the DoD than in the civil agencies. Except for consulting and education/training, the average expected change across the responding agencies is a healthy 17%.

2. TRANSITION/CONVERSION TO IN-HOUSE SUPPORT

- When a professional services contract is completed, the government is faced with a choice--should the continued support be transferred in-house, or should that continued support be obtained from a vendor? As presented in Exhibit IV-19, it is the preference of the civil agencies to convert the program to contractors for continued support services. This is a dramatic change from previous research where the clear preference was to bring the program in-house.

- Half of the DoD agencies surveyed have no clear policy and make a decision based on the circumstances of the specific project. Again, the data reflects a change from a preference for in-house operation.

- As a follow-up to this changing view, the government agencies surveyed by INPUT were asked to reveal any plans to either convert professional services contracts to in-house or to convert in-house support functions to outside contractor support. Exhibit IV-20 shows that while there are many more plans to convert in-house support to outside contractor support than vice versa, there is a growing body with plans to move services and support from contractors to in-house. With the current shortfall of staff and funds, it may be that these plans more accurately reflect contract prioritizations, that is, only priority projects will be contracted and other projects will be scheduled as time and money permit.

IV-31

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EXHIBIT IV-18

AGENCY-PROJECTED CHANGES IN PROFESSIONAL SERVICES CONTRACTING OVER THE NEXT FIVE YEARS

PROFESSIONAL SERVICE CATEGORY	CIVIL AGENCY SUMMARY			AVERAGE CHANGE (PERCENT)
	(PERCENT OF RESPONDENTS)			
	EXPECTED INCREASE	EXPECTED DECREASE	NO CHANGE	
Consulting Services	28	7	65	+10
Education and Training	31	7	62	+8
Programming and Analysis	45	4	51	+16
Facilities Management/ Operations and Maintenance	31	7	62	+18
Hardware Maintenance	35	10	55	+12
Software Maintenance	35	10	55	+15
Systems Integration	51	16	43	+20
DOD AGENCY SUMMARY				
Consulting Services	20	10	70	+17
Education and Training	40	10	50	+20
Programming and Analysis	50	10	40	+22
Facilities Management/ Operations and Maintenance	30	10	60	+17
Hardware Maintenance	30	10	60	+18
Software Maintenance	50	10	40	+18
Systems Integration	40	10	50	+17

Updated 1987

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EXHIBIT IV-19

AGENCY PREFERENCE FOR SOURCE OF
CONTINUED SUPPORT SERVICES

PREFERENCE FOR CONTINUED SUPPORT OF PROFESSIONAL SERVICES CONTRACT	CIVIL AGENCIES (Percent)	DOD AGENCIES (Percent)
Bring Program In-House	31	20
Leave Program Out-of-House	41	30
No Preference	28	50
Total	100	100

Updated 1987

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EXHIBIT IV-20

AGENCY PLANS FOR CONVERSION OF CURRENT
PROFESSIONAL SERVICES AND SUPPORT

PLANNED CONVERSION	CIVIL AGENCIES (Percent)	DOD AGENCIES (Percent)
From Contractor to In-House Staff	24	30
From In-House Staff to Contractor	51	60
No Conversion Plans	25	10
Total	100	100

Updated 1987

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3.   REASONS FOR TRANSITION/CONVERSION

- In the few occasions reported, the reasons the government agencies plan to convert professional services contracts to in-house support are to reduce costs and to minimize reliance on contractors. The DoD was more concerned about cost reduction and the civil agencies more concerned about minimizing their dependence on contractors. The application areas are primarily those of a general business type.

- The reasons the government agencies plan to convert in-house functions to outside contractor support are:

  -    Take advantage of expertise not available within the government.

  -    Balance workloads and supplement in-house staffs.

  -    Reduce costs.

  -    Expediency.

  -    Satisfy the requirements of government policy, in particular OMB Circular A-76.

- Almost all types of applications are planned for conversion to outside contractor support. The majority of the candidate applications are administrative in nature. Those to be converted to satisfy the requirements of OMB Circular A-76 are primarily in the areas of applications software maintenance and operations and maintenance of hardware.

4.   FACTORS AFFECTING FUTURE USE OF PROFESSIONAL SERVICES

- From the perspective of the government respondents, the nontechnical factors that are expected to affect the future use of professional services by the

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federal government are the same for both defense and civil agencies, as shown in Exhibit IV-21. However, the degree of impact differs.

- Funding issues head the list of concerns for both civil and DoD, but nearly twice as many civil respondents mentioned this factor. Until the next presidential election, funds for defense initiatives should not be an overwhelming problem. This is quite apparent in DoD responses to changes in the administration, budget, or national policy.

- Directives and OMB policy factors are ever present, with marginally larger civil respondents perceiving a significant impact.

- Agency representatives were also asked to identify those technical factors that would alter their agency's professional services plans. More than 25 factors were identified, and the five that were named most frequently are listed in Exhibit IV-22.

  - The technological factors reported to have the greatest impact was the evolution in the use of personal computers.

  - From there, DoD continued their technically-oriented concerns, citing both changes in micro architecture and LANs. Civil agency respondents, on the other hand, concentrated on the operational questions of software development, maintenance, and improving end-user capabilities.

5. FUTURE SUGGESTIONS FOR IMPROVEMENTS TO VENDOR SERVICES

- Agency respondents were queried on their suggestions for how vendors might make their professional services more valuable to the federal government over the next five years. As should be expected, the replies varied due to the different types and levels of experiences the respondents have encountered with vendors.

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EXHIBIT IV-21

AGENCY VIEWS OF FACTORS IMPACTING FUTURE USE OF PROFESSIONAL SERVICES

FACTOR	PERCENT OF RESPONDENTS
	CIVIL AGENCIES · DOD AGENCIES
Budget Process Restrictions	Civil: 52 / DOD: 28
Staffing Restrictions	Civil: 21 / DOD: 11
Directives and OMB Policies	Civil: 17 / DOD: 11
Administration Changes	DOD: 11
Federal Budget Policy	Civil: 14 / DOD: 22
National Policy Changes	Civil: 21 / DOD: 16

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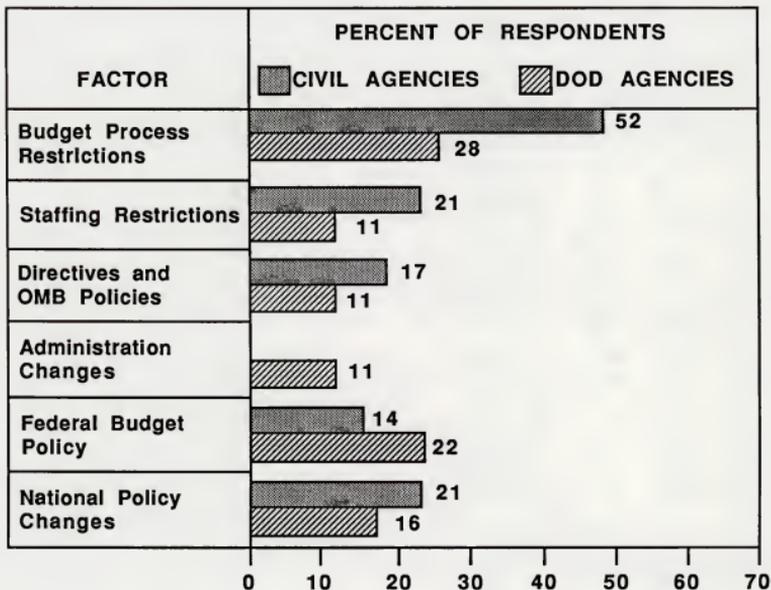
EXHIBIT IV-22

TECHNOLOGICAL FACTORS AFFECTING FUTURE GOVERNMENT
SPENDING FOR PROFESSIONAL SERVICES

FACTOR	CIVIL AGENCIES RANK*	DOD AGENCIES RANK*
Evolution in Use of Personal Computer	1	1
Developments in Software Development and Maintenance	2	4
Improvements in End-User Capabilities	3	5
Changes in Microcomputer Architecture	4	2
Proliferation of LANs	4	3

*Rank based on frequency of mention by respondents.

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- In descending order of frequency of mention, Exhibit IV-23 lists the principal suggestions made by the civil agencies. Improvements in responsiveness to agency needs and increased levels of staff experience were cited most frequently.

- The DoD agencies, however, offered more technically-oriented suggestions. They cited a need for more integrated services to be provided and for vendors to have a greater awareness of standards (see Exhibit IV-24).

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EXHIBIT IV-23

CIVIL AGENCIES' SUGGESTIONS FOR IMPROVEMENTS
TO VENDOR SERVICES

SUGGESTIONS	RANK*
Increase Cooperation and Responsiveness to Agency Needs	1
Increase Experience of Staff	2
Increase Adherence to Agency Pricing Policy	3
Increase Management Skills	4
Increase Availability of Off-the-Shelf Software	5

* Rank based on frequency of mention by respondents.

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EXHIBIT IV-24

DEFENSE AGENCIES' SUGGESTIONS FOR IMPROVEMENTS TO VENDOR SERVICES

SUGGESTIONS	RANK*
Increase Availability of Integrated Services	1
Increase Awareness of DoD Standards	2
Increase Use of Fourth Generation Tools for Development	3
Increase Work Force's Knowledge and Ability	4
Increase Awareness of Agency Requirements	5

*Rank based on frequency of mention by respondents.

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V   PROFESSIONAL SERVICES COMPETITION TRENDS

A.   PROFESSIONAL SERVICES RESPONDENT CHARACTERISTICS

- A profile of the 21 vendors surveyed by INPUT for this report is included in Exhibit V-1 from three perspectives--total corporate revenue, professional services revenue, and percentage of professional services revenue from the federal government. The vendor respondents represent many of the largest professional services suppliers to both the industry as a whole and the federal government sector.

- The vendors surveyed generally sold each of the categories of professional services, as shown in Exhibit V-2. Revenue distribution parallels the industry with program analysis, systems integration, and facilities management as the primary revenue sources.

- Vendors plan to provide additional professional services in the future in response to demands from government clients. A primary reason for this increased demand is the Reagan administration's emphasis on OMB A-76 policy. In addition, some of the government clients prefer a single contractor to be responsible for all aspects of developed systems.

- As shown in Exhibit V-3, vendors have acquired professional service contrcts for support functions (that were previously performed in-house) more frequently than they have lost them. However, the number of vendors

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EXHIBIT V-1

REVENUE CHARACTERISTICS OF
RESPONDENT PROFESSIONAL SERVICES VENDORS

CORPORATE REVENUE ($ MILLIONS)	PERCENT
Less than 500 Million	50
500 Million-1 Billion	15
Over 1 Billion	35
PROFESSIONAL SERVICES REVENUE ($ MILLIONS)	PERCENT
Less than 10	7
10 to 25	7
25 to 100	33
100 to 500	33
Over 500	20
GOVERNMENT PERCENT OF PROFESSIONAL SERVICES REVENUE	PERCENT OF VENDORS
Less than 20	9
20 to 80	24
80 to 100	67

Updated 1987

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EXHIBIT V-2

TYPE OF PROFESSIONAL SERVICES PROVIDED BY
RESPONDENTS

CATEGORY	PROPORTION OF RESPONDENTS		AVERAGE PORTION OF RESPONDENT REVENUES (Percent)
	CURRENTLY PROVIDING (Percent)	PLAN TO PROVIDE (Percent)	
Consulting Services	85	85	20
Education and Training	85	85	7
Programming and Analysis	95	95	31
Facilities Management/ Operations and Maintenance	85	90	22
Hardware Maintenance	45	45	5
Software Maintenance	85	85	18
Systems Integration	90	90	27

Updated 1987

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EXHIBIT V-3

RESULTS OF PROFESSIONAL SERVICES COMPETITION
FROM IN-HOUSE GOVERNMENT STAFF

Vendors Losing Contracts to In-House Staff — 55%

Vendors Gaining Contracts from In-House Staff — 67%

Proportion of Respondents

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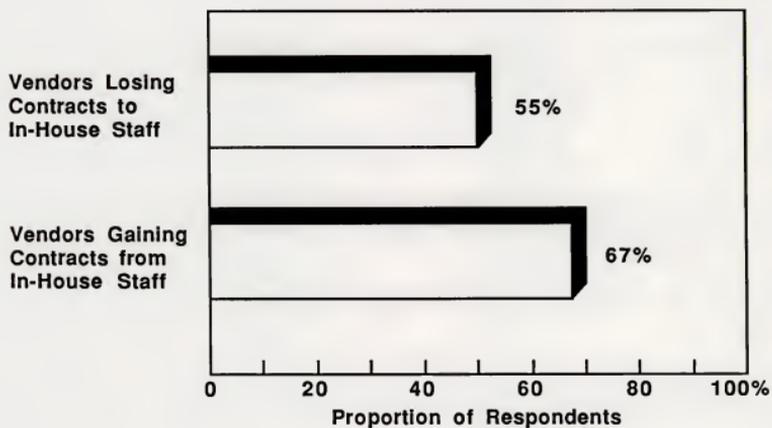
experiencing such losses is higher than would be expected given prevailing trends. And, in comparison to previous surveys, this data confirms a continuing movement of business to in-house resources.

- As shown in Exhibit V-4, the experience of the vendors surveyed is that most frequently the follow-on support for professional services contracts with the government for design, programming, and analysis is provided out-of-house by the original vendor. In-house follow-on has decreased moderately while third-party follow-on has increased at approximately the same amount.

    - The type of work moved in-house to government staffs typically is from hardware and software maintenance to consulting, analysis, and operations and maintenance. Applications ranged from administrative and financial systems to avionics systems and shipboard computing systems.

    - The primary reason given for moving the work in-house is to involve government personnel in the work and to eliminate reliance of the government on vendor personnel support of agency work. A secondary reason is to reduce costs by minimizing the amount of effort assigned to maintain software systems. Infrequently, it is part of an OMB A-76 cost comparison.

    - The majority of the follow-on professional services support provided by vendors is for operations and maintenance but there are several instances of consulting, software development, and software maintenance. Applications include administrative and financial systems, data bases, shipboard weapons systems, and environmental, health, and energy systems.

