INPUT

MARKET FORECAST

Federal Information Systems and Services Market FY 1996–FY 2001

Federal Market Analysis Program

1 9 9 6

Federal Information Systems and Services Market

FY 1996–FY 2001

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Vienna, VA 22182-3900
United States of America

Federal IT Market Analysis Program

Federal Information Systems and Services Market, FY 1996–FY 2001

MM15 • 725 • 1996

Abstract

According to this report, *Federal Information Systems and Services Market, FY 1996–FY 2001*, the federal market demand for vendor-furnished information systems and services will increase from $20.9 billion in FY 1995 to $26.0 billion in FY 2001 at a compound annual growth rate of 4.5%.

The federal market will become increasingly competitive in response to a declining defense budget, reduction in overall federal government spending and major civilian program delays. Agencies need connectivity, data portability, database interchange and standardization at lower overall cost. Under the aegis of the National Performance Review, the federal government will invest in information technology to improve Service to the Citizen and operate more efficiently.

Downsizing and continued pressure to outsource functions will occur through reengineering business functions and the information systems that will support them. Cost containment, acquisition reforms, budget deficit-control measures, and agency restructuring, will influence the level of IT spending in FY 1997 and projected spending in the outyears.

The most significant change in the fiscal year 1997 budget is an increase in commercial services, indicating a strong continuing signal that the federal government will be contracting out more and more of its IT systems and services. Professional services represent major contract commitments, but application development will be reduced in favor of commercial solutions.

Many agencies will undergo major restructuring during the next five years, and program sponsorship will change. The political influences are increasing as the Administration and the Congress prepare for the 1997 elections. The Republican Congress appears to favor a strengthening of

programs; the Democrats continue to push for social reforms. Both sides of Congress are prepared to increase state and local authority for program implementation, but uncertainty continues on how the redistributed tax dollars will be accounted for.

Vendors in this market face a constantly changing schedule of priorities, especially in view of the growing difficulties experienced by the Administration in implementing budget reduction and fiscal reform.

This report analyzes the trends expressed in the FY 1997 information technology (IT) budget requests. Based on interviews with agency officials and recent long-range IT plans, it forecasts trends in technology, acquisition processes and regulations. The report also notes key program developments that will shape the size and direction of this important marketplace.

This report contains 168 pages, including 82 exhibits.

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Exhibits

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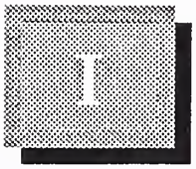


Introduction

Federal Information Systems and Services Market, FY 1996–FY 2001, is produced by INPUT as part of the Federal Systems and Services Market Program (FSSMP). This report forecasts information technology expenditures by the U.S. federal government for fiscal years 1996–2001 and includes analysis of the federal information technology budget submitted for Fiscal Year 1997.

FSSMP was initiated by INPUT for information industry clients in the federal government market. Since the program began, INPUT annually asks interested clients to identify specific business areas, service modes and issues they consider essential for their federal market planning. Their suggestions have been incorporated into FSSMP and have led to the selection of this annual report and the quarterly strategic perspective reports as appropriate vehicles for providing the information. During calendar year 1996, under FSSMP, INPUT will continue the program initiated in 1993 to publish profiles of federal agencies. These profiles provide an executive summary of information technology (IT) activities and trends in a federal agency, including mission, organization, program activities, program budget, IT budget, IT contract opportunities, top contractors and contracts, and issues.

INPUT does not detail the full spectrum of information systems and services opportunities in each fiscal year because there are more than 35,000 individual procurements annually. Instead, FSSMP examines the driving factors and establishes the basis for forecasting individual service mode growth prospects. INPUT selects major service modes for analysis based on both client interest and major program initiatives of the Administration. Major initiatives of the Administration begun in 1993 have created interest in programs dealing with business process reengineering (BPR), high-performance computing, network management, electronic mail (E-mail), electronic commerce, document management, the Internet and the World Wide Web (WWW).

The companion Federal Information Technology Procurement Program (FITPP) focuses on contract opportunities for significant new or recompete business potential for INPUT's vendor clients. More than 500 of these opportunities are provided in the Procurement Analysis Report (PAR) database issued biweekly. A newsletter summarizing recent database updates and procurement issues is distributed to INPUT's federal vendor clients monthly. However, the FSSMP market analysis reports provide more strategic intelligence and trends within each delivery mode and by agency.

A
Scope

This report covers only the U.S. federal government information technology market and includes only those expenditures expected of the executive branch agencies. INPUT bases its analysis on actual outlays from FY1987 through FY1995, the federal estimate for FY1996 and the federal forecast for FY1997. Note that embedded computer systems are not included in our data. IT outlays for classified national defense and intelligence programs are also not included.

The major service modes included in this report are:

- Processing services
- Software and related services
- Professional services
- Systems integration
- Outsourcing (includes systems operations)
- Turnkey systems
- Hardware products (furnished without systems design, applications software or communications services)
- Communications and network services
- Electronic commerce/EDI
- Office information systems
- Computer equipment maintenance
- Computer security.

The service modes are defined in Appendix B. The definitions were revised in 1992 to clarify some subsets of the service modes, which are identified as special delivery modes, in response to client requests. The expenditures for the submodes identified are part of the service modes listed above and, therefore, not additive to them.

Funding information in this report is rounded to the nearest $100 million, unless otherwise noted. In general, the funding information is initially derived from plans and budget requests not yet approved by the Congress nor confirmed by the Office of Management and Budget (OMB) and may change even after approval. Such changes may be dictated by the Administration or subsequent congressional action.

B
Methodology

To identify key expenditures in the service modes described above, INPUT analyzed the Office of Management and Budget (OMB)/General Services Administration (GSA)/National Institute of Standards and Technology (NIST) documents, the Budget of the United States Government, federal agency OMB Circular A-130 information technology plans and the federal agency OMB Circular A-11, Section 43 Information Technology Budget Requests.

Because agencies are not required to submit supporting data for plans to OMB, INPUT requested additional documentation on their OMB A-11 submissions and long-range information resource management plans and reviewed the documentation for guidance on the forecast. Interviews with agency policy and procurement officials were conducted to identify technology trends, policy changes and issues associated with plans to improve federal information resources and the acquisition process. Additional information on published policies and regulations is included.

The section on market trends was prepared after the interviews and research on the current information technology budget submission were completed.

The INPUT forecast of five fiscal years' growth by service mode is based on the OMB A-11, Section 43 budget requests and off-budget plans covering various federal funds and public corporations.

INPUT established the economic factors for the five years under the commercial Market Analysis Program (MAP) and employed these factors for all INPUT program forecasts. The growth guidelines are developed from annual INPUT surveys of users (including government), vendors and

INPUT-developed models. The growth rates used for this forecast are indicated in Exhibit I-1.

Exhibit I-1

1996 GDP and Inflation Growth Rate

Overall Percent	1996 Est.	1997 Est.	1998 Est.	1999 Est.	2000 Est.	2001 Est.	Average 1996–2001
Nominal GDP[1]	5.5	5.6	5.7	5.5	5.5	5.5	5.6
GDP Deflator	3.3	3.3	3.1	3.1	3.0	3.0	3.1
Real GDP[2]	2.2	2.2	2.3	2.6	2.4	2.4	2.4

Notes: *Source: INPUT*
(1) Total of GDP Deflator and Real GDP may not add due to rounding.
(2) Constant 1987 dollars.

Most economic observers now feel that growth should stabilize at around two per cent. There is also general agreement that the economy seems to be in a minimal expansion mode, and that long-term, the risk of recession in late 1996 is low. Gross Domestic Product (GDP) figures have been adjusted from last year's estimates to conform to this new economic profile for the next five years.

