

FEDERAL EQUIPMENT MAINTENANCE MARKET
1990 - 1995

INPUT

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**Federal Information Systems and Service
Program**

***Federal Equipment Maintenance Market,
1990-1995***

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Abstract

INPUT expects the federal government's market demand for computer equipment maintenance to grow from \$1.9 billion in FY 1990 to \$3.6 billion in FY 1995. This represents a compound annual growth rate of 13%. Maintenance of midsize systems will continue to dominate this market, reflecting the continuing robust federal market for midsize systems.

The report, titled *Federal Computer Equipment Maintenance Market, 1990-1995*, identifies and analyzes the forces influencing this market, including continuing budget constraints and federal emphasis on competition. INPUT divides the market into four categories: maintenance of large, midsize, and small systems, as well as ancillary services, including maintenance training and installation planning.



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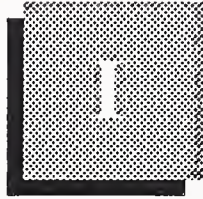
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Introduction

The Federal Equipment Maintenance Market, 1990-1995 is a new report on maintenance contracting trends emerging in the federal marketplace. The report was prepared in response to continuing client interest in this changing market. The report identifies market issues and trends that affect OEM and TPM vendors present in or entering the market through FY 1995. Insight into agency requirements and perceptions, and contractor guidance, are offered to help vendors plan their strategies to compete for federal maintenance contracts.

This report was prepared as part of INPUT's Federal Information Systems and Services Program (FISSP). Reports issued through this program are designed to assist INPUT's U.S. industrial clients in planning how to satisfy future federal government needs for computer-based information systems and services. The report's findings are based on research and analysis of several sources, including:

- INPUT's Procurement Analysis Reports (PARs)
- OMB/GSA/NBS Five-Year Information Technology Plans for 1990-1995
- Interviews with leading OEM and TPM vendors
- Federal agency GFY 1990 and GFY 1991 Information Technology Budgets

A**Scope**

The period covered in the report is GFY 1990 through 1995. Vendor interviewees were selected because they were identified as contractors of record for existing computer maintenance contracts or were listed as OEM or TPM vendors in INPUT's Vendor Analysis and Planning Service data base for 1989.

For the purposes of this study, INPUT defines computer equipment maintenance as including the following categories of vendor products and services:

- Large Systems
- Midrange Systems
- PCs/Workstations
- Ancillary Services

This report supplements INPUT's previous reports on computer hardware and professional services. It is intended to give INPUT's clients a description of the current status and future trends of the federal market for computer equipment maintenance. It also identifies the key vendors in the market, a subject of continuing interest to INPUT clients.

B**Methodology**

In developing this report, INPUT used a variety of sources and methods. First, agency long-range plans and budget submissions for GFY 1990-1995 for major program recompetes and new acquisitions were studied. Based on this research, INPUT pinpointed agencies and programs that related to computer equipment maintenance.

INPUT also reviewed the Procurement Analysis Reports (PARs) to develop further insights on agency activities. Many PARs cover programs that, for one reason or another, do not appear in the agency budget submissions. This situation yields possibilities for further research.

Separate questionnaires were developed for agency officials and vendor respondents (see Appendixes F & G).

- The agency questionnaire was designed to acquire information about current experience and plans for future use of computer equipment maintenance.
- The vendor questionnaire was designed to acquire information on industry status and further federal market plans.

Often the same or similar questions were asked of both groups of respondents for comparative analysis. Federal agency officials selected for interview included:

- Agency executives at the policy level
- Program managers
- System users

Industry representatives selected for interview in this report included:

- Marketing executives
- Corporate executives
- Project/Program managers of specific maintenance contracts

The current versions of the Federal Information Resource Management Regulations, Federal Acquisition Regulations, Defense Acquisition Regulation (changes to FAR), and GSA Schedule policy were investigated to identify changes that will impact maintenance service contracts and/or contract performance. OMB Federal Contract Reporting Center data for GFY 1989 were reviewed to identify contract sizes, duration, modification trends, and vendor market shares.

C

Report Organization

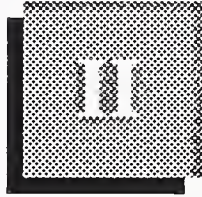
In addition to the introduction and appendixes, this report consists of five chapters:

- Chapter II contains an executive overview describing the major points and findings in the report.
- Chapter III provides the market forecast and describes the major market issues and trends impacting the industry.
- Chapter IV summarizes the federal agencies' requirements for computer equipment maintenance and future planned acquisitions.
- Chapter V presents vendors' perspectives on the federal computer equipment maintenance market.
- Chapter VI provides a sample of business opportunities for programs and initiatives in the federal market involving computer equipment maintenance.

Several appendixes are also provided:

- Interview Profiles
- Definitions
- Glossary of Federal Acronyms
- Policies, Regulations, and Standards
- Related INPUT Reports
- Questionnaires

Following the appendixes is a description of INPUT and its programs and services.



Executive Overview

A

Federal Market Pressures

The federal market for computer equipment maintenance is expected to continue growing over the next five years. Some of the pressures driving this growth are listed in Exhibit II-1. Government programs require highly reliable, maintainable computer systems in order to provide the necessary level of information technology support.

EXHIBIT II-1

Federal Market Pressures

- Budget constraints
- Computer equipment obsolescence
- Federal emphasis on competition
- Mixed installations
- Widespread microcomputer penetration

As with most other federal market areas, budget constraints are driving computer equipment maintenance. In this case, the constraints are exerting conflicting pressures:

- On the one hand, agencies are, by necessity, becoming very price-sensitive on maintenance buys. This is driving down vendor margins and, in some cases, service quality.

- On the other hand, equipment procurements are being postponed, as agencies respond to budget constraints by making do with older equipment. As this equipment becomes obsolete, maintenance costs go up, thus increasing the revenues for maintenance providers.

Federal emphasis on competition is also driving up computer obsolescence, and with it maintenance revenues. Within the last few years, virtually every major federal IS procurement has been delayed by protest. These delays have forced agencies to continue using old equipment long after it should have been replaced. This again drives up maintenance spending.

As with budget constraints, however, federal emphasis on competition is also exerting negative pressure on the market. Since competition for most maintenance contracts is widespread, margins are further driven down, making it more difficult to realize reasonable profits.

Federal emphasis on competition also results in a high level of mixed installations, which are far more common in the federal government than in the private sector. Thus, maintenance providers, including OEMs, must show a high degree of willingness to support other brands of equipment.

Finally, widespread microcomputer penetration has caused the downsizing of many applications by federal agencies. Some functions formerly performed on midsize and even large-scale systems are now being performed on high-end microcomputers and workstations, which typically have low maintenance costs.

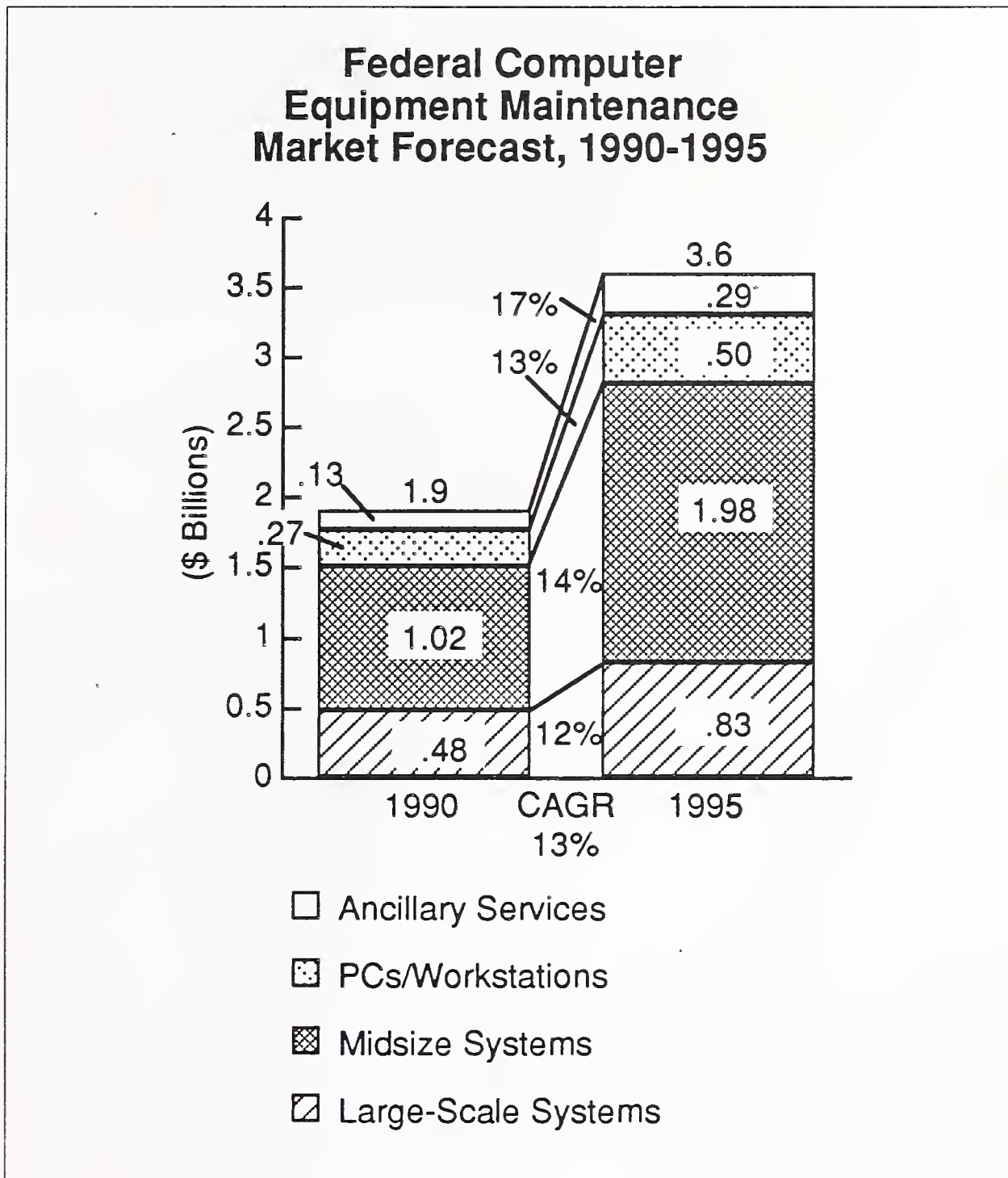
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Market Forecast

INPUT estimates that the federal computer equipment maintenance market will increase from \$1.9 billion in FY 1990 to \$3.6 billion in FY 1995, at a compound annual growth rate (CAGR) of 13%. Exhibit II-2 gives a breakdown of the market into four subordinate areas. These submarkets correspond to the commercial market areas discussed in INPUT's Customer Services Program (CSP) reports.

As noted in the exhibit, INPUT expects maintenance of midsize systems to dominate this market over the five-year period. This results in part from the surprisingly large number of acquisitions of midsize systems reported in INPUT's Procurement Analysis Report (PAR) data base. After these acquisitions are completed, agencies will be spending more to maintain these systems.

EXHIBIT II-2



Ancillary services include:

- Maintenance training
- Preinstallation planning and consulting
- Installation and deinstallation
- Network design and planning

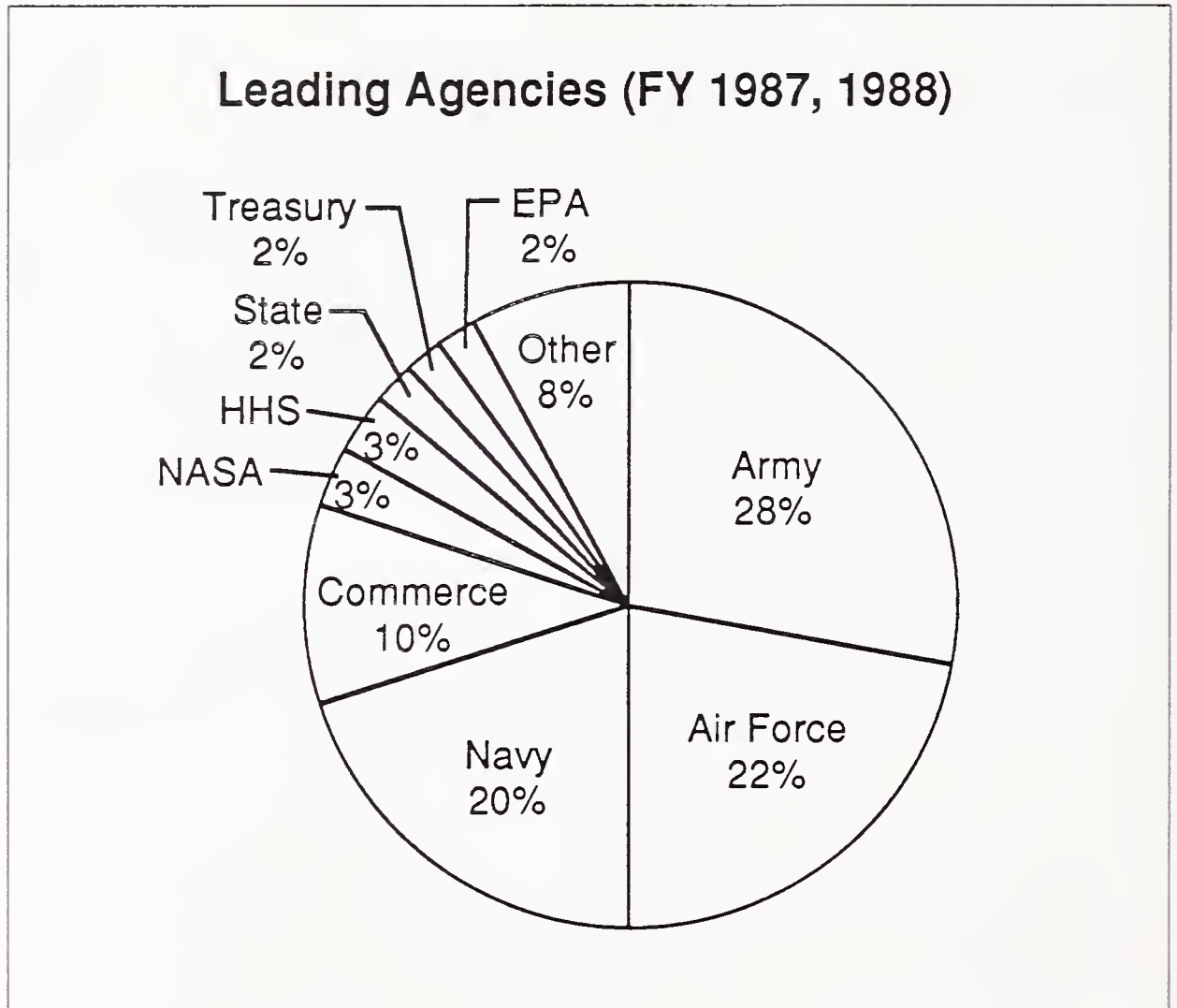
Although the smallest of the four components, ancillary services show the fastest growth rate. This rate will be driven by expected increased activities in this category, especially in the area of network design and planning.

C

Leading Agency Customers

Exhibit II-3 lists agencies that obligated the highest expenditures to equipment maintenance. The Department of Defense expended 83% of the funds obligated under the category of computer equipment maintenance. However, the exhibit understates the market share of NASA (listed at 3%) and Energy (not listed in the exhibit). These two agencies acquire most of their maintenance through systems operations contractors, and do not contract separately for maintenance.

EXHIBIT II-3



In terms of maintenance contracts available as prime vehicles, the exhibit gives a good representation of the available opportunities. Despite DoD budget cuts, INPUT expects the military services to continue as the leading source of new business for the vendor community.

D

Contractor Selection Criteria

Source evaluation and selection procedures complicate the marketplace for federal computer equipment maintenance. Agencies evaluate maintenance proposals in a variety of ways, leading to some confusion on the part of the vendors. Exhibit II-4 compares vendor ranking and agency ranking of contractor selection criteria.

EXHIBIT II-4

Relative Importance of Contractor Selection Criteria

Selection Criteria	Agency Ranking	Vendor Ranking
Performance	1	2
Cost	2	1
Vendor Reputation	3	4
Cost Control Procedures	4	3
Proposed Technical Solution	5	5
Contract Type	6	6

The main difference is that the agency respondents put greater emphasis on performance. It should be remembered, however, that most agency responses came from program managers and technical personnel, rather than contracting officers. Most contracting officers show great reluctance to make awards to any but the lowest bidder, especially if the difference in bid prices is significant.

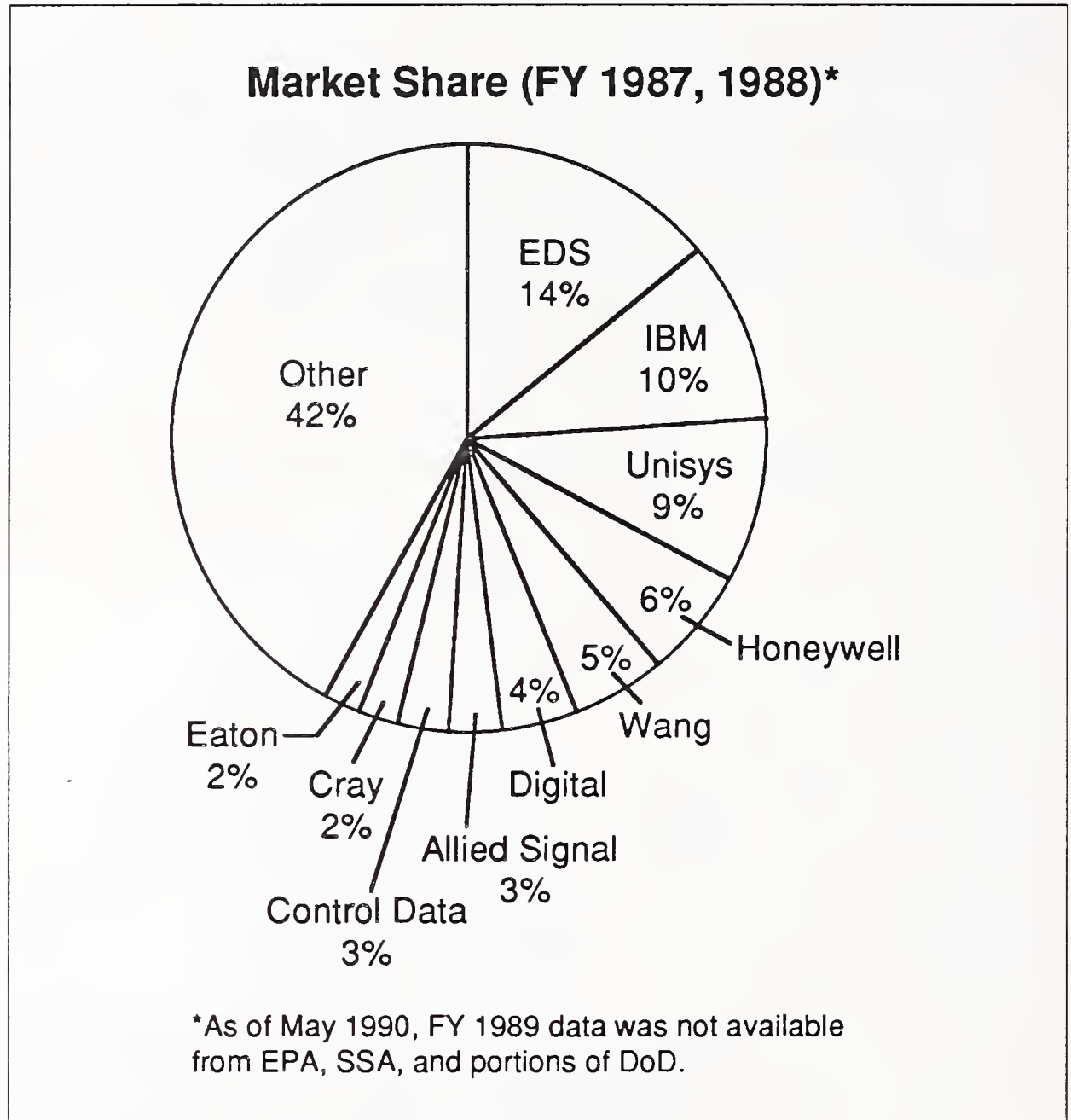
E

Leading Vendors

Exhibit II-5 lists the leading vendors in the federal computer equipment maintenance market. This is based on contract obligations in FY 1987 and FY 1988 combined, since, at this writing, complete FY 1989 data is not yet available.

EDS' dominant position reflects the tendency among many agencies, especially the Army, to report operations and maintenance activities under the maintenance category. For the most part, the remaining maintenance providers represent hardware suppliers. TPM vendors are omitted from the list, in part because much of their business comes through subcontracting arrangements. Further, many OEMs have begun functioning as TPMs through cross-servicing arrangements.

EXHIBIT II-5

**F****Competitive Outlook**

The competitive arena for the federal computer equipment maintenance market will be affected by trends specific to the federal and commercial markets through FY 1995, as shown in Exhibit II-6.

Technology advances are enabling the development of higher-capacity midrange machines at lower prices that compete with traditional mainframes. Conversely, technology advances will also be changing the microcomputer market. The growth of 386 and 486 chip technology will adversely affect the lower range of midsize computer systems as well as allow for downsizing of some applications from large systems. These shifts in computer hardware requirements will translate into changing needs for maintenance services. Newer equipment also requires less of a maintenance commitment.

EXHIBIT II-6

Competitive Factors

- Technology advances in computer hardware
- Federal ADP modernization efforts
- Industry merger and acquisitions
- Resurgence of OEM interest

Improvements in technology also coincide with the federal government's information technology modernization efforts. In short, the federal marketplace is buying systems to update existing automated functions, and to automate many functions that were previously done manually. This trend will increase opportunities for computer equipment maintenance in some government operations areas.

The current major vendors in the computer maintenance market will also experience increased competition from newly reorganized companies that were the result of mergers or acquisitions. Many companies are now stronger competitors due to their purchase of a company with an existing strong federal client base. This trend may continue over the next few years.

OEM vendors have newly recognized the value of this market and, as a result, are adopting a more flexible attitude toward mixed federal installations. In some cases, the OEM vendors are functioning like TPMs, maintaining the equipment of other vendors.

G**Recommendations**

In penetrating the federal market for computer equipment maintenance, vendors need to control costs. Extensive cost-cutting makes it very difficult to increase market penetration. Some companies, in an effort to increase market share, are bidding the work at or below cost, sometimes with unqualified personnel. They hope to regain profitability through contract modifications and extensions. However, without superior cost control, vendors have little chance to improve. Exhibit II-7 lists other recommendations that would improve vendors' positioning in this market and help control their costs.

Increasing their business through expansion of contracted services also enables vendors to control costs by spreading the fixed costs over a larger contract base. From the beginning of an agency contract, vendors must look for ways to encourage their customers to increase the contracted maintenance services.

Similarly, as with most other federal market segments, vendors need to invest more effort in understanding the agency's mission and its information resource requirements. This knowledge will enable vendors to develop appropriate maintenance solutions, rather than mis-sizing and misconfiguring their bids.

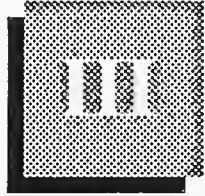
Because agencies have become dependent on their computer systems, companies in this market need to develop and maintain positive reputations. This is accomplished by providing technically and economically feasible services. This strategy will serve to enhance the industry's image with agency officials. Vendors are especially damaged when the hardware maintenance fails to perform as advertised. Such failures seriously hurt the vendor's credibility.

Finally, federal equipment maintenance vendors should establish strategic alliances to allow them to participate in more complex federal systems. Many systems integration (SI) projects include maintenance requirements that can be met through combining capabilities with other companies. If vendors subcontract to well-established prime contractors, they may capture more business. This in turn will enable them to participate in still larger maintenance projects.

EXHIBIT II-7

Recommendations

- Increase cost control procedures
- Expand contract usage
- Improve familiarity with system requirements
- Maintain positive reputation
- Establish strategic alliances



Market Analysis and Forecast

This chapter outlines the market structure and provides the market forecast. In addition, it describes the major market issues and trends impacting the industry.

A

Current Market Conditions

Despite the growing reliability of computer equipment, most federal agencies continue to increase spending on maintenance.

This continuing expansion of the federal computer equipment maintenance market, particularly of the TPM segment, results from several factors, summarized in Exhibit III-1:

EXHIBIT III-1

Market Influences

- Influence of TPM vendors
- Federal emphasis on competition
- Third-party distribution channels
- Mixed installations
- Increased use of computers
- Widespread microcomputer penetration

- The ability of TPM vendors to demonstrate the availability and benefits of an alternate source of service
- Federal regulatory emphasis on competition in awarding maintenance contracts
- Increasing use by equipment vendors of third-party distribution channels such as dealers, distributors and VARs. In many cases, this pattern has resulted in products sold through third-party channels being serviced and supported by the dealer or distributor.
- The increasing trend of acquiring computer systems from more than one equipment vendor on a user site. TPM companies have been joined by equipment vendors in providing multivendor or single-source service, a requirement driven by user needs. Mixed installations are especially common in federal agencies because of competitive pressures.
- Agencies are using computer systems across a wider spectrum of applications. A consequence of this trend is that computer systems are no longer the prerogative of sophisticated users. Computer systems are now embedded in virtually every facet of government operations.
- The introduction of large volumes of PC-based systems and products created opportunities for TPM companies and dealers. Because the equipment vendors are not as well positioned to service high volumes of low-cost systems, TPM companies and dealers have focused on PC systems.

Maintenance by TPM vendors also owes its high rate of growth over the last decade to user demand for:

- Cost savings
- Single-source maintenance
- Flexibility

Companies specializing in the provision of maintenance offer various economies. As these companies increase in size and capability, so do the range of products maintained and the services provided. Characteristic of TPMs is their rapid adaptability to user needs—unlike manufacturers that, because of size and structure, are less able to react as quickly.

TPM companies and equipment vendors alike have come under pressure as technology and the economies of scale reduce hardware costs and hence maintenance revenues. This pressure is given an added twist by intense price competition at federal agencies.

B**Market Structure**

For the purposes of this study, INPUT divided the federal computer equipment maintenance market into the following categories of vendor products and services:

- Large systems
- Midrange systems
- PCs/Workstations
- Ancillary services

The large systems segment includes traditional mainframes, minisupercomputers, and supercomputers that have typical word lengths of 32 bits and configuration prices in excess of \$350,000. Examples of such systems include IBM 303X, 308X, and 309X, and computer systems that compete with these products, including systems from Hitachi, Amdahl, NCR, Unisys, CDC and Bull. A smaller segment of this market is held by supercomputer manufacturers (typical configuration prices exceeding \$1 million), led by Cray Research.

Midrange systems describes superminicomputers and the more traditional business minicomputers. Due to steadily improving design and technology, the latter have outgrown traditional definitions (which defined small systems as providing 16-bit to 32-bit word lengths at prices ranging from \$15,000 to \$350,000). Increasingly, minicomputers and workstations meet the 32-bit definition, and many go beneath the \$15,000 lower price limit. Typical midrange systems include IBM System 3X, 43XX, AS/400, and 937X product lines, DEC PDP and VAX families (excluding MicroVAX families), and competitive products from a wide range of vendors, including HP, Data General, Wang, AT&T, Prime, Concurrent, Gould, Unisys, NCR, Bull, Harris, Tandem, Stratus, and many others.

Technological advances have also contributed to the PC/workstation market segment. This segment contains business-use microcomputers, supermicrocomputers, and technical workstations that traditionally are defined as 16- to 32-bit word lengths (again, advances have stretched these boundaries) and system prices that typically fall below \$15,000. Leading products in the traditional microcomputer segment include IBM's PC family (including the PS/2 line), Apple Macintosh, and systems from Compaq, Tandy, and at least 200 "name" and "no-name" IBM PC clone manufacturers. The most interesting end of this market, the supermicrocomputer and technical workstation markets, are best represented by products from Apollo (now a unit of Hewlett-Packard), Sun, Altos, DEC (the MicroVAX), and, to some extent, IBM (some see the extension of the PS/2 line into this market).

Ancillary services consist of maintenance training, preinstallation planning, consulting, installation/deinstallation, and network design and planning. Ancillary services apply to all sizes of computer systems.