    - Most often the government utilized contractors for follow-on support because either the agency does not have sufficient staff and/or the expertise to perform the tasks or an OMB A-76 cost comparison indicates that contracting out is more cost-effective.

V-5

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EXHIBIT V-4

SOURCE OF FOLLOW-ON SUPPORT FOR PROFESSIONAL SERVICES CONTRACT

SOURCE OF FOLLOW-ON SUPPORT FOR COMPLETED PROFESSIONAL SERVICES CONTRACT	PROPORTION OF RESPONDENTS (Percent)
In-House by Government	19
Out-of-House by Previous Vendor	62
Out-of-House by Another Vendor	19
Total	100

Updated 1987

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B. VENDORS' PERCEPTION OF GOVERNMENT

I. ADVANTAGES/BENEFITS OF CONTRACTING

- Vendors surveyed by INPUT have typically had opinions on the advantages and benefits to the federal government of using professional service contracts that were similar to those expressed by the government agencies, as shown in Exhibit V-5.

  - The ability to obtain expertise not available within the government agency was seen as a primary benefit to the government of contracting for professional services. Vendors believe that specialized skills are more easily obtained by contracting and that contractors can change the skill mix readily when the government's requirements change.

  - Reduced cost to achieve results was also seen as an important advantage in contracting for professional services. Vendors believe that the competitive environment allows the government to contract for professional services in a very cost-effective manner.

  - The ability to balance workloads and augment in-house government staff during peak workload times was considered an advantage because the government can start or stop work without any dislocation of in-house personnel, and there is an added cost benefit because reduction-in-force (RIF) costs are avoided.

  - Expedience, or a means of getting work done faster without the inherent administrative problems of shifting personnel to perform the work in-house, was considered another significant advantage. Several vendors believe that there is less hassle and fewer problems associated with ADP if the work is performed by a professional services contractor.

V-7

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EXHIBIT V-5

VENDOR VIEWS OF ADVANTAGES/BENEFITS OF
PROFESSIONAL SERVICES

ADVANTAGE/ BENEFIT	PERCENT OF RESPONDENTS
Cost-Effective	52
Expertise and Special Skills	44
Balanced Workload	32
Experience	20
Staff Experience	20
Problem Focus	16
Work Quality	16
Other Benefits	16

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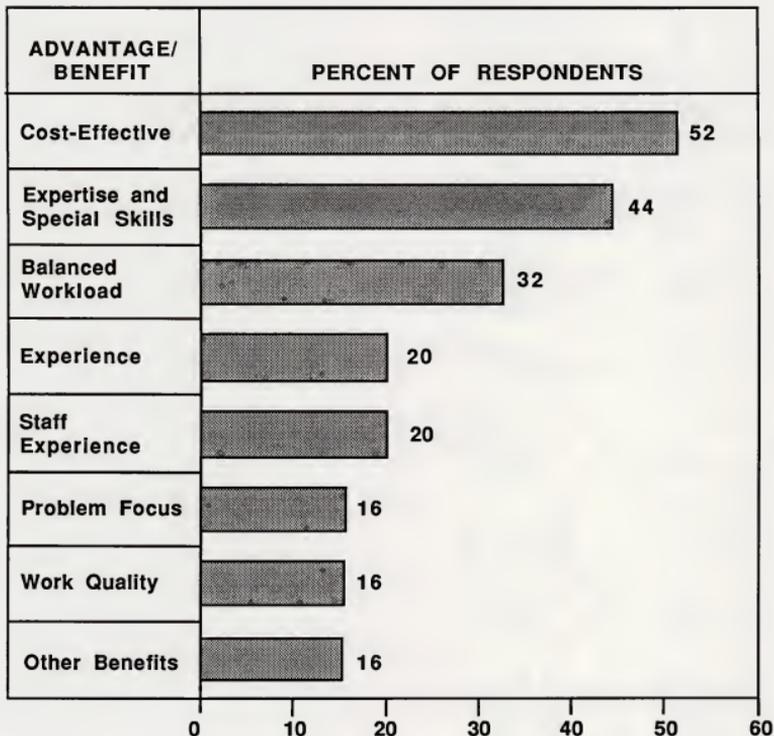
- Some vendors believe that contractor employees are more motivated to perform than government employees.

2. DISADVANTAGES/LIABILITIES OF CONTRACTING

- The vendor views of the disadvantages and liabilities of contracting for professional services shown in Exhibit V-6 are again similar to those of the government agencies surveyed, as shown in Exhibit IV-11.

    - The major disadvantage identified by the vendors was that associated with the actual procurement process. Vendors consider the government procurement process long and inflexible. They believe the government has a problem in evaluating quality versus price, and there is always the threat of a protest if the lowest priced bidder does not win.

    - Dependence on the contractor was considered another major liability. If contracting does not allow the government in-house staff to build its skills, then when the contractor leaves the expertise leaves, and when contracts are recompeted, some loss in continuity can occur if the incumbent is replaced.

    - Performance risk is another liability because the lack of control by government agencies over contractor personnel is a potential problem area.

    - Contract management is also considered a significant disadvantage. Some vendors stated that dealing with the complexities and legal obligations of a contract can pose problems.

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EXHIBIT V-6

VENDOR VIEWS OF DISADVANTAGES/LIABILITIES OF PROFESSIONAL SERVICES

DISADVANTAGES/ LIABILITIES	PERCENT OF RESPONDENTS
Procurement Problems	36
Dependence on Contractor	24
Contract Controllability	16
Contractor Learning Curve	16
Performance Risk	12
Cost Control	12

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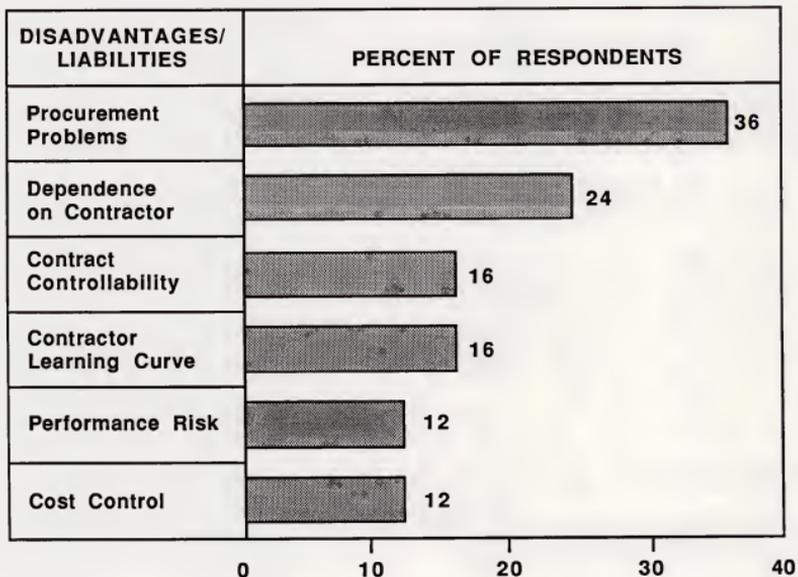
3. DIFFERENCES BETWEEN COMMERCIAL AND FEDERAL GOVERNMENT MARKETS

- The industry respondents were asked to identify what they perceive to be the differences between the commercial markets and the federal market for professional services.

    - Based on frequency of mention, the greater diversity of applications for systems in the federal government was the most highly rated difference (see Exhibit V-7).

    - The second most noted difference was the greater price sensitivity of the federal market. Regulations controlling margins and greater restrictions of funds has exacerbated this historic difference.

    - Interestingly, contracting process differences were less frequently mentioned. Apparently, the vendors interviewed perceive, or have had experience with, the long sales cycles, multiple decision layers, and abrupt contract cancellations that can occur in commercial markets.

4. VENDOR PERCEPTIONS OF AGENCY OPPORTUNITIES

- Professional service vendors differ as to which agencies provide the most attractive opportunities. Some vendors have narrowed their federal government marketing to only the DoD agencies or selective civil agencies, while other vendors serve both.

    - Exhibit V-8 shows that 48% or nearly half of the vendors conduct business with both the DoD and civil agencies. This group will increase over the next few years as more DoD vendors seek to expand their business base to civil. Frequent department targets include Treasury, NASA, Justice, Energy, and Transportation.

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EXHIBIT V-7

GOVERNMENTS VERSUS COMMERCIAL MARKET DIFFERENCES

MARKET DIFFERENCES		
FEDERAL MARKET	**COMMERCIAL MARKET**	**RANK***
More Diverse Applications	Less Diversity in Applications	1
Greater Price Sensitivity	Less Price Sensitivity	2
Lengthy Phased Development Cycle	Shorter Term Evolution	3
Wider Range of Opportunities	Narrower Opportunities	4
More Technical Applications	Less Technical Applications	5

* Rank based on frequency of mention by respondents.

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EXHIBIT V-8

VENDOR PERCEPTION OF AGENCY OPPORTUNIITIES
FOR PROFESSIONAL SERVICES

AGENCY OPPORTUNITIES	PERCENT
DD Agencies and Civil Agencies	48
DD Agencies Only	35
Civil Agencies Only	17

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- Over one-third of the respondents serve only the defense agencies for professional services.

- The smallest share of the vendors have selected to concentrate their professional service business within the civil agencies.

- Some vendors offered the unsolicited note that they are seeking more business in commercial markets. An increased emphasis in leveraging federal systems integration services on to the commercial side is a particular thrust.

5. SATISFACTION LEVEL

- Vendors were asked their opinion of the level of satisfaction of government agencies with the past performance of professional services contractors. The results are presented in Exhibit V-9. The agency responses are shown in the earlier Exhibit IV-12.

  - Vendors believe the government is reasonably satisfied with responsiveness to agency needs and quantity and quality of work.

  - However, the satisfaction levels given by the vendors themselves are not very high. In terms of several characteristics, notably cost and delivery schedule, vendors consider the government satisfaction level relatively low indeed.

  - This represents a fundamental problem for professional services vendors. Unless they can improve the perceived satisfaction levels to higher levels, the potential growth in the market may not be realized.

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EXHIBIT V-9

VENDOR-PERCEIVED LEVEL OF GOVERNMENT AGENCY SATISFACTION WITH PROFESSIONAL SERVICES CONTRACTORS

FACTOR	SATISFACTION LEVEL
Responsiveness to Agency Needs	3.6
Quantity of Work	3.5
Quality of Work	3.2
Cost	3.2
Project Management	3.1
Development Visibility	3.1
Delivery Schedule	2.9

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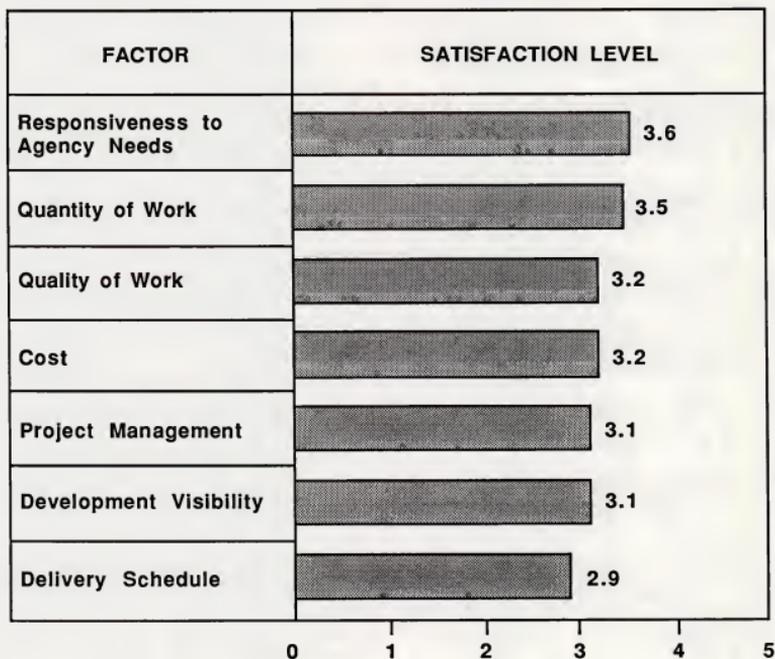
6. SUGGESTED IMPROVEMENTS TO PRODUCTS AND SERVICES

- The industry respondents were asked what they believe vendors need to do over the next five years to make their products and services more valuable to the federal government. The replies varied due to the different types and levels of experience the vendors have encountered with the federal agencies.

    - In descending order of frequency of mention, Exhibit V-10 lists the principal suggestions made by the respondents. Improved efficiency on delivery of goods and services was cited most frequently as a suggested means of making vendor services more valuable. Since this was a major concern voiced by agencies, this appears to be a positive step in enhancing satisfaction levels.

    - The vendors also noted the development of better lines of communication and increasing the staff's technical knowledge as suggested areas of improvement. Many of the suggestions made by the vendors were similar to those made by the civil and DoD agencies. To the extent that these steps aid the vendors' ability to be responsive to agency needs, these measures will be well received as well.

C. VENDOR VIEW OF CONTRACTING

1. AVAILABLE CONTRACTING VEHICLES

- Vendors provide professional services to the government under a variety of contract types.

    - Cost-plus contracts provide for vendor costs to be paid and a fee added that is either negotiated (cost-plus-fixed-fee) or based upon the performance of the contractor in satisfying the contract requirements

V-16

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EXHIBIT V-10

SUGGESTED IMPROVEMENTS TO PRODUCTS AND SERVICES

SUGGESTION	RANK*
Improve Efficiency on Delivery of Goods and Services	1
Develop Better Lines of Communication	2
Increase Staff's Knowledge of Networking Standards and Ada	3
Improve Management and Reporting Capabilities	4
Improve Software Program Efficiency and More Visibility	5
Improve Productivity	6

*Rank based on frequency of mention by respondents

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(cost-plus-award-fee). Cost-plus contracts regulate the margin of profit allowed, but clearly place the risk with the government.