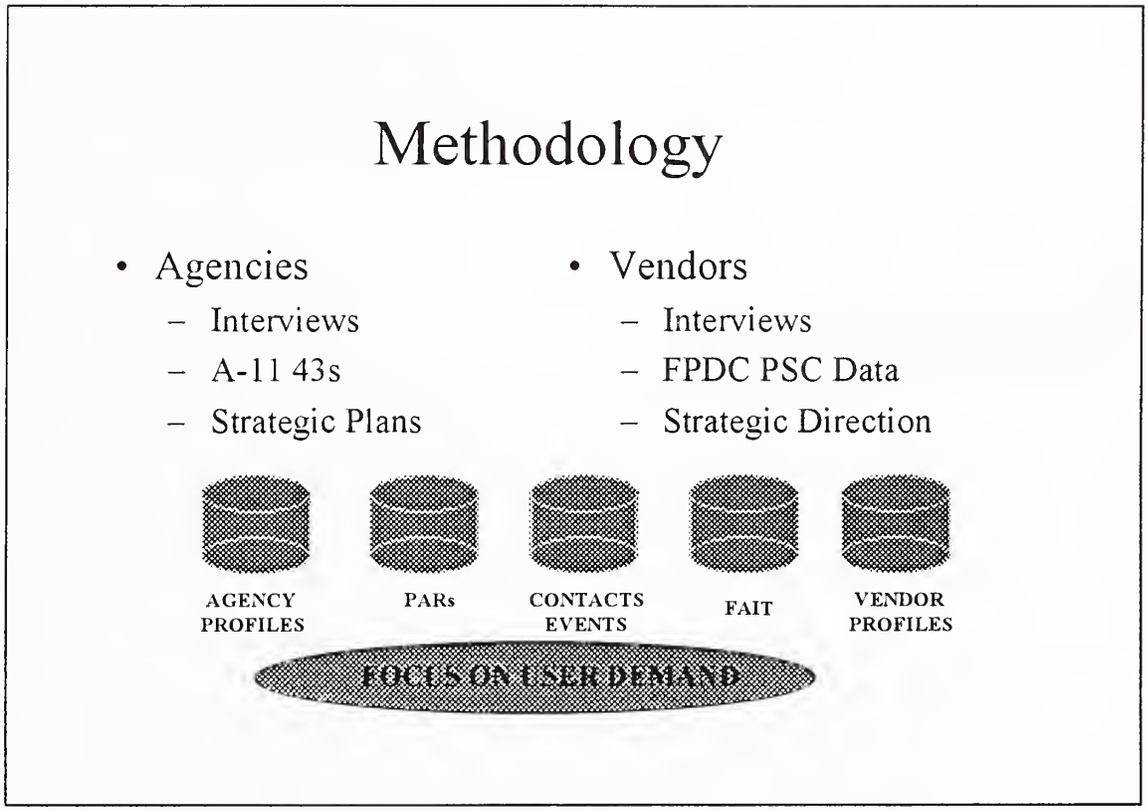
INPUT segments the market, modeling the way federal users buy products and services, into eight categories with 27 subcategories:

- **Systems Software Products** - mainframe, minicomputer, workstation/PC
- **Applications Software Products** - mainframe, minicomputer, workstation/PC
- **Turnkey Systems** - equipment, software products, professional services
- **Professional Services** - consulting, BPR, education/training, software development maintenance
- **Systems Integration** - equipment, software products, professional services, other
- **Outsourcing** - platform operations, applications operations, desktop services, network management, applications management
- **Processing Services** - transaction, utility, other
- **Network-Based Services** - electronic information services, network applications.

Both agency and industry perspectives are gathered (see Exhibit I-2) to create a government user demand profile:

- INPUT pulls federal budget information from federal agency submissions made to the OMB. Agency strategic IT plans are gathered. Key agency information resource management (IRM) officers are interviewed for insights into future plans.
- INPUT gathers procurement data on 208 product/service codes (PSC) from the GSA Federal Procurement Data Center (FPDC) — federal agencies are required to report procurement data, including the contract obligation amount, on procurements exceeding $25,000. Vendors are interviewed for their impressions of the marketplace and its direction.

Exhibit I-2



C
Report Organization

In addition to this introduction, this report has been organized as follows:

II Executive Overview

III Market Trends

IV Market Forecast.

Appendixes:

A Forecast Database and Reconciliation

B Definitions

C Glossary of Federal Acronyms

D Policies, Regulations and Standards.

D
Related INPUT Reports

Related reports of interest to the reader are as follows:

- Agency Recompete Practices in SETA and SO Contracts
- Defense CIM Information Services Market
- Federal Agency Recompete Practices
- Federal Electronic Commerce/EDI Market
- Federal IT Procurement Program, Procurement Analysis Reports
- Federal Systems Integration Market, 1992–1997
- Service to the Citizen Market
- Object-Oriented Technologies in the Federal Market — 1993
- Client/Server Trends in the Federal Market — 1994
- Federal Information Systems and Services Market, 1995–2000

- Business Process Re-engineering in the Federal Government
- Federal E-Mail Market — 1994
- Federal High-Performance Computing, 1994–1999
- Federal Telecommunications Market, 1994–1999
- Federal Document Management Market — 1995
- Federal Computer Security Market, 1995–2000
- Federal Wireless Technology Market, 1995–2000
- Financial Management Systems Market, 1996–2001
- Federal Imaging Market — 1996
- Geographical Distribution of Federal IT Spending.

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II

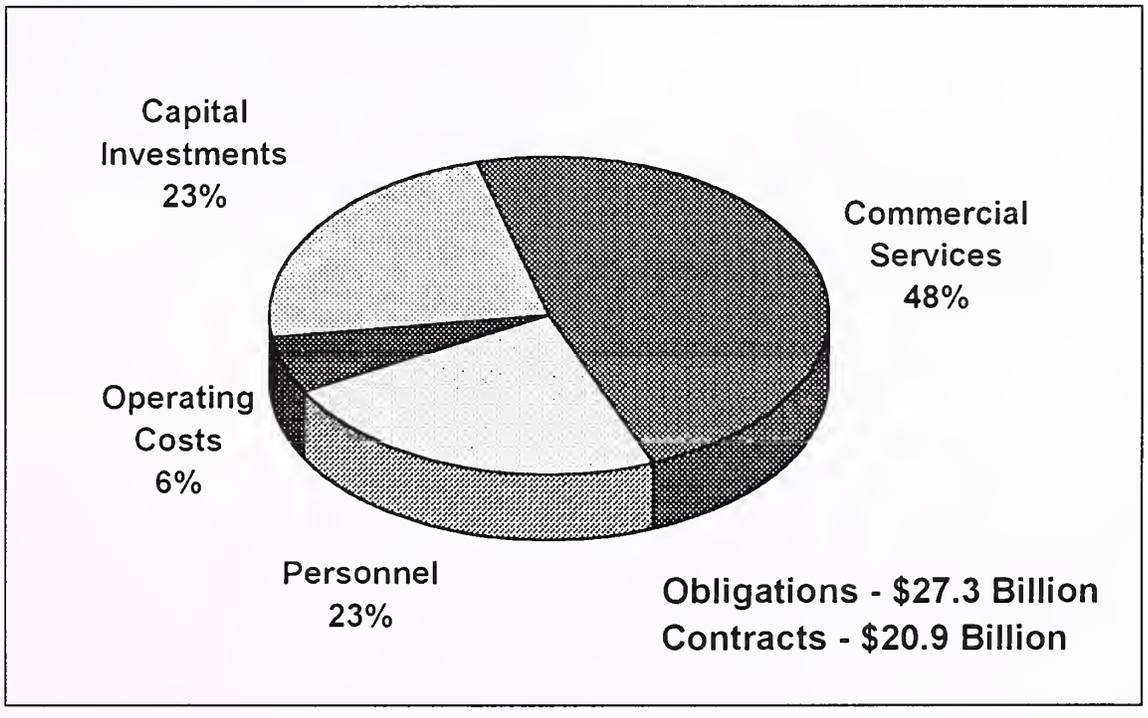
Executive Overview

A
Information Technology Budget, FY 1997

The proposed FY 1997 Federal Executive Branch Information Technology budget of $27.3 billion is up slightly from $26.7 billion in the proposed budget for FY 1996. The contract portion of the IT budget is estimated to increase from $20.3 billion in FY 1996 to $20.9 billion in FY 1997, excluding classified systems and imbedded technologies. Exhibit II-1 illustrates the division of the budget among the four primary components: commercial services, personnel, capital investments and operating costs.