These categories of maintenance services are combined in this report because:

- Together they cover all contracted computer equipment maintenance, a significant activity in the federal market.
- Most companies active in one service area (in the federal market at least) are also active in the other areas.
- Agency decisions to contract in these categories usually arise from the same set of circumstances and reflect the same internal and external pressures.

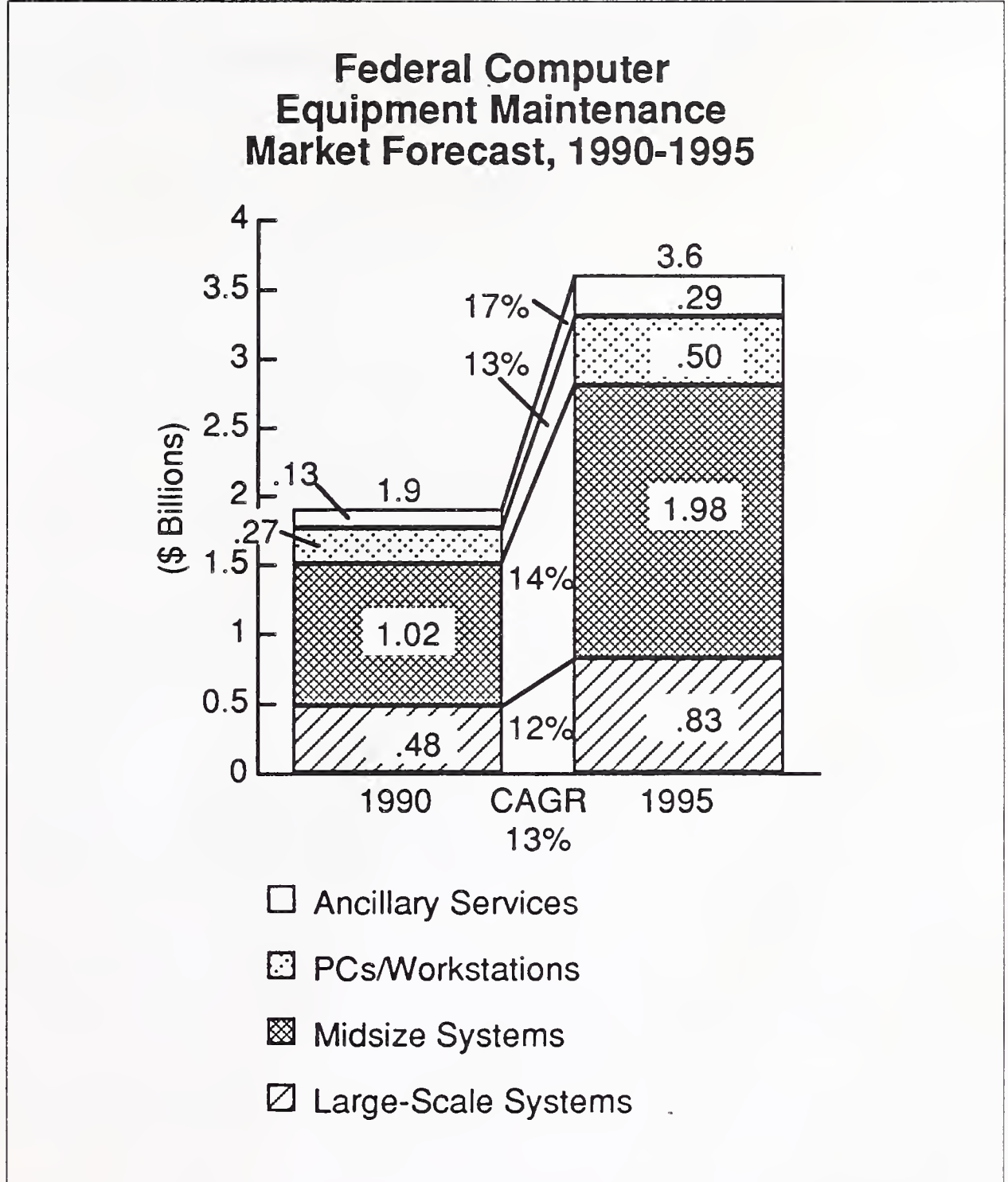
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Market Forecast

INPUT estimates that the federal computer equipment maintenance market will grow from \$1.9 billion in FY 1990 to \$3.6 billion by 1995, at a compound annual growth rate of 13%. Exhibit III-2 displays components of the market in four subordinate areas.

As noted in the exhibit, INPUT expects the smallest component—ancillary services—to experience the highest growth rate. This reflects the increased activity in this subcategory, especially in the area of network design and planning. The growth in midsize systems reflects the surprising viability of midsize purchases in the federal market. Despite suggestions by other analysts that this market is diminishing, INPUT found that midsize systems are taking a large share of the federal market. In fact, INPUT's Procurement Analysis Report (PAR) index shows more than 100 major acquisitions involving midsize systems.

EXHIBIT III-2



D

Federal Market Issues

During the two most recent administrations, presidential task forces investigated the problems and technological status of the federal government's information processing resources. Findings are shown in Exhibit III-3. The investigation showed significant shortcomings:

- The government has not taken full advantage of the technological advances of the private sector.
- A substantial amount of the ADP inventory was already obsolete or rapidly becoming so, driving up maintenance costs considerably.
- Federal executives have not managed ADP resources effectively.

EXHIBIT III-3

**Federal Information
Processing Weaknesses**

- Slow to adopt new technology
- Obsolete computer system inventory
- Ineffective management
- Inadequately trained personnel
- Insufficient information processing for public needs

- Federal personnel were not adequately trained in the use of information technology.
- Major initiatives were urgently needed to bring federal information management to the level needed for regulation, taxes, security, and services to the public.

Systems acquisitions in the second half of the 1980s addressed needed improvements in management, administration, human resources, and logistics functions that had not received newer data processing resources in more than a decade. These developments have been reflected in the focus on hardware-related maintenance procurements. Past omissions lead to current problems. Congress urgently needs more precise and timely data for the legislative process. Administrative decisions require complete data on domestic issues and regulatory affairs in order to satisfy congressional mandates. It is also necessary that these systems receive the appropriate level of maintenance.

1. Historical Perspective

The federal computer equipment maintenance market is not affected by as many federal policies and regulations as other types of procurements. However, agencies and vendors must still understand the rules in order to function effectively. Earlier, federal ADP and telecommunications systems were procured and managed for more than two decades by the FPRs, FPMRs, and ASPRs. ADPE and services procurements were modified by the 1966 Brooks Act and subsequent amendments.

The Paperwork Reduction Act of 1980 included a number of provisions concerning information resource management and system acquisition.

The Act:

- Created the post of Information Resources Management senior official in each department and major agency.
- Placed all but sensitive and mission-essential ADP under a new “mini-Brooks Bill.”
- Provided a separate approval procedure for national security and defense mission ADP.
- Authorized annual preparation and publication of a Federal Agency Five-Year Plan for major ADP/Telecom Acquisition by OMB and GSA.

Most major equipment maintenance contracts are included in agency five-year plans. Frequently, the maintenance services are tied in with other activities, even if agencies intend to contract for them separately.

Under the authority of the Federal Administration Act and the Paperwork Reduction Act, GSA prepared and made effective in April 1984 a new regulation for information resources. The Federal Information Resource Management Regulation (FIRMR) superseded the FAR and FPMR in information technology areas. GSA intended for the FIRMR to streamline the information resources acquisition process. GSA is now rewriting the FIRMRs to reflect significant legal and regulatory changes. A new FIRMR is to be issued by GSA in September or October, 1990.

Other regulations and policy initiatives that are changing acquisition procedures include:

- The Competition in Contracting Act (CICA) of 1985 provided expanded legal powers for ADP protest action via the GSA Board of Contract Appeals (GSBCA) and GAO, increased the opportunity to employ negotiated contracts, and established seven more-restrictive categories of exceptions that permit sole-source awards. Agencies view the CICA as allowing vendors to complicate and lengthen the acquisition process. The Act’s provisions make it easier for vendors to protest procurement activities and bring temporary halts to procurement schedules. Many hardware and related maintenance services contracts are protested under CICA.
- The Paperwork Reduction Reauthorization Act of 1986 expanded the power of the GSBCA, but also retained the Warner Amendment, which provides DoD with mission-critical ADP procurement exemptions to

Brooks Act coverage, except for application of general-purpose ADPE in noncritical functions, such as testing, recalibration, and programmer workbenches.

At this writing, the Paperwork Reduction Act has expired. Although there are several areas of disagreement between Congress and the Bush Administration, the main problem concerns the authority of OMB's Office of Information Resource Administration (OIRA). OMB wants to retain the disputes resolution authority of that office, while Congress wants to weaken it somewhat. Such a weakening may increase vendors' difficulty in securing fair and equitable treatment.

2. Budgetary Constraints

Future-year funding of current acquisition programs and approval of funding for the next budget year are always in doubt in the federal government market. The authorization of an agency budget and the requested information sources by the agency oversight committee do not assure the agency or vendors that funds will be provided in the out years. Appropriation acts for the agencies approve the Total Obligational Authority (TOA) for certain large systems, but not the fiscal year or years in which the funds will be available (called outlays). Given the continuing, monthly nature of these payments, it is doubtful, at least in the short run, that work would be curtailed sharply. However, some maintenance coverage may be curtailed if the mission or function can tolerate the reduction.

Continuing economic and political sensitivity to the large national budget deficit could negatively impact a number of acquisitions in the less-than-critical defense and civil technology sectors. The FY 1990 DoD budget cut for IRM, nearly \$600 million, eliminated or reduced many sales opportunities. Major ADP systems already approved are likely to continue in preference to unapproved programs.

Major civil systems affect service to the public and have greater political appeal than research programs. Deficit control measures, especially those under the Gramm-Rudman-Hollings (GRH) Act, could force agencies to cancel programs that do not meet stringent productivity improvement requirements and, in some cases, delay or extend those that do. However, Congress appears to be backing away somewhat from the GRH targets, and most agencies have not yet experienced any major effect from the Act.

INPUT expects budget difficulties to continue to constrain the federal information systems market, particularly on the Defense side. However, if the procurement process is simplified to reduce the protest volume, acquisitions should begin to increase. Many agency executives view

information systems as key to productivity increases. Therefore, budget constraints sometimes lead to increased opportunities in the information systems market. Though these cuts may not substantially decrease maintenance requirements for existing systems, they may limit new opportunities.

3. Computer Obsolescence

In the 1988 GSA study on computer obsolescence, the four-year trend analysis indicated that the average age of large and very large computers peaked in 1983 and improvements seem to be appearing in the average age of the government's large computer inventory segment. This is critical to assessing the equipment maintenance market. The study's conclusions anticipate that in the future, however, small- and medium-size equipment will contribute to the overall obsolescence of the government inventory of computers as the number of low-end computer categories increase. The federal government's need to modernize its obsolete equipment will lead to multiple replacements of large-scale systems, even when mission changes appear to be minimal. These replacements will bring about greater opportunities for computer equipment maintenance.

The government is now also taking steps to take advantage of the increased processing power of microcomputers to combat computer obsolescence. The forces at work (such as federal ADP modernization, decentralized computers, OSI products, and technology advances) will no doubt increase the numbers of newer microcomputer systems in the federal sector and with it the required maintenance.

With microcomputers becoming easier to acquire through GSA Schedules, lower DPA thresholds, and especially requirement contracts, many applications previously handled on aging mainframes can be downsized to the newly acquired and more powerful microcomputers. This might reduce maintenance spending, since mainframes usually involve a more comprehensive maintenance commitment. In an additional step to combat computer obsolescence, agencies are also acquiring microcomputer-based LANs and upgrading their computer technology to incorporate many advanced networking capabilities that handle additional applications.

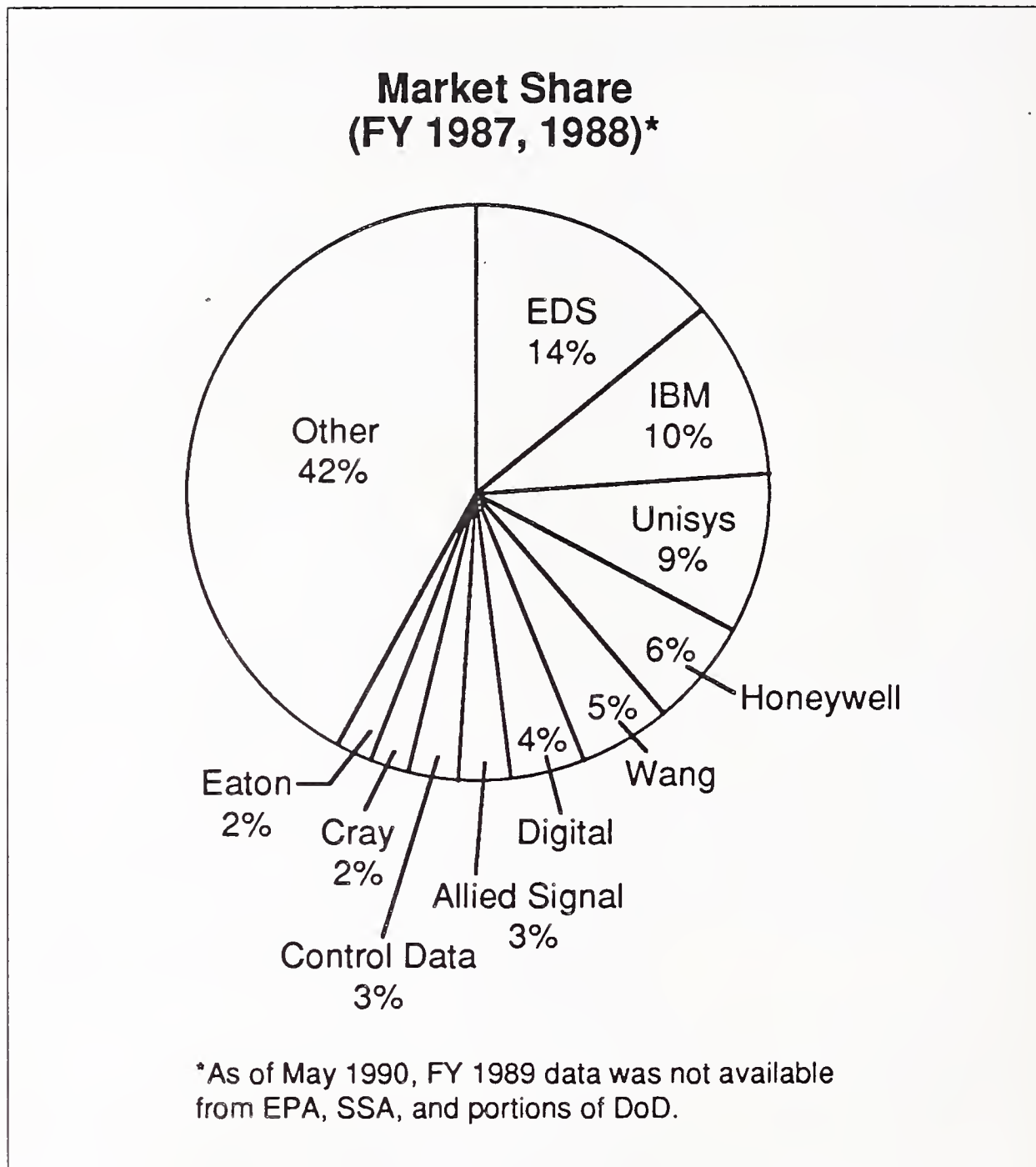
E

Competitive Environment

Exhibit III-4 lists the market share of the top ten vendors in federal equipment maintenance. The data identifies agency obligations in FY 1987 and FY 1988 combined. As of May 1990, the FY 1989 data was unavailable because of a lack of reporting among several agencies.

EDS' dominant position illustrates the tendency among many agencies, especially the Army, to report both operations and maintenance activities under the maintenance category. The remaining maintenance providers

EXHIBIT III-4



represent hardware suppliers. For the most part, they parallel the installed inventory as reported in previous INPUT reports. The one exception is Amdahl, which has more than 10% of the federal installed base, yet ranks only 21st among maintenance providers, with less than 1% of the market. However, it should be remembered that under many contracts, including the large Army ASIMS (formerly VIABLE) contract, EDS maintains Amdahl equipment.

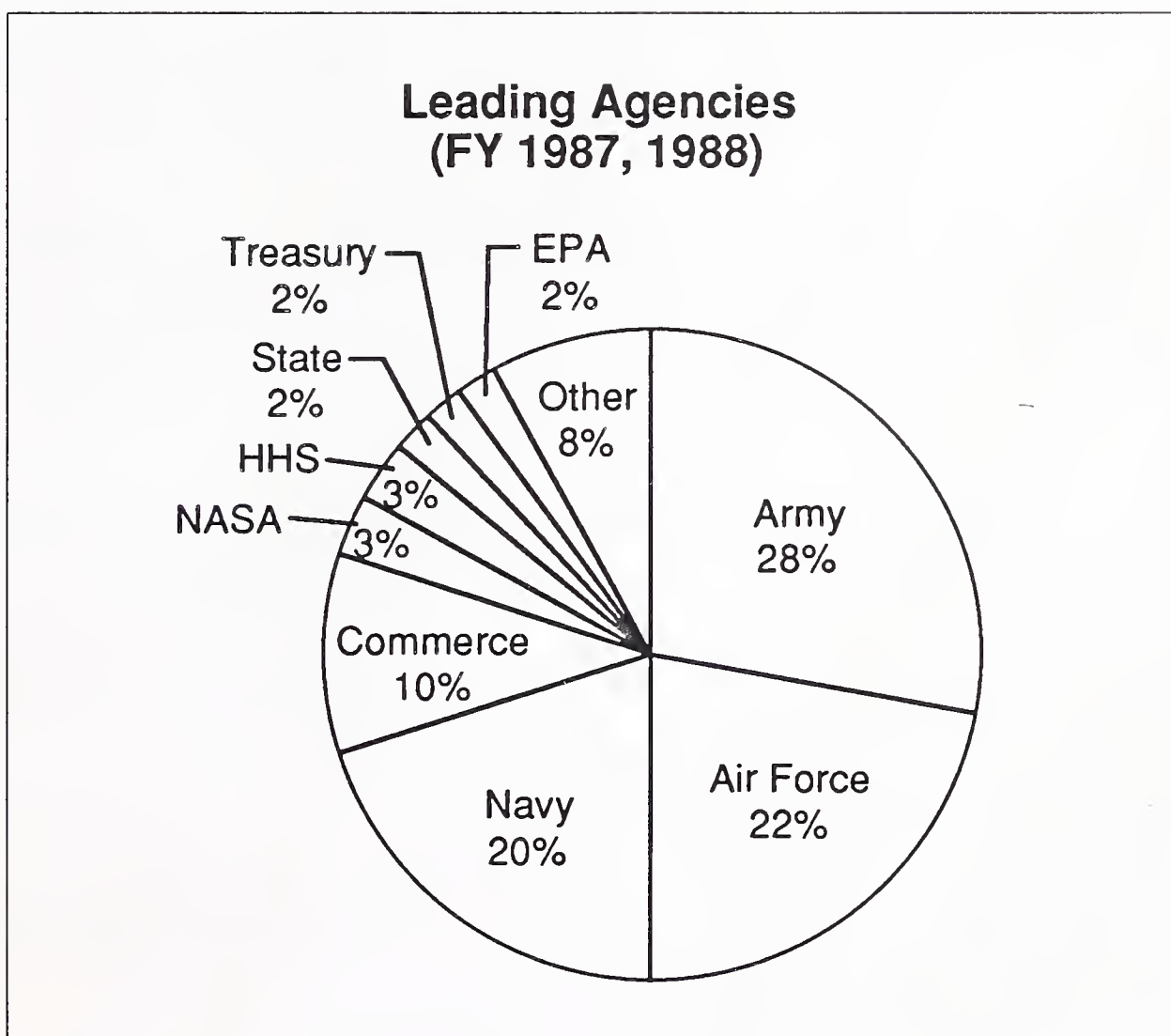
At first glance, it may seem surprising that none of the leading TPM vendors are included. This is due in part to subcontracting on many systems integration projects. For example, EDS may subcontract some maintenance activity to Sorbus; however, the Sorbus business does not appear, since the data does not show payments between primes and their subcontractors.

F

Leading Agencies

Exhibit III-5 lists agencies that spend the most on computer equipment maintenance. This data is extracted from the same data base as the competitive information in the last section. Again, as pointed out in the previous section, the Army reports heavy maintenance expenses, leading all other agencies with 28% of the market. In fact, Defense agencies overall represent 83% of the market, leaving only 17% to the civilian agencies. The Commerce Department spends more than half of the civilian agency maintenance dollars.

EXHIBIT III-5



To some extent, maintenance spending among agencies does not correlate with inventory data, at least when comparing inventory of large-scale systems. In a previous report, INPUT determined that the Energy Department had the largest installed base among civilian agencies. However, according to the current data, Energy spent only \$6.2 million—less than one half of one percent of the total—on maintenance. This can be explained by the unusually heavy dependence Energy places on contractors. In all likelihood, most computer maintenance is performed through systems operations contractors. EPA also uses facilities operations contractors which includes IS among other functions.

A less consistent finding appears when comparing the inventories of Defense and civilian agencies. Exhibit III-6, taken from INPUT's 1988 report, *The Federal Large-Scale Systems Market*, shows that civilian agencies have fewer but higher priced systems. Exhibit III-7, taken from INPUT's report, *The Federal Midsize Systems Market*, shows that civilian agencies report more processors than does the Defense Department. Based on this data, civilian maintenance expenses should be considerably higher than 17% of the total.

EXHIBIT III-6

Large Systems Installed at Federal Agencies

Large Systems	DoD Agencies	Civilian Agencies
Total Number of Systems	951	787
Purchase Value of Systems (\$ Thousands)	777,106	1,255,428

Source: Computer Intelligence, September 1988.

EXHIBIT III-7

Midsize Systems Installed at Federal Agencies

Midsize Systems	DoD Agencies	Civilian Agencies
Total Number	3,528	6,970
Purchase Value (\$ Thousands)	314,824	492,284

Source: Computer Intelligence, September 1988.

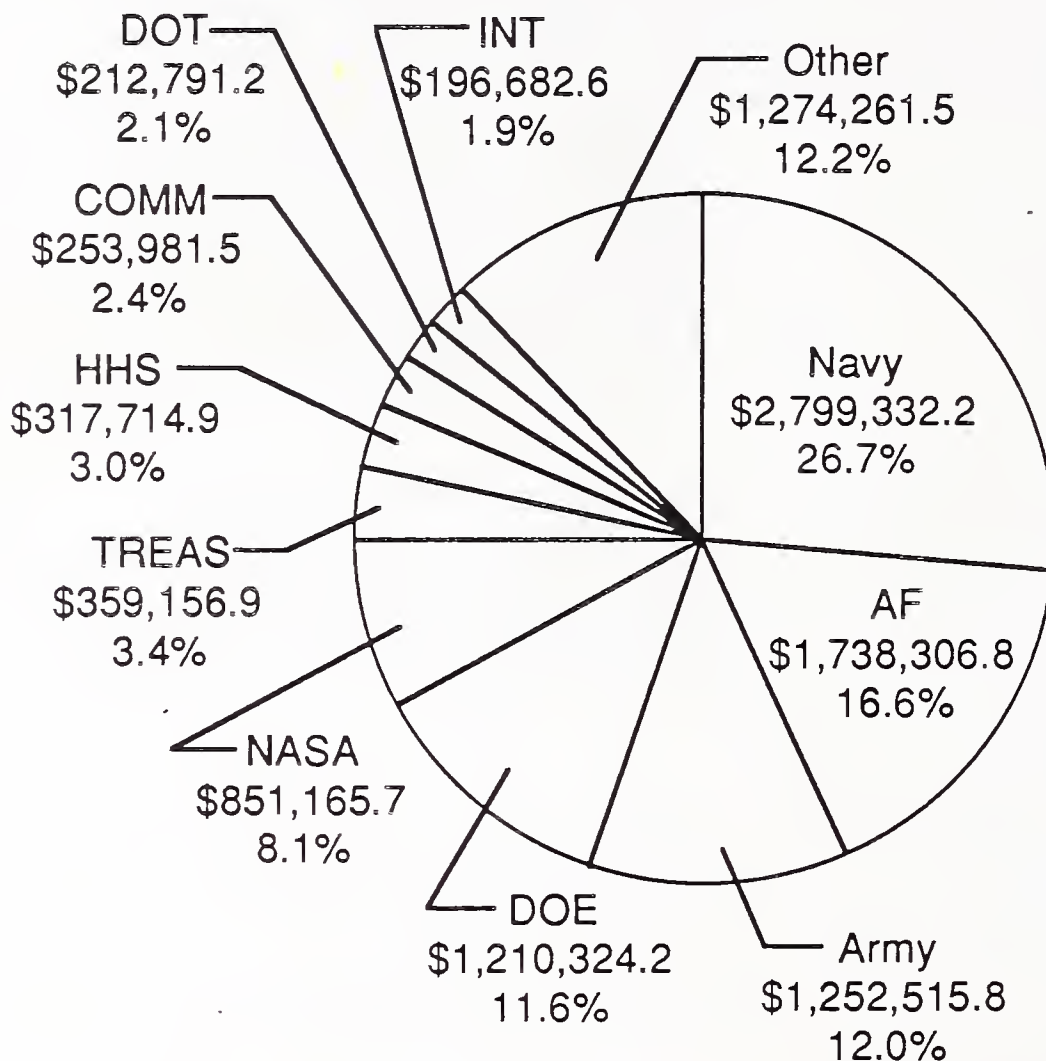
To resolve the contradiction, INPUT consulted the latest GSA inventory, published in the spring of 1990. Exhibit III-8, taken from that report, suggests an even split of ADP equipment between defense and civilian agencies. One answer to the puzzle comes from the average age of the installed base. Exhibit III-9 summarizes this information for some of the leading agencies.

According to GSA, the major defense agencies have very old systems, and this accounts for some of the higher spending. As already pointed out, maintenance spending at Energy is largely funded through systems operations contracts. The same is true at NASA. As a result, maintenance reporting is sharply reduced. It is not surprising that Commerce spending on maintenance is highest among civilian agencies, since its equipment is older than that at most other agencies.

However, INPUT cannot account for the contradiction at Treasury which, among other systems, reports 293 medium-sized systems of an average age of 17 years and four months. With this inventory, INPUT believes that Treasury's maintenance spending should be considerably higher than the 2% reported.

EXHIBIT III-8

Distribution of ADPE Dollar Value by Reporting Agency



Total ADPE Dollar Value (\$ Thousands): \$10,466,233.3

- Navy - Department of the Navy
- AF - Department of the Air Force
- Army - Department of the Army
- DOE - Department of Energy
- NASA - National Aeronautics & Space Administration
- TREAS - Department of Treasury
- HHS - Department of Health and Human Services
- COMM - Department of Commerce
- DOT - Department of Transportation
- INT - Department of the Interior

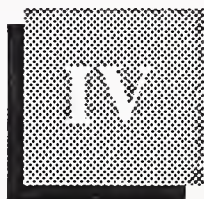
Source: *Automatic Data Processing Equipment in the U.S. Government, Third and Fourth Quarter FY 1989 Summary*, U.S. General Services Administration.

EXHIBIT III-9

Average Age of Installed Base

Agency	Years/ Months
Defense Communications Agency	8/5
Veterans Affairs	8/11
Interior	9/4
HHS	9/6
Army	12/0
Agriculture	12/9
Energy	13/4
NASA	13/6
Air Force	13/9
Commerce	14/4
DLA	14/4
Treasury	15/9

Source: *Automatic Data Processing Equipment in the U.S. Government, Third and Fourth Quarter FY 1989 Summary*, U.S. General Services Administration.



Federal User Requirements and Trends

This chapter discusses the response to INPUT surveys among agency personnel. Overall, the respondents emphasized the importance of timely and knowledgeable vendor support in maintaining agency equipment.