- Fixed-price contracts commit vendors to perform and complete a contract at a predetermined price ceiling. To a significant extent, the profitability associated with a fixed-price contract is dependent upon the vendor's ability to accurately appraise, in advance, the cost of providing services. Managing fixed-price contracts successfully requires an extremely well written and detailed statement of work and project scope. The risk of completion is placed on the vendor.

- Level of effort (LOE) or time and materials (T&M) contracts provide for an hourly billing rate for the various labor categories to be applied to a contract plus the reimbursement by the government for travel, supplies, equipment, and other materials required to satisfy the terms of the contract. In many competitive situations, vendors are required to combine their contract with a "not-to-exceed" clause that essentially imposes cost ceilings on the contract.

2. PREFERRED CONTRACT TYPES

- As shown in Exhibit V-11, vendors generally prefer a mixture of types of contracts in order to minimize their financial risk. This particularly applies to programming and analysis contracts where the financial risks are substantial. The vendors were also evenly split in their preference for cost-plus and fixed-price contracts. This continues to be out of line with agencies' preference for fixed-price, but vendor movement in this direction has been noted.

3. CHARACTERISTICS OF A SUCCESSFUL CONTRACTOR

- The vendors surveyed by INPUT in some instances had a similar view of the importance of characteristics in winning a bid for professional services with the government agencies described in Section IV.

V-18

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EXHIBIT V-11

VENDOR PREFERENCE FOR CONTRACT TYPE
FOR PROFESSIONAL SERVICES

PREFERRED CONTRACT TYPE	PERCENT		
	VENDORS	CIVIL AGENCIES	DOD AGENCIES
Cost-Plus	25	13	—
Fixed-Price	25	49	70
Mix	45	25	30
Other	5	13	—

Rating: ☐ =Most Important

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- As shown in Exhibit V-12, the vendors ranked price, staff experience, and software development as the three most important characteristics, as did the agencies, but not in the same order of importance as shown earlier in Exhibit IV-13.

- Support and hardware experience were rated as the least important of all characteristics by the vendors. As previously noted, these characteristics were reported by government respondents as important to winning a bid. This incongruence needs to be addressed.

- One reason for the divergence of opinion is that the agency respondents are looking at the situation after the bid has been awarded, whereas contractor respondents were primarily oriented toward getting the business rather than operating the contract.

- However, vendors should emphasize their support capabilities and preference in their bids. Unfortunately, it is INPUT's experience that most professional service vendors cannot provide evidence of customer satisfaction since they do not carry out systematic surveys in this area.

4. PERCEPTION OF MOST ATTRACTIVE PRODUCT OR SERVICE

- Vendors were asked which of their company's professional services or product capabilities they think agencies find most attractive. The responses ranged from the specific categories of professional services under study in this survey and extended to other products or services related to the vendors' areas of expertise.

  - As shown in Exhibit V-13, the most frequently cited professional service was programming and analysis. The next most attractive service was systems integration.

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EXHIBIT V-12

VENDOR PERCEPTION OF THE RELATIVE IMPORTANCE
OF VENDOR CHARACTERISTICS TO FEDERAL AGENCIES

FACTOR	LEVEL OF IMPORTANCE
Price	4.5
Staff Experience	3.9
Software Development Experience	3.7
Integration Experience	3.7
Federal Contract Experience	3.6
Agency Experience	3.6
Application Functional Experience	3.4
Hardware Experience	3.0
Support	3.0

Updated 1987

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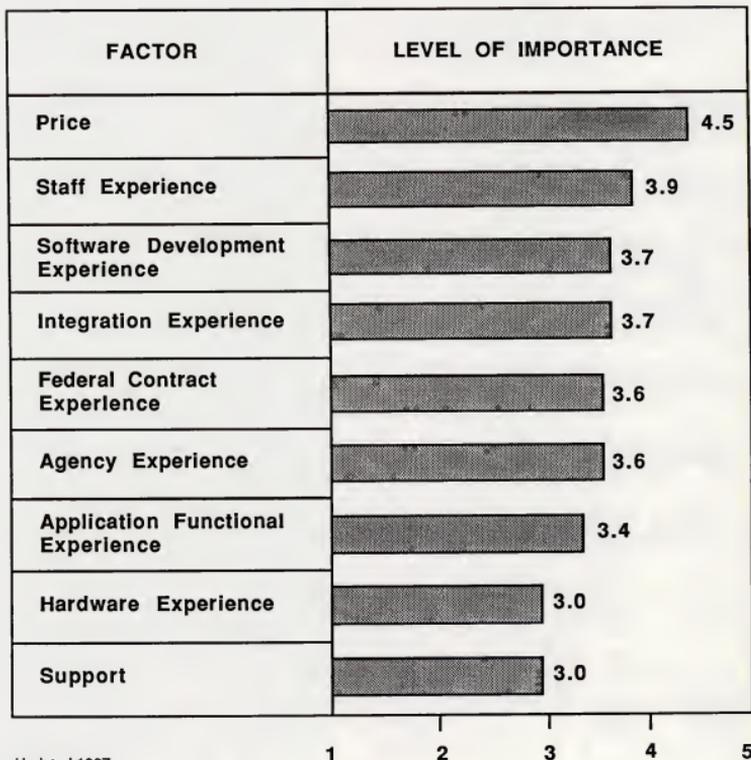
EXHIBIT V-13

VENDOR RANKING OF PRODUCTS AND SERVICES
GOVERNMENT AGENCIES FIND MOST ATTRACTIVE

PRODUCT/SERVICES	RANK*
Programming and Analysis	1
Systems Integration	2
Consulting	3
Project Management	4
Financial Systems	5
Support	6

* Rank based on frequency of mention by respondents.

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- The top six products/services also included consulting, project management, and support

5. SELECTION CRITERIA

- Vendors must understand and respond to the criteria utilized by the government in selecting a winning vendor for professional services. As shown in Exhibit V-14, vendor respondents considered the proposed technical solution the number one selection criterion, as did the agency respondents.

D. TRENDS, 1986-1991

1. INCREASES/DECREASES IN PROFESSIONAL SERVICES

- A majority of the vendors surveyed foresee an increase in the amount of professional services work with the government over the next two to five years, as shown in Exhibit V-15. The largest increases anticipated are in systems integration, D&M, and programming and analysis. This perception is in partial agreement with the government respondents who expect programming and analysis to be the fastest growing category.

2. FACTORS AFFECTING GOVERNMENT SPENDING

- Vendors surveyed by INPUT suggested numerous factors that could increase or decrease federal government spending on professional services in the next two to five years. INPUT grouped these factors into the five categories presented in Exhibit V-16.

    - The factor that had the most consensus among vendors was the impact of budget changes. The most frequently mentioned factor was the emphasis on budget cuts and changes in authorization and appropriations.

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EXHIBIT V-14

VENDOR PERCEPTION OF THE RELATIVE IMPORTANCE OF
CONTRACTOR SELECTION CRITERIA TO FEDERAL AGENCIES

SELECTION CRITERIA	VENDOR RANKING
Proposed Technical Solution	1
Cost	2
Vendor Reputation	3
Risk Containment Procedure	4
Contract Type	5

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EXHIBIT V-15

VENDOR-EXPECTED CHANGE IN
CONTRACTING FOR PROFESSIONAL SERVICES

PROFESSIONAL SERVICE CATEGORY	PERCENT OF RESPONDENTS			AVERAGE CHANGE* (Percent)
	EXPECTED INCREASE	EXPECTED DECREASE	NO CHANGE	
Consulting Services	65	—	35	22
Education and Training	60	—	40	20
Programming and Analysis	70	—	30	30
Facilities Management/ Operations and Maintenance	65	5	30	31
Hardware Maintenance	30	—	70	20
Software Maintenance	55	—	45	24
Systems Integration	80	—	20	43

* Change Over the Next Five Years, GFY 1987-1991
Updated 1987

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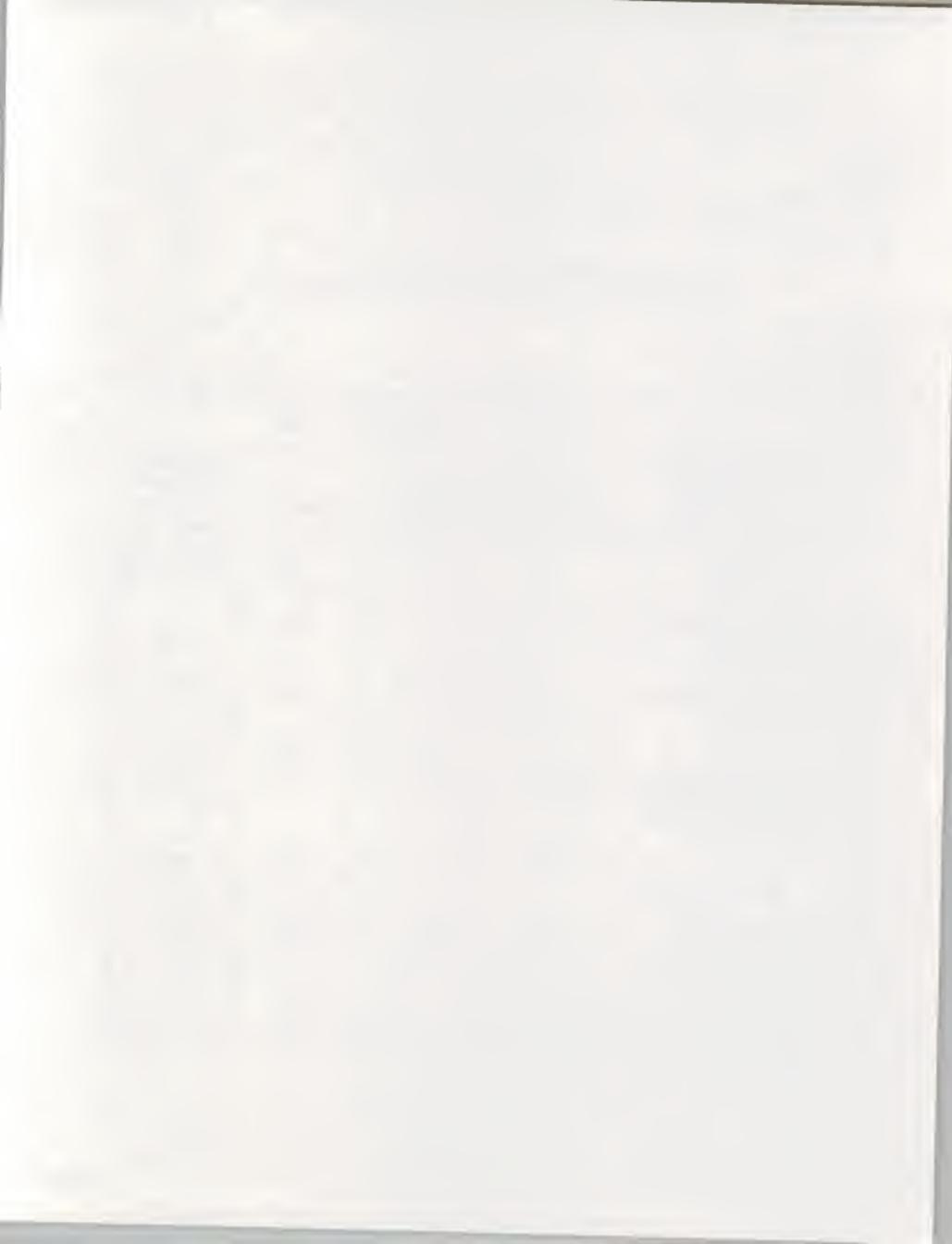
EXHIBIT V-16

RANKING OF FACTORS AFFECTING
FUTURE GOVERNMENT SPENDING
FOR PROFESSIONAL SERVICES

FACTOR	RANK*
Budget Changes (Authorization, Appropriation, Apportionment)	1
Government Directives and Policies	2
Budget Policy Changes (Reform 88, Grace Commission, etc.)	3
Government Personnel Availability	4
Political Uncertainty (Elections, Domestic versus Foreign Policy)	5

* Rank based on frequency of mention by respondents.
Updated 1987

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- Government directives and policy were considered the second most important factor. The most frequently mentioned factor was the emphasis on contracting out and in particular the use of A-76. Also included are new acquisition regulations, information services policies, and trade policies.

- Budget policy, in particular Reform 88, was considered to be important influences.

- The availability of government personnel was also considered an important factor. Included in this factor is not only the shortage resulting from congressionally imposed limits on agency staffing but also the lack of sufficient numbers of specialists and managers in newer ADP technology within the government.

- Some of the vendors noted political uncertainty as a factor. In particular, this uncertainty was fueled by the upcoming 1988 elections and by the threats to world peace.

- The elections tend to focus on domestic issues at some expense to technology and defense issues.

- A change in the administration or the majority party in the Senate usually spawns some upsets in spending programs for services.

- Changes in national policy regarding perceived threats to world peace negatively affect a large number of agencies and their information technology acquisition plans, sometimes rather permanently.

3. FACTORS AFFECTING VENDOR REVENUE

- The factors that vendors believe will have an impact on their professional services revenue are numerous and varied. INPUT grouped the responses into six categories, as shown in Exhibit V-17.

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EXHIBIT V-17

RANKING OF FACTORS AFFECTING
VENDOR PROFESSIONAL SERVICES REVENUE
IN THE FEDERAL MARKET

FACTOR CATEGORY	SIGNIFICANCE*
Procurement/Acquisition Regulations	1
Program Stability and Funding	2
Services Market Maturity	3
Availability and Cost of Skilled Personnel	4
Small Business Policies (Set-Asides, 8-a Programs, etc.)	5
Financial Resources of New Competitors	6

* Significance based on frequency of mention by respondents.

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- Changes in federal procurement/acquisition regulations and level of enforcement can impact vendors positively or negatively. The FIRMR are expected to be more competitive and to increase the number of vendors in the market, at a cost to those already in the market (in lost shares).

- Improvement of IT Program stability and funding should reduce vendor investment costs frequently related to long-drawn-out programs that have slippery funding status and repetitive "Best and Final Offer" cycles.