Exhibit II-1

Information Technology Budget, FY 1997



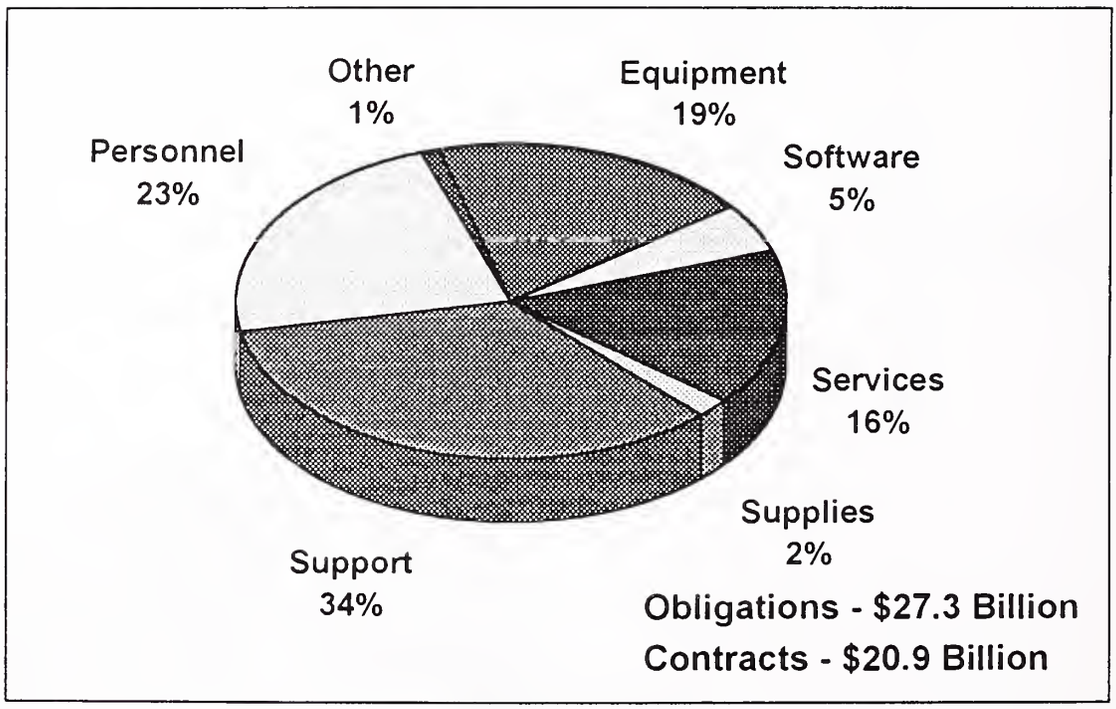
Sources: OMB, INPUT

Commercial services (network services/facilities; ADPE time; voice/data communications; operations/maintenance; systems analysis, programming, design and engineering; management/feasibility studies; significant use of IT) is up 1% from FY 1996. Capital investments (purchase of hardware and software; site/facility construction) is down 2% from FY 1996. Operating costs (hardware/software leases; lease of space; supplies and other in-house expenses) are up 1% from FY 1996. Personnel costs (compensation, benefits and travel) increased slightly.

The traditional way of distributing budget categories in the IT budget changed in fiscal year 1996 reporting. The seven categories (distribution shown in Exhibit II-2) represent requirements identified by OMB, but not consistently reported. This distribution is shown here for informational purposes only. Equipment is down 3% from FY 1996, while services went up 3% from FY 1996. All other categories stayed the same.

Exhibit II-2

Information Technology Budget Categories, FY 1997



Source: INPUT

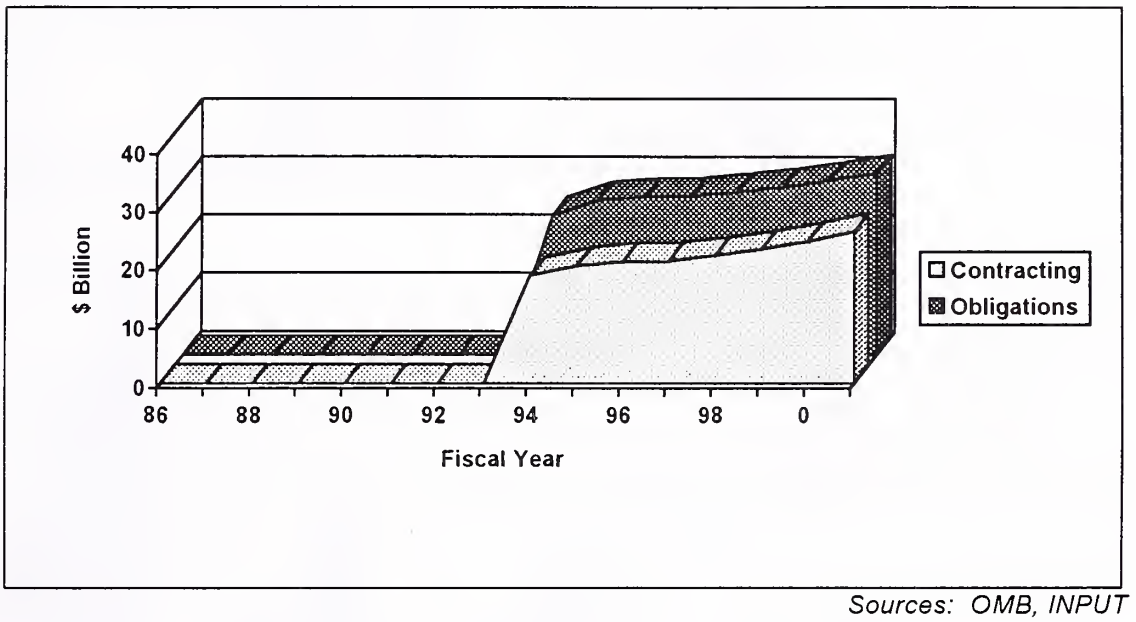
This represents a strong continuing signal that the federal government will be contracting out more and more of its IT systems and services responsibilities. (See Exhibit II-3.) The IT market available to vendors in FY 1997 is expected to increase slightly over FY 1996 at $20.9 billion. Contracting continues to increase over the long term from 77% of the FY 1994 federal IT budget to 84% in FY 2001 — a 4.5% CAGR. Defense is around 70% contracting, while civilian government is around 80%.

Drivers include:

- **Agency downsizing** - particularly in civilian agencies
- **Outsourcing of people** - both hardware/software and staff are being transferred via outsourcing agreements
- **IRM managers unable to maintain technical expertise in-house** - easier to contract out for needed skills.