A

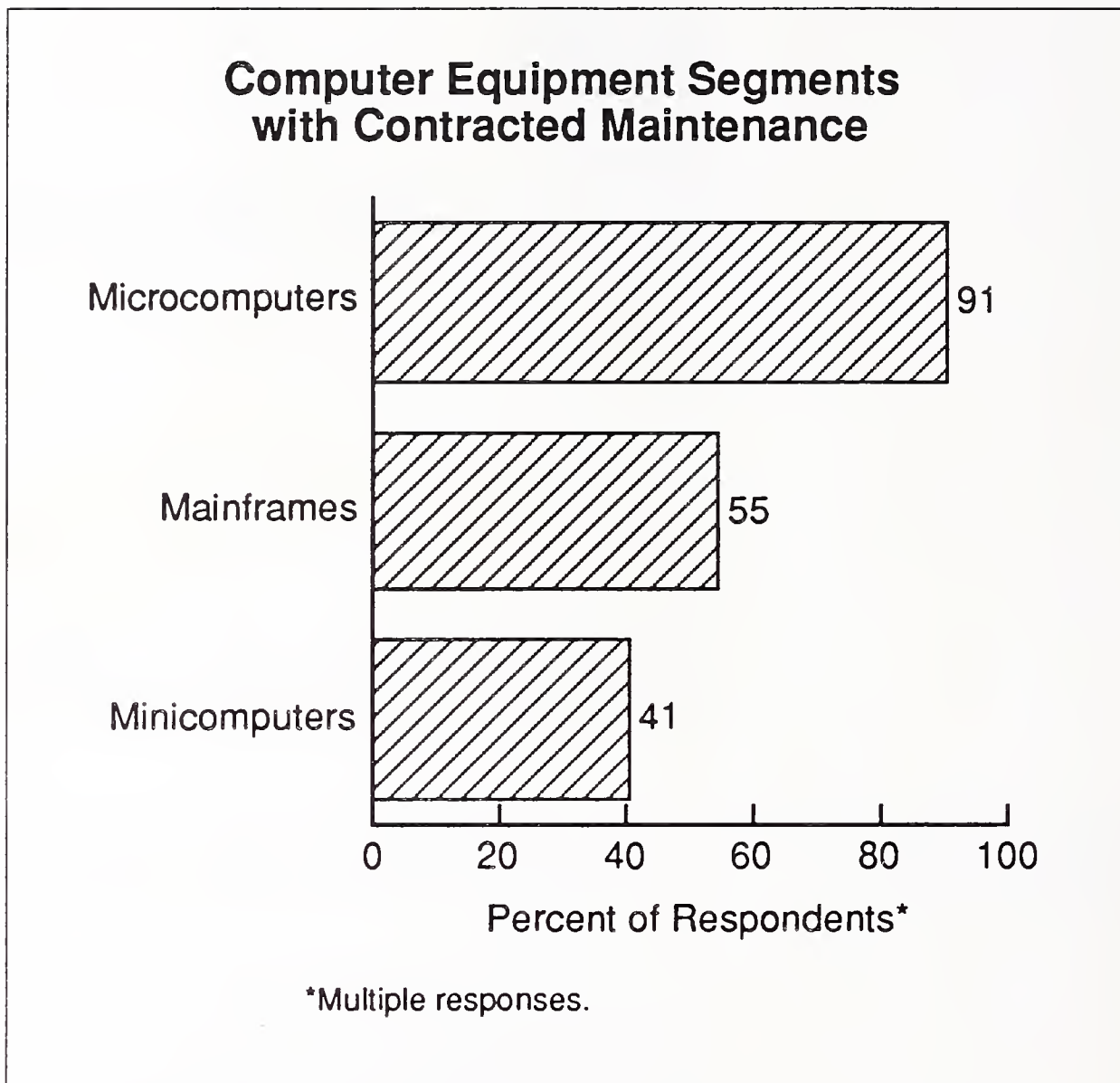
Agency Hardware Environment

This section covers agency survey responses to questions about the environment in which maintenance vendors must market their services.

1. Current Computer Equipment Contract Maintenance

In order to characterize the equipment environment of agency respondents, INPUT asked them to identify the computer equipment currently installed, for which contract maintenance services have been acquired. The replies included a wide range of equipment types and models. Exhibit IV-1 summarizes the results of this question.

EXHIBIT IV-1



The majority (91%) of respondents have microcomputers which require maintenance services. IBM, Zenith, Compaq, Apple, and IBM-compatible models were mentioned most frequently for types of microcomputers already installed. Mainframe manufacturers' named most included IBM, Sperry, Honeywell, CDC, Unisys, Amdahl, and Data General, for organizations with large computers. For the 41% of agency respondents with minicomputers, models identified include IBM, Honeywell, Digital, Wang, and Unisys.

The response provided some unexpected results. First, based on previous studies, INPUT has determined that practically every office in every agency has microcomputers. However, 9% of the respondents to this question do not contract out their maintenance support. This suggests that either the equipment is too old to be maintained (e.g., there are still a few Osborne computers in the federal inventory) or the site is too remote for computer maintenance.

The second surprising result concerns the higher response rate for mainframes (55%) than for minicomputers (41%). Again, previous INPUT research shows that far more midsize computers are installed at federal agencies. GSA has estimated a ratio of nearly 20 midsize computers installed for each mainframe or supercomputer. Although this may overstate the difference somewhat, it still seems surprising that mainframes were cited more often. The response appears to reflect the greater importance of maintenance support for mainframe systems, since many minicomputers operate in a largely unattended mode. It may also reflect the higher spending levels for mainframes, which also dictate higher support costs. However, a direct relationship may not always exist. Sometimes agency responses do not fully characterize the actual environment.

The name brands identified above are virtually the same as were mentioned in previous surveys. The only difference worth mentioning was the inclusion of Data General in the mainframe category, since INPUT normally classifies Data General equipment as midsize. However, this may simply reflect the downsizing of applications in many agencies.

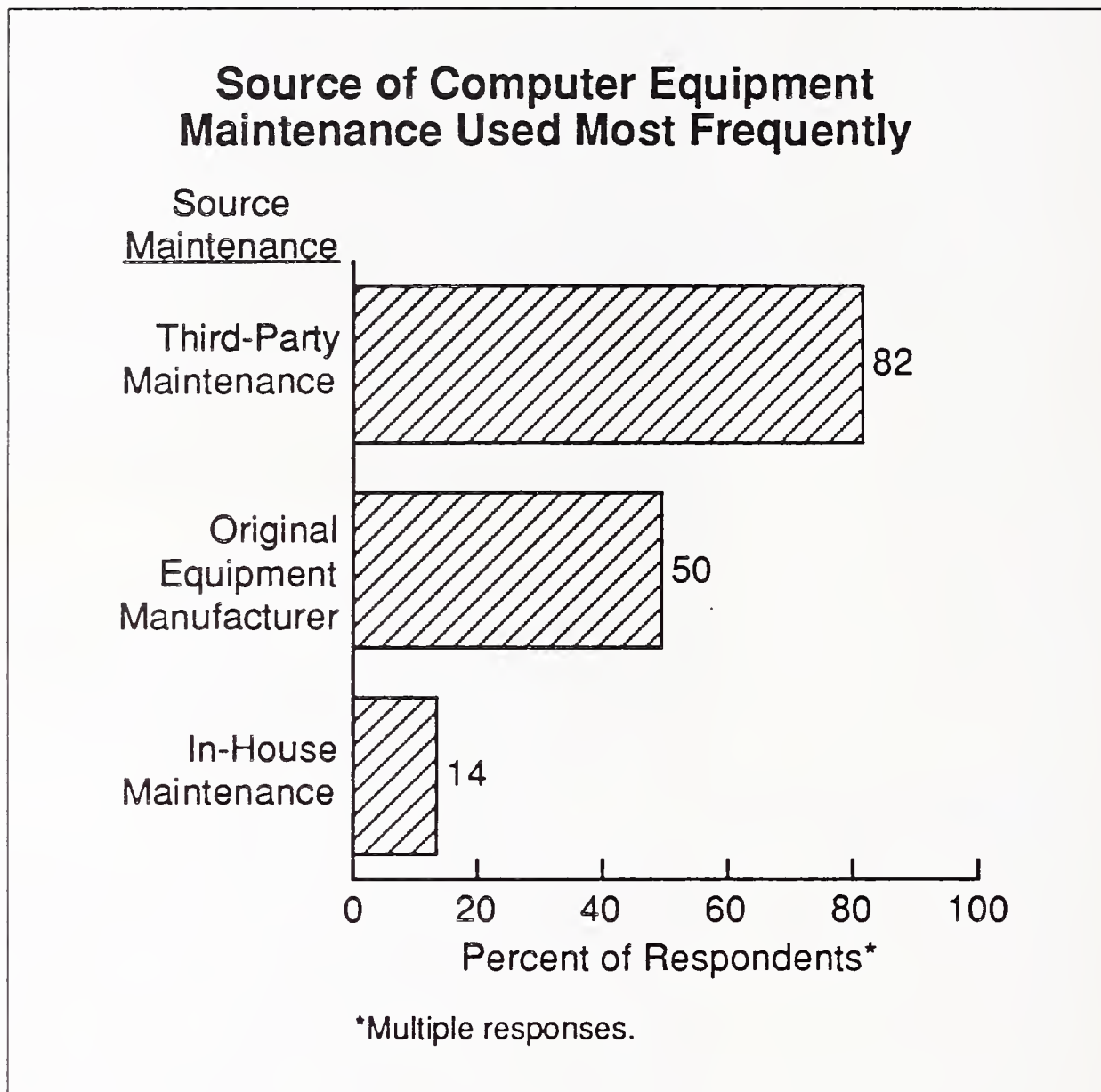
Agency respondents were also asked for their views about the impact of having both old and new computer equipment when attempting to comply with federal maintenance policies and procedures. Fifty percent of the respondents indicated that they have experienced minimal or no effect from having equipment of different ages. Nineteen percent stated that their organization did not have any old equipment. The remaining respondents varied in their views of how they were affected, with some showing minor effects and others experiencing considerable downtime.

Several respondents noted that it was more costly to maintain older equipment. Also it was notably more difficult to meet maintenance objectives for aging equipment. Newer equipment was usually easier to maintain. However, one respondent indicated that their new equipment was more troublesome. Another respondent commented that purchase of new equipment forces the use of OEMs for maintenance. This observation may only be valid during the initial maintenance phase following the purchase.

2. Type of Maintenance Currently Acquired

Exhibit IV-2 lists the source of computer equipment maintenance used most frequently by the agency respondents. Respondents noted use of multiple sources of maintenance. The largest share (82%) of the agencies use third-party maintenance (TPM) services. TPM is used frequently for maintaining microcomputers. This usage is much higher than comparable commercial environments, suggesting that government policies on competition provide an advantage to TPMs.

EXHIBIT IV-2



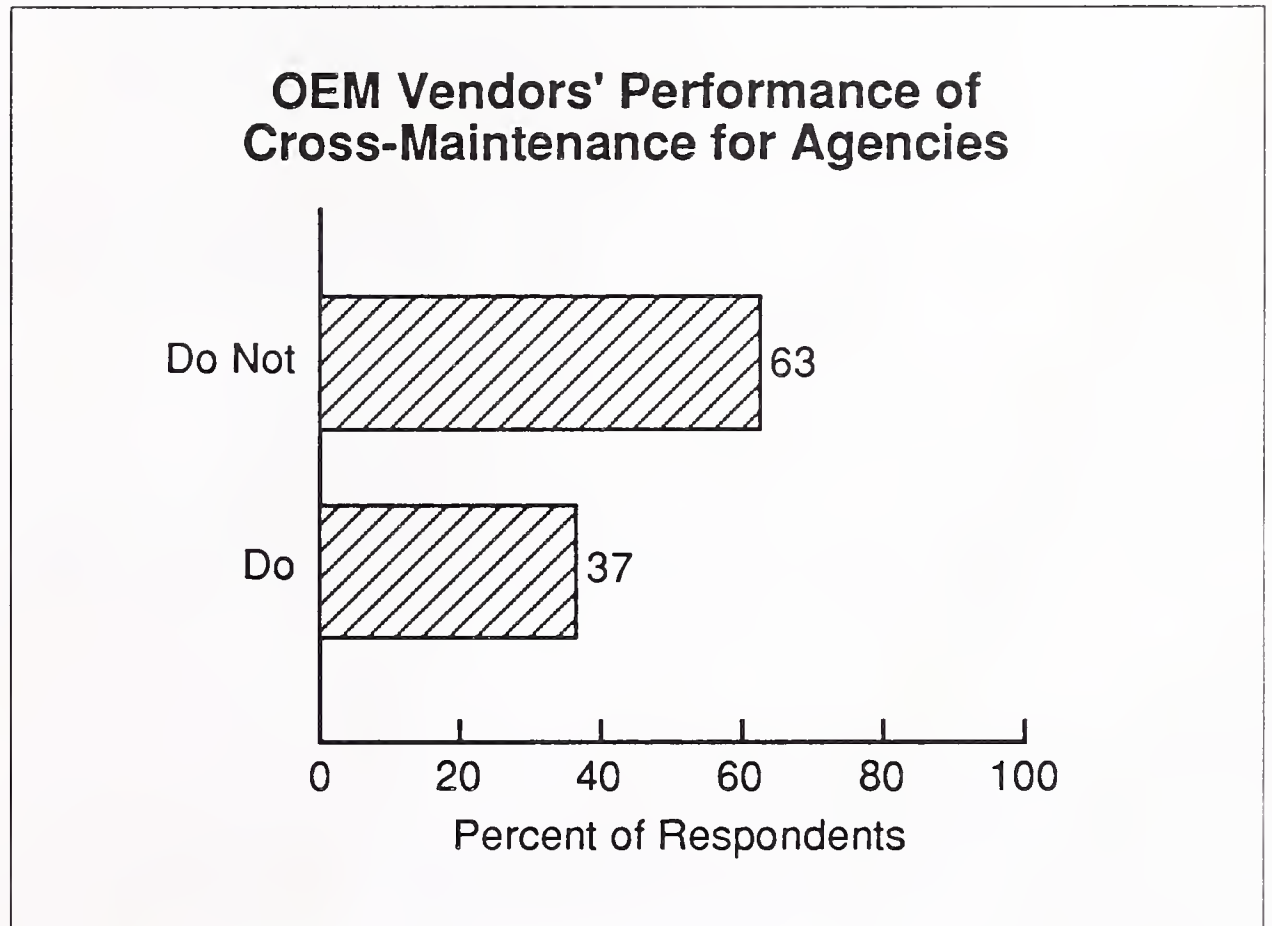
Half of the respondents utilize the services of original equipment manufacturers (OEMs), which appear to be associated with mainframes and larger networks. One respondent noted use of a systems integrator along with an OEM.

A small number (14%) of the agencies are doing some maintenance in-house, in addition to acquiring outside maintenance services. They did not specify the type(s) of equipment for which they have developed their own expertise. In-house maintenance may result from the increasing modularity, as well as reliability, of new computer equipment. For example, the new IBM laser printer contains fewer than half the parts of a Hewlett-Packard Laser Jet III unit. This simplicity enhances maintainability by the user as well as reliability. It also reduces the cost of spare parts inventory.

3. Cross-Maintenance of Computer Systems

Agency respondents were asked if their current OEM vendor provides cross-maintenance services or maintains multiple vendor computer systems for the agency. Exhibit IV-3 shows that the majority (63%) of the OEM vendors servicing the respondents do not currently provide cross-maintenance. This may be due to the cost and competitiveness associated with providing the services, or it may merely result from traditional company practices. As pointed out in Chapter III, some OEM vendors are beginning to function as TPMs.

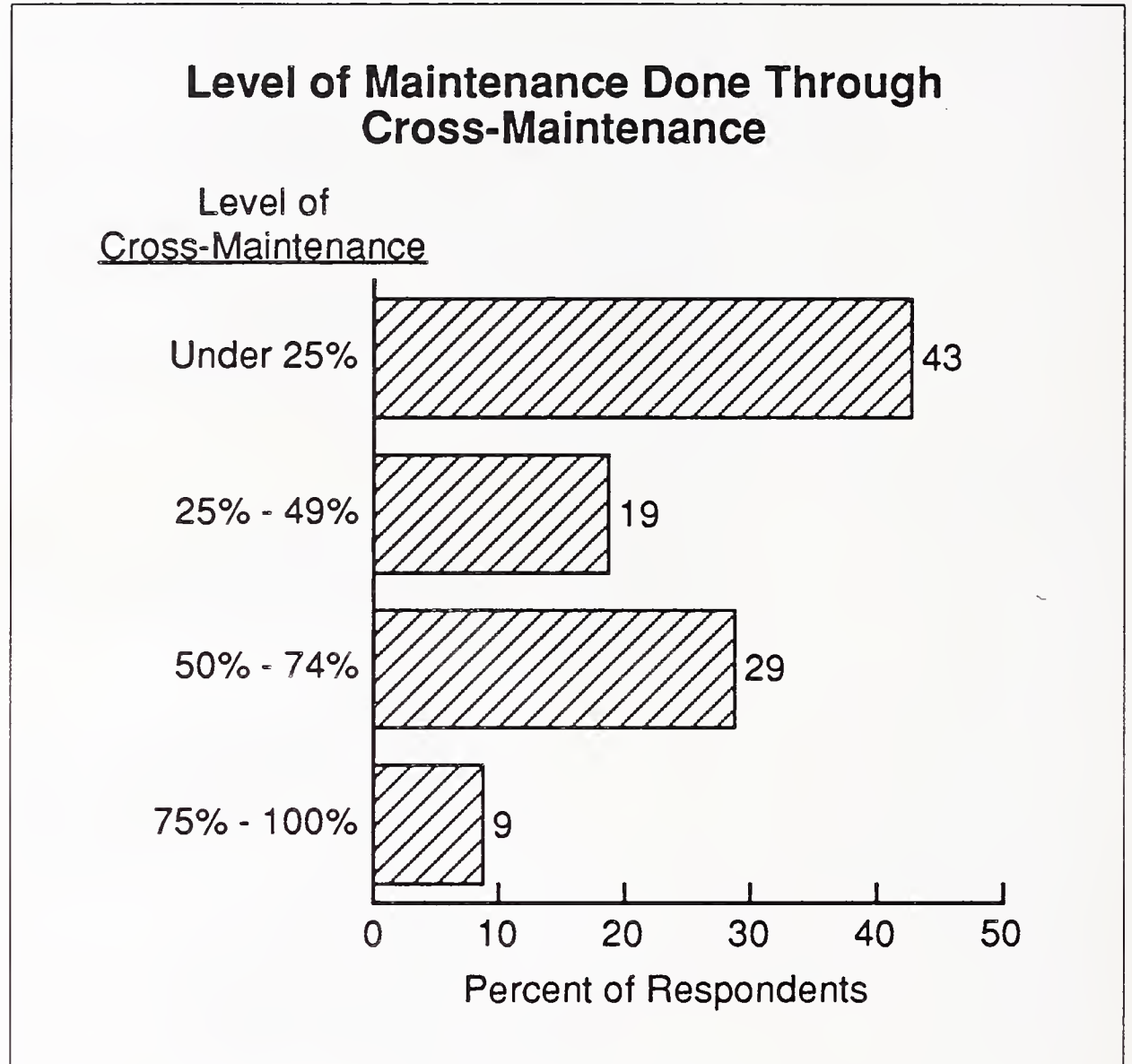
EXHIBIT IV-3



The agencies were also asked to estimate what percent of the agency's computer equipment maintenance is performed through cross-maintenance contracts. As shown in Exhibit IV-4, most respondents (43%) have 25% or less of their total maintenance done via cross-maintenance contracts. The next largest share of respondents (29%) have between 50% and 74% of their maintenance provided by this method. The wide disparity is probably the result of the differences in the agencies' installed equipment bases and their current maintenance contractors.

INPUT expects an increase in cross-maintenance activities among leading equipment suppliers, especially IBM. This reflects an increasing recognition among OEMs of the advantage of account control in winning more of the business opportunities in this area.

EXHIBIT IV-4



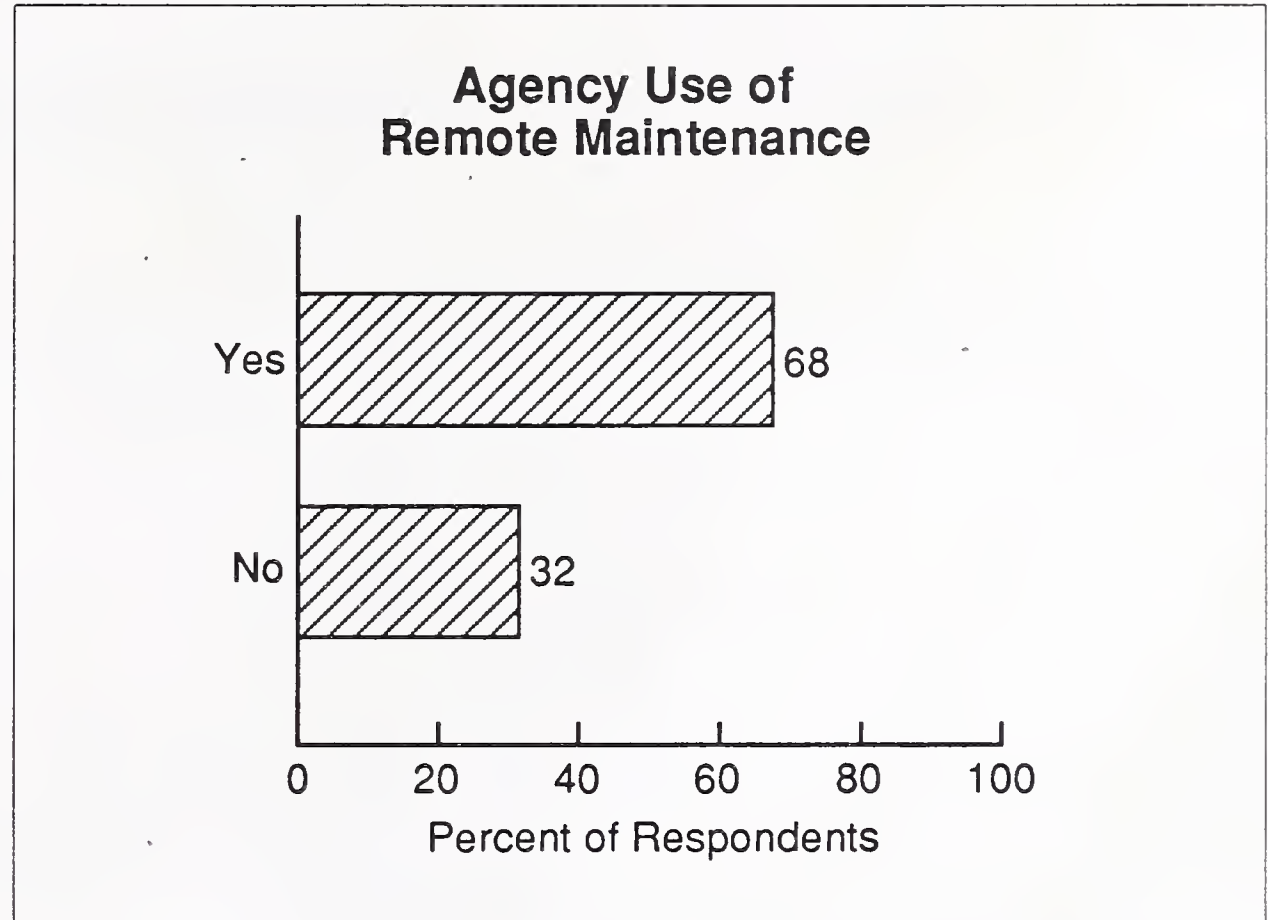
4. Use of Remote Maintenance

Remote maintenance involves gaining electronic access to a computer from a point physically distant from the computer, in order to perform problem determination activities and repair. Originally, this capability was more common to software maintenance support, as software problems can be solved or circumvented through downloading of new code (fixes). Agencies are now frequently utilizing remote maintenance for their computer hardware.

Exhibit IV-5 shows that 68% of the agency respondents are using remote maintenance for some portion of their installed computer equipment. Use of remote maintenance is expected to increase in the future as more vendors offer this service. Furthermore, its popularity at agencies will grow because it is cost-efficient and more responsive than on-site maintenance.

INPUT expects that the popularity of remote maintenance will increase as the technology used in problem determination improves.

EXHIBIT IV-5

**B**

Performance Requirements

This section covers agency response to survey questions on the relationship of performance requirements to equipment type and age.

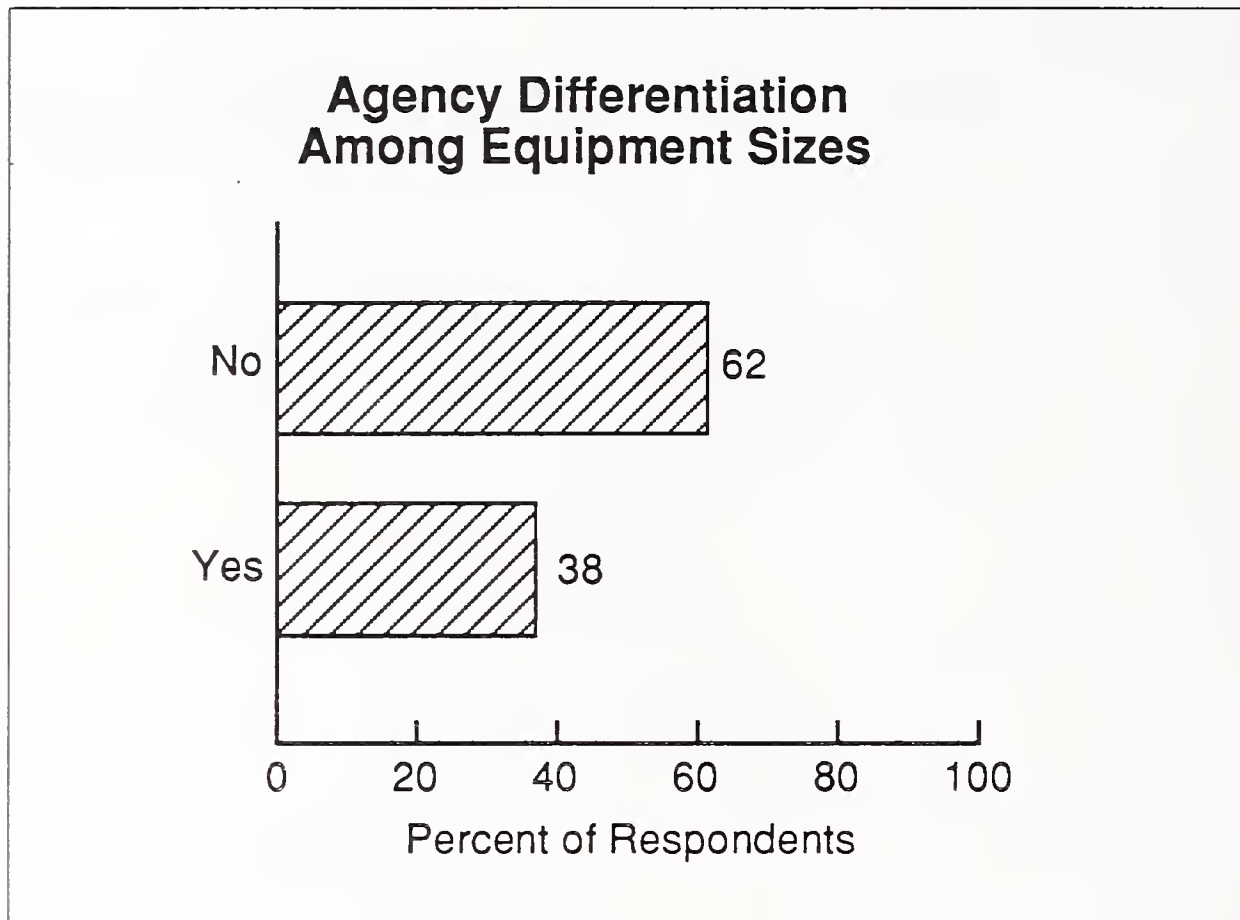
1. Size Differentiation

Respondents were surveyed as to whether their agency differentiates among equipment sizes (large, medium, small) in their maintenance contracts. Exhibit IV-6 notes that nearly two-thirds (62%) of agency respondents do not use different maintenance contracts based on equipment sizes.