- Maturity of some portions of the professional services market, such as code conversion and GOCO facilities management, narrows the allowable cost envelope for successive contract bidders. Incumbents cannot assume that cost and profit recovery will come automatically in recompetition of their support services contracts.

- Federal government agencies employ professional services contracts to overcome personnel shortages; vendors are also faced with overcoming labor pool shortages in specific hardware and software systems and/or in particular geographical areas. Failure to resolve these requirements in the pre-bid stage can be expensive in both overhead and management costs after award.

- Continuing changes in national small business policies and initiatives have affected, and will continue to affect, the revenues of larger vendors and those classified as "Small Business." Programs and projects earmarked as "Small Business Set Aside" or selected by SBA as an 8-a program are denied to slightly larger vendors as well as the really large firms, reducing their effective market. Failure to identify some fair amount of prospects for small businesses can have a devastating impact on new/small business organization.

INPUT

- In the federal government professional services market, some of the more recent entrants that are looking for diversification have investment resources as well as recoverable overhead funds to support pre-bid marketing and sales. These entrants also have proposal preparation to assure improved probability of successful awards.

4. TECHNOLOGY TRENDS

- At the present time, 67% of the vendors included in INPUT's survey are qualified in Ada, as shown in Exhibit V-18, a substantial increase from the 48% reporting qualification last year. These same vendors did not report having a great deal of contract work that required the use of this Ada expertise. Another 19% reported that they are planning to become qualified in Ada when it is required in order to acquire contracts for professional services work.

- Industry representatives were also asked to identify those technological factors that would alter the federal government's spending for professional services. The factors named most frequently are listed in Exhibit V-19.

    - The increase in distribution systems was most frequently cited by the vendors as having a strong impact on future professional service acquisitions.

    - The other factors mentioned include some technical developments also cited by the civil and DoD agency respondents.

- The President's ADP reorganization project highlighted the pervasive lack of federal management computer literacy as a primary factor in the government's failure to effectively utilize its already massive ADP resources base.

INPUT

EXHIBIT V-18

CURRENT AND PLANNED
VENDOR QUALIFICATION IN ADA

STATUS	PERCENT OF RESPONDENTS
Vendors Currently Qualified In Ada	67
Vendors Planning to Become Qualified	19
Vendors with No Current Plans for Ada	14
Total	**100**

Updated 1987

INPUT

EXHIBIT V-19

VENDOR RANKING OF TECHNOLOGICAL FACTORS AFFECTING FUTURE GOVERNMENT SPENDING FOR PROFESSIONAL SERVICES

FACTOR	RANK*
Increase In Distribution Systems	1
Telecommunications Activities	2
Office Automation	3
Uncrease in Speed and Memory Capabilities	4
Artificial Intelligence	5

* Rank based on frequently of mention by respondents.

GFP4

INPUT

- Information services operations were relegated to lower levels of management, with little or no visibility of the information resource requirements being levied upon the agency by presidential orders or congressional mandates.

- Continuing illiteracy is seen by a recent NBS study as a serious obstacle to early employment of the capabilities of microprocessors or computerized management tools.

- The leading software application prospect is graphics, both packaged and customized, with potential for continued growth over the next three to five years. Every graphics tool acquired from the private sector is shortly thereafter loaded with customized applications to meet a widening range of engineering, scientific, financial, scheduling, and general management needs for graphic portrayal of statistical, fiscal, and survey data.

  - The increase in personel computer acquisitions to meet middle, and even senior, management requirements for graphic pesentations is cited as a major factor in the demand for newer graphics tools and more efficient coding.

  - Although still not considered as cost-effective for long-term storage as microfiche, graphic technologies for data file storage and frequent retrieval, electronic transmission, and financial planning are currently perceived as more desirable in strategies for expanding office automation in the government.

E.   RECOMMENDATIONS

- Vendors must resign themselves to the fact that the federal government prefers to do business on a fixed-price basis. Vendors must find, and put into

INPUT

practice, methods of pricing and managing professional services contracts that allow them to minimize the risk of performance on a fixed-price basis or they will not be able to compete successfully in the government marketplace.

- Vendors should vertically penetrate potential agency customers to better understand the agency mission and functions and to solve the agency problems, not modify the problem to meet an available solution.

- Vendors should be aware that, especially in the civil agencies, their reputation is an important factor in whether they can win work with an agency. The government is a "small community," and a questionable reputation in one agency can impede getting work in another. Overcoming a "poor" reference can take a long time.

- It is extremely important that vendors regularly and systematically survey their agency customers to determine problems, satisfaction levels, trends, and opportunities. This should not be done through the field staff but by a central organization. In at least part of the survey, an independent third party should be employed to prevent biases and provide objective standards.

- Vendors can make more effective use of their marketing budget if they emphasize their marketing in areas that are politically popular. In election years, Congress reacts to programs that gain or hold votes. In presidential election years, budgets are more likely to emphasize domestic issues and spending programs than technology or defense.

- The surveys of government agencies revealed projected increases in the amount of future contracting for operations and maintenance. In addition, similar increases are projected for software maintenance. This type of work requires specialized expertise that not all vendors possess; however, vendors that do should ensure that they take advantage of this potential growth area. These areas may not always be as attractive as developing state-of-the-art systems but they are less risky and often financially more rewarding.

INPUT

- Opportunities for involvement with the increasing number of government supercomputer installations will require new programming and engineering skills that closely match the proposed areas of application. Vendors interested in this submarket need careful research of the target to assure prospects.

INPUT

VI PROFESSIONAL SERVICES OPPORTUNITIES

A. PRESENT AND FUTURE PROGRAMS

- Funding for professional services is provided in several budget categories of federal government agencies.

  - Both support and direct investigation may be funded by research and development (R&D) elements.

    - Direct investigation may be identified in the R&D program descriptions.

    - Support services may be included in a general support budget element.

  - Professional services acquired through procurement funding may be separately identified or included in an overall information system acquisition.

  - Professional services oriented toward operation and maintenance or facility management will not be specifically identified within O&M or administrative budget elements of the agencies.

INPUT

- Most medium and smaller professional services projects and tasks, valued at less than $2 million, are rarely identified in agency budget documents, unless specifically related to an information technology R&D project.

- New professional services opportunities that are larger than $1-2 million are listed in at least one of the following federal government documents:

    - 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 in response to 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.

    - OMB Circular A-76 agency support services review schedules for conduct of cost comparisons on a site-by-site, year-by-year basis.

    - Commence Business Daily for specific professional service opportunities, for qualification as a bidder, and to obtain a copy of the RFP or RFQ.

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

        - R-1: RDT&E Budget Request.

        - P-1: Procurement Budget Request.

- Classified program documentation available to qualified DoD contractors.

- This report includes service modes that are, or will be, separate reports in the FISSP. The details of these markets will be provided in the following reports; only the year-to-year market potential is included in this report.

  - <u>Federal Government Systems Integration Market, 1986-1991</u> includes systems engineering and integration, code conversion, independent verification, and validation opportunities within custom systems design and implementation projects.

  - <u>Federal Government Facilities Management Market, 1986-1991</u> includes the PSFM (professional services facilities management or government-owned, contractor-operated) and federal O&M (operations and maintenance) markets.

- The programs identified in this report are typical of this market, but the list is not all-inclusive.

  - Professional services is the largest market segment of the federal government and is expected to remain so during this decade.

  - Most professional services contracts are multiyear documents, employing options or contract modifications to remain in force for a given vendor.

  - With only a few exceptions, most services contracts are limited to three to five years in duration and require that the services be recompeted publicly.

  - Contracts for professional services range in value from less than $10,000 to more than $700 million. The majority of contracts fall in the less than $2 million category.

INPUT

- The first subsection lists projects or contract tasks that were initially planned for contract action in government fiscal year 1986 but were incomplete or unobligated by September 30, 1986. Current information suggests that the programs will happen in GFY 1987.

- The other fiscal year lists for GFY 1989-1992 are small because budgetary data forecasts are incomplete or unavailable. With only a relatively few exceptions, most professional support services contracts now in force are likely to be extended or recompeted and reissued through at least GFY 1991.

B. PROGRAMS - BY FISCAL YEAR START - 1986 (slipped from 1987)

AGENCY	PROGRAM	CODE	TOTAL VALUE ($M)
ARMY			
	Corps of Engineers/Various Installations Engineering and Science Application RFP Release: FY86	PAR: V-2-5	9.4
TREASURY			
	IRS - Collection Field Function RFP Release: 1Q FY86	-	28.1
	Customs - TECS II Design and Development RFP Release: 1Q FY86	-	25.6
GSA			
	Office of Software and Information Technology Support - Professional Service Agreements RFP Release: 4Q FY86	PAR: VIII-14-15	3.8

INPUT

C. PROGRAMS – BY FISCAL YEAR START – 1987

AIR FORCE

Electronic Warfare ADP Enhancement RFP Release: FY87	PAR: V-1-14	0.5
WWMCCS Information System (WIS) RFP Release: FY88	PAR: V-1-32	229.4
Command Readiness Exercise System (CRES) RFP Release: 2Q FY87, 3Q FY87	PAR: V-1-34	3.9
Depot Maintenance Management Information System (DMMIS) RFP Release: 2Q FY87	PAR: V-1-37	2.6
FLITE Conversion to On-Line System RFP Release: 2Q FY87	PAR: V-1-90	1.4
Network Front-End Processor for C3I RFP Release: 1Q FY87	PAR: V-1-91	1.3
Intelligent Gateway Processors (IGP) RFP Release: 3Q FY87	-	5.5
Advanced Computer Flight Plan RFP Release: 1Q FY87	PAR: V-1-93	6.2
Air Staff Office Automation Project (SIRG) RFP Release: 2Q FY87	PAR: V-1-98	16.0
MAC Information Processing System (MAC IPS) RFP Release: 2Q FY87	PAR: V-1-101	28.8
Joint Mission Processor RFP Release: FY87	PAR: V-1-103	15.2
Special Operations Forces Enhancement of the Automated Mission Planning System (AMSP) RFP Release: 3Q FY87	PAR: V-1-105	5.2
MAC - Computer System Replacement for the USAF Environmental Technical Applications Center (USAFETAC) - Support RFP Release: 3Q FY87	PAR: V-1-73 MAC/ADPS-15	8.5

INPUT

AF Global Weather Central/Scott AFB -
Environmental Support System (SESS)
Relocation
RFP Release: 3Q FY87

PAR: V-1-61
AFCC/ADS-15

8.2

Air Force Space Command/Peterson AFB
System Engineering Support for NORAD
Computer System (Recompetition)
RFP Release: 3Q FY87

PAR: V-1-30
SPACECMD/ADPS-80

14.2

AFCC - Air Force Integrated Readiness
Measurement System Development and
Support
RFP Release: FY87

AFCC/ADPS-59

3.9

Project 6000 (formerly: Air Force
MAJCOM Information System) (formerly:
Command ADP Modernization Program (CAMP))
RFP Release: FY87

PAR: V-1-2

57.5

MAC IPS Military Airlift Command (MAC) part
of the Command and Control (C2) Upgrade -
Software Transition
RFP Release: 2Q FY87

PAR: V-1-101

29.0

AF Space Command/NCMC ALASAT Mission
Control Center Software Support
RFP Release: 2Q FY87

SPACECMD-ADS-80

19.4

USAFETAC/AFGWC Software Improvement
Program (ASIP)
RFP Release: 2Q FY87

MAC/ADPS-15

9.5

AFSC/AFWAL/WPAFB Materials Research
Automation
RFP Release: FY87

PAR: V-1-16
AFSC/ADPS-43

2.0

HQ-AFLL Technical Repair Center Technical
Order Distribution (TRCCTOD)
RFP Release: 4Q FY87

PAR: V-1-53
AFLC/ADS-99

80.0

AFCC/Pentagon Headquarters System
Replacement Program (formerly: First
Information Systems Group (IIS6)
Modernization Program)
RFP Release: FY87

PAR: V-1-78

157.0

INPUT

ARMY

General Purpose Computing Requirement RFP Release: FY87	PAR: V-2-29	30.0
Corps Theater ADP Service Center II (CTASC II) RFP Release: FY87	PAR: V-2-30	49.3
Army Corporate Data Base Project (ACDBP) RFP Release: FY87	PAR: V-2-31	9.7
Army Information Systems Integration Project (AISI) RFP Release: 2Q FY87	PAR: V-2-33	6.0
Army Commissary Automation System (ACAS) RFP Release: 1Q FY87	-	12.5
Corps of Engineers/Various Installations Engineering and Science Application RFP Release: FY87	PAR: V-2-5	9.4
National Guard Bureau - Army National Guard Management Information System (ARNG-MIS) (CAMIS-Related) RFP Release: FY87	PAR: V-2-6	54.1
ODCS-OPS-C4-WWMCSS Information System (WIS) (System Support Contract) Block B RFP Release: 4Q FY87	PAR: V-2-8	93.7
Corps of Engineers Automation Plan/Option I (CEAP-1) Support Services RFP Release: 2Q FY87	PAR: V-2-9	28.5
Army Food Management Information System (AFMIS) Support RFP Release: 4Q FY87	PAR: V-2-14	3.7
TRADOC - Technical Support Services RFP Release: 3Q FY87	PAR: V-2-15	52.0

NAVY

Department of Navy Office Automation and Communications System (DONOACS) RFP Release: 2Q FY87	PAR: V-3-3	5.3