Exhibit II-3

Information Technology Contracting Trends, FY 1997



Sources: OMB, INPUT

Key observations between the new FY 1996 estimates and the forecasted FY 1997 budgets are:

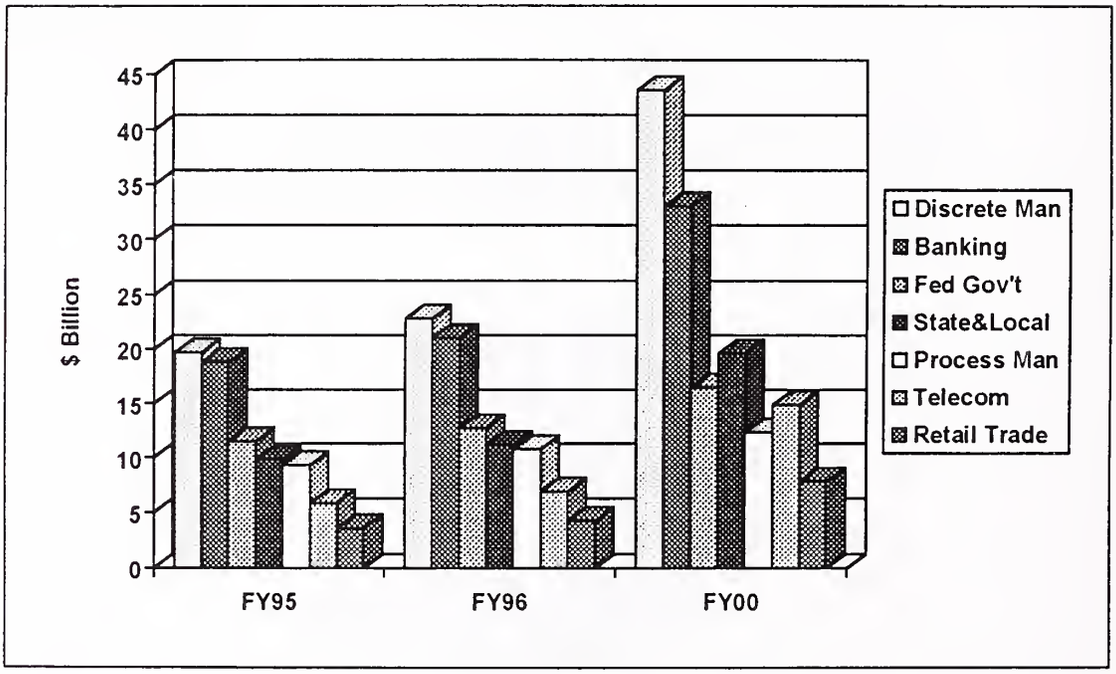
- The **commercial services** segment will see increases in leased telecommunications data services and professional services.
- The **capital investment** segment has a 3% increase in hardware acquisitions at the expense of a 13% decrease in software acquisitions.
- **Operating costs** inched up 1% from FY 1996. This segment represents only 6% of the total IT budget.
- **Personnel costs** are projected to increase slightly to $6.3 billion in FY 1996 — representing 23% of the overall IT budget. The increase of only $33 million is earmarked primarily for continued purchasing of early retirements. Although a slight increase, spending on personnel probably will experience a gradual decline through FY 2001, as a result of the Administration's early out programs. These data comprise a summation and analysis of the individual executive branch agencies' budgets submitted under OMB Circular A-11, Section 43, including revisions through June 1996.

B
Information Technology Markets

The federal government information services marketplace ranks third within the U.S. industry sector — behind discrete manufacturing and banking and finance. (See Exhibit II-4.) But due to the federal government market's slow growth, this sector will drop to fourth place by 2000. (See Exhibit II-5.) State government, with its 16% CAGR, overtakes the federal sector in 1999 — funds are shifting from the federal to the state level. Note that the combined federal and state government market would be the number one industry sector in 1996.

Exhibit II-4

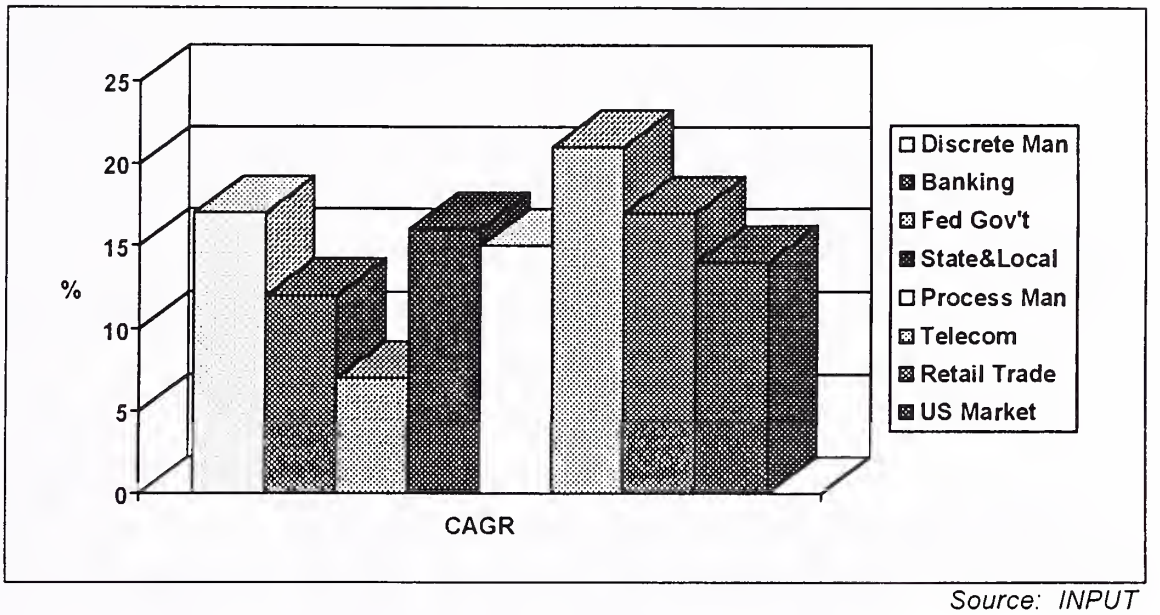
U.S. Information Services Industry Forecast, FY 1995–2000



Source: INPUT

Exhibit II-5

U.S. Information Services Industry Growth Rates, FY 1995–2000

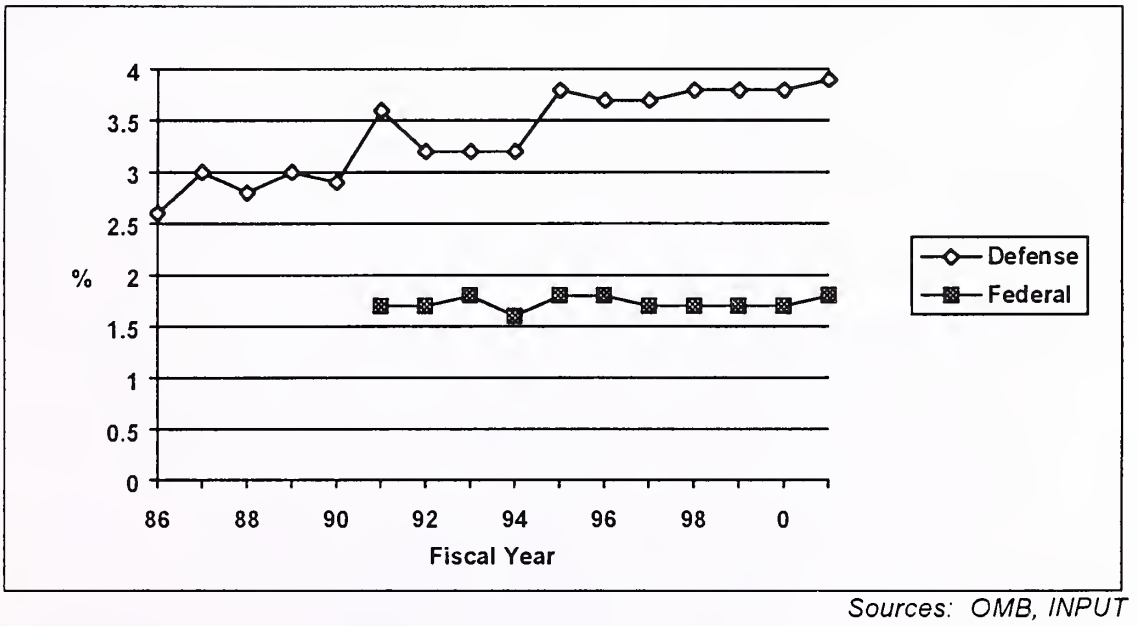


Source: INPUT

The percentage of federal budget obligations spent on IT has remained steady at around 1.7%. (See Exhibit II-6.) The percentage of defense budget obligations spent on IT has increased from 2.6% in FY 1986 to 3.7% in FY 1996. INPUT forecasts IT taking more of the defense budget, 3.8%, by FY 2001.