Organizations that had different contracts based the maintenance requirements on the following:

- Characteristics of different computer makes/models
- Computer room equipment versus geographically dispersed microcomputers and printers
- Different contracting offices
- Prioritized large computer users
- Minicomputers maintained regularly by OEMs and microcomputer maintenance done on an on-call basis by TPMs

EXHIBIT IV-6



In general, agencies have higher performance expectations for systems in protected environments. The particular application partially dictates these expectations. Vendors should recognize that, though agencies usually want very high reliability and very comprehensive maintenance support, they may not always be willing to pay for them.

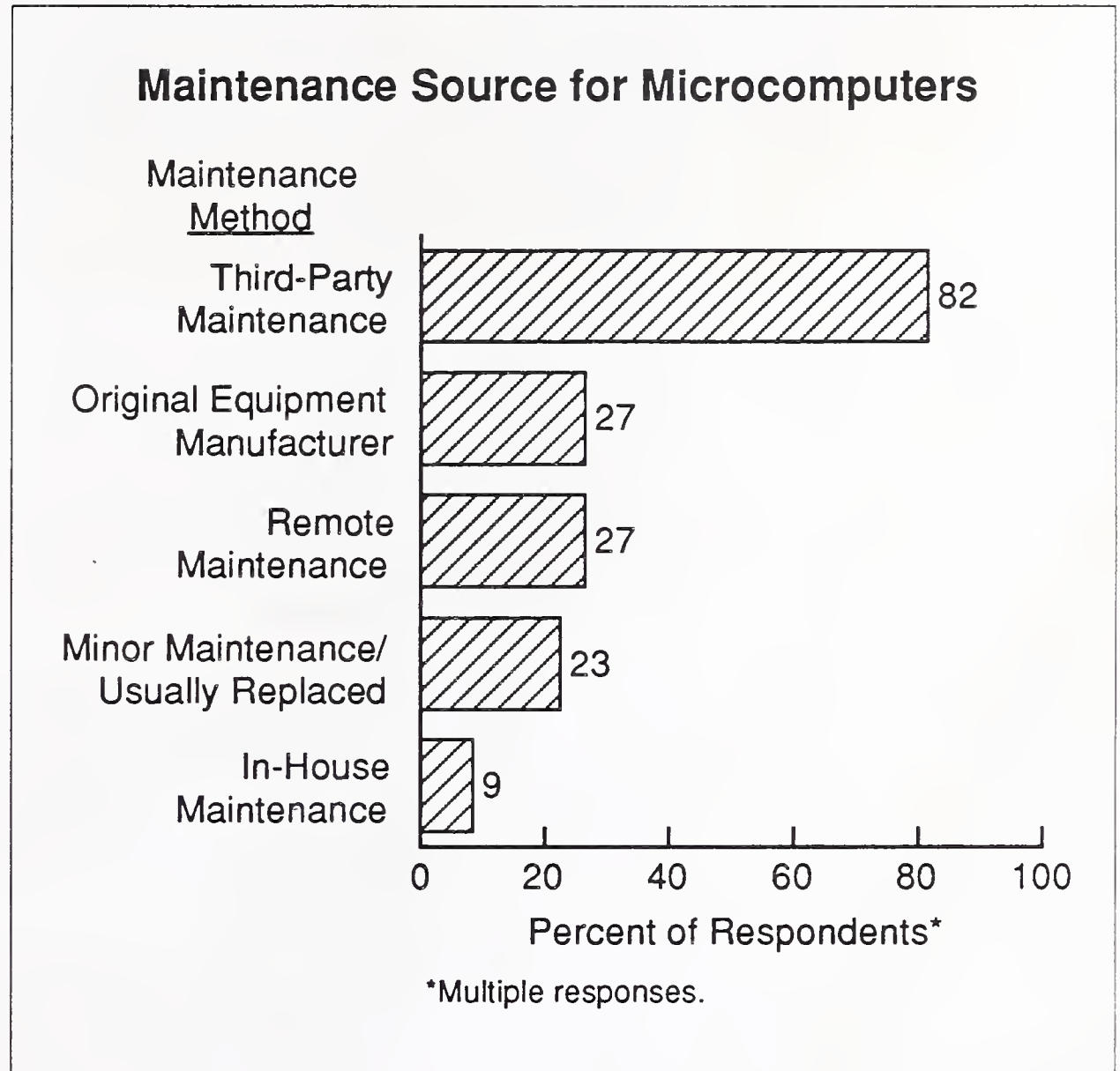
Agencies did not indicate whether they specify higher maintenance requirements in contracts for smaller systems or larger systems.

2. Maintenance of Microcomputers

Since nearly all government agencies use microcomputers, INPUT surveyed the respondents as to the source of maintenance for servicing microcomputers at their organizations. The responses from the agencies are summarized in Exhibit IV-7.

Over eighty percent of the respondents have their microcomputers serviced by TPMs. Since the 1980s, the government's purchase of microcomputers has exploded, creating a tremendous need for microcomputer support. Few manufacturers provided on-site support of microcomputers, preferring to rely on product distributors and third-party maintainers to provide service. With a dispersed user base, a significant number of micro users at government sites began to rely on authorized retailers and TPMs to service their microcomputers.

EXHIBIT IV-7



INPUT believes that the geographic distribution of microcomputers, as well as the special relationships between OEMs and their distributors, help account for this high response rate. Since government agencies are often widely dispersed, it would be prohibitively expensive for OEMs to maintain the microcomputers. As a result, on major contracts, OEMs often enter into cooperative arrangements with a series of local TPMs to maintain the government equipment. Similarly, when distributors offer maintenance as part of their suite of services, OEMs show reluctance to interfere with this arrangement.

Of the agencies surveyed, OEMs account for only 27% of the respondent's maintenance of microcomputers. Again, it is noticeable that OEMs have a greater presence in the servicing of larger computers.

Remote maintenance, either by a TPM or an OEM, occurs at 27% of the agency organizations. Remote maintenance is growing in popularity due to its cost effectiveness. In some cases (23%) it is also more cost-effective to replace rather than repair microcomputers or to do minimal maintenance. Lastly, only a small share (9%) of the respondents maintain microcomputers in-house.

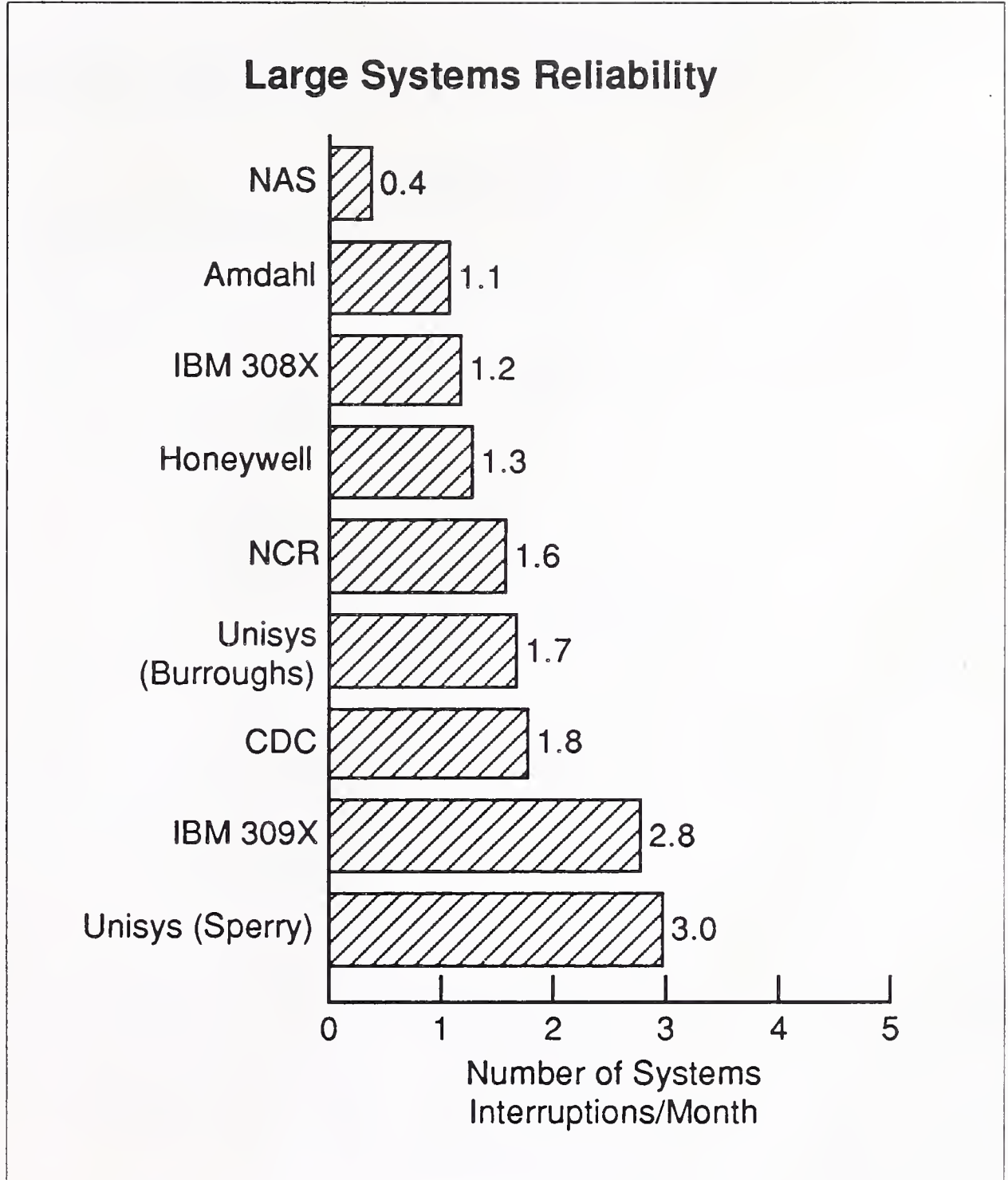
3. Effect of Equipment Retention Periods

The government agencies retain computer equipment for varying amounts of time. The retention period is frequently longer than actually expected due to budgetary constraints for funding replacement equipment. Twenty-three percent of the agency respondents indicated that performance requirements are affected by equipment retention periods. For these organizations, the performance standards and expectations are lower for older equipment.

Furthermore, when these same respondents (23%) were asked if these lower performance requirements are reflected in the provisions of agency maintenance contracts, forty percent indicated that the contracts did reflect the lower requirements. Respondents would not give information on contract specifications, but apparently maintenance standards are relaxed as the equipment ages.

Exhibit IV-8, taken from a recent report from INPUT's Customer Service Program, compares reported reliability among various brands of equipment. Although age differentiation was not specified, it is worth noting that the older IBM 308X has fewer than half the systems interruptions of the newer 309X models. This data suggests that system age may not always be a good indicator of system reliability.

EXHIBIT IV-8



C

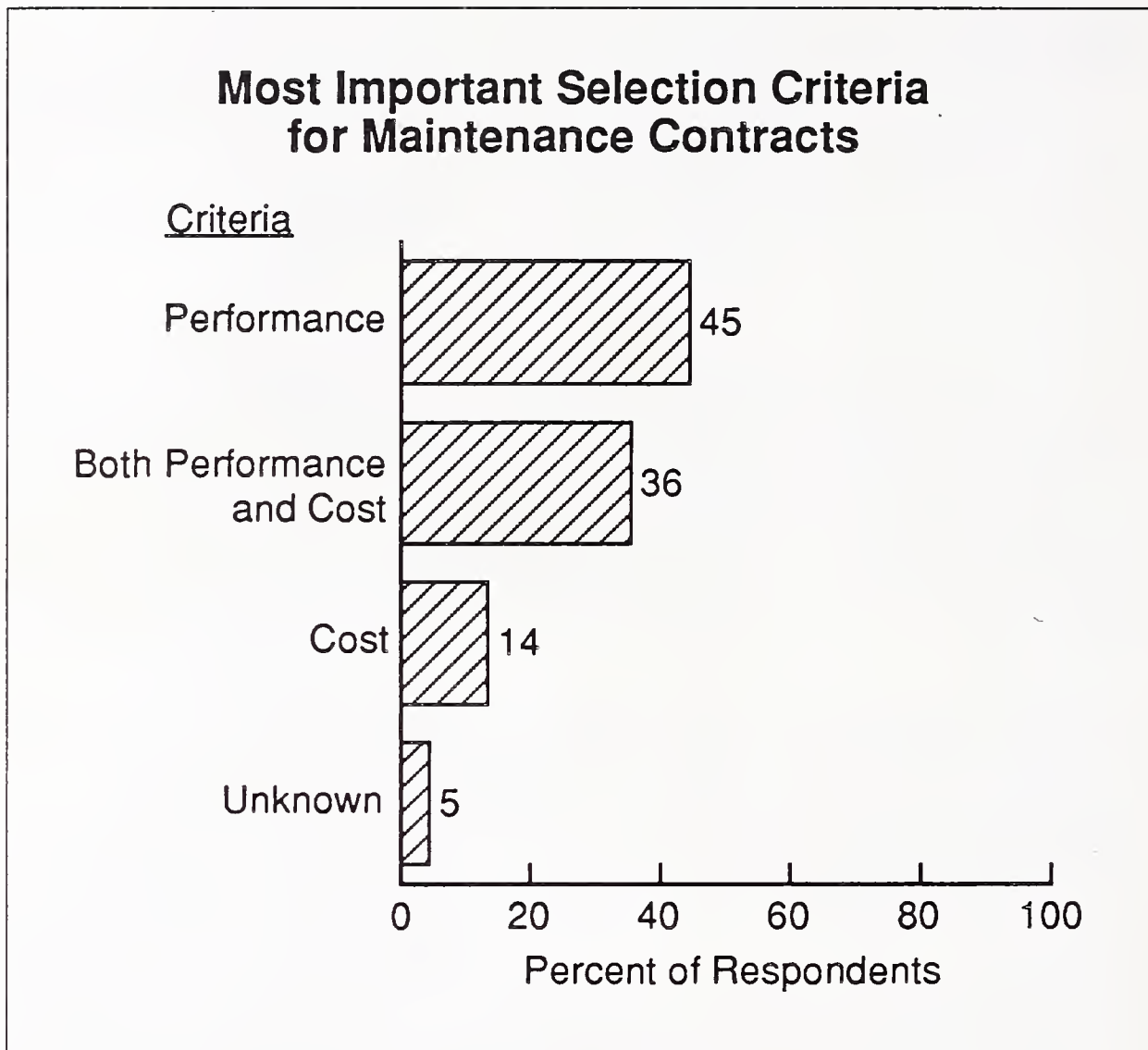
Agency Acquisition Plans and Preferences

This section discusses responses to agency survey questions on selection criteria and vendor determination.

1. Selection Criteria

Agency respondents were asked which was the most important criterion for selection of a maintenance method—cost or performance? Exhibit IV-9 summarizes the agency responses.

EXHIBIT IV-9



Forty-five percent of the agency respondents identified performance as the most important criterion, and 14% chose cost. This contrasts sharply with the industry respondents, all of whom indicated that cost was the most important criterion to the government. The government's responses may be a direct result of interviewing agency program managers rather than contracting officers.

Agencies that specified performance did so due to the following factors:

- Importance of proper maintenance
- Criticality of systems operation at all times
- Importance of obtaining quality service
- Nature of the computer operations

Cost is an important criterion where budget and technical specifications were given higher weight than performance for selecting a maintenance method. Vendors may want to keep these factors in mind when preparing to address agencies' maintenance needs.

Additionally, 36% of the agency respondents indicated that cost and performance are equally important. These respondents are attempting to achieve a balance in their selection criteria as well as satisfy their users.

Exhibit IV-10 shows comparative agency and vendor rankings of additional maintenance selection criteria. The rankings are similar between the agency and vendor respondents, except for the importance of vendor reputations. The agency respondents ranked vendor reputation in first place, while vendors themselves put it second to cost control procedures. This difference arises from industry's view that cost is generally the most important criterion for agencies. All respondents placed the proposed technical solution above contract type in importance.

EXHIBIT IV-10

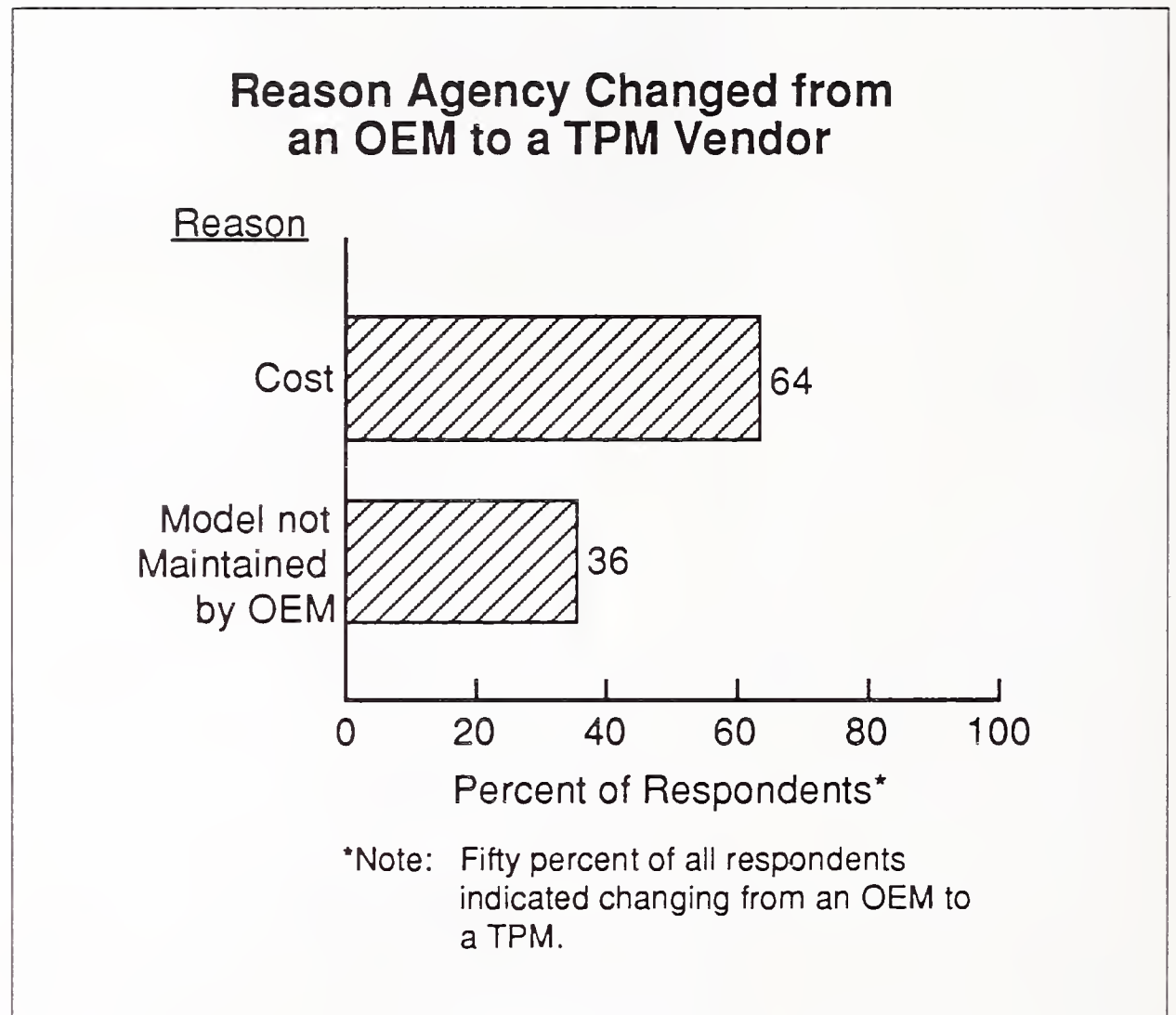
Criteria	Agency Rank	Vendor Rank
Vendor Reputation	1	2
Cost Control Procedures	2	1
Proposed Technical Solution	3	3
Contract Type	4	4

2. Change of Maintenance Vendors

The government agencies surveyed by INPUT were asked if their agency had changed from using an OEM to a TPM vendor for computer equipment maintenance. Fifty percent of the respondents have changed vendors to acquire the services of a TPM vendor. Exhibit IV-11 shows that of those respondents that changed, twice as many did so for cost reasons

than because the computer model was not maintained by the OEM. In these times of budget constraints, agencies are looking to cut costs wherever possible, including maintenance costs. This could lead to further restraint on vendors' profit margins.

EXHIBIT IV-11



Sixty-six percent of the respondents indicated that they changed vendors at the end of the initial maintenance contract, rather than at some point during the contract. Many changes are the result of recompetitions of the maintenance contract.

In other INPUT commercial studies, research supports the contention that cost saving is one of the key factors in initially establishing use of a TPM and secondly, that other factors (notably convenience and efficiency) become more important as the market matures.

The reasons offered for not using TPM in the commercial market can be even more important. The most frequently mentioned were:

- Satisfaction with manufacturer service
- Lack of awareness of TPM
- Perceived service advantage of the manufacturer

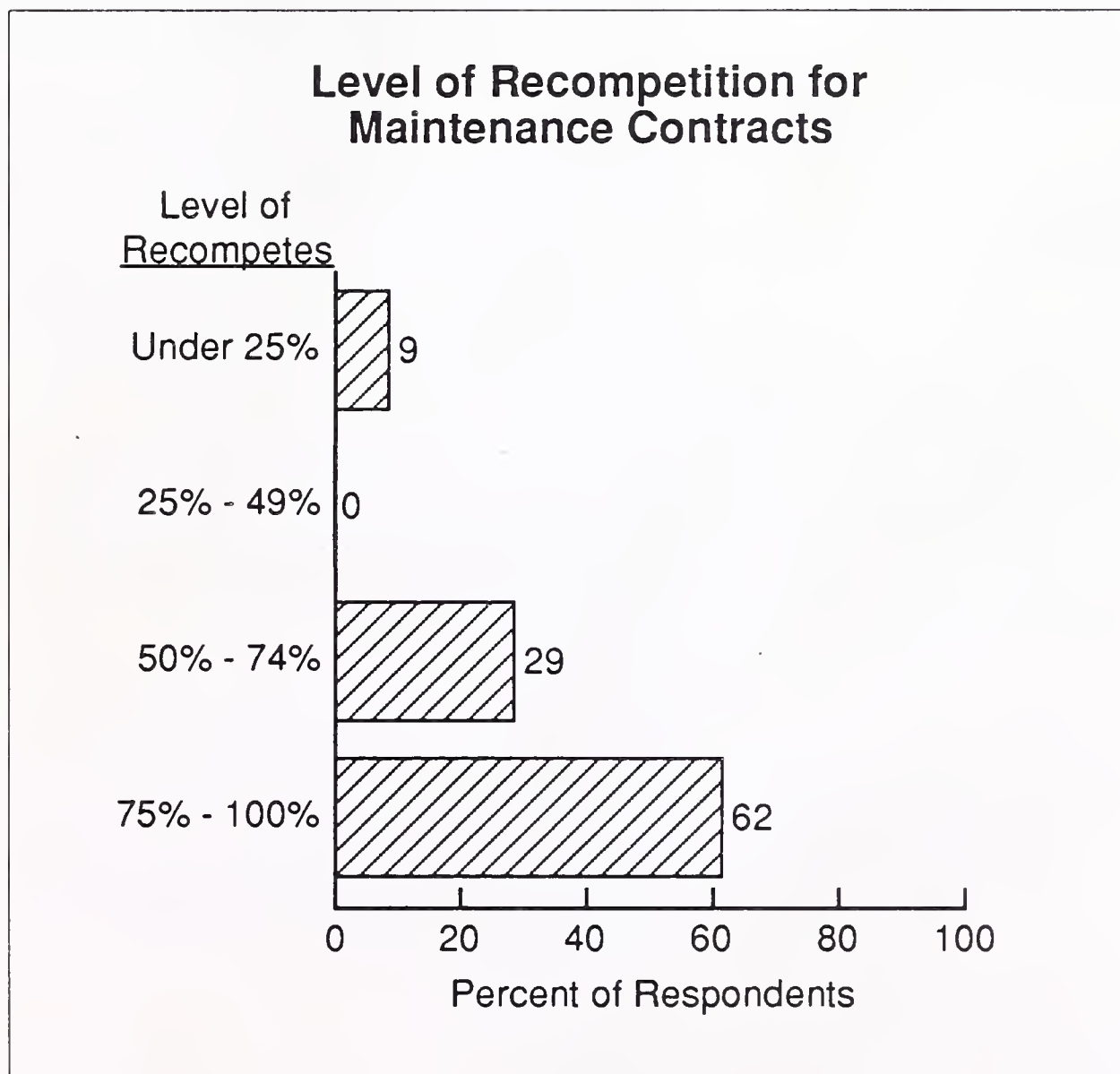
Such factors as the perceived financial weakness of TPMs, and fear of an adverse OEM supplier response were mentioned infrequently by commercial users.

3. Level of Recompetition for Maintenance Contracts

Although maintenance for most large computer systems and many smaller computers is done through competitive procurement contracts, the level of recompetition for computer equipment maintenance contracts varies among agencies. Factors such as agency procurement regulations, age of equipment, equipment type, reliance on GSA Schedules, and planned system upgrades have some effect.

Respondents estimated the portion of their agency's computer equipment maintenance that is recompeted. (See Exhibit IV-12). Nearly two-thirds (62%) of the agencies surveyed recompete 75% to 100% of their maintenance contracts. Over 29% of respondents recompete 50% to 74% of their contracts. These findings reflect the dependence of agencies on lengthy competitive bidding procedures to secure maintenance for their computers. This is particularly true for equipment contracts estimated at \$1 million or above.

EXHIBIT IV-12



As an interim measure for single computer purchases (i.e. minicomputer) or smaller systems (fewer than 12 microcomputers), the GSA Schedule is often used for obtaining short-term maintenance until the recompetition of the agency's main maintenance contract is awarded. This tactic allows for the additional maintenance to be obtained relatively quickly, without the agency violating any procurement procedure regulations. Use of the GSA Schedule also serves as indirect advertising for vendors to become known at government agencies. Furthermore, since many agencies model their RFPs on the services offered on the Schedule, it eases the transition to the contracted services and assures compliance with the RFP.

During the interviews, most respondents would not specify examples of agency equipment maintenance contracts that are expected to be recompleted over the next two years. However, Chapter VI—Key Opportunities—lists some typical maintenance contracts that agencies will be acquiring between FY 1990 and FY 1995. Future releases of INPUT's Procurement Analysis Reports (PARs) will also include recompetition of contracts for equipment maintenance at agencies.