INPUT

Navy Integrated Computer-Aided Design, Manufacturing, and Maintenance (NICADMM) RFP Release: FY87	PAR: V-3-14	5.8
Systems Analysis and Programming RFP Release: 1Q FY87	PAR: V-3-27	2.0
Naval Bases and Stations Support RFP Release: 1Q FY87	PAR: V-3-60	11.5
Enhanced Naval Wargaming System Software Maintenance RFP Release: 3Q FY87	PAR: V-3-66	12.2
Strategic Mobility Subsystem (STRATMOB) RFP Release: 3Q FY87	PAR: V-3-68	1.6
Headquarters Project (Integrated Information System) RFP Release: 2Q FY87	PAR: V-3-76	3.1
COMNAVOCEANCOM Large-Scale Computer Plan RFP Release: 4Q FY87	PAR: V-3-78	2.2
Engineering Data Management Information and Control System (EDMICS) RFP Release: 3Q FY87	PAR: V-3-79	2.4
FLENUMOCEANCEN – PEPS Software System (PSS) RFP Release: 2Q FY87 (est)	PAR: V-3-46 ADPS-016	8.4
NAVSUP – Uniform Automatic Data Processing System Programming Contract RFP Release: 3Q FY87	PAR: V-3-51 ADPS-L58	25.7
NWC/China Lake – Data Processing and Related Services (Recompetiition) RFP Release: 3Q FY87	PAR: V-3-5 ADPS-006	23.4

MARINE CORPS

Reserve Component Common Personnel Data System (RCCPDS) RFP Release: 2Q FY87	–	3.5

INPUT

DEFENSE

DCA - Software Engineering and Development
to Support Defense Communications Engineering
Center (Recompetition)
RFP Release: 2Q FY87   DCS/ADPS-01   2.0

DMA - Automated Aeronautical Information
Processing System (AAIPS)
RFP Release: 4Q FY87   -   5.0

HQ-DNA - Information Resource System
Support
RFP Release: 2Q FY87   PAR: V-4B-1   3.7

AGRICULTURE

Agricultural Marketing Service - Cotton
Electronic Recording System Support
(Recompetition)
RFP Release: 4Q FY87   PAR: VI-5-13   4.2

Mainframe Computer Replacements
RFP Release: 4Q FY87   PAR: VI-5-23   1.8

Replacement of Existing O/A and ADP
Equipment
RFP Release: 2Q FY87   PAR: VI-5-25   4.3

Soil Conservation Service - Soil Design
and Programming Services
RFP Release: 4Q FY87   PAR: VI-5-10   22.6

DOC

Bureau of Economic Analysis/Competitive
Replacement of Computer Systems
RFP Release: FY87   PAR: VI-6-4   2.8

Advanced Weather Interactive Processing
System (AWIPS)
RFP Release: 1Q FY87   PAR: VI-6-24   51.7

Census Bureau Computer Replacement
(including the UNIVAC 1100/83 Upgrade)
(previously Long-Range ADP Acquisition)
RFP Release: FY87   PAR: VI-6-3   43.8

DOE
Advanced Computer Center
RFP Release: 3Q FY87   PAR: VI-7-18   0.5

INPUT

Recompetition of the Contract for Computer
Services
RFP Release: 3Q FY87   PAR: VII-13-5   19.0

Upgrade Central Computer Facility
RFP Release: 1Q FY87   PAR: VI-7-58   0.6

Replace Central Computers
RFP Release: 1Q FY87   PAR: VI-7-60   0.7

Basic Energy Sciences Shared Computer
Facility
RFP Release: 4Q FY87   PAR: VI-7-68   2.7

HHS

Program Benefits Logical Application Group
(LAG)
RFP Release: FY87   -   12.9

ADMIN/MI Capacity Upgrade
RFP Release: 3Q FY87   PAR: VII-8-7   6.8

Test and Time Sharing Facility (TTSF)
RFP Release: FY87   -   7.4

National Center - Toxicological Research
Data Processing Services for NCTR
Pathology Department
RFP Release: FY87   PAR: VII-8-21   7.8

HCFA - Project to Redesign Information
Systems Management (PRISM) - Short-Term
Improvements
RFP Release: Mid FY87   PAR: VII-8-20   17.1

DOL

PBGCF Facility Management/Maintenance
RFP Release: FY87   -   7.5

HUD

HUD Integrated Information Processing
Service (HIPPS)
RFP Release: 3Q FY87   PAR: VII-9B-4   120.0

INPUT

HUD Mortgage Accounting Project (HUDMAP)
(Recompetition)
RFP Release: 3Q FY87   PAR: VII-9B-2   7.6

DOS

Foreign Affairs Information System Support
RFP Release: 1Q FY87   PAR: VII-9C-1   32.4

DOT

Departmental Accounting and Financial
Information System (DAFIS)
RFP Release: FY87   PAR: VII-11-20   23.7

Vessel Traffic Service (VTS) New Orleans
Surveillance Project
RFP Release: 3Q FY87   PAR: VII-11-22   2.0

Weather Communications Processors
RFP Release: 3Q FY87   PAR: VII-11-25   4.0

FAA/Air Force Radar Replacement (FARR)
RFP Release: 3Q FY87   PAR: VII-11-26   200.0

TREASURY

IRS - Automated Examination System -
Phase III
RFP Release: 5/87   PAR: VII-12-5   96.4

Mini/Micro Acquisition Strategy
RFP Release: 4Q FY87   PAR: VII-12-12   7.8

IRS Automated Financial System
RFP Release: FY87   -   21.2

Detroit Data Center (DDC)
Terminals/Printers and UNIVAC Replacement
RFP Release: FY87   PAR: VII-12-21   6.1

IRS - Tax Processing System Redesign (TRSR)
RFP Release: 4Q FY87   PAR: VII-12-6   131.2

FMS ADP Quality Assurance Program
RFP Release: 3Q FY87   -   2.0

Integrated Collection System (ICS)
RFP Release: 3Q FY87   PAR: VII-12-33   58.9

VI-11

INPUT

FMS ADP Quality Assurance Program RFP Release: 3Q FY 87	-	2.0
Secret Service Protective Intelligence System RFP Release: 3Q FY87	-	1.2

GSA

Operation and Maintenance of General Supply Fund Computer System RFP Release: FY87	PAR: VIII-14-18	37.2
Office of Software and Information Technology Support - Professional Service Agreements (Recompetition) RFP Release: 4Q FY87	PAR: VIII-14-15	3.8

NASA

ADP Operations Services RFP Release: FY87	PAR: VIII-15-58	3.6
Numerical Aerodynamic Simulator (NASA) Processing System Network (NPSN) (Processor #2) RFP Release: 2Q FY87	PAR: VIII-15-60	12.9
Space Station Definition and Preliminary Design Program RFP Release: 3Q FY87	PAR: VIII-15-61	400.0

EPA

RTP - Technical Feasibility Studies and Systems Design (Recompetition) RFP Release: 2Q FY87	PAR: VIII-17-4	30.0
NCC - Facility Management of the National Computing Center (Recompetition) RFP Release: 2Q FY87	PAR: VIII-17-7	30.0

FEMA

Resource Economic Assessment System RFP Release: FY87	-	24.0

INPUT

Propagation Software Development
RFP Release: 3Q FY87   –   2.2

D.   PROGRAMS – BY FISCAL YEAR START – 1988

AIR FORCE

AF Space Command/Peterson AFB BMEWS
Contract Services
RFP Release: 2Q FY88   SPACECMD/ADPS-V4   19.4

WWMCCS Replacement (AFWIS)   PAR: V-1-27
RFP Release: Multiple FY88   AFSC/ADPS-80   40.0

IBM 4341 Enhancement
RFP Release: FY88   PAR: V-1-72   1.2

Computer Replacement/Enhancement at the
USAF Environmental Technical Applications
Center (USAFETAC)
RFP Release: 1Q FY88   PAR: V-1-74   7.5

Software Transition Program
RFP Release: FY88   PAR: V-1-89   28.9

AFSC – Integrated Management Information
System (IMIS)
RFP Release: Mid FY88   AFSC/ADPS-81   4.4

MAC – Computer Replacement for Two UNIVAC
Computers at the Air Force Global Weather
Central – Software Support   PAR: V-1-63   14.0
RFP Release: 4Q FY88   MAC/ADPS-15

SAC/ADS-90 Contract Services
RFP Release: FY88   SAC/ADS-90   38.0

Software Improvement at the USAF
Environmental Technical Applications Center
(USAFETAC)
RFP Release: 1Q FY88   PAR: V-1-94   5.6

INPUT

AF Transportation Coordinator Automated
Command and Control Information Center
(TCACCIS)
RFP Release: 2Q FY88   -   20.6

Contracting Data Management System - Phase
II
RFP Release: 1Q FY88   PAR: V-1-104   22.9

TAC Nellis AFB/Air Combat and Maneuver
System O&M
RFP Release: 3Q FY88   -   1.5

SAMTEC/VAFB Metric Data Processing
RFP Release: 3Q FY88   -   1.2

AFCC - Air Force Integrated Readiness
Measurement System Development and Support
RFP Release: FY88   -   13.9

ARMY

Corps of Engineers/Various Installations
Engineering and Science Application
RFP Release: FY88   PAR: V-2-5   9.4

Computer Adaptive Testing
RFP Release: FY88   PAR: V-2-27   8.2

Telecommunication Modernization Program
(TEMPO)
RFP Release: 1Q FY88   PAR: V-2-32   12.9

USM EPC/SSS - Joint Computer Center
RFP Release: 2Q FY88   -   0.6

National Guard Bureau - Army National Guard
Management Information System (ARN6-MIS)
(CAMIS-related)
RFP Release: FY88   PAR: V-2-6   54.1

Yuma Proving Ground/Data Reduction
RFP Release: 3Q FY88   -   0.9

MEPCOM/Computer Operations O&M
RFP Release: 3Q FY88   -   0.6

INPUT

NAVY

NATC/EMPASS O&M
RFP Release: 4Q FY88   -   0.7

DPSCWEST Teleprocessing Hardware and
Software Support (Recompetition)   PAR: V-3-55
RFP Release: 1Q FY88   ADPS-001   15.9

SOCC/SACC/FCC Upgrade
RFP Release: 1Q FY88   -   58.4

NADC Vector Computer
RFP Release: 1Q FY88   -   8.8

DEFENSE

Defense Communications Agency NMCS Software
Development and Maintenance Recompetition
RFP Release: 4Q FY88   DCA-11   8.5

DCA - Software Development, Maintenance,
and Documentation for WWMCCS (Recompetition)
RFP Release: 2Q FY88 (est)   DCA/ADPS-02   15.0

HQ-DNA - Information Resource System
Support
RFP Release: 2Q FY88   PAR: V-4B-1   3.7

Defense Nuclear Agency WWMCCS Information
System (WIS)
RFP Release: FY88   PAR: V-4B-3   5.9

AGRICULTURE

Automated Administrative Management System
(AAMS)
RFP Release: FY88   PAR: VI-5-24   8.2

Inspection Position Coverage System (IPCS)
RFP Release: 1Q FY88   PAR: VI-5-26   0.3

Foreign Agriculture Service Contract
Software Maintenance and New Development
(Recompetition)
RFP Release: 4Q FY88   FAS-4   3.6

Soil Conservation Service - Soil Design and
Programming Services
RFP Release: 4Q FY88   PAR: VI-5-10   22.6

INPUT

DOC

Census Bureau Decennial Data Capture (DDC) - Support Services RFP Release: 2Q FY88	PAR: VI-6-18	69.4

ENERGY

HQ/Information Systems Support RFP Release: 4Q FY88	-	2.8
HQ/Computer Support Services RFP Release: 4Q FY88	-	1.3
Recompetition of the Contract for Computer Services RFP Release: 3Q FY88	PAR: VII-13-5	19.0

HHS

HQ/DP Services RFP Release: 1Q FY88	-	0.4

HHS/MAS

FAIMS Technical DP Assistance RFP Release: FY88	-	1.0

DEPARTMENT OF INTERIOR

U.S. Fish and Wildlife Service - Commercial Services (Recompetition) RFP Release: 4Q FY88	PAR: VII-9-10	7.6

DOL

MSHA OMB A-76 Management Study RFP Release: FY88	-	1.3

JUSTICE

Capital Investments, Equipment Rental and Commercial Services (formerly Office of Information Technology - Acquisition of New Data Center in Dallas) RFP Release: FY88	PAR: VII-10-13	41.0

INPUT

TREASURY

Files Archive Image Storage and Retrieval
(FAISR)
RFP Release: 2Q FY88 — PAR: VII-12-37 — 46.3

Secret Service - Software Development -
Protective Intelligence System
RFP Release: FY88 — - — 1.2

IRS Automation of Criminal Investigation
RFP Release: 2Q FY88 — - — 21.4

Distributed Input System
RFp Release: 2Q FY88 — PAR: VII-12-50 — 13.6

IRS - Automated Under-Reporter Program
(Recompetition)
RFP Release: 10/88 — - — 10.4

DOT

TSC Cambridge/ADP Support
RFP Release: 3Q FY88 — - — 4.8

GSA

Contract Services Programs (Recompetition) — - 160.0/yr

Office of Software and Information
Technology Support - Professional Service
Agreements (Recompetition)
RFP Release: 4Q FY88 — PAR: VIII-14-15 — 3.8

Lewis RC-ICARE Systems Support
(Recompetition)
RFP Release: Early FY88 — NASL-36 — 1.25

GSA Regions - Contract Services Program (CSP)
RFP Release: By Region FY88 — PAR: VIII-14-10 165.0/yr

NASA

JSC/SAI O&M
RFP Release: 3Q FY88 — - — 0.7

Lewis RC-ICARE System Support (Recompetition)
RFP Release: Early FY88 — NASL-36 — 1.25

INPUT

Ames Research Center - Master Programming Contract (Recompetition) RFP Release: FY88	PAR: VIII-15-8	63.2
Ames RC - Software Development, Maintenance, and Documentation (Recompetition) RFP Release: Early FY88	NAS2-11	43.6
GSFC - Software Development, Maintenance, and Documentation to Support Manned Space Flight Network Central Computer System (Recompetition) RFP Release: 1Q FY88	NAS5-28	45.0
Langley RC - Replace Real-Time Simulation Processors RFP Release: Early FY88	NASL-11	3.9
Ames RC - Master Programming Contract (Recompetition) RFP Release: Early FY88	PAR: VIII-15-8	60.7
Lewis RC - Replace IBM 3033 System Support RFP Release: 1Q FY88	NASL-21	1.5
GSFC/Goddard Institute of Space Sciences RFP Release: 3Q FY88	-	1.9
Wallops/DP/Engineering Support RFP Release: 1Q FY88	-	1.8
GSFC/Shuttle Operations Support RFP Release: 1Q FY88	-	18.0
GSFC/STDN O&M RFP Release: 2Q FY88	-	8.3
GSFC/NASCOm Center O&M RFP Release: 2Q FY88	-	14.3
Numerical Aerodynamic Simulator (NAS) Processing System Network (NPSN) (Processor #3) RFP Release: FY88	PAR: VIII-15-60	8.8