Exhibit II-6

IT Share of U.S. Budget, FY 1986–2001



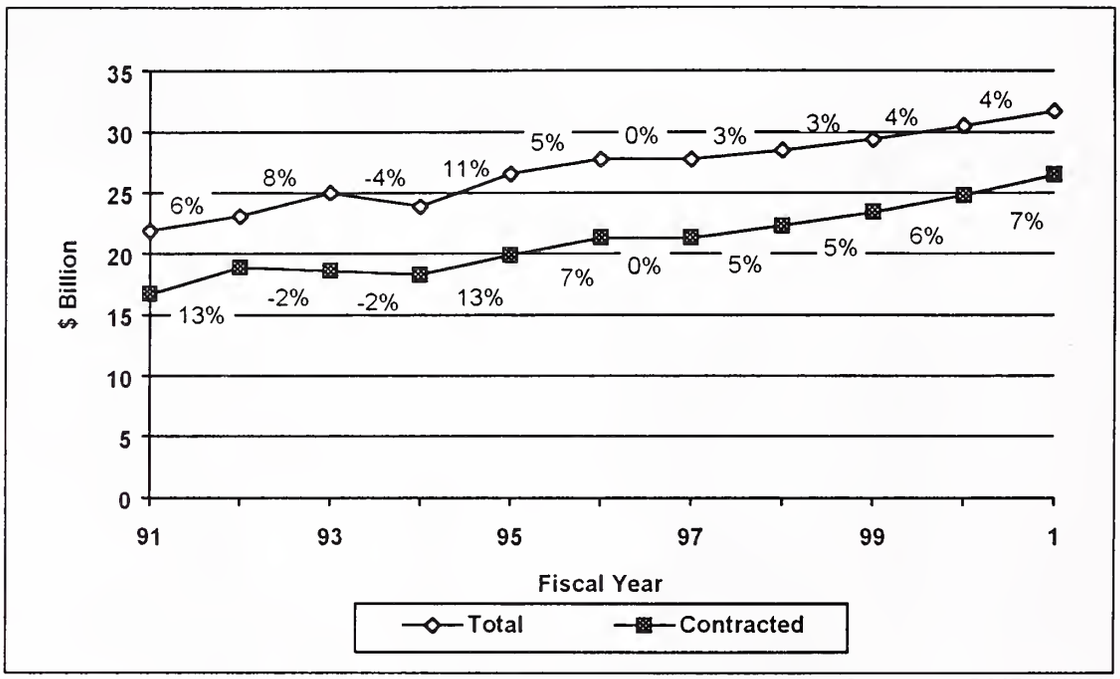
Sources: OMB, INPUT

INPUT reviewed the changes in budget documentation to identify the key areas affected. FY 1997 budget figures show virtually no growth reported from FY 1996. (See Exhibit II-7.) FY 1995 saw the largest differential in total federal IT expenditures, $1.9 billion increase (of which $1.7 billion

was in defense), between projected expenditures and actual outlays. The previous record was $1.0 billion. INPUT forecasts marginal growth to continue through the outyears, although vulnerabilities exist from added pressures to reduce the federal deficit and overall spending. The Administration and Congress both appear willing to continue the information technology investment to gain efficiencies and thus reduce government spending.

Exhibit II-7

Total Federal IT Expenditures, FY 1991–2001



Sources: OMB, INPUT

The IT market available to vendors is expected to increase from $20.8 billion in FY 1996 to $26.0 billion in FY 2001, at a compound annual growth rate (CAGR) of 4.5%. The growth is higher than forecast last year because of delayed spending in FY 1995–1996 with eventual anticipated spending levels in the later years. The forecast includes the proposed IT budget estimates of agencies not required to file OMB Policy A-11, Section 43 and several off-budget expenditures of agencies such as the U.S. Postal Service, and other public corporations. The figures exclude classified systems, embedded systems, and legislative and judicial acquisitions.

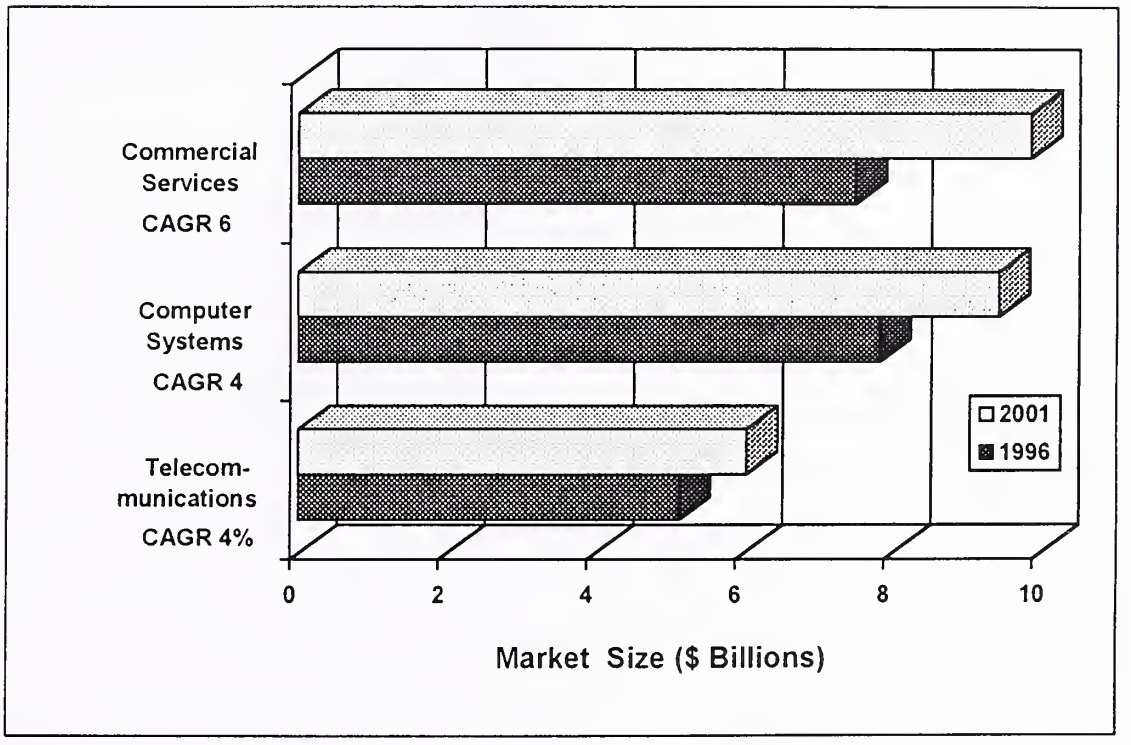
Current budget cuts by the Republican-controlled Congress have not been as severe as initially proposed, but they signal continued pressure to reduce overall government spending. IT was mostly a winner in the FY 1997 budget battle. Specific program winners were the Decenial Census, FBI Law Enforcement, High Performance Computing, IRS Tax System Modernization and the National Weather Service Modernization. Program losers were the FAA Air Traffic Modernization and the Patent and Trademark Office (PTO) Office Automation. Department

consolidation, as proposed in the House of Representatives, may still create significant delays or cancellations in program spending. Congress is seeking demonstration that operating improvements follow from increased IT budget authority.

The overall IT market is expected to grow at 3% over the next five years. The contract portion (addressable market) is expected to grow at 4.5%. The mix of the three principal components of the contract portion of the agencies' proposed IT expenditures are shown in Exhibit II-8.