D

Agency Satisfaction with Vendor Performance

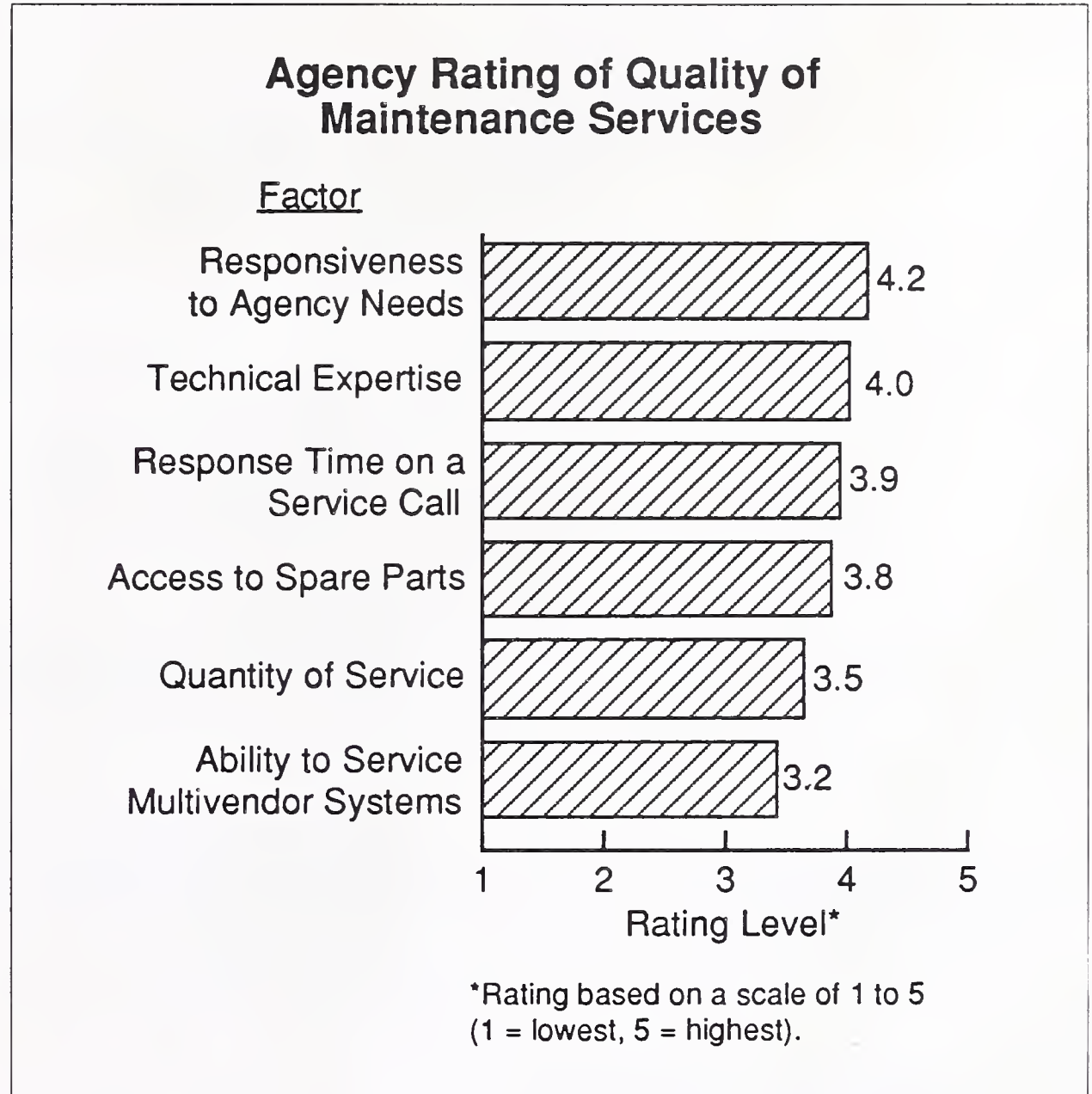
The overall satisfaction level of agency respondents with the quality of maintenance services from vendors is above average. Exhibit IV-13 shows the ratings given to specific aspects of maintenance services.

On a scale of one to five, (five being highest), agencies rated vendors highest on responsiveness to agency needs. Most agencies view industry as being able to appropriately respond to their maintenance needs for a variety of equipment types and user demands. The technical expertise of vendors received the second highest rating by the agencies with a 4.0. This indicates that vendors have sufficiently trained their staff on evolving computer technologies.

Agencies are somewhat less satisfied with vendors' response times and access to spare parts. Delays in response times may be due to user sites being somewhat distant from the vendor company. Accessibility of spare parts can vary with manufacturer and model types, and is expected to decline for aging equipment.

Agencies are moderately pleased with the quantity of service obtained. The area of least satisfaction is the ability of vendors to service multivendor systems (cross-maintenance). The majority of OEMs that maintain the agency respondents' computers are not providing cross-maintenance. Agencies believe that the TPMs providing the service need to make improvements to the quality of these services.

EXHIBIT IV-13

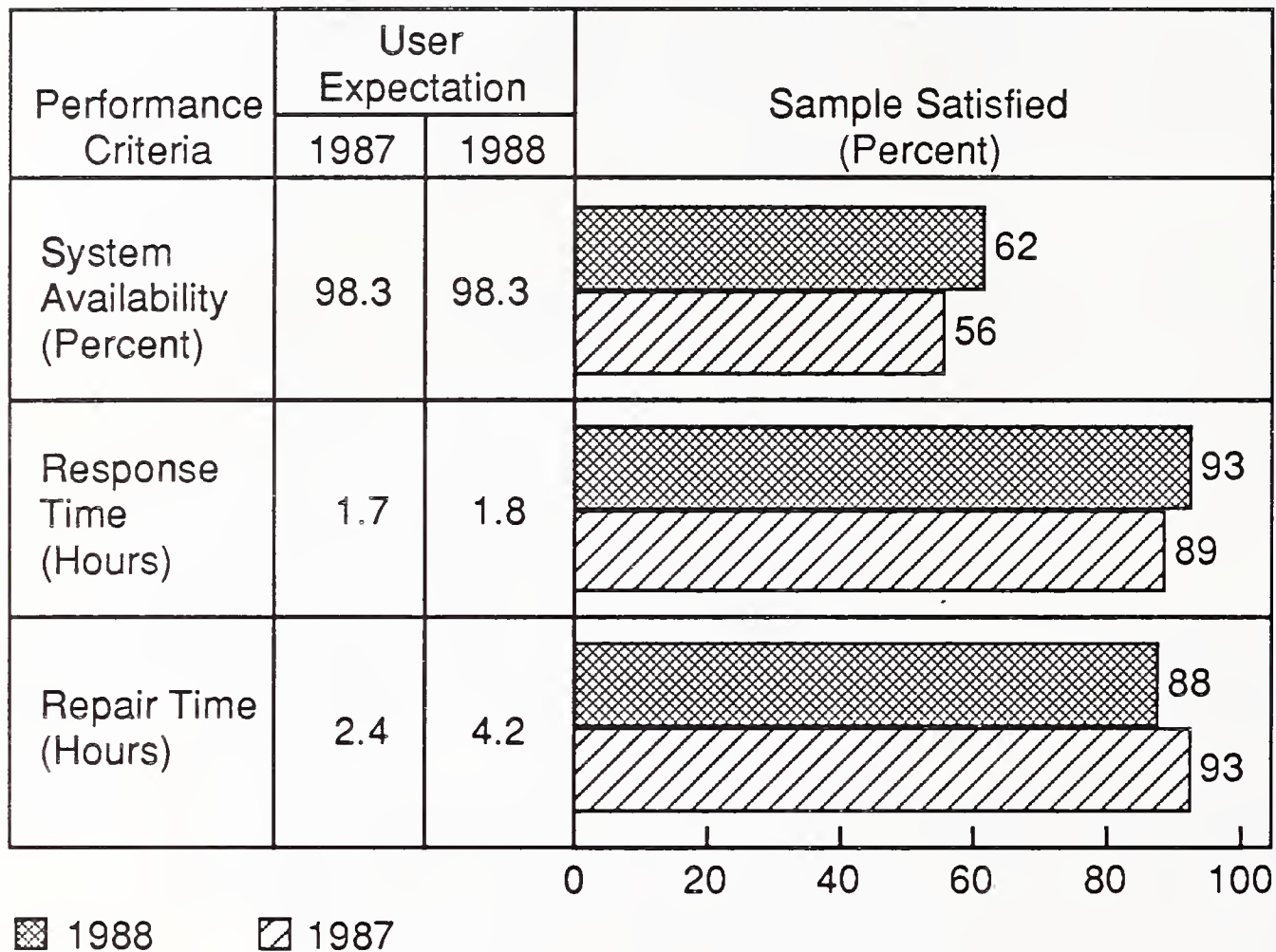


In general, commercial users show more satisfaction than those in the government, although systems availability seems to be a problem. Exhibit IV-14, taken from a recent INPUT CSP report, shows a very high satisfaction level with both response and repair times. This finding seems surprising, in light of the extremely tight requirements defined in most government maintenance contracts. It may suggest higher expectations on the part of agency customers, rather than lower-quality performance. It may also reflect lower profit margins on competitive government contracts, which may affect the quality of service.

To continue to meet the needs of federal agency customers, vendors will have to contend with such competing issues as rising spare parts costs, the need to have quickly accessible parts, and the need to control costs (including labor). To be successful, vendors will need to continue to increase service automation (call handling and dispatching, parts inventory, diagnostics, and remote support delivery).

EXHIBIT IV-14

**User Satisfaction with Service Performance
All Large System Users**



E

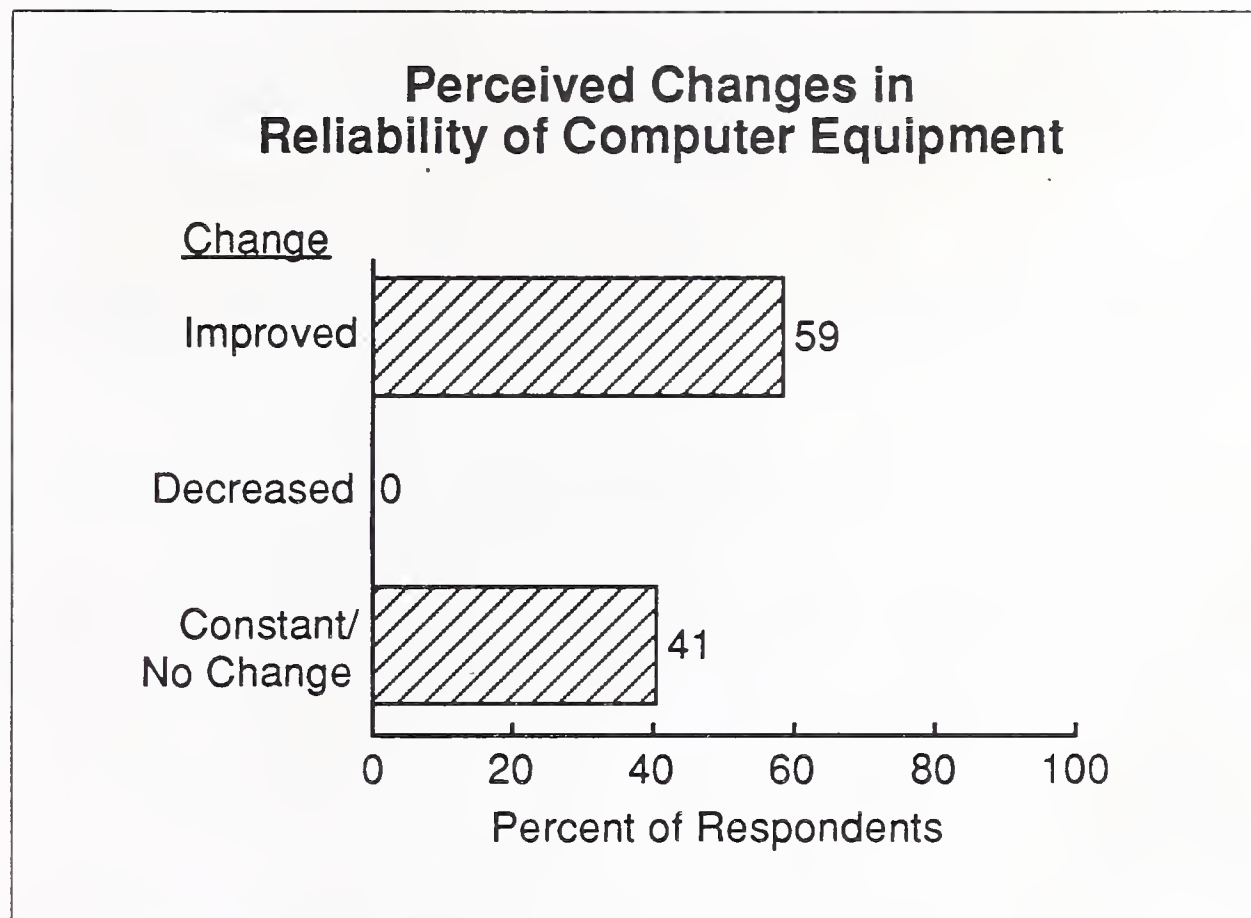
Trends

This section examines agency responses to questions on likely trends in federal equipment maintenance.

1. Reliability Trends

Agency respondents were queried as to their opinions on whether the reliability of computer equipment has improved, decreased, or stayed constant over the past three years. As shown in Exhibit IV-15, over half (59%) of the respondents perceive that reliability has improved. The remaining respondents were of the opinion that there has been no significant change in the reliability of computer equipment.

EXHIBIT IV-15



The improvement in reliability has been achieved through improved chip technology and computer design, and enhanced computing power. Over the past few years users have also experienced lessened requirements for full-service maintenance as reliability improved.

The changes in reliability have brought about a decrease in the cost of maintenance per hardware unit. Some respondents have noted a significant decrease in costs, while others encountered only a slight decline at present, but expect greater savings in the future. Furthermore, a respondent mentioned that he has not seen any savings because of an increasing number of units acquired.

Reliability has lowered vendor profitability for some computer equipment. However, some newer systems with increased reliability have proven to be profitable for vendors servicing the federal market, as the actual labor commitment declined.

2. Agency Rules/Regulations

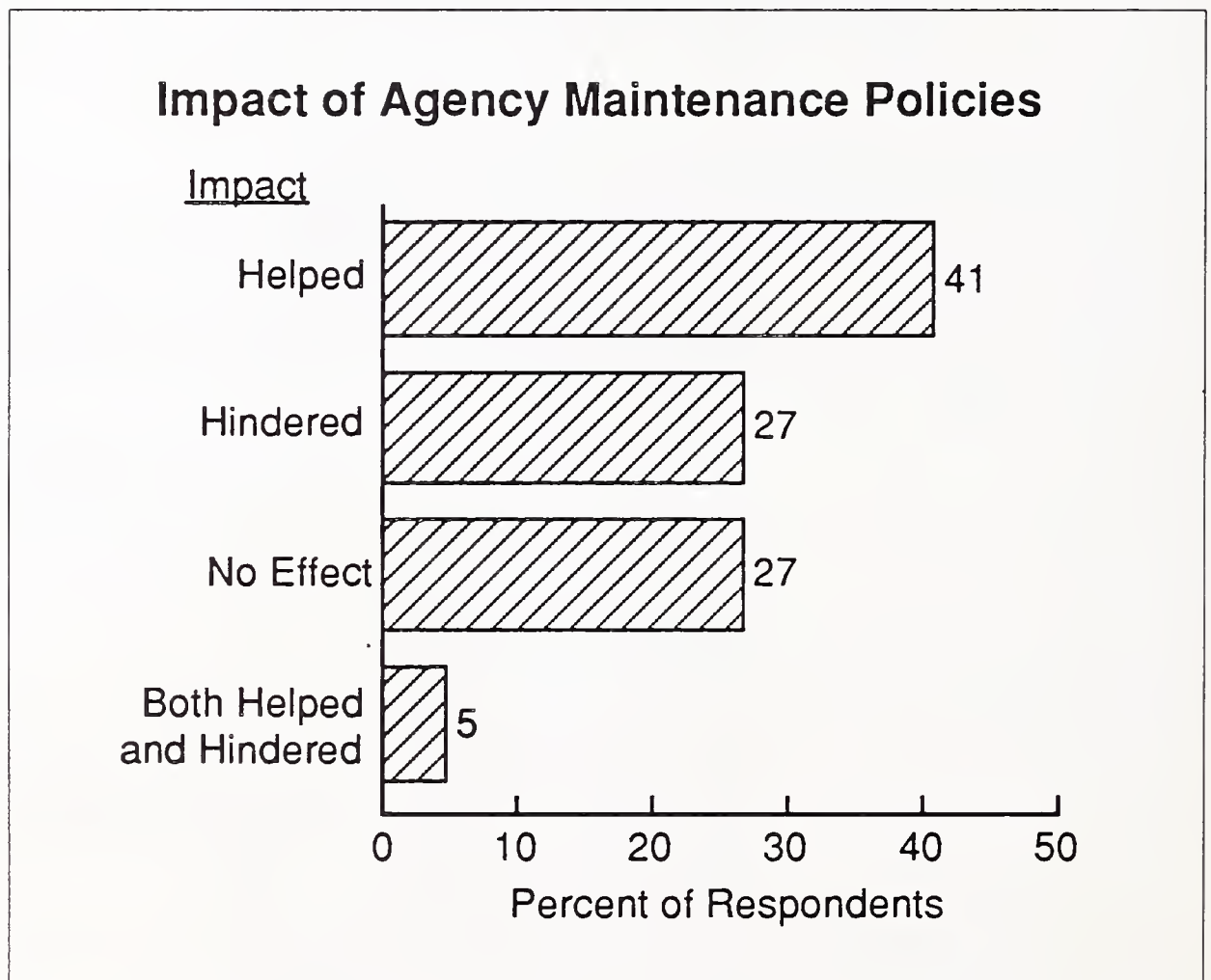
Rules and regulations for contracting equipment maintenance services have remained unchanged at most respondent agencies. Eighty-two percent indicated no changes. Those who indicated a change in any rules/regulations noted the following:

- Change in FAR regulations
- Stiffer rules in general for maintenance
- Separation of hardware and software in maintenance contracts

These changes have brought about a closer scrutiny of maintenance contracts by agency procurement officials and in some cases may lengthen or delay the procurement process.

Additionally, agency respondents were asked if, in general, agency maintenance policies have helped or hindered the acquisition of a satisfactory level of computer equipment maintenance. The largest share (41%) of the respondents expressed a positive reply that agency policies have helped. Exhibit IV-16 also shows that 27% of the agencies either experienced no effect or were hindered by agency policies.

EXHIBIT IV-16

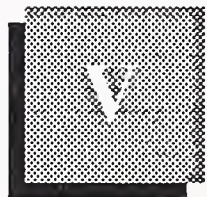


Standardization of maintenance policies has the most notable impact, enabling agencies to meet all requirements and needs more uniformly and easily. Vendors to the federal market also continue to express their concern over operating in extremely diverse hardware environments. Therefore, many vendors have intensified their efforts to adhere to

industry standards, thus promoting compatibility and interoperability. This will facilitate the vertical and horizontal integration of information, both within and between organizations, and promote greater efficiency of maintenance services.

Other respondents viewed the policies as improving the quality and value of maintenance services and being oriented toward achieving a balance between costs and needs. In addition, it was mentioned that some agencies save time in determining the appropriate maintenance solution and in selection of a contractor. The maintenance policies have now also removed restrictions that had limited competition for contracts.

Respondents who view the policies as a hindrance blamed the paperwork burden and the slowness of the bureaucracy. Some respondents believe that the maintenance policies at their agency make it more difficult to acquire maintenance services. There is also more scrutiny of contracts and policies since congressional investigations have taken place.



Competitive Trends

This chapter discusses the results of vendor surveys as well as other competitive information.

A

Vendor Participation

This section presents the results of survey questions on participation in the federal equipment maintenance market.

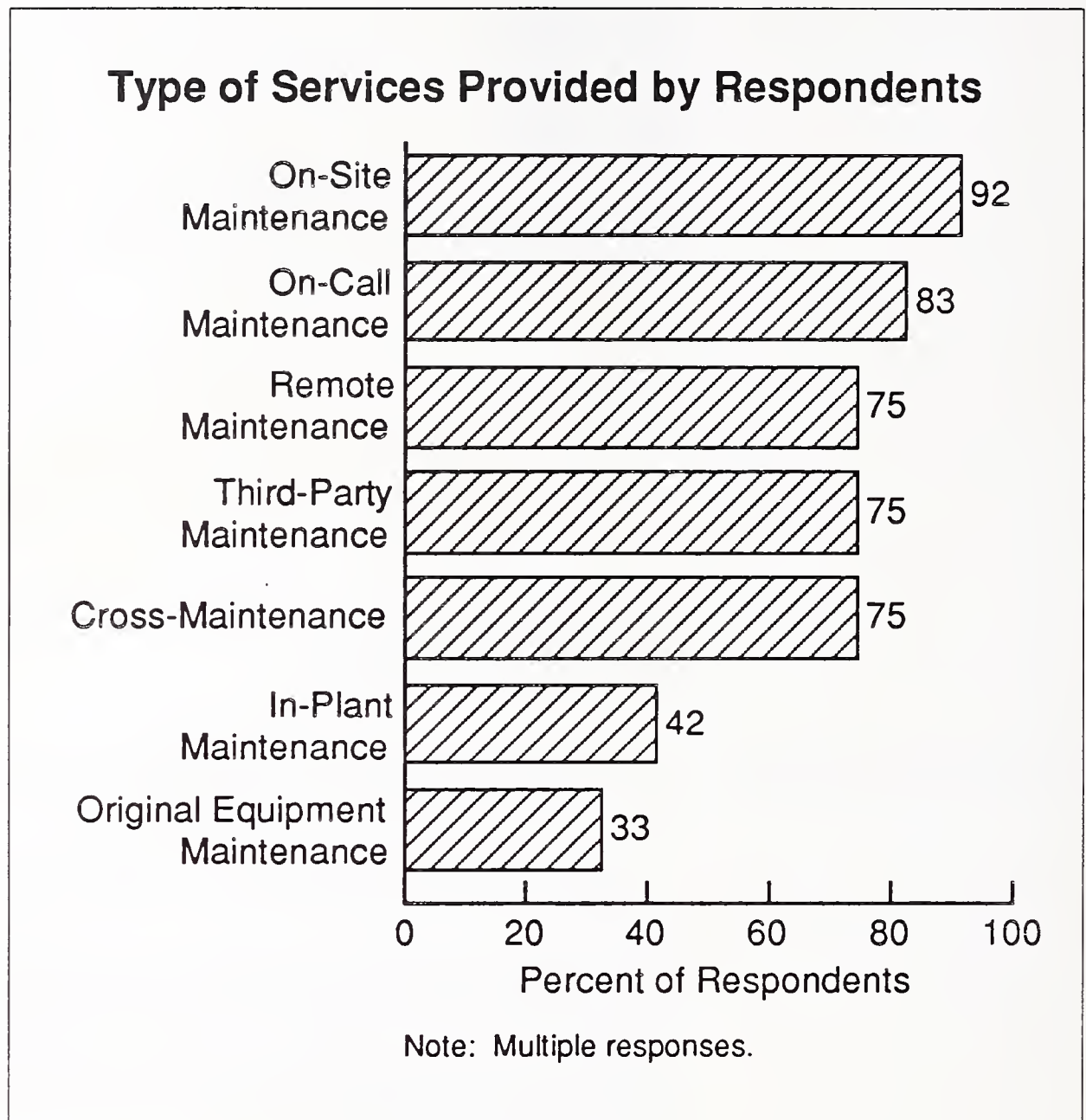
1. Vendor Maintenance Services Offered

Vendors that compete in the federal computer equipment maintenance market offer a wide range of services. Exhibit V-1 shows the maintenance services that vendor respondents currently provide to the federal agencies. These services target the conventional end-user market, emphasizing competitive price, quality service, and the flexibility to meet individual client needs.

Currently, on-site maintenance, remote maintenance, and on-call maintenance are offered by the largest percentage of respondents. These services are being provided by companies that are both OEMs and TPMs.

Third-party maintenance and cross-maintenance are offered by 75% of the respondents. These two services are likely to be offered by more vendors in the future, due to their increased popularity with the federal agencies.

EXHIBIT V-1



Industry respondents were also asked to identify which of their services they expect to increase in offerings to the federal agencies in the next five years. The most frequent responses were for an increase in cross-maintenance, on-site maintenance, remote maintenance and on-call maintenance. Some companies are predominantly active in one or more of these market segments already, and are looking to expand.

Maintenance service vendors continue to look for new service opportunities that increase client satisfaction and provide new revenue sources. In some cases, these industry efforts have helped to expand the definition of computer equipment service and support beyond traditional remedial hardware maintenance to include such areas as consulting and network design. Maintenance vendors are also becoming active in developing disaster recovery services.

It is apparent that as the federal maintenance market matures and competitive forces increase, the provision of services expands for the following reasons:

- Meet user demands
- Respond to competitive pressures
- Exploit areas of business with better margins
- Anticipate traditional maintenance activity reaching a plateau

Vendors must therefore be careful to continually reexamine their service offerings against changing and developing user needs and market conditions.

INPUT notes that the larger TPM vendors tend to offer a wide range of services. This suggests that TPMs are beginning to market part of operations management—hitherto the province of systems and software houses. Some vendors are increasing marketing of products and equipment, previously the province of equipment vendors. Equipment vendors are shown to be taking an increasing interest in single-source services, which indicates a convergence and potential collision of interest between the TPM companies and the equipment vendors in the area of total service solutions.

2. Type of Equipment Serviced

Exhibit V-2 indicates the range of equipment types maintained by the industry respondents. The majority of services are provided by TPMs rather than OEMs. No large-system OEMs are included in this study.

EXHIBIT V-2

	Percent of Respondents*		
	OEM	TPM	Both
Microcomputers	20	75	10
Workstations	20	70	10
Midsized Systems	25	60	20
Large Systems	0	10	20
Telecommunications	0	50	0

*Multiple responses (non-additive).

Forty percent of the OEMs interviewed currently focus on midsize systems. In the future, workstations are expected to account for a greater portion of their maintenance efforts. Microcomputers have a slight lead over workstations for being serviced most frequently by TPMs. Presently, few service organizations view microcomputer support as a profitable endeavor on its own. Instead, most service organizations maintain micros at a larger-system user's site as a way of satisfying the total support needs of those users. They may also see this as a way of penetrating a user's site in order to take over the service of larger, more-profitable product maintenance at that site.

Midsize systems are serviced by TPMs at some agencies, while only a relatively small share of TPMs cited service of large systems. This may be attributed to the federal agencies' tendency to purchase hardware and maintenance together in the initial RFP.

Eighty-three percent of the respondents provide or plan to provide cross-maintenance services on other than their own brand of equipment. There was a diversity of replies about which brands of equipment were cross-serviced. Included were the major brands of microcomputers, workstations, and peripherals, as well as general mention of OEMs' computers. A few respondents noted that their cross-maintenance services are based on the agency population of equipment and user demands.

B

Vendor Perceptions

This section presents the results of survey questions on the views of vendors toward the federal equipment maintenance market.

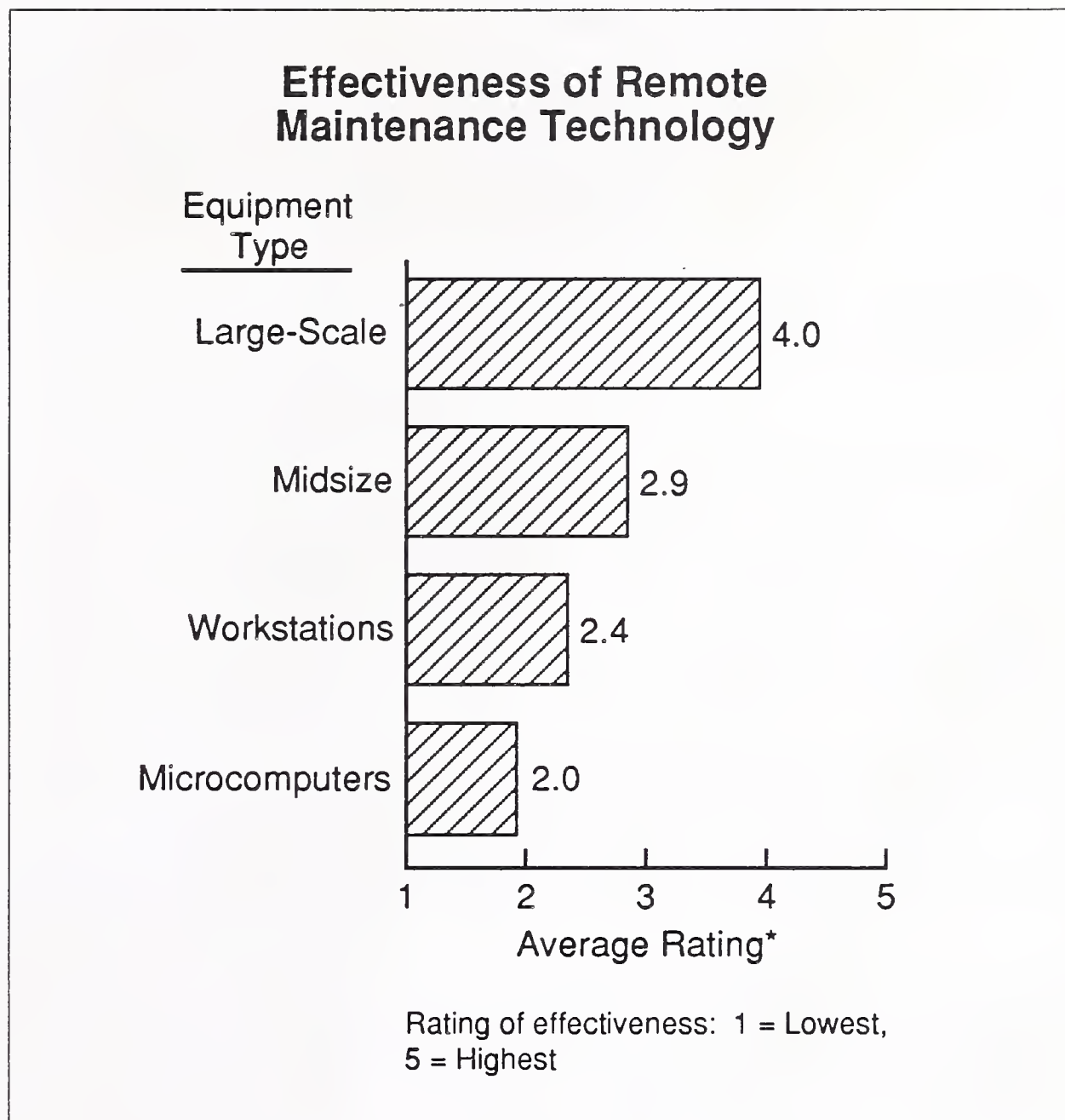
1. Remote Maintenance

Industry respondents were asked to rate the effectiveness of the use of remote maintenance technology with different types of computer equipment. Exhibit V-3 shows the average ratings based on a rating scale of 1 to 5, with 1 being the lowest level of effectiveness and 5 being the highest.