EPA

RTP/U 1110 System Operation and Support RFP Release: 3Q FY88	-	7.3

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INPUT

E. PROGRAMS - BY FISCAL YEAR START - 1989

AIR FORCE

AFMPC Pipeline Management System
RFP Release: 1Q FY89   —   8.5

AFLC - Technical Integration Contractor
Services
RFP Release: Recompete FY89   AFLC/ADS-99   7.3

Air Force Accounting and Finance Center
Computer Replacement
RFP Release: 1Q FY89   —   21.0

San Antonio/Computer Center FM
RFP Release: 3Q FY89   —   1.5

ARMY

Corps of Engineers/Various Installations
Engineering and Science Application
RFP Release: FY89   PAR: V-2-5   9.4

National Guard Bureau - Army National
Guard Management Information System
(ARN6-MIS) (CAMIS-related)
RFP Release: FY89   PAR: V-2-6   54.1

Navy/NADC

NADC - Digital Computer Systems
RFP Release: 1Q FY89   —   4.5

NAVY

NAVAVNLOGCEN - Software Development,
Maintenance, and Documentation for
Management System Development Directorate
RFP Release: 3Q FY89   ADPS-L29   5.5

NAVMILPERS - Military Personnel - Navy
(MPN) Financial System (MFS) Support   PAR: V-3-29
RFP Release: FY89   ADPS-011   3.2

INPUT

DEFENSE

DLA/DSS - Systems Analysis and Programming
Support for USAEUCOM - Stuttgart, Germany
(Recompetition)
RFP Release: 1Q FY89   -   5.5

AGRICULTURE

Soil Conservation Service - Soil Design and
Programming Services
RFP Release: 4Q FY89   PAR: VI-5-10   22.6

DOC

Census Bureau - Computer Replacement
(including the UNIVAC 1100/83 Upgrade)
(previously Long-Range ADP Acquisition)
RFP Release: FY89   PAR: VI-6-3   43.8

ENERGY

HQS-EAO/ADP Support
RFP Release: 3Q FY89   -   4.0

Nevada/Computer Center FM
RFP Release: 3Q FY89   -   2.5

HQS/Data Support Services
RFp Release: 3Q FY89   -   1.0

HHS

National Toxicological Research Center D.R.
RFP Release: 3Q FY89   -   0.6

Alcoholism Treatment Monitoring Center   -   1.5

DOL

Black Lung Automated Support System
RFP Release: 2Q FY89   -   55

Lakewood MSHA Facility Management Services
RFP Release: 3Q FY89   -   2.5

INPUT

JUSTICE

	INS - Software Development and Maintenance Services (Recompetition) RFP Release: 2Q FY89	INS-13	6.1

DOT

	Coast Guard - Information Resource Management Systems (Recompetition) RFP Release: 1Q FY89	-	8.0

GSA

	Office of Software and Information Technology Support - Professional Service Agreements (Recompetition) RFP Release: 4Q FY89	PAR: VIII-14-15	3.8
	Information Services - Programming and Systems Analysis (S&P) Basic Agreements RFP Release: 1/89	PAR: VIII-14-8	28.0

NASA

	JSC/Computer Systems Engineering and Operations RFP Release: 3Q FY89	-	25.0
	JSC/Shuttle ADP Support RFP Release: 3Q FY89	-	0.5
	GSFC/National Space Science Data Center RFP Release: 1Q FY89	-	2.3
	HQ/Computer Center O&M RFP Release: 1Q FY89	-	4.8
	DRYDEN/Computer Facility Operation RFP Release: 3Q FY89	-	1.6
	HQS/ADP Facility Operation RFP Release: 3Q FY89	-	5.0
	LRC/Simulation and Data System Support RFP Releae: 4Q FY89	-	3.2
	Lewis Research Center Class VII Computer System and Support RFP Release: 3Q FY89	PAR: VIII-15-57	20.0

INPUT

F.   PROGRAMS – BY FISCAL YEAR START – 1990

AIR FORCE

AFRPL/Edwards AFB – Data Services Contract   PAR: V-1-22
RFP Release: 3Q FY90   AFSC/ADPS-33   7.5

ARMY

Corps of Engineers/Various Installations
Engineering and Science Application
(Separate Acquisitions)
RFP Release: FY90   PAR: V-2-5   9.4

National Guard Bureau – Army National
Guard Management Information System
(ARN6-MIS) (CAMIS-related)
RFP Release: FY90   PAR: V-2-6   54.1

NAVY

NAVAVNLOGCEN – Naval Rework Facility –
Workload Control System (WCS)
(Recompetition)   PAR: V-3-38
RFP Release: 1Q FY90   ADPS-V30   20.5

DOC

Census Bureau – Computer Replacement
(including the UNIVAC 1100/83 Upgrade)
(previously Long-Range ADP Acquisition)
RFP Release: FY90   PAR: VI-6-3   43.8

HHS

HUD Facilities Support (Recompetition)
RFP Release: FY90   -   1.0

GSA

Public Building Service – Task Order Support
(Recompetition)
RFP Release: FY90   PAR: VIII-11-1   15.0

INPUT

Office of Software and Information
Technology Support - Professional Service
Agreements (Recompetition)
RFP Release: 4Q FY90   PAR: VIII-14-15   3.8

NASA

ADP Operations Services (Recompetition)
RFP Release: FY90   PAR: VII-15-58   3.6

Numerical Aerodynamic Simulator (NAS)
Processing System Network (NPSN)
(Processor #4)   PAR: VIII-15-60   2.1

Wallops/Data Processing and Engineering
Support
RFP Release: 1Q FY90   -   2.0

GSFC/Computer O&M
RFP Release: 1Q FY90   -   2.1

HQ/STIC (Scientific and Technical Information
Center) FM
RFP Release: 1Q FY90   -   5.8

LRC/Business Data Processing
RFP Release: 2Q FY90   -   2.8

GSFC/Business Data Processing
RFP Release: 2Q FY90   -   1.2

GSFC/Institute for Space Sciences
RFP Release: 2Q FY90   -   2.5

OFFICE OF PERSONNEL MANAGEMENT

Retirement System Software Support
(Recompetition)
RFP Release: 1Q FY90   -   10.5

INPUT

G. PROGRAMS - BY FISCAL YEAR START - 1991

ARMY

National Guard Bureau - Army National Guard
Mangement Information System (ARN6-MIS)
(CAMIS-related)
RFP Release: FY91 — PAR: V-2-6 — 54.1

NAVY

Pacific Missile Test Center
RFP Release: FY91 — PAR: V-3-56 — 16.4

AGRICULTURE

Forest Service/ADP/WP Equipment Operation
and Maintenance (Recompetition)
RFP Release: FY91 — PAR: VI-5-15 — 46.1

DOL

OSHA Systems Analysis and Programming
(Recompetition)
RFP Release: FY91 — - — 3.8

GSA

Office of Software and Information
Technology Support - Professional Service
Agreements (Recompetition)
RFP Release: 4Q FY91 — PAR: VIII-14-15 — 3.8

NASA

GSFC - Systems Analysis, Computer
Programming, and Software Maintenance
for Mission Support (Recompetition)
RFP Release: FY91 — NAS5-28 — 32.5

GSFC - Programming, Analysis, and Enginering
Support - Ground Space Flight Tracking and
Data Network (G-STDN) (Recompetition)
RFP Release: FY91 — NAS5-29 — 7.5

ARC - Operations Support
RFP Release: FY91 — NASi-29 — 42.5

INPUT

H. PROGRAMS - BY FISCAL YEAR START - 1992

<u>DOE</u>

Recompetition of the Contract for Computer
Services
RFP Release: 3Q FY92   PAR: VII-13-5   19.0

<u>GSA</u>

Office of Software and Information
Technology Support - Professional Services
Agreements (Recompetition)
RFP Release: 4Q FY92   PAR: VIII-14-15   3.8

<u>OFFICE OF THE SECRETARY OF DEFENSE</u>

Assistant Secretary - Health Affairs -
Defense Enrollment Eligibility Reporting
System (DEERS) (Recompetition)
RFP Release: FY92   PAR: V-4E-2   50.0

INPUT

A.   PROFESSIONAL SERVICES RESPONDENT PROFILES

I.   AGENCIES

- The interviews were conducted by telephone for 92% of the respondents, the remaining 8% were on-site contacts.

- The following distribution of respondents were contacted within the DoD and the civil agencies:

	Policy	Buyers	Users	Total
Civil	11	7	11	29
DoD	5	1	4	10
Total	16	8	15	39

2.   LIST OF AGENCIES INTERVIEWED

- Department of Agriculture.

  - Economic Management Service.

  - ASCS.

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INPUT

- Soil Conservation Service.

- Department of Commerce.

  - International Trade Administration.

  - Office of Information Policy and Planning.

  - Office of Procurement Management.

  - Patent and Trademark Office.

- Department of Defense.

  - Air Force.

    - Office of the Secretary.

    - Military Airlift Command.

    - Communications Group.

    - Logistics Command.

  - Army.

    - DARCOM.

    - Civil Personnel Center.

  - Navy.

    - Office of NALTOACS Program.

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- Navy Medical Command.

- Space Command.

 - Defense Logistics Agency.

- Department of Education.

 - Office of Information Resources Management.

- Department of Energy.

 - Information Systems Division.

 - Office of ADP Services.

- Department of Health and Human Services.

 - Office of the Secretary.

 - Social Security Administration.

 - Public Health Service.

- Department of Housing and Urban Development.

 - Office of Acquisition Management.

- Department of Interior.

 - Office of Information Resources Management.

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INPUT

- Department of Justice.

  - Drug Enforcement Agency.

  - Federal Bureau of Investigation.

- Department of Labor.

  - Office of Information Resources Management.

- Department of Transportation.

  - Office of Information Systems and Telecommunications Policy.

  - Federal Aviation Administration.

- Treasury Department.

  - Office of Information Resources Management.

  - Internal Revenue Service.

- Environmental Protection Agency.

  - Office of Information Management.

- General Services Administration.

  - Office of Information Resources Management.

  - Office of Software Development and Office Technology (2).

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- National Aeronautics and Space Administration.

    - NASA Headquarters--Office of ADP Management.

    - Langley Research Center (2).

3. PROFESSIONAL SERVICES BUDGET LEVELS OF RESPONDENTS

- The government agencies surveyed by INPUT were a uniform sample of all the agencies of the federal government. The size of the professional services budget responsibilities of these agencies were varied, thus ensuring that the data and opinions collected would not be biased. As shown in Exhibit A-1, the actual annual expenditures for professional services are large, particularly by commercial standards. The size of the respondents' professional services budget averaged over $30 million.

4. PROFESSIONAL SERVICES VENDORS

- All contacts with vendor personnel were made by telephone.

- The vendor personnel contacted had the following distribution of job classifications:

    - Marketing - 9.

    - Executive - 12.

    - Total - 21.

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PROFESSIONAL SERVICES BUDGET LEVELS
OF AGENCY RESPONDENTS

PROFESSIONAL SERVICES BUDGET RANGES ($ Millions)	NUMBER OF CIVIL AGENCIES	NUMBER OF DOD AGENCIES
Less than 1	1	1
1 to 5	5	2
5 to 20	9	1
20 to 50	5	0
50 to 100	3	3
Greater than 100	4	1
Not Disclosed	2	2
Total	**29**	**10**

Updated 1987

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APPENDIX B: DEFINITIONS

- To accommodate the range of ADP 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 procure-
  ment/acquisition process is included in Appendix C, Glossary.

A. SERVICE MODES

1. PROCESSING SERVICES

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

- <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

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FEDERAL INFORMATIONS SYSTEMS AND SERVICES PROGRAM
SYSTEMS AND SERVICES MODES

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

Hardware (Systems)
- Mainframe
  - Mini-computer
  - Large Computer
  - Super-computer
  - Systems Software
  - Mass Storage
- Micro-computer
  - Personal Computer
  - Work Station
  - Word Processor
  - Front Back-End Processors
- Peripherals
  - OCR
  - Keyboard
  - Modem
  - Tape Drive
  - Disk Drive
  - Printer
  - Plotter
  - Large Screen Display

Integrated Systems
- Professional Services
  - Systems Engineering
  - Systems Integration
  - Software Development
  - Installation
  - Training
  - Maintenance
- Turnkey Systems
  - Systems Software
  - Application Software
  - Training
  - Maintenance
- Hardware

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

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

Processing Services
- Facilities Management
  - Special Purpose
  - General Purpose
  - Interactive
  - Value Added Networks
- Remote Computing Services
  - Distributed Data Processing
  - Proprietary Data Base
  - User Site Hardware Software
- Batch Processing
  - Data Entry
  - Data Output
  - Com
  - Remote Batch

Sec 3

100%
no shift

ΣP
65

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>ON-LINE 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, including the federal government.

- <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. In the latter case the hardware may reside at the vendor's site. 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.

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. Significant software as part of the service.

- <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 plan, control, operate, and own the facility provided to the user, either on-site, through communications lines, or in a mixed mode.

- <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:

  - 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.

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INPUT

. 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.

2. PROFESSIONAL SERVICES

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

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

- EDUCATION AND TRAINING - 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.

- 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 benchmarking. These services may also include follow-on and software maintenance.

- 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:

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INPUT

- OPERATION AND MAINTENANCE (O&M) - Vendor operation and maintenance of government-owned ADP/telecommunications equipment 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 maintenance 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/telecommunications systems may be provided with related engineering activities such as Systems Engineering and Integration (SE&I) or Systems Engineering and Technical Assistance (SETA).

3. TURNKEY SYSTEMS

- Turnkey systems, also known as 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.