Exhibit II-8

ISS Markets, FY 1996–2001



Source: INPUT

Some key observations follow:

- The **commercial services** market is experiencing the most growth. Outyear spending is forecast at 6% CAGR. Professional services is fueling this growth. Several factors are driving the demand for commercial services: loss of in-house capability due to pressure to reduce the size of the federal workforce, requirement to redesign business functions of the federal government and loss or lack of expertise needed to integrate legacy systems in emerging client-server environments.

- Expenditures for **computer systems**, including hardware and systems software, will increase by $0.5 billion in FY 1997 from estimates for FY 1996. Future spending is expected to increase

steadily, growing to $9.4 billion in FY 2001 at a CAGR of 4%. This growth is significant because commercial hardware and software product costs continually decline. Agencies are putting increased emphasis on commercial product solutions (i.e. COTS - commercial-off-the-shelf solutions) rather than developmental systems.

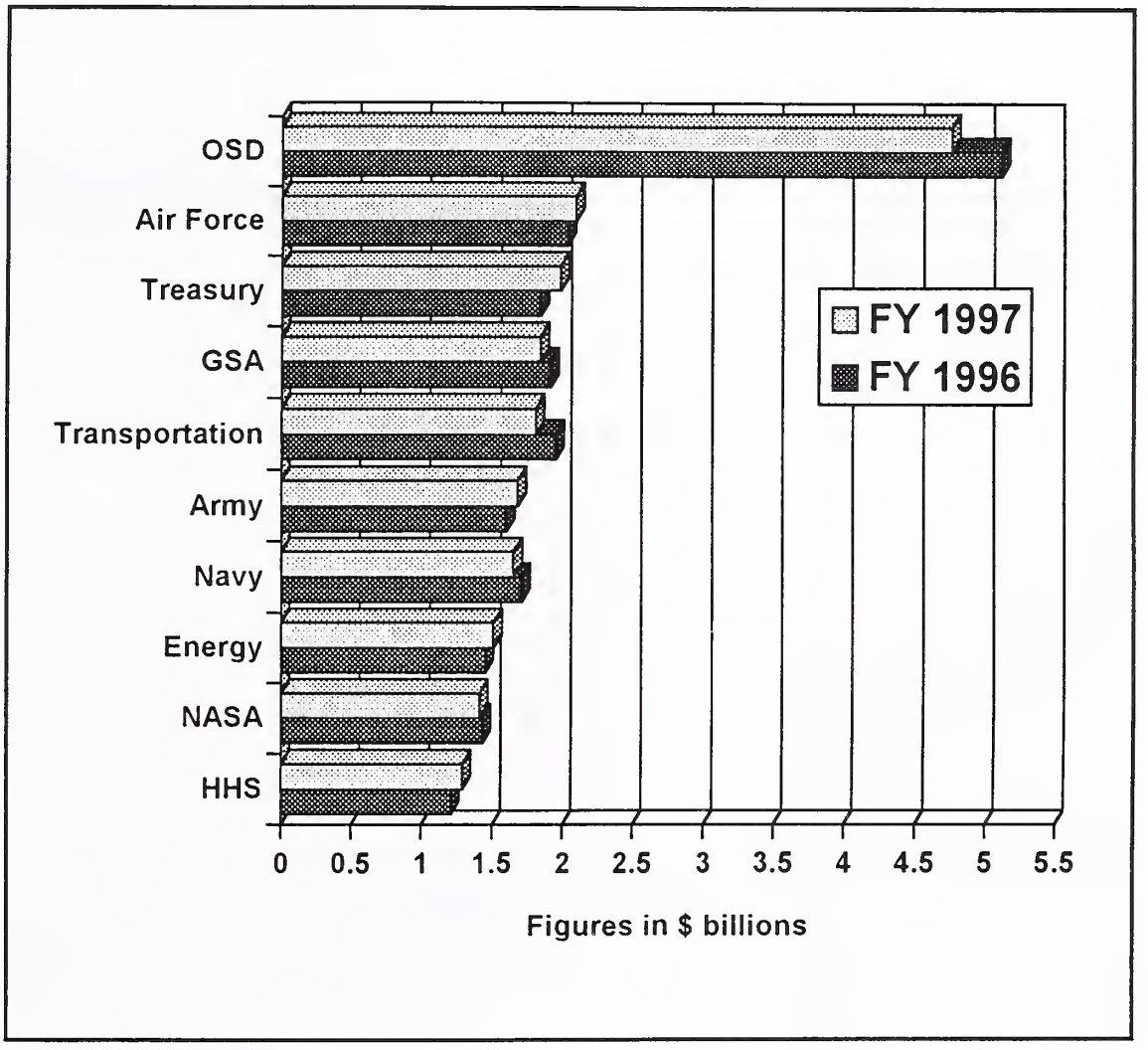
- **Communications and network services** expenditures are projected to increase from $5.1 billion in FY 1996 to $6.0 billion in FY 2001 at a CAGR of 4%. The rate of spending for voice and data circuits continues to grow. Difficulties in reporting of telecommunications outlays continue. The lower rates due to price readjustments of the FTS2000 contract continue to reduce actual dollars spent. Recompetition of the FTS2000 and proposed integration of the Defense Information Systems Network (DISN) will drive prices and spending further downward, although demand for voice and data will increase.

The distribution of IT spending across agencies changed for FY 1997 from the distribution for FY 1996 spending. Half of the top ten agencies with the largest IT budgets showed increases; half showed declines. The Office of the Secretary of Defense (OSD) and Transportation were significant losers. Treasury was a significant gainer. Exhibit II-9 shows the ranking of these agencies with their FY 1996 and FY 1997 forecasted spending levels. This change demonstrates the shifting of program priorities in the federal government to civilian agencies. Of the three military services, only Navy did not increase in actual IT spending for FY 1997. The Air Force jumped from ninth place last year, while Navy dropped from fourth to seventh. Note that both Justice and Agriculture made the billion dollar club but are still below the top ten.

A look at the agency ranking for the contracted portion of the IT budget (Exhibit II-10) shows a drastically different distribution. The Air Force spends over 50% of its IT dollars on personnel, as compared to 30% for the other services and 15% for OSD. Civilian agencies average 20%.