The respondents considered remote maintenance technology twice as effective for large-scale systems (4.0) as for microcomputers (2.0). Midsize systems obtained an average rating (2.9) for effectiveness, and workstations at 2.4 were viewed as below average for effectiveness.

These findings support the longstanding practice that for mainframes, remote support is most effective when used in tandem with telephone consulting, which allows users to assume more of the diagnostic procedures and some self-maintenance activities. Remote maintenance has also aided in the identification and tracking of needed spare parts, thus reducing the number of times that a field engineer arrived on-site without access to the correct spare part.

EXHIBIT V-3



Respondents were also queried as to how likely they were to replace—rather than repair—remote microcomputer equipment and peripherals. On a scale of 1 to 5, with 5 being the most likely, the average rating was a 3.9 for likelihood of replacement for microcomputers.

Several factors contribute to this above-average rating for likelihood to replace. These include:

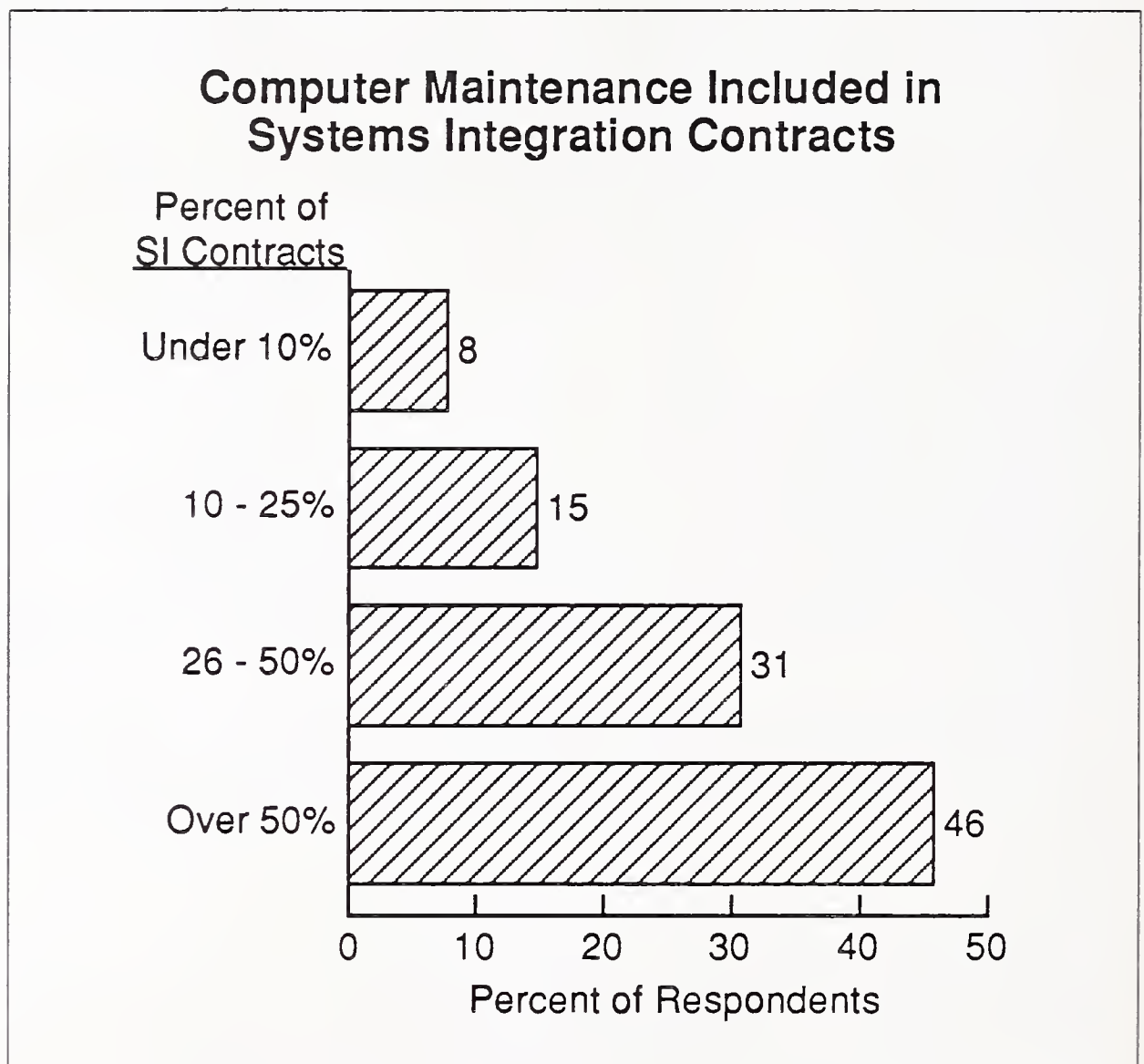
- Cost of microcomputers
- Perceived ineffectiveness of remote maintenance for microcomputers
- Advancing microcomputer technologies

Vendors are weighing the costs of parts and technician labor for repair of microcomputers against the cost of stocking replacement microcomputers. Also, the wide dispersion of microcomputers affects agencies' decisions to replace the machines. This is due to the problem of acquiring timely maintenance at remote sites. Furthermore, with technology rapidly changing, users may prefer to obtain newer microcomputers.

2. Maintenance as Part of SI Contracts

Respondents estimated the extent to which federal agencies are including computer equipment maintenance as part of a systems integration contract. Exhibit V-4 summarizes the percent of SI contracts that include maintenance services.

EXHIBIT V-4



Nearly one-third (31%) of the industry respondents estimated that 26% to 50% of SI contracts have some maintenance included. The largest share (46%) of the respondents gauged that over 50% of systems integration contracts include computer equipment maintenance. Several vendors felt that 80% of SI contracts included maintenance. Maintenance services are often included as warranty services. INPUT suspects that very few, if any, SI contracts omit maintenance.

INPUT's Procurement Analysis Reports (PARs) include the following two SI procurements which serve to show that maintenance is often included with the majority of systems integration services that are acquired.

a. Defense Agency

PROGRAM: Special Operations Forces Planning and Rehearsal System (SOF-PARS)

AGENCY: Air Force/Electronic Systems Division (ESD)

SERVICES and EQUIPMENT to be included: Hardware; minicomputers, peripherals; software; operating software, DBMS; professional services; SI, maintenance, and systems support.

BACKGROUND/FUNCTION: This program is intended to provide near-time realistic planning. The SOF-PARS will serve the Air Force, Army, and Navy by allowing computerized mission planning for all nodes on the network. There will be data bases with information on electronic countermeasures, terrain data, and potential threats in the mission. The system will allow the Special Operations Forces to develop a complete mission plan and threat-analysis in less than 5 minutes.

ACQUISITION PLAN: This program will have 3 phases. Phase I will consist of the IOC (Initial Operating Capability), including an Aviation Planning System for the various DoD services. Phase II will be an Integrated Ground-Air-Sea System, and Phase III the Real-Time Mission Rehearsal.

All 3 phases are still being evaluated. Presently, Phase I is expected to get much of its equipment and services from the AFAMPS program (AF Automated Mission Planning System). Phases II and III are still in the planning stages.

b. Civilian Agency

PROGRAM: Environmental Monitoring and Assessment Program (EMAP)

AGENCY: Environmental Protection Agency

SERVICES and EQUIPMENT to be acquired include: Hardware; computers & peripherals; software: DBMS, applications software; professional services; analysis, maintenance, and engineering support.

BACKGROUND/FUNCTION: This program provides for a full range of computer equipment, software (including DBMS), data analysis, and support services for a "field ecological monitoring program".

The Environmental Monitoring and Assessment Program (EMAP) will support EPA's continuing mission to measure environmental changes in various ecosystems. Planning for EMAP is done at OMMSQA (Office of

Modelling, Monitoring Systems, and Quality Assurance). However, actual procurement activities are being conducted from the six individual labs involved in this program.

ACQUISITION PLAN: EPA has received funding for EMAP, and the Near Coastal component (out of Narragansetts, RI) will be the first lab to release an RFP, probably by August 1990. The Terrestrial component (Las Vegas) also will likely have an RFP in late FY 1990. The RFP for the Fresh Water component (Corvallis), however, is not expected until FY 1991.

3. Problems Associated with the Federal Market

Exhibit V-5 ranks the major problems, based on frequency of mention, that vendors now face in providing equipment maintenance services to the federal government.

EXHIBIT V-5

Problems Associated With Federal Market	
Problem	Rank*
Control Costs/Maintain Margins	1
Servicing Wide Variety of Equipment	2
Contracts Awarded on Price Basis	3
Logistics Costs	4
Adherence to Old Maintenance Procedures	5

*Rank based on frequency of mention by industry respondents.

The most frequently cited problems are controlling costs and maintaining profit margins. The market has become fiercely competitive at the same time that costs are escalating. This puts vendors in the uncomfortable position of seeing their profit margins decline. Furthermore, the additionally cited problem of maintenance contracts being awarded on a price basis also erodes profit margins. Many vendors feel that the government is shortchanging industry by not giving fuller attention to the quality of services and capabilities.

The government's currently installed base of computer equipment is diverse, putting vast service requirements on industry vendors. The mix of equipment and requirements to maximize equipment uptime put heavy demands on companies that provide cross-maintenance services. Some participants in this market also noted the increased risk of allocating resources to multiple sites and keeping a large inventory of spare parts while facing the possibility of the government cancelling the contract at any time with or without cause.

The transportation and supply costs associated with the logistics of providing computer equipment maintenance is becoming an increasingly noticeable problem in the federal market. The perplexity of servicing geographically dispersed agency sites is burdening several vendors. It is difficult for smaller companies to compete for on-site maintenance contracts, but the government imposes restrictions on the quantity of off-site maintenance allowed.

Lastly, the industry respondents viewed the federal government as adhering to old maintenance procedures and hindering vendors' creativity. Some vendors think it would be more appropriate and beneficial if they could utilize newer maintenance techniques to replace obsolete methods required by some agencies. This problem is most apparent when trying to apply old methods to newer, complex computer systems which are more technically advanced.

4. Recommended General Strategies

Industry vendors mentioned several general strategies that they think vendors need to adopt in order to survive in the increasingly competitive federal equipment maintenance market. The recommendations mentioned most frequently are listed in Exhibit V-6.

The increased pressure on profit margins requires a major effort by companies to control costs. Reducing operating expenses will enable vendors to remain competitive in a market where the lowest priced bids usually win.

EXHIBIT V-6

Recommended Strategies

Strategy	Rank*
Reduce Operating Costs	1
Offer Broader Support Services	2
Include Maintenance As Part of SI or Systems Operations Contracts	3
Improve Pricing	4
Offer Quality and Flexible Services	5

*Rank based on frequency of mention by industry respondents.

It was suggested that maintenance be included as part of a systems integration or systems operation contract. Provided that the company has all the required capabilities or working alliances to fulfill the requirements, this may expand the vendor's presence in the federal market. Also, it may be well-suited to many agencies seeking to acquire multiple services through a single contract vehicle in order to expedite the procurement process.

Industry respondents suggest that companies in the federal equipment maintenance market broaden their service offerings to the federal agencies. It was mentioned specifically that vendors need to expand their cross-maintenance capabilities to remain competitive. This suggestion might require additional resources, but could extend a foothold at many agencies.

Appropriate pricing strategies are key to survival in this competitive market. Companies should carefully examine operating costs and prepare strategies to provide high-quality services but at a lower cost to agencies. This can be achieved partly through the application of technology to reduce labor costs and partly through contract growth, which is spurred by high-quality service.

Federal agencies rely on contractors for quality services as well as flexibility in providing maintenance for their computer systems. The government looks to vendors for skills and expertise not available in-house. Companies need to continue to train their staffs to emphasize their maintenance service responsibilities, in order to grow and prosper in the federal marketplace.

C

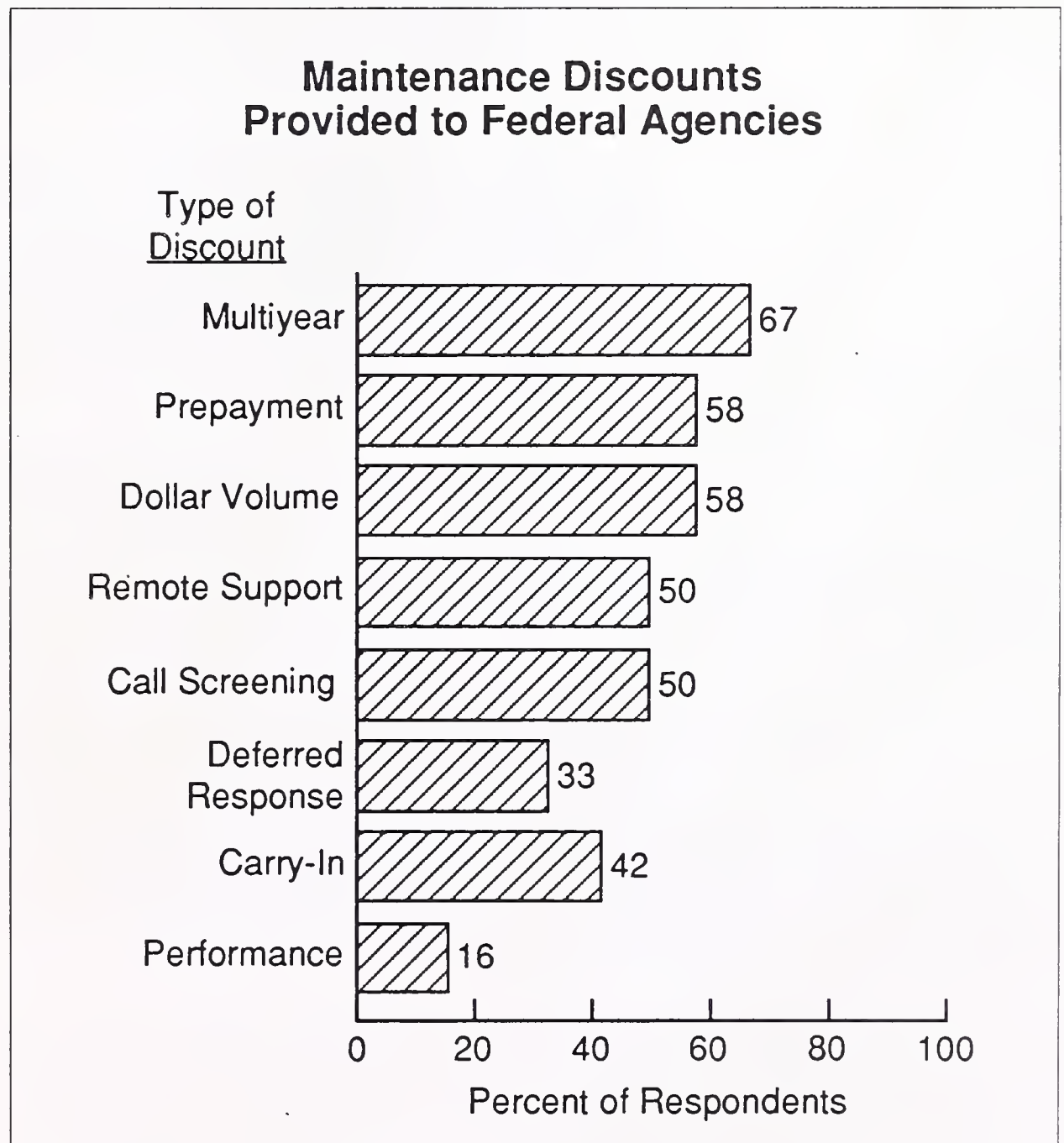
Discounting and Alliance Practices

This section presents vendor survey results on discounting and alliances.

1. Discounts Provided to Federal Agencies

The industry respondents provide a wide range of discounts to the federal agencies. Discounting is becoming more important to the agencies due to their budgetary constraints and concerns involving costs. Exhibit V-7 identifies the range of discounts offered most frequently by the vendors.

EXHIBIT V-7



Multiyear discounts are the most prevalent type offered by the companies surveyed. This type of discount also serves to eliminate yearly negotiations which can be tedious at some agencies. Prepayment and dollar volume discounts are offered by over half of the respondents (58%). These discounts give agencies better prices without reducing maintenance services. This may prove to be costly to some vendors.

Some vendors have implemented discounts based on alternative types of maintenance services. Remote support and call-screening are available from half of the respondents. Agencies utilizing these types of discounts need to first evaluate if the maintenance will be appropriate to their computer systems and installed equipment. Vendors may need to tailor the maintenance services specifically for each agency.

The additional discounts offered include carry-in, deferred response, and performance. These discounts are less frequently used in the government market, as they are more relevant to the commercial sector. Not all federal system users are sufficiently capable or willing to increase their own involvement in participative types of maintenance or to decrease their level of services.

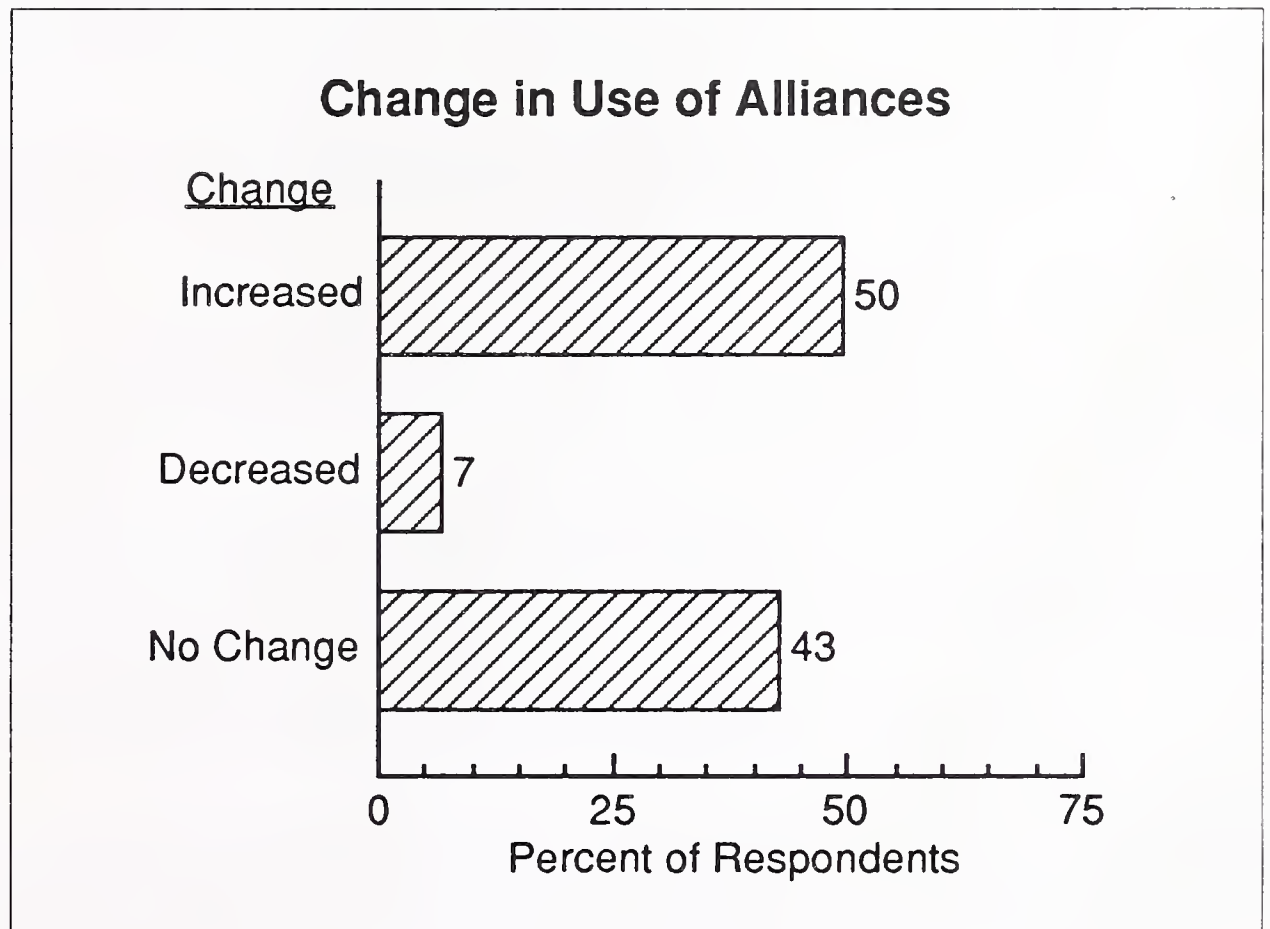
Fifty-eight percent of the respondents negotiate other types of discounts with federal agencies, which are not included in Exhibit V-7. The additional discounts include customized support agreements, stock spare discounts, multisystem, and campus discounts. Furthermore, some vendors negotiated discounts specifically geared to a reduced level of service, which can be more profitable to the company over the course of the contract.

In a recently released INPUT study, *Analysis of Third-Party Maintenance*, it appears that even though there is tremendous price competition in the commercial sector between TPMs and manufacturers for maintenance business, less than 50% of the sample reported receiving any type of discounts from their TPM. The most popular discount is a multiyear contract, with 45% of the respondents receiving a mean discount of 18%. Volume or cluster discounts are next in popularity, with 30% of users receiving these types of discounts. The majority of the discounts received from the TPMs related to contractual issues: multiyear contract, volume/cluster quantity, and prepayment of contract price. The lowest percent of respondents received discounts for reduced service. Users do not appear willing to accept reductions in service, even for reduced prices.

2. Company Alliances

Industry respondents were asked whether their company's alliance efforts in the federal computer equipment maintenance market have changed over the past two years. As shown in Exhibit V-8, fifty percent of the respondents indicated an increase in the use of alliances. This reflects the change needed in formulating alliances to meet the growing complexity of government bids.

EXHIBIT V-8



Vendors gave the following reasons for the increased use of alliances:

- Perceived needs of government agencies
- Price factors
- Need for capabilities to support a wider range of equipment products

Many vendors noted that increased maintenance requirements had exceeded their companies' capabilities and they needed to utilize the expertise of other companies. Respondents that indicated a decrease in alliances cited that they had increased their own in-house capabilities, thus reducing their dependence on alliances.

The industry respondents identified a variety of leading TPM vendors and OEMs as the companies with which they already have established cross-service agreements or alliances. The respondents also indicated that

alliances are being formed with local dealers and subcontractors. The alliances may vary for different agencies due to the mix of equipment and staffing skills required.

D

Maintenance Contractor Selection Criteria

Industry respondents were asked which was the most important criterion used by federal agencies for selection of a maintenance contractor—cost or performance? All respondents were in agreement that cost is more important. Forty-five percent of the agency respondents viewed the second most important criterion as performance, while another 36% were of the opinion that performance and cost were equally important.

The vendors gave numerous reasons why they view cost as the basis for selection at federal agencies. The main reasons cited include:

- Minimum performance requirements defined by agencies
- Not enough focus on quality at agencies
- Government staff's lack of ability to evaluate pertinent criteria
- Lack of agency understanding of technology/complexity of computer systems

It was further noted that unless vendors do not exhibit the resources or capabilities, the federal government assumes the company will achieve its commitment to perform.

Exhibit V-9 shows the vendors' ranking of the additional maintenance contract selection criteria. Cost control procedures topped the industry respondents' selection criteria list and was second in the ratings by the agencies. All parties in this market are aware of the emphasis on controlling costs as the marketplace becomes more competitive and budgets are tightened.

The high ratings for vendor reputation and proposed technical solution indicate that these criteria were also important in winning present and future contracts. This is particularly true in computer maintenance contracts, where multiple systems have been given to a vendor due to his proven experience and expertise. The contract type was given the lowest rating by industry respondents.

EXHIBIT V-9

Vendor Ranking of Additional Contract Selection Criteria

Criteria	Rank
Cost Control Procedures	1
Vendor Reputation	2
Proposed Technical Solution	3
Contract Type	4

E

Trends

This section covers vendor responses to survey questions on the federal trends in equipment maintenance.

1. Impact of Changes in Federal Procurement Regulations

Industry respondents were asked if their companies have been affected by changes in federal procurement regulations. The respondents were evenly divided, with 50% indicating no impact and 50% having been affected to some extent by changes in federal regulations.

The main impacts from changes in regulations include:

- Slower procurements due to the Procurement Integrity Regulations
- Impact on data rights that affect vendor strategies
- Procurement delays due to increased record-keeping requirements
- Changes in certification processes affecting products and procurements
- Removal of some product distribution regulations, which has benefited vendors

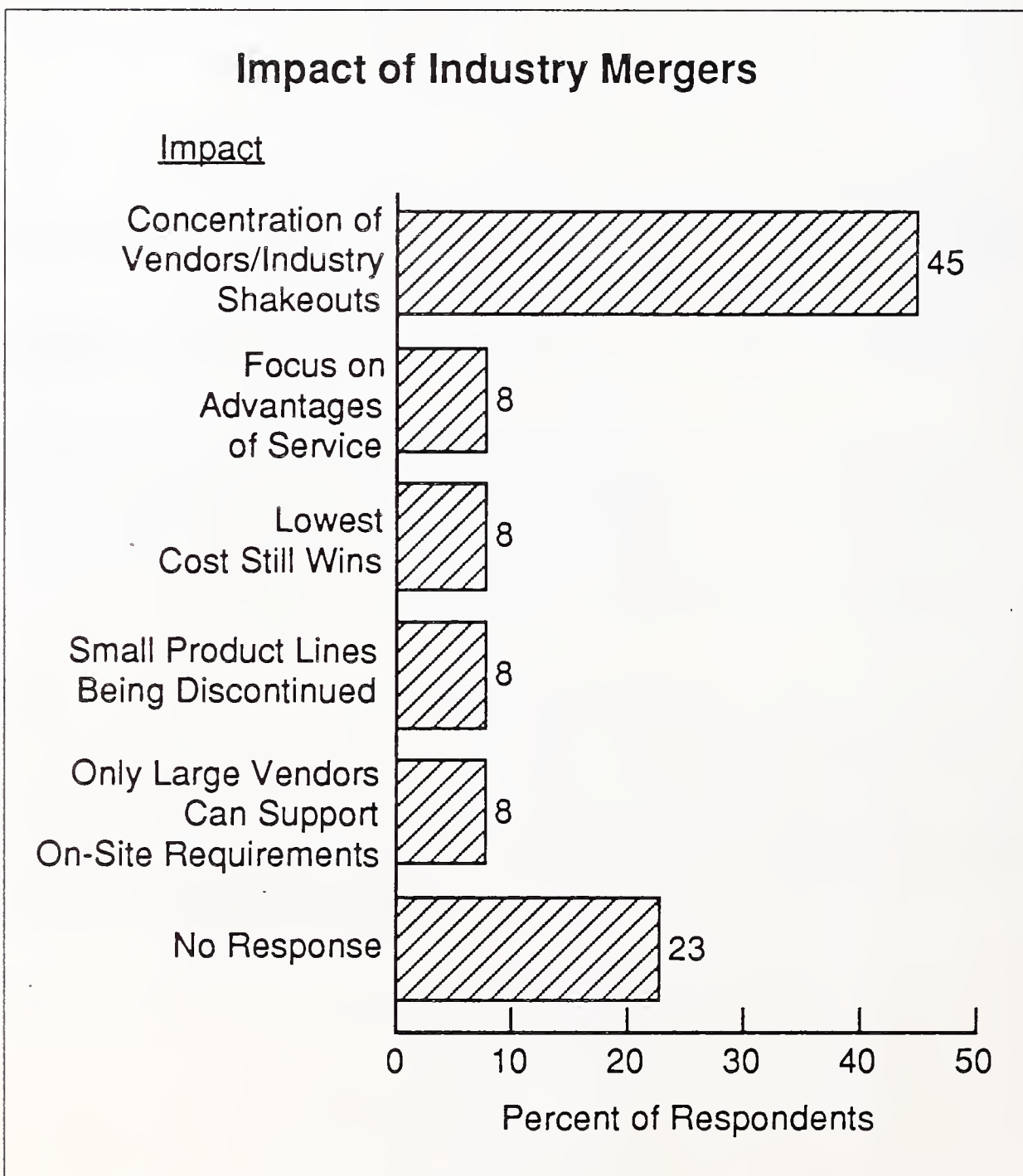
Most of these developments have been negative. Vendors must work harder to combat the ill effects these regulations have on their procurements. Gaining a better understanding of procurement regulations and the certification process can speed the acquisition process.