INPUT

EXHIBIT B-2

SOFTWARE PRODUCTS

```
                              SOFTWARE
                              PRODUCTS
```

Systems Software

Applications Software

Cross Industry

Industry Specific
- Education
- Federal Government
- Insurance
- Medical
- Process Manufacturing
- Service
- State and Local Government
- Transportation
- Utilities
- Other

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
- 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 and Management Systems
- Retrieval Systems
- Spreadsheet Systems
- Translators
- Others

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

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

Human Resources
- Benefits
- Payroll
- Personnel
- Training and 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
- Others

Graphics
- Character Graphics
- Line Graphics
- Picture Graphics
- Others

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

INPUT

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

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

    - <u>INDUSTRY-SPECIALIZED PRODUCTS</u> - 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.

- <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.

INPUT

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).

• PERIPHERALS - 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 DEVICES - Includes keyboards, numeric pads, card readers, light
      pens and track balls, tape readers, position and motion sensors, and
      analog-to-digital converters.

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

    - COMMUNICATION DEVICES - Modems, encryption equipment, special
      interfaces, and error control.

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

• TERMINALS - Federal government systems use three types of terminals as
  described below.

    - USER-PROGRAMMABLE - Also called intelligent terminals, including:

        . Single-station or standalone.

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INPUT

- Multi-station shared processor.

- Teleprinter.

- Remote batch.

  - NON-PROGRAMMABLE - Also called "dumb" terminals, including:

    - Single-station.

    - Multi-station shared processor.

    - Teleprinter.

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

- HARDWARE SYSTEMS - 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.

  - MICROCOMPUTER - 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.

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INPUT

- 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.

    - 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

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INPUT

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. Super-computers 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 configur-ations:

  - Parallel processors.

  - 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 activi-ties. 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.

INPUT

- <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>LOCAL AREA NETWORK (LAN)</u> - 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:

    - Multiple channels through FDM or TDM.

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

- <u>TRANSMISSION FACILITIES</u> - Includes wire, carrier, coaxial cable, microwave, optical fiber, satellites, cellular radio, and marine cable operating in one of two modes depending on the vendor and the distribution of the network.

INPUT

- <u>MODE</u> - 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 distribution systems.

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

- <u>MEDIA</u> - 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.

  - 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.

INPUT

- 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.

- <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.

INPUT

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

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

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

- BPS - Bits per second--also mbps and kbps, million bits per second and thousand bits per second, respectively.

- BSC - 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."

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

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

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

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

- CIRCUIT SWITCHING - A process that, usually on demand, connects two or more network stations and permits exclusive circuit use until the connection

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INPUT

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.

- <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.

INPUT

- <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.

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INPUT

- <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.

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

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

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

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

INPUT

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

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

- <u>FIELD ENGINEER (FE)</u> - 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.

- <u>FULL-DUPLEX</u> - Bi-directional communications with simultaneous two-way transmission.

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

- <u>HALF-DUPLEX</u> - Bi-directional communications, but only in one direction at a time.

- <u>HARDWARE INTEGRATOR</u> - 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.

- <u>HDLC</u> - High-level Data Link Control.

- <u>HERTZ</u> - Number of signal oscillations (cycles) per second--abbreviated Hz.

- <u>IBM TOKEN RING</u> - 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.

INPUT

- <u>IDN</u> - Integrated Digital Network--digital switching and transmission; part of the evolution to ISDN.

- <u>INDEPENDENT SUPPLIERS</u> - Suppliers of machine room peripherals--usually do not supply general purpose computer systems.

- <u>INFORMATION PROCESSING</u> - Data processing as a whole, including use of business and scientific computers.

- <u>INSTALLED BASE</u> - Cumulative number or value (cost when new) of computers in use.

- <u>INTERCONNECTION</u> - Physical linkage between devices on a network.

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

- <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.

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INPUT

- <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.

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

- <u>MESSAGE</u> - 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.

- <u>MMFS</u> - Manufacturing Messaging Format Standard--application-level protocol included within MAP.

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

- <u>NCP</u> - 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.

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

- **OSI NETWORK LAYER** - Layer 3, providing call establishment and clearing control through the network nodes.

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

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

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

INPUT

- **OSI TRANSPORT LAYER** - Layer 4, providing end-to-end terminal control signals such as acknowledgements.

- **OVERSEAS** - Not within the geographical limits of the continental United States, Alaska, Hawaii, and U.S. possessions.

- **PABX** - Private Automated Branch Exchange--hardware that provides automatic (electro-mechnanical or electronic) local circuit switching on a customer's premises.

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

- **PBX** - Private Branch Exchange--hardware which provides local circuit switching on the customer premise.

- **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.

INPUT

- **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.

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

- **SDN** - Software-Defined Network.

- **SECURITY** - 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.

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

- **SIMPLEX** - Undirectional communications.

INPUT

- <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.

- <u>SYNCHRONOUS</u> - Communications operation with separate, continuous clocking at both sending and receiving stations.

- <u>SYSTEMS ANALYST</u> - Individual who analyzes problems to be converted to a programmable form for application to computer systems.

- <u>SYSTEMS HOUSE</u> - 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.

- <u>SYSTEMS INTEGRATOR</u> - 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.

INPUT

- **TI** - 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.

- **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.

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INPUT

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.

- 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.

- 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).
- DOC — Department of Commerce.

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INPUT

- 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.

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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.
- FTPS — Federal Telecommunications Standards Program administered by NCS; Standards are published by GSA.

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INPUT

- 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.
- MIPR — Military Interdepartmental Purchase Request.
- MOD — Modification.

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- 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.
- OFMP — Office of Federal Management Policy (GSA).
- OFPP — Office of Federal Procurement Policy.

INPUT

- 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.
- PPBS   Planning, Programming, Budgeting System.
- PR   Purchase Request or Procurement Requisition.

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INPUT

- 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 Defense 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.

     INPUT

- 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.
- 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.
- WS — Work Statement - Offerer's description of the work to be done (proposal or contract).

INPUT

- • 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.

- • UPS   Uninterruptable Power Source.

     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-123 Internal Control Systems.

INPUT

- A-127 Financial Management Systems.

- 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.

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 Policy and Procedures for the Management and Control of High-Order Languages and Mandate for Use of Ada Language for all DoD Mission-Critical Applications.

- DD-5000.35 Defense Acquisition Regulatory Systems.

- DD-5200.1 DoD Information Secutity Program.

- DD-5200.28 Security Requirements for Automatic Data Processing (ADP) Systems.

D-2

INPUT

- 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 Systems (AIS).

- DD-7920.2   Major Automated Information Systems Approval Process.

- DD-7935   Automated Data Systems (ADS) Documentation.

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.

D-3

INPUT

- EIA RS-464   EIA PBX Standards.

- EIA RS-465   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 64.

- 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.

- 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).

INPUT
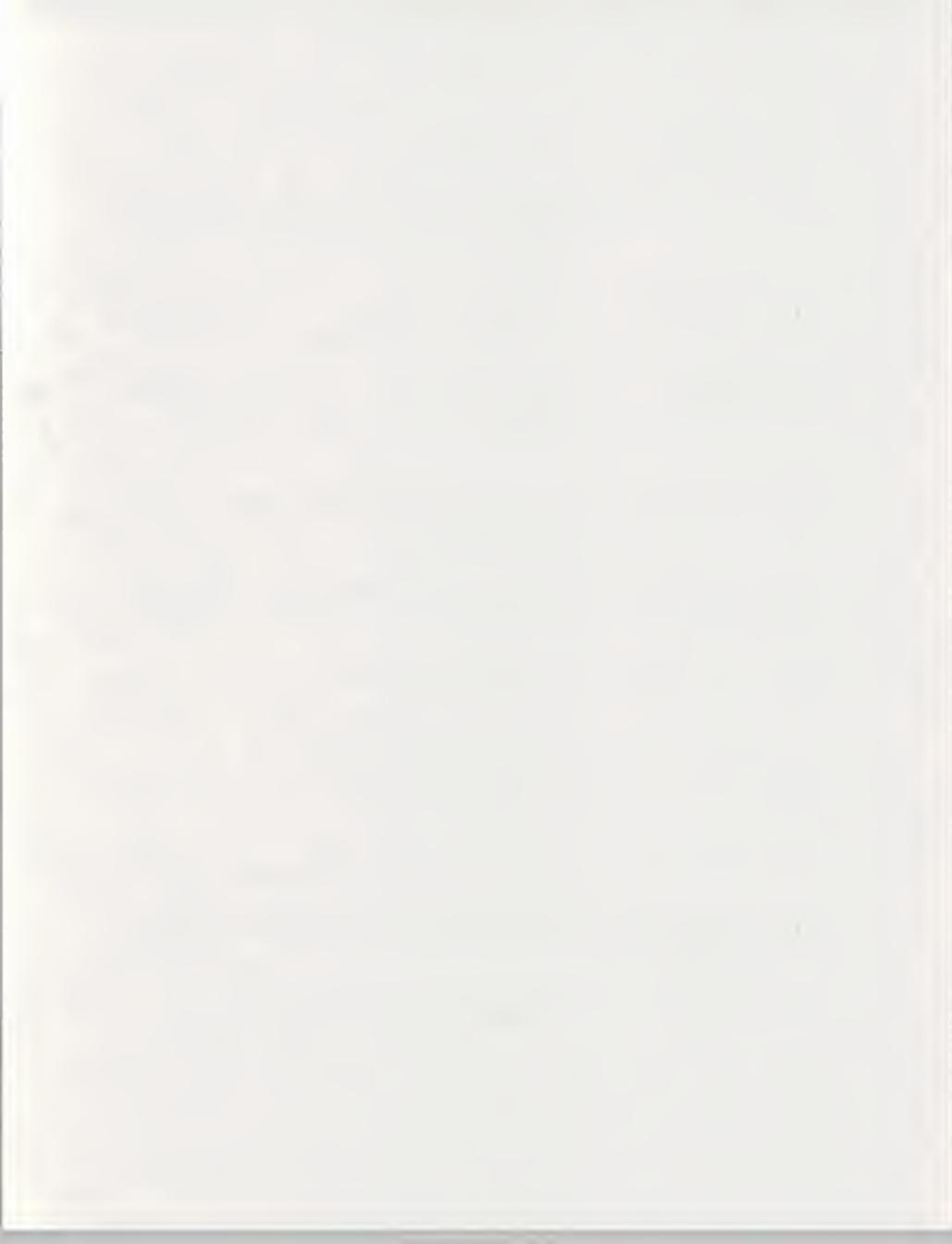
- FIPS 81   DES Modes of Operation.

- 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-1750A   Embedded System Microchip Architecture Specification.

- MII-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).

INPUT

- MIL-STD-1782   TELNET - Virtual Terminal Protocol.

- MIL-STD-1815A   Standard for the Ada Programming Language, February 1983.

- X-21   CCITT 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).

INPUT

APPENDIX E: RELATED INPUT REPORTS

A. ANNUAL MARKET ANALYSES

- U.S. Information Services Vertical Markets, 1986.

- U.S. Information Services Cross-Industry Markets, 1986.

- Procurement Analysis Reports, GFY 1985-1989.

B. INDUSTRY SURVEYS

- U.S. Information Services Industry, 1986.

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

- Seventeenth Annual ADAPSO Survey of the Computer Services Industry - 1983.

- Directory of Leading U.S. Information Services Vendors - 1983.

INPUT

C. PROFESSIONAL SERVICE MARKET REPORTS

- U.S. Professional Services Market, 1986-1991.

- Federal Office Information Systems Market, 1986-1991.

- Federal Systems Integration Market, 1986-1991.

- Departmental Systems and Software Directions, 1986.

- IBM Operating Systems Strategies, 1986.

- Federal ADP Facilities Management Market, 1985-1990.

- Federal Government Professional Services market, 1985-1990.

- Applications Software Development Tools, 1985.

- Data Base Management Systems Markets, 1985.

- Fourth Generation Languages Markets, 1985.

- Information Services Markets in Artificial Intelligence, 1985.

- New Generation of Integrated Software, 1985.

- Professional Services Market Directions, 1985.

- Analysis of Prototyping, 1985.

- Artificial Intelligence, 1985.

INPUT

PROFESSIONAL SERVICES - AGENCY QUESTIONNAIRE

For the purposes of this survey, we have defined "PROFESSIONAL SERVICES" - "for ADP" as follows.

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

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

<u>OPERATION AND MAINTENANCE</u> - (Also referred to as O&M) - Contractor (vendor) - staffed support of client ADP/telecommunications equipment on-site (on government property), in cases where the vendor does not manage the complete facility and the equipment and initial software suite may not have been provided by the vendor.

<u>MAINTENANCE (HARDWARE AND/OR SOFTWARE)</u> - Vendor-furnished services provided after installation and acceptance by the user. These services may be part or a warranty or may be separately contracted; services may be provided by resident or on-call personnel of the vendor.

<u>PROGRAMMING AND ANALYSIS</u> - Including system design, contract or custom programming, code conversion, independent verification and validation (also called "IV&V"), benchmarking.

<u>SYSTEMS INTEGRATION</u> - Services associated with systems design, integration of computing components, installation and government acceptance of ADP/telecommunications systems under projects called SE&I or SETA. Integration services may be provided with related engineering activities (such as SE&I (Systems Engineering and Integration) or SETA (Systems Engineering and Technical Assistance).

1) Have you used any of the following professional services categories within the past year? Proposed future use?

	YES	NO	FUTURE YES	FUTURE NO	WHY
Consulting	___	___	_____	_____	_____
Education/Training	___	___	_____	_____	_____
Hardware Maintenance	___	___	_____	_____	_____
Software Maintenance	___	___	_____	_____	_____
Programming and Analysis	___	___	_____	_____	_____
Systems Integration	___	___	_____	_____	_____
Operation and Maintenance	___	___	_____	_____	_____

2) What percent of your total professional services budget is currently spent on each of following categories?