Exhibit II-9

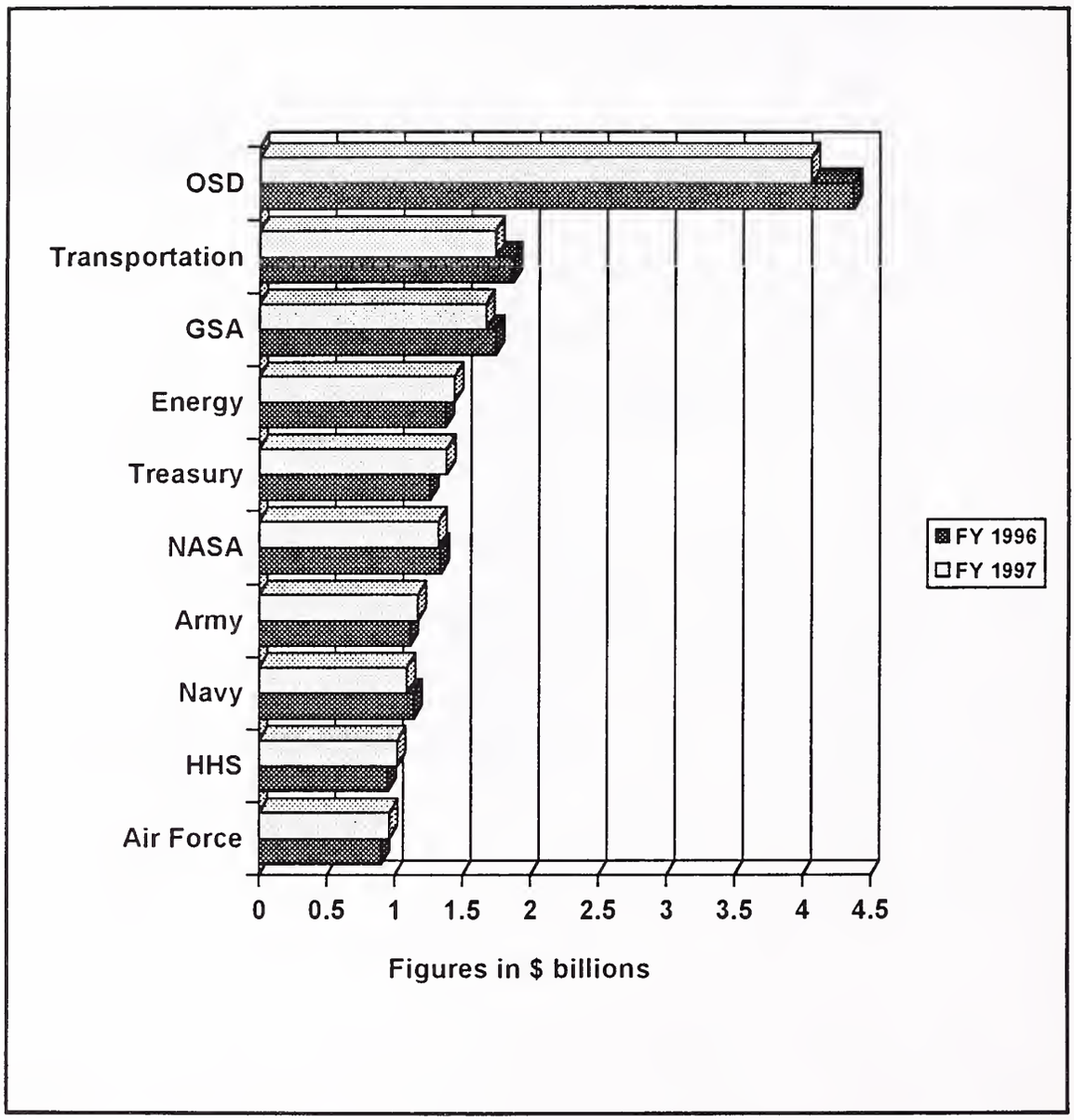
Top Ten IT Budgeted Agencies



Source: INPUT

Exhibit II-10

Top Ten IT Contracting Agencies

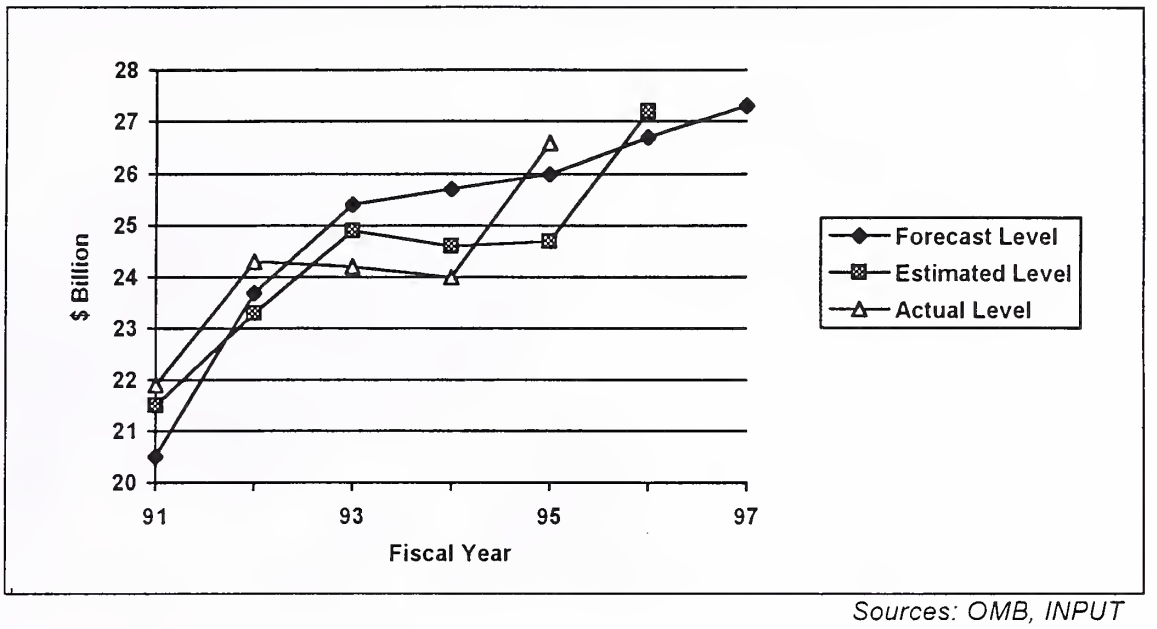


Source: INPUT

When agencies report IT budget to OMB, they identify three time periods. They forecast spending in the budget year, they report an estimated spending level for the current year, and they report actual spending levels for the past year. The agencies went through a budget reporting trend change in FY 1993 when actual expenditures fell below forecast levels. Prior to FY 1993, the agencies had for a number of consecutive years forecast lower levels than levels of actual reported spending. In FY 1995 the agencies went back to their old ways. Exhibit II-11 shows these crossovers.

Exhibit II-11

Federal Budget Forecast/Spending Crossover



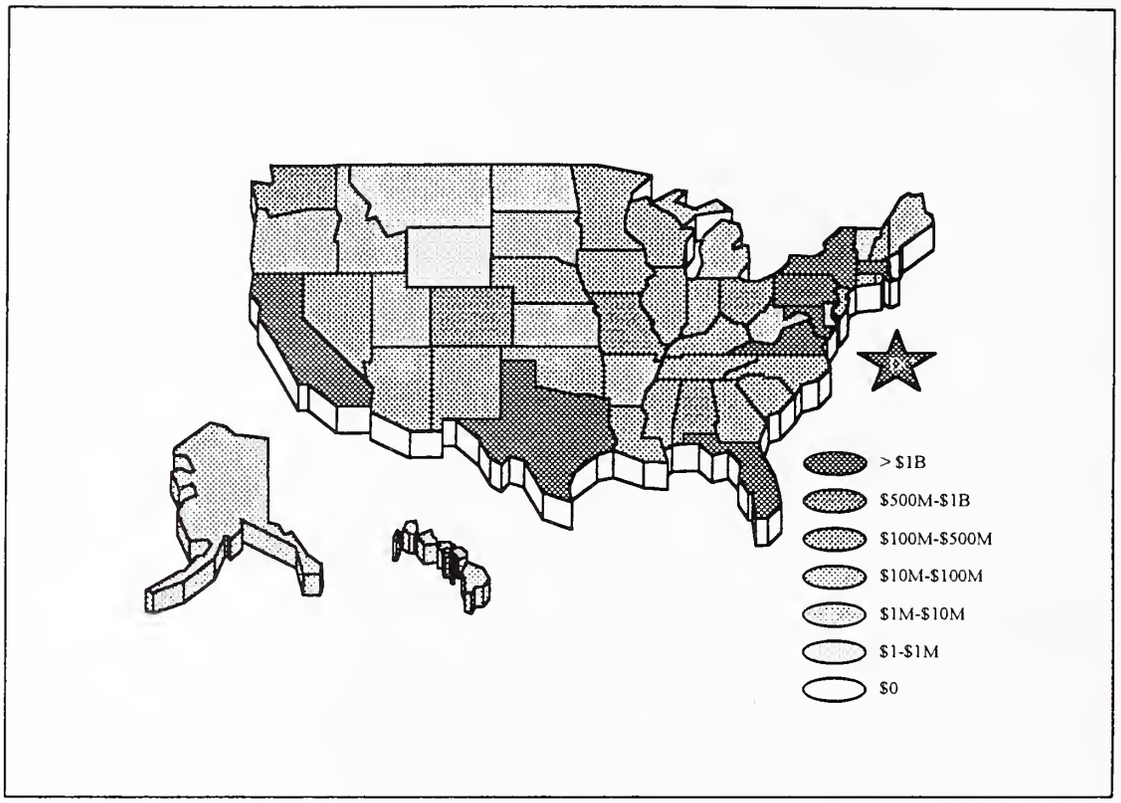
Sources: OMB, INPUT

Agencies do not spend all of their budget in a given year. Hence, what is in the "pipeline" varies from year to year. The distribution of federal spending in FY 1995 is shown in Exhibit II-12. Some general observations from the FPDC *place of performance* data follow:

- Work continues to flee the Washington, DC-Virginia-Maryland area — 42% spending in FY 1993 versus 31% in FY 1995
- 70% of spending done by Defense
- 65% of spending done through large business
- 10% of spending done through 8(a)s.