Record-keeping requirements can become especially onerous if they involve cost and pricing data. Many companies have reduced this burden by establishing wholly owned subsidiaries to handle their federal business.

2. Impact of Industry Mergers

Vendors were asked to indicate the impact of industry mergers on the competitive environment of the federal computer equipment maintenance market. Exhibit V-10 summarizes the major impacts noted.

EXHIBIT V-10



The largest share (45%) of the vendors surveyed indicated that there will be a smaller concentration of vendors as the industry continues to shake out ineffective players. Most notable was CDC's maintenance facilities being merged with Sorbus, a Bell Atlantic Customer Service Subsidiary.

Several vendors mentioned that, in order to remain competitive, vendors must focus on the advantages of their maintenance services. This is often difficult when many companies offer the same or very similar services. Other vendors noted that regardless of mergers and other market conditions, the lowest-cost bid still usually wins. Since this is so, vendors need to minimize costs.

The fast rate at which acquisitions, mergers and reorganizations have occurred over the last twelve months continues to change the face of federal computer equipment maintenance towards a broader-based service industry. Trends for making acquisitions can be broken down into the following categories:

- TPM companies acquire other TPM companies to obtain growth and/or a specialist market niche.
- TPM companies acquire service companies with a required expertise, such as fourth-party maintenance.
- Manufacturers acquire TPM vendors.
- Nonmaintenance organizations acquire TPM companies.

The changes wrought by previous years' acquisitions still reverberate through the industry. Computer maintenance is a people-based business and it is apparent that, following an acquisition or merger, a significant period of settling is to be expected. The effect of some changes, mostly in larger companies, has yet to be fully realized.

Computer maintenance companies are expanding the range of services they offer. This expansion is being achieved by the acquisition of specialist service companies. Some typical services acquired by this strategy are:

- Media supplies
- Installation of computer features
- Computer upgrades
- Product sales

Fast-growing and, in some cases, highly profitable TPM companies have attracted the attention of financial institutions and manufacturers in increasing numbers. This attention is perhaps a recognition that the federal maintenance market is no longer immature and is now a leading computer services area.

With the continued mergers, some discontinuation of smaller product lines is occurring. The newly merged companies are focusing on the largely distributed equipment in order to achieve a better foothold at federal agencies.

The government's imposition of additional on-site maintenance requirements has impacted smaller industry vendors. Some vendors find that only large vendors have sufficient on-site capabilities to comply with agency requirements.

Vendors were also questioned about whether they expect recent vendor consolidations, including mergers and buyouts, to limit competition for federal maintenance contracts. The majority (58%) did not foresee industry consolidation limiting competition. Those vendors that did see competition being limited noted that to the extent that prime contractors start to favor certain subcontractors, business opportunities will become limited. Also, it was noted that with fewer players, there is a greater tendency for vendors to buy in to control accounts. Another continuing concern is that a major player would be bought by another major competitor.

3. Impact of Increased Third-Party Maintenance Services

Industry respondents were queried on how they view the competitive outlook of the federal market over the next five years in light of increased third-party maintenance services. The responses obtained were diverse. Most vendors foresee increased competition and lowering of profit margins. Furthermore, the focus on cost negatively impacts quality.

Some vendors feel that there will be fewer opportunities for systems integration type contracts. This may reflect the expectation of more requirements being combined into single contracts. Also, the most significant impact on competition will be for the large bids.

Other maintenance industry respondents remarked, however, that some TPM vendors are not yet capable of handling the newer computer system technologies. For these systems, the agencies may still be relying on the OEMs for the majority of maintenance. In the future, vendors believe that the government will increase its use of third-party maintenance vendors due to continued budgetary constraints. This suggests an expectation that TPM costs will continue to be lower than those of the OEMs.

4. Impact of Increased Use of Microcomputers

The industry respondents were asked to comment on how the competitive outlook of the federal computer equipment market would be impacted by the increased use of microcomputers. The replies varied due to the nature of the services that vendors offered and their experiences with the federal agencies. Most of the comments were favorable to vendors seeking opportunities in the federal marketplace.

The majority of the respondents anticipate increased opportunities for maintenance of microcomputers due to the following factors:

- Older equipment requiring additional maintenance
- Increased focus on shared data
- Opportunities for expanded or diverse types of services
- Increased demand for network services

Some vendors expressed views that it is more cost-efficient to maintain microcomputers, thus improving profitability. Also, it was noted that the government is increasing its use of large maintenance contracts for microcomputers.

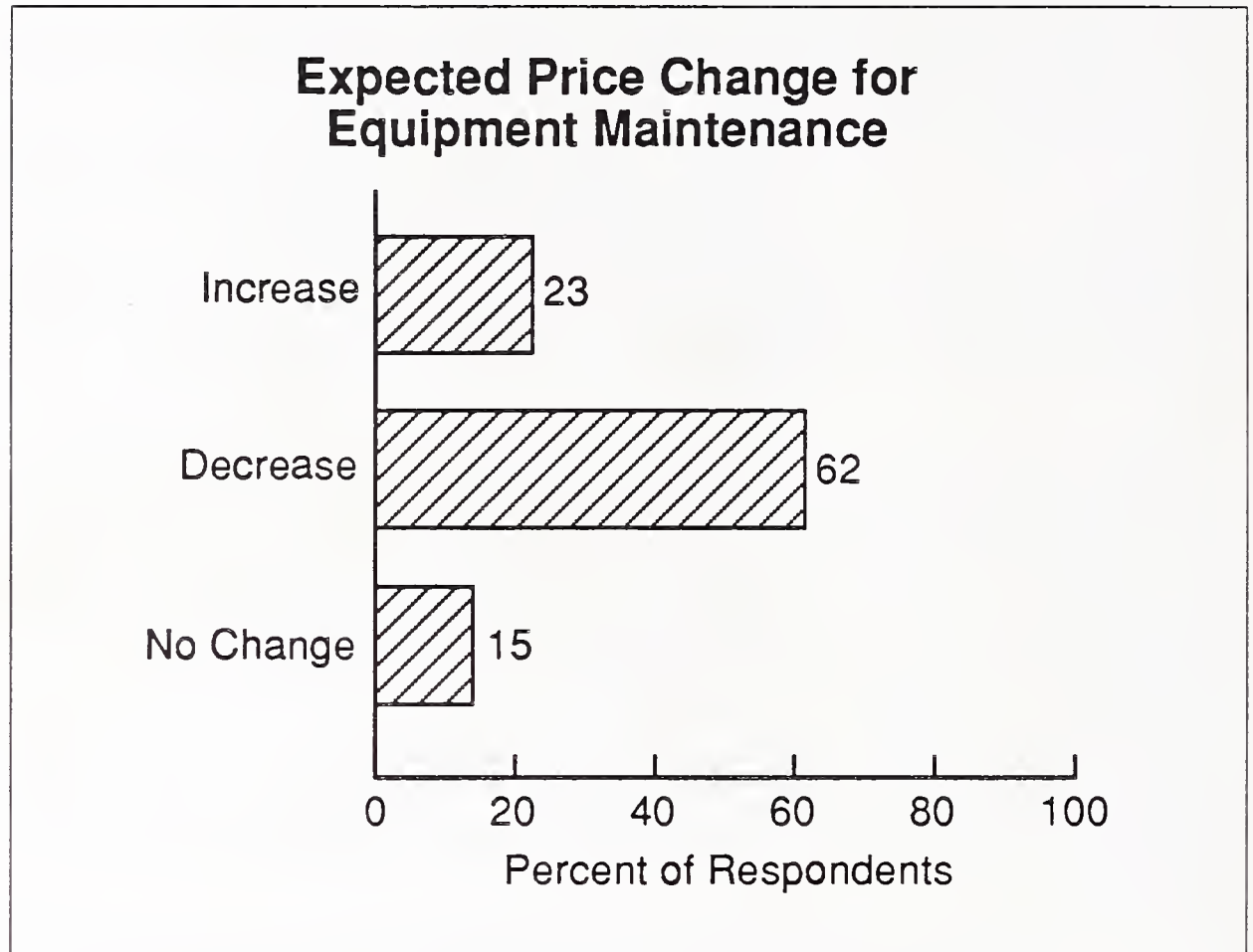
Several negative impacts on industry vendors were mentioned by the respondents. Some vendors are not pleased that since the increased use of microcomputers, maintenance for some microcomputer equipment is being discounted. The discounting will hurt the smaller companies most if it becomes standard.

The increased complexity of microcomputers has affected some vendors as they work on training skilled technicians to handle the newer technologies. Lastly, industry respondents are mentioning the increased competition arising from additional companies now servicing microcomputers. Many are mindful that profits from the microcomputer segment may be lowered.

5. Expected Price Change for Equipment Maintenance

As shown in Exhibit V-11, the majority (62%) of respondents expect that prices for federal computer equipment maintenance will decrease over the next five years. Nearly a quarter (23%) anticipate that prices will increase.

EXHIBIT V-11



The factors identified as contributing toward a price decrease include:

- Increasingly competitive bidding practices
- Improved diagnostics, call-screening
- Tightening of federal budgets
- Improved hardware technology and reliability

Increased prices are expected to stem from increasing labor costs and the greater complexity of network configurations.

Industry respondents were asked to comment on the impact of reliability trends on any price increases. The majority of respondents took the view that reliability, which appears to be leveling off, does not contribute significantly to price increases. It was noted that improved reliability is often offset by the complexity of newer equipment/systems.

6. Vendor-Estimated Revenue Growth Rates

Vendors' views of the estimated revenue growth rates for the types of maintenance services in the federal computer equipment maintenance market are identified in Exhibit V-12. Some vendors expect increases for all services they offer.

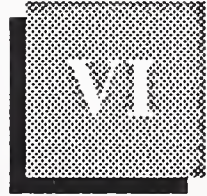
EXHIBIT V-12

Service	Respondent Average Estimated Growth Rate (Percent)
Third-Party Maintenance	19
Original Equipment Maintenance	15
Remote Maintenance	14
Microcomputer Maintenance	14
On-Call Maintenance	13
On-Site Maintenance	11

Respondents were of the opinion that TPM services would increase an estimated 19% over the next two to five years. This compares favorably with INPUT's overall forecast of a 13% annual growth rate. Most vendors are, in fact, quite optimistic about growth prospects in this service area.

For OEM maintenance services, the industry respondents gave lower average growth expectations. This probably reflects the expectation of higher competition for federal maintenance contracts.

Similar growth is anticipated for remote maintenance, microcomputer maintenance, and on-call maintenance. These services will also remain highly competitive.



Key Opportunities

This section describes specific opportunities in the federal information technology market.

Although this opportunity list is not all-inclusive, it includes major programs typical of the federal market.

This list of opportunities becomes smaller after FY 1990 because new programs have not yet been identified or initially approved by the responsible agency. Subsequent issues of this report and the INPUT Procurement Analysis Reports will include additional programs and detailed program information for FY 1990 - FY 1995.

A

Present and Future Programs

New information technology programs 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 to meet the reporting requirements of the Paperwork Reduction Reauthorization Act of 1986
- Agency annual operating budget requests submitted to congressional oversight and appropriations committees based on the OMB A-11 information
- *Commerce Business Daily* for specific opportunities for qualifications as a bidder, and invitations to submit a bid in response to an RFP or RFQ

- Five-Year Defense Plan, which is not publicly available, and the supporting documentation of the separate military departments and agencies
- Classified program documentation available only to qualified DoD contractors

Opportunities related to equipment maintenance may not be specifically identified as such in these documents. Information technology planning documents usually identify mission requirements to be met by specific programs, rather than methods for meeting those requirements. An agency decision to use an equipment maintenance contractor may not be made until a program is well under way and an acquisition plan has been formulated. Over the last several years, however, agencies have shown an increasing tendency to use systems engineering and integration contractors for larger, more complex systems.

All funding proposals are based on cost data of the year submitted with inflation factors dictated by the Administration as part of its fiscal policy, and are subject to revision, reduction, or spread to future years in response to congressional direction. Some additional reductions will be likely in FY 1991 and beyond, due to the tightening of the Department of Defense budget.

B**Equipment Maintenance
Opportunities by Agency**

<u>Agency/Program</u>	<u>PAR Reference</u>	<u>RFP Schedule</u>	<u>FY1990-FY1995 Funding (Est. \$ Million)</u>
Air Force			
System Engineering Support for Norad Computer System	V-1-30	4/1/91	Unk
Special Operations Forces Planning and Rehearsal System	V-1-105	8/21/90	Unk
Air Force Supercomputer Environment	V-1-118	Unk	Unk
Automated Records Management System	V-1-124	7/1/90	Unk
Joint Staff Automation into the Nineties	V-1-126	7/1/90	Unk
Defense Emergency Authorities Retrieval and Analysis System	V-1-127	6/1/90	Unk
Navy Superminicomputers	V-1-128	8/1/90	Unk
Database Machines	V-1-129	6/1/90	Unk
WWMCCS Follow-on Maintenance Contract	V-1-130	Unk	Unk
Tactical Air Force Workstations	V-1-132	6/18/90	Unk
Operations and Maintenance of the Air Force Weapon Lab Electro-Magnetic Pulse Facilities	V-1-135	5/91	Unk
Operations and Maintenance of Western Space and Missile Center	V-1-136	4/1/91	Unk
SETA for Flight Test Center	V-1-137	10/1/91	Unk
Test Range Support	V-1-138	5/1/92	Unk

<u>Agency/Program</u>	<u>PAR Reference</u>	<u>RFP Schedule</u>	<u>FY1990-FY1995 Funding (Est. \$ Million)</u>
Army			
Army WWMCCS Information System	V-2-8	7/1/90	Unk
Standard Depot Systems Modernization	V-2-28	6/15/90	25
Integrated Procurement System	V-2-36	Unk	16.8
Army Tactical Command and Control System	V-2-38	6/1/90	Unk
Conus Telephone Modernization Program	V-2-47	8/1/90	Unk
High Energy Laser System Test Facility	V-2-49	FY91	80
Medical Diagnostic Imaging Support System	V-2-50	8/90	Unk
Common Hardware/Software II	V-2-51	7/1/91	Unk
Laptop Computer Units	V-2-52	7/1/90	Unk
Navy			
PERSPAY Consolidated Computer Center Program	V-3-11	FY93	26
CAD/CAM II	V-3-14	Multiple	82
DPSC West Computer Center Facilities Contract	V-3-56	FY91	Unk
Navy Superminicomputer Acquisition	V-3-91	8/1/90	Unk
Remote Information Exchange Terminal System	V-3-93	8/1/90	Unk

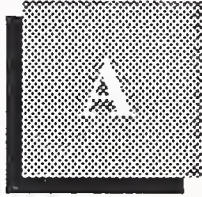
<u>Agency/Program</u>	<u>PAR Reference</u>	<u>RFP Schedule</u>	<u>FY1990-FY1995 Funding (Est. \$ Million)</u>
Lapheld II	V-3-110	4QFY90	Unk
Navy Standard Civilian Pay System	V-3-111	Unk	Unk
Shipboard Non-Tactical ADP Program	V-3-113	1/1/92	129
Navy Occupational Health Information Management System	V-3-114	Unk	9
Facilities Management of the Central Computing Center	V-3-115	FY94	Unk
Operations and Maintenance for the Range Data System	V-3-119	FY92	24
Marine Corp			
Marine Air Ground Task Force Automated Services Center	V-3A-4	FY92	Unk
DCA			
Integrated Defense Communications System—Western Hemisphere (IDCS-WH)	V-4G-6	FY91	10
DIA			
Compartmented Mode Workstation	V-4H-1	Unk	75

<u>Agency/Program</u>	<u>PAR Reference</u>	<u>RFP Schedule</u>	<u>FY1990-FY1995 Funding (Est. \$ Million)</u>
Agriculture			
Laboratory/Office Automation	VI-5-22	Unk	16
ASCS/FAS IRM Integration	VI-5-29	7/1/90	Unk
Integrated Systems Acquisition Project	VI-5-34	8/1/90	Unk
Commerce			
Computer Replacement (Numbers 2 and 3)	VI-6-3	FY91	56
Electronic Demand Printing	VI-6-20	FY92	Unk
Office of Systems Operations Gateway Computer Systems	VI-6-30	6/90	14
Computer Assisted Interviewing	VI-6-33	10/91	6.2
Energy			
Advanced Computer System	VI-7-48	Unk	25
National Waste Information Network	VI-7-85	Unk	Unk
Licensing Support System	VI-7-87	FY91	Unk
Energy Information Administration Facilities Management	VI-7-92	9/1/90	Unk
Operations and Maintenance of ADP and Communications	VI-7-94	FY93	13
Health and Human Services			
Annual Wage Reporting System Enhancements	VII-8-40	Unk	Unk
HCFA Data Center	VII-8-42	FY93	Unk

<u>Agency/Program</u>	<u>PAR Reference</u>	<u>RFP Schedule</u>	<u>FY1990-FY1995 Funding (Est. \$ Million)</u>
Interior			
Automated Graphics Digitizing System	VII-9-3	Unk	Unk
Bureau of Land Management ADP Modernization Project	VII-9-11	9/1/90	128
EROS Data Center	VII-9-17	3QFY91	40
Supervisory Control and Data Acquisition	VII-9-20	FY92	8
Labor			
Integrated Management Information System	VII-9A-5	1/91	Unk
Information System Planning Program	VII-9A-13	FY92	Unk
State			
Co-Processing Facility	VII-9C-2	FY91	39
Justice			
Antitrust Office Automation	VII-10-17	Unk	8
National Prisoner Transportation System	VII-10-23	8/1/90	2
National Crime Information Center Upgrade	VII-10-24	Unk	143
Computer Assisted Dispatch and Reporting Enhancement II	VII-10-27	Unk	26
Transportation			
Marine Safety Network	VII-11-32	10/90	18
Treasury			
Tax Modernization Effort	VII-12-6	Unk	296

<u>Agency/Program</u>	<u>PAR Reference</u>	<u>RFP Schedule</u>	<u>FY1990-FY1995 Funding (Est. \$ Million)</u>
Integrated Management System	VII-12-35	Unk	3
Document Processing System	VII-12-67	12/1/90	652
Education			
Minicomputer Upgrade	VII-13-12	1/1/93	8
Office Automation	VII-13-15	Unk	34
NASA			
Center-Wide Computer Equipment Maintenance	VIII-15-9	6/1/90	Unk
UNIVAC 1100S	VIII-15-36	9/1/90	Unk
NAS Processing System Network-Hi Speed Processors 3 and 4	VIII-15-60	9/1/90	52
NASA Occupational Health Management Information System	VIII-15-70	Unk	Unk
Engineering Analysis and Data System	VIII-15-71	4/1/91	98
Kennedy Inventory Management System	VIII-15-80	8/1/90	7
Maintenance of Honeywell Computers	VIII-15-88	10/1/93	Unk
Computation Mission Services	VIII-15-91	FY96	73
Pioneer Data Processing	VIII-15-92	FY91	8
Data Communications Support Services	VIII-15-94	FY93	45
Veterans Affairs			
Medical Center Telephone System Replacement	VIII-16-9	Unk	65

<u>Agency/Program</u>	<u>PAR Reference</u>	<u>RFP Schedule</u>	<u>FY1990-FY1995 Funding (Est. \$ Million)</u>
DVB Modernization	VIII-16-11	1/1/91	Unk
Austin Equipment Replacement	VIII-16-13	Unk	44
Environment Protection Agency			
Environmental Monitoring and Assessment Program	VIII-17-13	11/1/90	Unk
Federal Emergency Management Agency			
Integrated Emergency Management Information System	VIII-18-7	Unk	4
Integrated Management and Economic Analysis System	VIII-18-8	1/1/92	500
Tennessee Valley Authority			
Personnel Computer Hardware and Accessories Accelerated Delivery	VIII-25-3	7/1/90	Unk
U.S. Courts			
Project for UNIX Microcomputer Acquisition	VIII-30-2	1/1/90	Unk



Appendix: Interview Profiles

A

Federal Agency Respondent Profile

Contacts with agencies were made both by mail and telephone. Federal agency officials selected for interviews included policy officials, program managers, and system users. One or more individuals at the following agencies were interviewed:

- Department of Agriculture
- Department of the Air Force
- Department of Commerce
- Department of Defense (OSD)
- Defense Logistics Agency
- Department of Energy
- Environmental Protection Agency
- Federal Emergency Management Agency
- General Services Administration
- Department of Health & Human Services
- Department of Interior
- Department of Labor
- Marine Corps
- Department of the Navy
- Securities and Exchange Commission
- Department of the Treasury

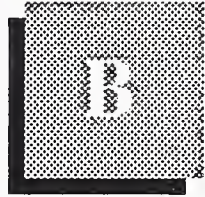
B

Vendor Respondent Profile

For this study, INPUT contacted a representative sample of OEM and TPM contractors that provide computer equipment maintenance to the federal government.

Job classifications among individual vendor respondents included marketing personnel, administrative executives, and project managers.

Interviews with vendor personnel were conducted by telephone and by mail.



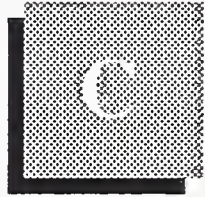
Appendix: Definitions

Federal Computer Equipment Maintenance Market Report Questionnaire Definitions

- *Original Equipment Manufacturer (OEM)* - Vendor producing computer equipment.
- *Third-Party Maintenance (TPM)* - Any service provider other than the original equipment vendor, as well as the process of providing the service.
- *Remote Maintenance* - An extension of remote diagnostics where some level of support is performed from a point physically distant from the computer.
- *Computer Equipment* - Includes all computers that can be separately acquired with or without installation by the vendor.
- *Peripherals* - Includes all input, output, communications, and storage devices (other than main memory) that can be connected locally to the main processor, and that generally cannot be included in other categories such as terminals.
- *Microcomputer* - Combines all of the CPU, memory, and peripheral functions of an 8-, 16-, or 32-bit computer on a chip in the form of:
 - Integrated circuit packages
 - Plug-in boards with more memory of peripheral circuits
 - Console including keyboard and interfacing connectors

Microcomputers are primarily single-user computers that cost under \$15,000.

- *Midsize Computer* - 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. Specific systems in this category are: IBM 98XX systems, all Digital VAX series systems, and common UNIX-based systems such as from Apollo and Sun. Most large shared-logic, integrated office systems—such as those from Wang, Hewlett-Packard, and Groupe Bull—would also be considered midsize systems. This category does not include microcomputers (standalone, or shared), embedded systems and CAD/CAM systems.
- *Large Computer* - 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, VonNeumann-type processors for system control. Usually refers to traditional mainframes (such as IBM 30XX, Unisys (Sperry) 1100/XX, Honeywell DDPS88, Unisys (Burroughs) A15, or CDC Cyber series) and supercomputers (such as products from Cray, ETA, Fujitsu, and the new IBM development effort).
- *Computer System* - The combination of computing resources required to perform the desired functions and which may include one or more CPUs, machine room peripherals, storage systems, and/or applications software.



Appendix: Glossary of 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

Federal Acronyms

AIS	Automated Information System.
AMPE	Automated Message Processing Equipment.
AMPS	Automated Message Processing System.
Appropriation	Congressionally approved funding for authorized programs and activities of the Executive Branch.
APR	Agency Procurement Request.
ARPANET	DARPA network of scientific computers.
ASP	Aggregated Switch Procurement.
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.
AUTODIN	AUTOMATIC DIGITAL Network of the Defense Communications System.

AUTOSEVOCOM	AUTOMatic SEcure VOice COMmunications Network.
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.
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.
C2	Command and Control.
C3	Command, Control, and Communications.
C4	Command, Control, Communications, and Computers.
C3I	Command, Control, Communications, and Intelligence.
CALS	Computer-Aided Automated Logistic System.
CBD	Commerce Business Daily - U.S. Department of Commerce publication listing government contract opportunities and awards.
CBO	Congressional Budget Office.
CFE	Contractor-Furnished Equipment.
CFR	Code of Federal Regulations.
CICA	Competition in Contracting Act.
CO	Contracting Office, Contract Offices, or Change Order.
COC	Certificate of Competency (administered by the Small Business Administration).
COCO	Contractor-Owned, Contractor-Operated.
CONUS	CONTinental United States.

COP	Capability Objective 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.
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.
DCC	Digital Control Computer.
DCP	Development Concept Paper (DoD).
DCS	Defense Communications System.
DDN	Defense Data Network.
DDS	Dynamic Diagnostics System.
DECCO	DEfense Commercial Communications Office.
D&F	Determination and Findings - required documentation for approval of a negotiated procurement.
DIA	Defense Intelligence Agency.
DHHS	Department of Health and Human Services.
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.
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.
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.
EO	Executive Order - Order issued by the President.
EOQ	Economic Ordering Quantity.
EPA	Economic Price Adjustment.
EPA	Environmental Protection Agency.
EUC	End User Computing, especially in DoD.
FA	Formal Advertising.
FAR	Federal Acquisition Regulations.
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.
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.
FSS	Federal Supply Schedule or Federal Supply Service (GSA).
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.
FTS 2000	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).

GOCO	Government Owned - Contractor Operated.
GOGO	Government Owned - Government Operated.
GOSIP	Government Open Systems Interconnection Profile.
GPO	Government Printing Office.
GRH	Gramm-Rudman-Hollings Act (1985), also called Gramm-Rudman Deficit Control.
GS	General Schedule.
GSA	General Services Administration.
GSBCA	General Services Administration Board of Contract Appeals.
HCFA	Health Care Financing Administration.
HHS	(Department of) Health and Human Services.
HSDP	High-Speed Data Processors.
HUD	(Department of) Housing and Urban Development.
ICA	Independent Cost Analysis.
ICE	Independent Cost Estimate.
ICST	Institute for Computer Sciences and Technology, National Bureau of Standards, Department of Commerce.
IDAMS	Image Display And Manipulation System.
IDN	Integrated Data Network.
IFB	Invitation For Bids.
IOC	Initial Operating Capability.
IPS	Integrated Procurement System.
IQ	Indefinite Quantity Contract.
IR&D	Independent Research & Development.
IRM	Information Resources Management.
JFMIP	Joint Financial Management Improvement Program.
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	Letter of Interest.
LRPE	Long-Range Procurement Estimate.
LRIRP	Long-Range Information Resource Plan.