	% SPENT NOW
Consulting	_____
Education/Training	_____
Hardware Maintenance	_____
Software Maintenance	_____
Programming and Analysis	_____
Systems Integration	_____
Operations and Maintenance	_____
Other	_____
TOTAL	_____

3) What is your annual expenditure for professional services?

_____

INPUT

4) Do you anticipate any change in the amount of professional services you will use in the next two to five years?

YES _____   NO _____

(If Yes, proceed to question 4a) (If no, proceed to question 5)

4a) In which of the following categories do you expect either an Increase or decrease In the next two to five years, and can you estimate by what percent?

	INCREASE	DECREASE	NO CHANGE	% CHANGE
Consulting	_____	_____	_____	_____
Education/ Training	_____	_____	_____	_____
Hardware Maintenance	_____	_____	_____	_____
Software Maintenance	_____	_____	_____	_____
Programming and Analysis	_____	_____	_____	_____
Systems Integration	_____	_____	_____	_____
Operations and Maintenance	_____	_____	_____	_____

5) What types of applications have been contracted out to professional services vendors in the past year?

_____

_____

_____

5a) What additional applications do you foresee in the next five years?

_____

_____

_____

INPUT

6) In your opinion, is your agency going to continue to utilize custom software in its computer operations? (software development).
YES _____   NO _____

a. How many of these applications are equivalent to commercial software applications and could be accomplished by minor modifications to a commercial software package?

b. How many custom software applications are unique to the government agency only and do not have a commercial equivalent available for use?

Is your agency using or planning to use commercial or customized Data Base Management Systems (DBMS)?
YES _____   NO _____

For what types of applications? _____

7) Which computer language standards are in effect now or might be applied in the future to your agency's use of professional services?
Instructions: For each standard use by agency, give which professional services it is used for and whether it is used currently or for the future.

LANG. STANDARD	PROF. SERVICE APPLICATIONS	CURRENT USE	FUTURE USE
1. _____			
2. _____			
3. _____			

8) What types of education and training requirements does your agency have? _____
_____
_____

8a) Have they increased or decreased over the last five years?

_____ INCREASE   _____ DECREASE

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INPUT

8b) Will they increase _____, decrease _____, or stay about the same _____ over the next five years?

8c) Where will the funding be obtained or diverted to for supporting these educational requirements? _____

_____

9) How would you rank the importance of the following professional services vendor characteristics in winning a bid.

    1 - Definitely not important
    2 - Somewhat important
    3 - Important
    4 - Very Important
    5 - Crucial

CHARACTERISTICS		RANK				
1)	Application Functional Expeerience	1	2	3	4	5
2)	Integration Experience	1	2	3	4	5
3)	Staff Experience	1	2	3	4	5
4)	Hardware Experience	1	2	3	4	5
5)	Software Development Experience	1	2	3	4	5
6)	Support Functions	1	2	3	4	5
7)	Federal Contract Experience	1	2	3	4	5
8)	Agency Experience	1	2	3	4	5
9)	Price	1	2	3	4	5
10)	Other	1	2	3	4	5

10) On a scale of 1 to 5, with 5 being the most satisfied, how would you rank your level of satisfaction with professional services vendors in the past regarding:

INPUT

	CHARACTERISTICS	RANKINGS
a.	Quality of Work	1 2 3 4 5
b.	Quantity of Work	1 2 3 4 5
c.	Responsiveness of Agency Needs	1 2 3 4 5
d.	Project Management	1 2 3 4 5
e.	Development Visibility	1 2 3 4 5
f.	Delivery Schedule(s)	1 2 3 4 5
g.	Cost	1 2 3 4 5

11) What type of contract does your agency prefer for professional services?

_____ Cost Plus   _____ Fixed Price

_____ Mix of Both   _____ Other (Specify)

12) When a professional services contract for design, programming and analysis is completed, do you usually transfer continued support in-house or leave support with the contractor?

In-House _____   Out of House _____

13) Do you plan to convert any professional services contracts to in-house?

YES _____   NO _____

13a) Why? _____

_____

14) Do you plan to convert any in-house support functions to outside contractor support?

YES _____   NO _____

14a) Why? _____

_____

14b) Which applications? _____

INPUT

15) **Could you identify those factors (non-technical) that would have the greatest Impact on your agency's professional services plans?**

_____

_____

_____

16) **What technological changes might alter the way your agency accomplishes its professional services plans?**

_____

_____

_____

17) **What would you like to see vendors do in the next two to five years to make their services more valuable?** _____
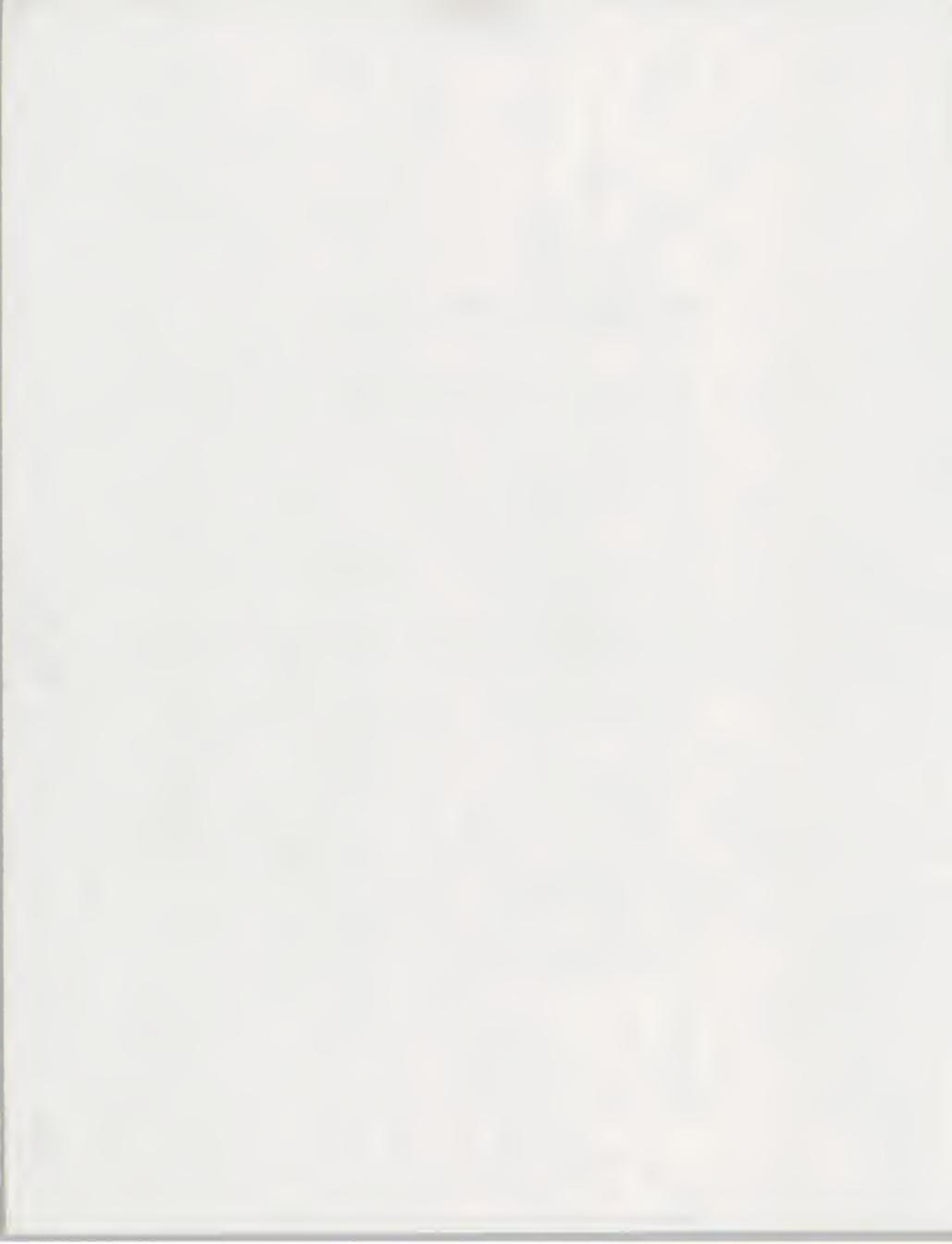
_____

_____

18) **Which type of vendor or organization appears more desirable for performing professional services?**

_____ **Mainframe Manufacturer**

_____ **Systems House (Non-Hardware)**

_____ **Not-for-Profit**

_____ **Software Manufacturer**

_____ **Other (specify)**

18a) **Why?** _____

_____

INPUT

PROFESSIONAL SERVICES - INDUSTRY QUESTIONNAIRE

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<u>OPERATION AND MAINTENANCE</u> - (Also referred to as O&M) - Contractor (vendor) - staffed support of client ADP/telecommunications equipment on-site (on government property), in cases where the vendor does not manage the complete facility and the equipment and initial software suite may not have been provided by the vendor.

<u>MAINTENANCE (HARDWARE AND/OR SOFTWARE)</u> - Vendor-furnished services provided after installation and acceptance by the user. These services may be part of a warranty or may be separately contracted; services may be provided by resident or on-call personnel of the vendor.

<u>PROGRAMMING AND ANALYSIS</u> - Including system design, contract or custom programming, code conversion, independent verification and validation (also called "IV&V"), benchmarking.

<u>SYSTEMS INTEGRATION</u> - Services associated with systems design, integration of computer components, installation and government acceptance of ADP/telecommunications systems under projects called SE&I or SETA. Integration services may be provided with related engineering activities (such as SE&I (Systems Engineering and Integration) or SETA (Systems Engineering and Technical Assistance).

INPUT

1a) **Does your company now provide or plan to provide professional services to the federal government?**

YES _____   NO _____

(If No, close Interview)

1b) **What types of systems or services do you now provide or plan to provide? (If Yes, go to 1b)**

	YES	NO	FUTURE YES	FUTURE NO	WHY
Consulting	___	___	___	___	_____
Education/Training	___	___	___	___	_____
Hardware Maintenance	___	___	___	___	_____
Software Maintenance	___	___	___	___	_____
Programming and Analysis	___	___	___	___	_____
Systems Integration	___	___	___	___	_____
Operation and Maintenance	___	___	___	___	_____

2) **What percent of your total professional services business was done with the federal government last year?** _____

3) **What percent of your federal professional services revenue was generated in each of these categories last year.**

	% Spent Last Year
Consulting	_____
Education/Training	_____
Hardware Maintenance	_____
Software Maintenance	_____

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INPUT

Programming and Analysis _____

Systems Integration _____

Operations and Maintenance _____

Other _____

3a) **What was your company's total professional services revenue in dollars last fiscal year — both commercial and government?** _____

3b) **According to your company's total professional services revenues, do you rank your company within the top 10 professional services vendors serving the federal market?**

    YES _____   NO _____

3c) **What is your approximate rank?** _____

3d) **What was your company's total corporate revenue in dollars for your most recent fiscal year?** $ _____   FY _____

4) **Do you anticipate any change in the amount of professional services you will provide to the federal government in the next two to five years?**

    YES _____   NO _____

4a) **(If Yes)**

    In which of the following categories do you expect either an increase or decrease in the next two to five years, and can you estimate by what percent? This is federal government only.

	INCREASE	DECREASE	NO CHANGE	% CHANGE
Consulting	_____	_____	_____	_____
Education/ Training	_____	_____	_____	_____
Hardware Maintenance	_____	_____	_____	_____
Software Maintenance	_____	_____	_____	_____

INPUT

Programming and
Analysis _____ _____ _____ _____

Systems
Integration _____ _____ _____ _____

Operations and
Maintenance _____ _____ _____ _____

5) In your opinion, what technical factors will increase or decrease federal
government spending on professional services in the next two to five
years?

_____

_____

6) How would you rank the importance of following professional services
vendor characteristics in winning a bid?

1 - Definitely not important
2 - Somewhat important
3 - Important
4 - Very important
5 - Crucial

CHARACTERISTICS	RANK
1) Application Functional Experience	1 2 3 4 5
2) Integration Experience	1 2 3 4 5
3) Staff Experience	1 2 3 4 5
4) Hardware Experience	1 2 3 4 5
5) Software Development Experience	1 2 3 4 5
6) Support Functions	1 2 3 4 5
7) Federal Contract Experience	1 2 3 4 5
8) Agency Experience	1 2 3 4 5
9) Price	1 2 3 4 5
10) Other _____	1 2 3 4 5

INPUT

7) Are you now qualified or do you plan to become qualified in Ada programming? Qualified Now _____ Planning To Be _____

8) In your opinion, which agencies provide the most attractive opportunities for your company in providing professional services services to the government?

_____

_____

9) What differences do you see between commercial markets and the federal market for your products and services?

_____

_____

10) On a scale of 1 to 5 with 5 being the most satisfied, how would you rank the government's level of satisfaction with professional services vendors in the past regarding:

CHARACTERISTIC	RANK
a. Quality of Work	1 2 3 4 5
b. Quantity of Work	1 2 3 4 5
c. Responsiveness of Agency Needs	1 2 3 4 5
d. Project Management	1 2 3 4 5
e. Development Visibility	1 2 3 4 5
f. Delivery Schedule(s)	1 2 3 4 5
g. Cost	1 2 3 4 5

11) What type of contract does your company prefer for professional services category you provide:

Cost Plus _____   Fixed Price _____

Mix of Both _____   Other (Specify) _____

INPUT

12) **Which of your company's professional services or product capabilities do you think agencies find most attractive?**

_____

_____

13) **When you complete a professional services contract with the government for design, programming, and analysis is follow-on support usually transferred in-house or left with you or another vendor?**

In-House _____

Out-of-house Self _____

Out-of-house Other _____

14) **Have you ever lost any professional services contracts to government in-house staffs? YES _____ NO _____**

14a) **Why?** _____

_____

14b) **What types of applications?** _____

_____

15) **Have you ever acquired a contract for support functions which were previously done in-house by the government?**

YES_____ NO _____

16) **Could you identify those non-technical factors that would have the greatest impact on government professional services acquisitions?**

_____

_____

17) **What do you believe vendors need to do over the next five years to make their products and professional services more valuable to the federal government?**

_____

_____

_____

INPUT