MAISRC	Major Automated Information Systems Review Council (DoD).
MANTECH	MANufacturing TECHnology.
MAPS	Multiple Address Processing System.
MAP/TOP	Manufacturing Automation Protocol/Technical and Office Protocol.
MASC	Multiple Award Schedule Contract.
MILSCAP	Military Standard Contract Administration Procedures.
MIL SPEC	Military Specification.
MIL STD	Military Standard.
MIPR	Military Interdepartmental Purchase Request.
MOL	Maximum Ordering Limit (Federal Supply Service).
MPC	Military Procurement Code.
MYP	Multi-Year Procurement.
NASA	National Aeronautics and Space Administration.
NIP	Notice of Intent to Purchase.
NIST	National Institute Standards and Technology
NSA	National Security Agency.
NSF	National Science Foundation.
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.
OIRM	Office of Information Resources Management.
O&M	Operations & Maintenance.
OMB	Office of Management and Budget.
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.
OSI	Open System Interconnect.
OTA	Office of Technology Assessment (Congress).
Out-Year	Proposed funding for fiscal years beyond the Budget Year (next fiscal year).
P-I	FY Defense Production Budget.
PAR	Procurement Authorization Request or Procurement Action Report.
PCO	Procurement Contracting Officer.
PME	Performance Monitoring Equipment.
PMP	Purchase Management Plan.
PO	Purchase Order or Program Office.
POSIX	Portable Open System Interconnection Exchange.
PPBS	Planning, Programming, Budgeting System.
PR	Purchase Request or Procurement Requisition.
PRA	Paperwork Reduction Act.
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.
QMR	Qualitative Material Requirement (Army).
QPL	Qualified Products List.
R-I	FY Defense RDT&E Budget.
RAM	Reliability, Availability, and Maintainability.
RC	Requirements Contract.
R&D	Research and Development.
RDD	Required Delivery Date.
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.
SBA	Small Business Administration.
SB Set-Aside	Small Business Set-Aside contract opportunities with bidders limited to certified small businesses.
SDN	Secure Data Network.
SEC	Securities and Exchange Commission.
SE&I	Systems Engineering and Integration.

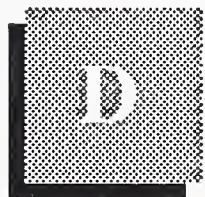
SETA	Systems Engineering/Technical Assistance.
SETS	Systems Engineering/Technical Support.
SIBAC	Simplified Intragovernmental Billing and Collection System.
SIMP	Systems Integration Master Plan.
Sole Source	Contract award without competition.
Solicitation	Invitation to submit a bid.
SOR	Specific Operational Requirement.
SOW	Statement of Work.
SSA	Source Selection Authority (DoD).
SWO	Stop-Work Order.
Synopsis	Brief description of contract opportunity in CBD after D&F and before release of solicitation.
TA/AS	Technical Assistance/Analysis Services.
TCP/IP	Transmission Control Protocol/Internet Protocol.
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	Technical and Industrial Liason Office-Qualified Requirement Information Program - Army.
TM	Time and Materials contract.
TOA	Total Obligational Authority (Defense).
TR	Temporary Regulation (added to FPR, FAR).
TRCO	Technical Representative of the Contracting Offices.
TREAS	Department of Treasury.
TRP	Technical Resources Plan.
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 Affairs Department.
VE	Value Engineering.
VHSIC	Very High Speed Integrated Circuits.

VIABLE	Vertical Installation Automation BaseLine (Army).
WGM	Weighted Guidelines Method.
WITS	Washington Interagency Telecommunications System.
WIS	WWMCCS Information Systems.
WS	Work Statement - Offerer's description of the work to be done (proposal or contract).
WWMCCS	World-Wide Military Command and Control System.

B**General and Industry
Acronyms**

ADAPSO	Association of Data Processing Service Organization, now the Computer Software and Services Industry Association.
ADP	Automatic Data Processing.
ADPE	Automatic Data Processing Equipment.
ANSI	American National Standards Institute.
BOC	Bell Operating Company.
CAD	Computer-Aided Design.
CAM	Computer-Aided Manufacturing.
CBEMA	Computer and Business Equipment Manufacturers Association.
CCIA	Computers and Communications Industry Association.
CCITT	Comite Consultaif Internationale de Telegraphique et Telephonique; Committee of the International Telecommunication Union.
COBOL	COMmon Business-Oriented Language.
COS	Corporation for Open Systems.
CPU	Central Processing Unit.
DBMS	Data Base Management System.
DRAM	Dynamic Random Access Memory.
EIA	Electronic Industries Association.
EPROM	Erasible Programmable Read-Only-Memory.
IEEE	Institute of Electrical and Electronics Engineers.
ISDN	Integrated Services Digital Networks.
ISO international	International Organization for Standardization; voluntary standards organization and member of CCITT.
ITU	International Telecommunication Union.
LSI	Large-Scale Integration.

MFJ	Modified Final Judgement.
PROM	Programmable Read-Only Memory.
RBOC	Regional Bell Operating Company.
UNIX	AT&T Proprietary Operating System.
UPS	Uninterruptable Power Source.
VAR	Value-Added Retailer.
VLSI	Very Large-Scale Integration.
WORM	Write-Once-Read-Many-Times.



Appendix: 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.
	A-127	Financial Management Systems.
	A-130	Management of Federal Information Resources.
	A-131	Value Engineering.

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.
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C

DoD Directives	DD-5000.1	Major System Acquisitions.
	DD-5000.2	Major System Acquisition Process.
	DD-5000.11	DoD Data Elements and Data Codes Standardization Program.
	DD-5000.31	Interim List of DoD-Approved High-Order Languages.
	DD-5000.35	Defense Acquisition Regulatory Systems.
	DD-5200.1	DoD Information Security Program.
	DD-5200.28	Security Requirements for Automatic Data Processing (ADP) Systems.

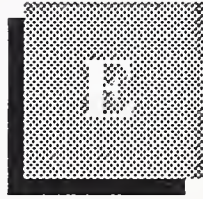
DD-5200.28-M	Manual of Techniques and Procedures for Implementing, Deactivating, Testing, and Evaluating Secure Resource Sharing ADP Systems.
DD-7920.1	Life Cycle Management of Automated Information (AIS).
DD-7920.2	Major Automated Information Systems Approval Process.
DD-7935	Automated Data Systems (ADS) Documentation.

D

Standards

ADCCP	Advanced Data Communications Control Procedures; ANSI Standard X3.66 of 1979; also NBS FIPS 71.
CCITT G.711	International PCM standard.
CCITT T.0	International standard for classification of facsimile apparatus for document transmission over telephone-type circuits.
DEA-1	Proposed ISO standard for data encryption based on the NBS DES.
EIA RS-170	Monochrome video standard.
EIA RS-170A	Color video standard.
EIA RS-464	EIA PBX standards.
EIA RS-465	Standard for Group III facsimile.
EIA RS-466	Facsimile standard; procedures for document transmission in the General Switched Telephone Network.
EIA RS-232-C	EIA DCE to DTE interface standard using a 25-Pin connector; similar to CCITT V-24.
EIA RS-449	New EIA standard DTE to DCE interface which replaces RS-232-C.
FED-STD 1000	Proposed Federal Standard for adoption of the full OSI reference model.
FED-STD 1026	Federal Data Encryption Standard (DES) adopted in 1983; also FIPS 46.
FED-STD 1041	Equivalent to FIPS 100.
FED-STD 1061	Group II Facsimile Standard (1981).
FED-STD 1062	Federal standard for Group III facsimile; equivalent to EIA RS-465.
FED-STD 1063	Federal facsimile standard; equivalent to EIA RS-466.
FED-STDs 1005, 1005A-1008	Federal Standards for DCE Coding and Modulation.
FIPS 46	NBS Data Encryption Standard (DES).
FIPS 81	DES Modes of Operation.
FIPS 100	NBS Standard for packet-switched networks; subset of 1980 CCITT X.25.
FIPS 107	NBS Standard for local-area networks, similar to IEEE 802.2 and 802.3.

FIPS 146	Government Open Systems Interconnection (OSI) Profile (GOSIP).
FIPS 151	NIST POSIX (Portable Operating System Interface for UNIX) standard.
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 networks standard for token-ring networks.
IEEE P1003.1	POSIX standard, similar to FIPS 151.
MIL-STD-188-114C	Physical interface protocol similar to RS-232 and RS-449.
MIL-STD-1777	IP-Internet Protocol.
MIL-STD-1778	TCP - Transmission Control Protocol.
MIL-STD-1780	File Transfer Protocol.
MIL-STD-1781	Simple Mail Transfer Protocol (electronic mail).
MIL-STD-1782	TELNET - virtual terminal protocol.
MIL-STD-1815A	Ada Programming Language Standard.
SVID	UNIX System Interface Definition.
X.12	ANSI standard for Electronic Data Interchange.
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).



Appendix: Related INPUT Reports

A

Annual Market Analyses

U.S. Information Services Vertical Markets, 1989
U.S. Information Services Cross-Industry Markets, 1988
Procurement Analysis Reports, GFY 1990-1995

B

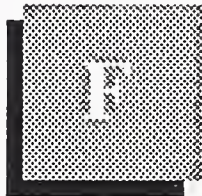
Industry Surveys

U.S. Information Services Industry, 1988
Eighteenth Annual ADAPSO Survey of the Computer Services Industry
Directory of Leading U.S. Information Services Vendors, 1989

C

Market Reports

- *Federal Large-Scale Systems Market, 1988-1993*
- *Federal Professional Services Market, 1989-1994*
- *Federal Software and Related Services Market, 1989-1994*
- *Federal Midsize Systems Market, 1988-1993*
- *Federal Systems Integration Market, 1989-1994*
- *Federal Telecommunications Market, 1988-1993*
- *Federal Office Information Systems Market, 1988-1993*
- *Federal Microcomputer Market, 1989-1994*
- *Defense Logistics Agency Information Services Market*
- *NASA Information Systems Market, 1988-1993*
- *Federal Processing Services/Systems Operations Market, 1989-1994*



Appendix: Federal Agency Questionnaire

CONFIDENTIAL

Federal Agency Questionnaire Federal Computer Equipment Market

This questionnaire is directed to the study of the federal government's use of computer equipment maintenance services. The study focuses on the requirements, competitive trends, and relevant issues for this market.

1. Please identify computer equipment/models for which contracted maintenance services have been acquired at your agency:

2. Does your agency differentiate among equipment sizes (large, medium, small) in your maintenance contracts?

Yes ___
No ___

If so, how? (For example, do you specify higher maintenance requirements in contracts for smaller systems or larger systems?)

3. Which type of computer equipment maintenance does your agency use most?

- Original Equipment Manufacturer (OEM) _____
- Third Party Maintenance (TPM) _____
- In-House Maintenance _____
- Other (specify) _____

4a. Which is the most important criteria for selection of a maintenance method—Cost or Performance?

- Cost _____
- Performance _____
- Other (specify) _____

Why?

4b. Please rank in order of importance, the following additional vendor selection criteria from an agency viewpoint.

Selection Criteria	Rank
Contract Type	_____
Cost Control Procedures	_____
Proposed Technical Solution	_____
Vendor Reputation	_____

5. I have a list here of different aspects of maintenance service. As I read through them, would you please rate the quality of maintenance services received from OEMs and TPMs vendors or In-House for each factor.

On a scale of one to five (five being highest), what was the level of quality for maintenance services for: (read list)

Factor	Rating Level (1-5)
a. Responsiveness to agency needs	_____
b. Quantity of service	_____
c. Response time on a service call	_____
d. Access to spare parts	_____
e. Technical expertise	_____
f. Ability to service multi-vendor systems	_____

6a. (If appropriate) Why has your agency changed from an OEM to a TPM vendor for computer equipment maintenance? (Check the reason that best applies or specify other reason)

- Model not maintained by OEM _____
- Cost _____
- Maintenance is part of Systems Operation Contract _____
- Other (specify) _____
- Did not change _____

6b. When did change occur?

- End of initial contract _____
- Mid-point or during contract _____

7. How are your agency's microcomputers serviced? (check all that apply)

- OEM _____
- TPM _____
- Remote Maintenance _____
- Minor Maintenance/Usually Replaced _____

8. Does your agency utilize remote maintenance for any of its computer equipment?

- Yes _____
- No _____
- Future _____

9a. In your opinion, has the reliability of computer equipment improved, decreased or stayed constant over the past three years?

- Improved _____
- Decreased _____
- Constant _____

9b. How has the change in reliability impacted maintenance costs?

10. What has been the impact of having both old and new equipment when attempting to comply with federal maintenance policies and procedures?

11. How are performance requirements affected by equipment retention periods? (i.e., are performance standards and expectations lower for older equipment)
-
-

12. (If appropriate) Are these lower performance requirements reflected in the provisions of agency maintenance contracts?

Yes

No

Is so, how?

- 13a. Does your OEM vendor service multiple vendor computer systems? (Cross-Maintenance outside of their own product line)

Yes

No

- 13b. What percent of your computer equipment maintenance is done through cross-maintenance? (Estimate approx. percent)

Under 25%

25%-49%

50%-74%

75%-100%

14. What percent of the agency computer equipment maintenance contracts are recompeted? (Estimate approx. percent)

Under 25%

25%-49%

50%-74%

75%-100%

15. As examples of recompetes, please identify two or three of your agency's equipment maintenance contracts that are expected to be recompeted over the next two years and for what type of equipment. (Indicate information below)

System/Computer Program Name

Type Equipment

- 1. _____
- 2. _____
- 3. _____

16a. How has your agency changed its rules/regulations for contracting equipment maintenance services? What has been the impact of these changes?

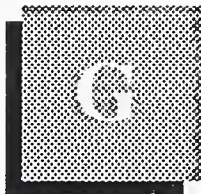
Rule	Change	Impact
_____	_____	_____
_____	_____	_____
_____	_____	_____

No changes _____

16b. In general, have agency maintenance policies helped or hindered your acquiring a satisfactory level of computer equipment maintenance?

Helped _____
 Hindered _____

In what ways?



Appendix: Industry Vendor Questionnaire

CONFIDENTIAL

INPUT Questionnaire - Industry Vendors

Catalog No.: FISSP-71

Study Title: Federal Computer Equipment Maintenance Market (1990-1995)

Code: GFEM

Interview Type: Marketing Telephone
 Technical On-Site
 Executive Mail

Date: _____

This questionnaire is directed to the study of the federal government's use of computer equipment maintenance services. The study focuses on the requirements, competitive trends, and relevant issues for this market.

Interviewer: _____

Respondent Name: _____

Title: _____

Phone: _____

Company: _____

Address: _____

Office Code: _____

Thank you for your patience in completing this questionnaire. Please return this questionnaire by _____ in the enclosed envelope. You will receive an executive summary of this report.

CONFIDENTIAL

**Industry Questionnaire
Federal Computer Equipment Maintenance Market**

1. Which of the following computer equipment maintenance services do you provide to federal agencies? (Check all that apply)

- Hardware Maintenance (OEM)
- Hardware Maintenance (TPM)
- Cross-Maintenance (Multiple vendor systems)
- On-Site Maintenance
- Remote Maintenance
- On-Call Maintenance Services
- In-plant Maintenance
- Other (Specify) _____

Which of these services do you expect to increase in offerings to the federal agencies in the next five years?

2. Please indicate the types of federal computer equipment that you service as either an OEM or TPM. (Check all that apply in each column)

	OEM	TPM
Microcomputers	___	___
Workstations	___	___
Midsize Systems	___	___
Large Systems	___	___
Other (Specify) _____		

3. Do you provide or plan to provide cross-maintenance services on other than your own brand of equipment?

- Yes ___
- No ___

If so, which brands?

4. What discounts are available to federal agencies for computer equipment maintenance?

	YES	NO
Multi Year	___	___
Prepay	___	___
Carry In	___	___
Call Screening	___	___
Dollar Volume	___	___
Performance	___	___
Deferred Response	___	___
Remote Support	___	___

In addition to the discounts above, do you also negotiate discounts with individual federal customers?

Yes ___
 No ___

If YES, what types of discounts are negotiated?

5a. Do you expect prices for federal computer equipment maintenance to increase, decrease, or stay constant over the next five years?

Increase ___
 Decrease ___
 Constant ___

Why?

5b. If a price increase is expected, to what extent are reliability trends (which appear to be leveling off) affecting this increase?

6. What alliances has your company established for cross-service agreements? (Specify company names)

Alliances formed with:

Has your use of alliances increased or decreased over the past two years?

Increased

Decreased

Why?

7. What general recommended strategies do you think vendors need to adhere to in order to survive in the increasingly competitive federal maintenance market?

8. Please give us your best estimate of the probable revenue growth rates for each of the following major services in the federal market.

Computer Hardware Maintenance(OEM)	<input type="text"/>	%
Third Party Maintenance (TPM)	<input type="text"/>	%
Remote Maintenance	<input type="text"/>	%
On-Site Maintenance	<input type="text"/>	%
On-Call Maintenance	<input type="text"/>	%
Microcomputer Maintenance	<input type="text"/>	%
Other <input type="text"/>	<input type="text"/>	%

9. How do you view the competitive outlook of the federal market over the next five years in light of the following:

(INDICATE IMPACT/INFLUENCE)

a. Industry mergers/buy-outs:

b. Increased TPM services:

c. Increased use of microcomputers:

Do you expect recent vendor consolidation, including mergers and buyouts, to limit competition on federal maintenance contracts?

Yes
 No

If YES, to what extent?

10. Has your company been affected by changes in federal procurement regulations?

Yes
 No

If YES, which changes affected you, and in what way?

11a. Which is the most important used criteria by federal agencies for selection of a maintenance method—COST OR PERFORMANCE?

Cost
 Performance
 Other (Specify) _____

Why?

11b. Please rank, in a 1-4 order, the following additional vendor selection criteria from an agency viewpoint. (1=Highest, 4=Lowest rank)

Selection Criteria	Rank
Contract Type	_____
Cost Control Procedures	_____
Proposed Technical Solution	_____
Vendor Reputation	_____

12. Please estimate to what extent federal agencies are including computer equipment maintenance as part of a systems integration contract? (Indicate approx. percent)

Under 10% _____
10-25% _____
26-50% _____
Over 50% _____

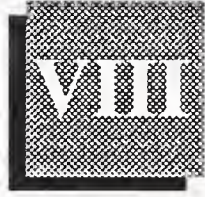
13. What do you consider the major problems that vendors face right now in providing computer equipment maintenance services to the federal government?

14. This question concerns maintenance of micros and their peripherals at remote sites. On a scale of 1 to 5, with 5 being most likely, please note how likely are you to replace rather than attempt to repair, remote equipment?

Likelihood of Replacement _____ (1 to 5)

15. Again on a rating scale of 1 to 5, how effective is the use of remote maintenance technology with different types of equipment (Insert level of effectiveness 1=lowest, 5=highest)

Microcomputers _____
Midsize _____
Workstations _____
Large Scale _____



About INPUT

Company Profile

INPUT provides planning information, analysis, and recommendations to managers and executives in the information processing industries. Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions.

Continuous-information advisory services, proprietary research/consulting, merger/acquisition assistance, and multiclient studies are provided to users and vendors of information systems and services (software, processing services, turnkey systems, systems integration, professional services, communications, and systems/software maintenance and support).

Many of INPUT's professional staff have more than 20 years experience in their areas of specialization. Most have held management positions in large organizations, enabling them to supply practical solutions to complex business problems.

Formed as a privately held corporation in 1974, INPUT has become a leading international research and consulting firm. Clients include more than 100 of the world's largest and most technically advanced companies.

Staff Credentials

INPUT's staff have been selected for their broad background in a variety of functions, including planning, marketing, operations, and information processing. Many of INPUT's professional staff have held executive positions in some of the world's leading organizations, both as vendors and users of information services, in areas such as the following:

- Processing Services
- Professional Services
- Turnkey Systems
- Applications Software
- Field (customer) Service
- Banking and Finance
- Insurance
- Process Manufacturing
- Telecommunications
- Federal Government

Educational backgrounds include both technical and business specializations, and many INPUT staff hold advanced degrees.

U.S. and European Advisory Services

INPUT offers the following advisory services on an annual subscription basis.

1. Market Analysis Program—U.S.

The Market Analysis Program provides up-to-date U.S. information services market analyses, five-year forecasts, trend analyses, vertical/cross-industry market reports, an on-site presentation, hotline inquiry service, and sound recommendations for action. It covers software, professional and network services, turnkey systems, and professional services markets. It is designed to satisfy the planning and marketing requirements of current and potential information services vendors.

2. Market Analysis Program—Europe

This program is designed to help vendors of software and services with their market planning. It examines the issues in the marketplace, from both a user and a vendor viewpoint. It provides detailed five-year market forecasts to help plan for future growth.

3. Vendor Analysis Program—U.S.

A comprehensive reference service covering more than 400 U.S. information services vendor organizations, VAP is often used for competitive analysis and prescreening of acquisition and joint-venture candidates. Profiles on leading vendors are updated regularly, and hotline inquiry service is provided.

4. Vendor Analysis Program—Europe

This is an invaluable service for gaining competitive information. Two binders are provided—one is a directory listing names, addresses, and turnover of some 700 European software and services vendors. The second binder contains profiles of about 300 key vendors.

5. Electronic Data Interchange Program—U.S.

Focusing on what is fast becoming a major computer/communications market opportunity, this program keeps you well informed. Through monthly newsletters, timely news flashes, comprehensive studies, a joint user/vendor conference, and telephone inquiry privileges, you will be informed and stay informed about the events and issues impacting this burgeoning market.

6. Network Services Program—Europe

Network services is a fast-growing area of the software and services industry. This program is essential to vendors of EDI, electronic information services, and network products and services. It keeps clients informed of the latest developments and includes a monthly newsletter on EDI.

7. Systems Integration Program—U.S.

Focus is on the fast-moving world of systems integration and the provision of complex information systems requiring vendor management and installation of multiple products and services. The program includes an annual market analysis of the U.S. systems integration and operations markets, SI vendor profiles and updates, topical market analysis reports, and an annual SI seminar.

8. Systems Operations Program—U.S.

This program includes an annual market analysis report of the systems operations and systems integration market, SO vendor profiles and updates, reports on network management and SO management practices, and an annual SO seminar.

9. Systems Management Program—Europe

Systems integration and systems operations (facilities management) are key growth areas for the decade. This program examines these two areas and analyzes current market trends, user needs, and vendor offerings.

10. Federal Information Systems and Services Program

This program presents highly specific information on U.S. federal government procurement practices, identifies information services vendor opportunities, and provides guidance from INPUT's experienced Washington professionals to help clients maximize sales effectiveness in the federal government marketplace.

11. Information Systems Program

ISP is designed for executives of large information systems organizations and provides crucial information for planning, procurement, and management decision making. This program is widely used by both user and vendor organizations.

12. Customer Service Program—International

This program provides customer service organization management with data and analyses needed for marketing, technical, financial, and organizational planning. The program pinpoints user perceptions of service received, presents vendor-by-vendor service comparisons, and analyzes and forecasts service markets for large systems, minicomputers, personal computer systems, and third-party maintenance. A monthly newsletter helps clients keep informed of the latest developments in the market.

13. Customer Service Program—Europe

Customer service is an expanding area. Companies are now expanding from hardware service to more software-related maintenance and professional services. This program helps vendors penetrate these new areas and provides guidelines for future market strategy. A monthly newsletter helps clients keep abreast of the latest developments in the market.

14. Worldwide Information Services Market Forecasts, 1989-1994

In 1989 INPUT initiated this research study, which provides an international forecast for the information services market.

15. INPUT's sales office in Japan

Provides research services on U.S. and global information services to Japanese clients.

Customized Advisory Services

In addition to standard continuous-information programs, INPUT will work with you to develop and provide a customized advisory service that meets your unique requirements.

Acquisition Services

INPUT also offers acquisition services that are tailor-made for your requirements. INPUT's years of experience and data base of company information about information systems and services companies have helped many companies in their acquisition processes.

An Effective Combination

INPUT'S Executive Advisory Services are built on an effective combination of research-based studies, client meetings, informative conferences, and continuous client support. Each service is designed to deliver the information you need in the form most useful to you, the client. Executive Advisory Services are composed of *varied combinations of the following products and services:*

Research-Based Studies

Following a proven research methodology, INPUT conducts major research studies throughout each program year. Each year INPUT selects issues of concern to management. Topical reports are prepared and delivered throughout the calendar year.

Information Service Industry Reports

INPUT's Executive Advisory Services address specific issues, competitive environments, and user expenditures relative to:

Software
Processing/Network Services
Systems Integration
Telecommunications Service
Office Systems

Professional Services
Turnkey Systems
Small-Systems Service
Third-Party Maintenance
Large-Systems Service

Industry-Specific Market Reports

Detailed analyses of market trends, forces driving the markets, problems, opportunities, and user expenditures are available for the following sectors:

Discrete Manufacturing	Insurance
Process Manufacturing	Medical
Transportation	Education
Utilities	Business and Technical Services
Telecommunications	Consumer Services
Retail Distribution	Federal Government
Wholesale Distribution	State and Local Government
Banking and Finance	Other Industry Sectors

Cross-Industry Market Report

A separate analysis covers the following cross-industry application areas:

Accounting	Office Systems
Education and Training	Planning and Analysis
Engineering and Scientific	Other Cross-Industry Sectors
Human Resources	

Hotline: Client Inquiry Services

Inquiries are answered quickly and completely through use of INPUT's Client Hotline. Clients may call any INPUT office (California, New York, Washington D.C., London, or Paris) during business hours or they may call a unique voicemail service to place questions after hours. This effective Hotline service is the cornerstone of every INPUT Executive Advisory Service.

The Information Center

One of the largest and most complete collections of information services industry data, the Information Center houses literally thousands of up-to-date files on vendors, industry markets, applications, current/emerging technologies, and more. Clients have complete access to the Information Center. In addition to the information contained in its files, the center maintains an 18-month inventory of over 130 major trade publications, vendor consultant manuals, economic data, government publications, and a variety of important industry documents.

Access to INPUT Professional Staff

Direct access to INPUT's staff, many of whom have more than 20 years of experience in the information industry, provides you with continuous research and planning support. When you buy INPUT, you buy experience and knowledge.

Annual Client Conference

Each year, you can attend INPUT's Annual Client Conference. This event addresses the status and future of the information services industry, the competitive environment, important industry trends potentially affecting your business, the impact of new technology and new service offerings, and more.

You will attend with top executives from many of the industry's leading, fastest-growing, and most successful vendor companies—and with top Information Systems (IS) managers from some of the world's most sophisticated user organizations.

On-Site Presentation by INPUT Executives

Many of INPUT's programs offer an informative presentation at your site. Covering the year's research, this session is held in the fourth quarter of each calendar year.

Proprietary Research Service

INPUT conducts proprietary research that meets the unique requirements of an individual client. INPUT's custom research is effectively used:

For Business Planning

Planning for new products, planning for business startups, planning for expansion of an existing business or product line—each plan requires reliable information and analysis to support major decisions. INPUT's dedicated efforts and custom research expertise in business planning ensure comprehensive identification and analysis of the many factors affecting the final decision.

For Acquisition Planning

Successful acquisition and divestiture of information services companies requires reliable information. Through constant contact with information services vendor organizations and continuous tracking of company size, growth, financials, and management "chemistry," INPUT can provide the valuable insight and analysis you need to select the most suitable candidates.

For the Total Acquisition Process

INPUT has the credentials, the data base of company information, and—most importantly—the contacts to assist you with the total acquisition and/or partnering relationship processes:

- Due Diligence
- Schedules and Introduction
- Criteria & Definitions
- Retainer and Fee-Based
- Active Search

For Competitive Analysis

Knowing marketing and sales tactics, product capabilities, strategic objectives, competitive postures, and strengths and weaknesses of your competition is as critical as knowing your own. The career experience of INPUT's professionals—coupled with INPUT's collection and maintenance of current financial, strategic, tactical, and operational information about more than 400 active companies—uniquely qualifies INPUT to provide the best competitive information available today.

For Market and Product Analysis

Developing new products and entering new markets involves considerable investment and risk. INPUT regularly conducts research for clients to identify product requirements, market dynamics, and market growth.

More About INPUT...

- More than 5,000 organizations, worldwide, have charted business directions based on INPUT's research and analysis.
- Many clients invest more than \$50,000 each year to receive INPUT's recommendations and planning information.
- INPUT regularly conducts proprietary research for some of the largest companies in the world.
- INPUT has developed and maintains one of the most complete information industry libraries in the world (access is granted to all INPUT clients).
- INPUT clients control an estimated 70% of the total information industry market.
- INPUT analyses and forecasts are founded upon years of practical experience, knowledge of historical industry performance, continuous tracking of day-to-day industry events, knowledge of user and vendor plans, and business savvy.
- INPUT analysts accurately predicted the growth of the information services market—at a time when most research organizations deemed it a transient market. INPUT predicted the growth of the microcomputer market in 1980 and accurately forecasted its slowdown in 1984.

For More Information . . .

INPUT offers products and services that can improve productivity, and ultimately profit, in your firm. Please give us a call today. Our representatives will be happy to send you further information on INPUT services or to arrange a formal presentation at your offices.

For details on delivery schedules, client service entitlement, or Hotline support, simply call your nearest INPUT office. Our customer support group will be available to answer your questions.

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