Exhibit II-12

Total Federal Spending, FY 1995



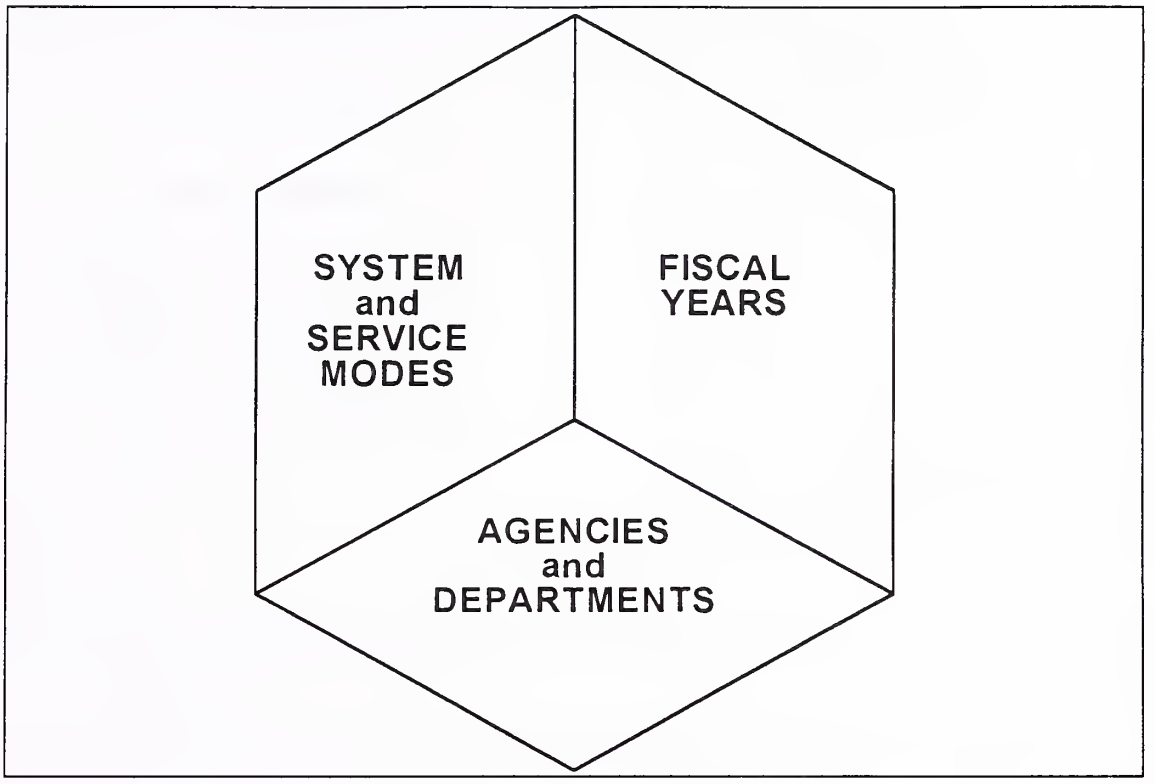
Sources: FPDC, INPUT

C
Federal Market Segmentation

One difficulty in collecting and interpreting federal IT budget numbers lies in the different terminology applied by operating personnel, administrators, legislators and budget specialists. INPUT avoids this confusion by employing service modes to describe market conditions. INPUT added system modes to comply with OMB/GSA-derived budgetary information, as indicated in Exhibit II-13. Individual mode funding trends are discussed in Chapter III. Some modes are subsets of the primary modes to clarify expected spending patterns. The funding details of the principal modes are described in Chapter IV.

Exhibit II-13

Federal Market Segmentation



Source: INPUT

Both service/system modes and user-functional modes identify the requested budget in the fiscal years of proposed obligation, permitting development of a common base of proposed outlays for either set of modes by fiscal year.

The 1996 series of INPUT services and systems modes are defined in detail in Appendix B of this report.

D
Federal Budget Issues

Although some improvements in the overall financial situation have been reported in various economic indexes, the economy cannot support constantly expanding government discretionary expenditures, in opposition to out-of-control entitlement spending. The reductions in near-term military threat and fading space challenge lent themselves to demands that the deficit and its debt implications be controlled. As a result, slower overall budget growth and the resultant reduction in outlays for goods and services can be expected throughout the remainder of the decade as noted in Exhibit II-14.

Exhibit II-14

FY 1996 Budget Driving Forces

- Cost containment
- Acquisition reforms
- Budget deficit-control measures
- Program downsizing
- Outsourcing pressure
- Agency restructurings

Source: INPUT

Several factors influence both the level of IT spending in FY 1996 and projected spending in the outyears, beginning with FY 1997:

- **Cost containment** - Congress and the public want less government. Reduced government services will result in much lower overall growth of the IT budget unless Congress can be convinced that increased IT spending will result in lower operating costs.

- **Acquisition reforms** - as agencies determine the level of discretion the new reforms afford them, the agencies should be able to spend their budgets faster. (See Exhibit II-15.)

- **Budget deficit-control measures** - OMB is trying to tie agency IRM plans to agency budgets. This is in advance of increased capital investment, due in part to the insistence on commercial products rather than developmental systems (i.e. the COTS effect).

- **Program downsizing** - government is following the private sector's lead in trimming the workforce. Although there is a possible impact from federal union efforts to protect government staffing in the face of shrinking operations budgets, INPUT forecasts declining IT staffs.

- **Outsourcing pressure** - in their capital planning, agency heads must determine whether to privatize, outsource or insource anything outside their core competencies.

- **Agency restructurings** - as the politicians play the "shell game," consolidations and outright elimination of agencies will contract IT spending overall.

Exhibit II-15

Procurement & IT Management Reform

Aspect	Brooks Act Era ('65–'96)	ITMRA Era ('96-->)
Focus	Technology and process	Mission, cost-effectiveness and performance
Emphasis	Single agency solutions	Interagency coordination; Sharing of expertise
Procurement Authority	Split	Agencies
Accountability	Diffuse	Agencies
Enforcers	GSA	OMB Director and CIOs
Accountability Tactics	GSA exclusive IT procurement authority	Agency budget linked capital planning and investment control; Agency performance and results-based management
Protest Jurisdiction	GSBCA	GAO
Implementation Tactics	Massive, multi-year systems development	Modular 12-18 month IT infusions
Regulation Tactics	DPA; FIRMR	no DPA; FIRMR on the way out
Acquisition Tactics	Agency investment	Multi-agency investment
Acquisition Process	Prove acquisition integrity	Prove mission/business processes; Plan before purchasing
Negotiation Tactics	All bidders through process	Bidders excluded after initial proposals
COTS	Option	Preferred approach
Industry communications	Cautious	Encouraged

Defense IT spending will continue the decline that began in FY 1988. (See Exhibit II-16.) FY 1995 actuals show a reverse to this trend, but INPUT believes this to be short-lived. The "blip" of defense activity in FY 1995 is due to pent up demand:

- **Defense past their downsizing** - now devoting full attention to mission
- **Conducting military actions** - Bosnia, etc.
- **Fruits of electronic warfighter "fever"** - past research to buying the technology.

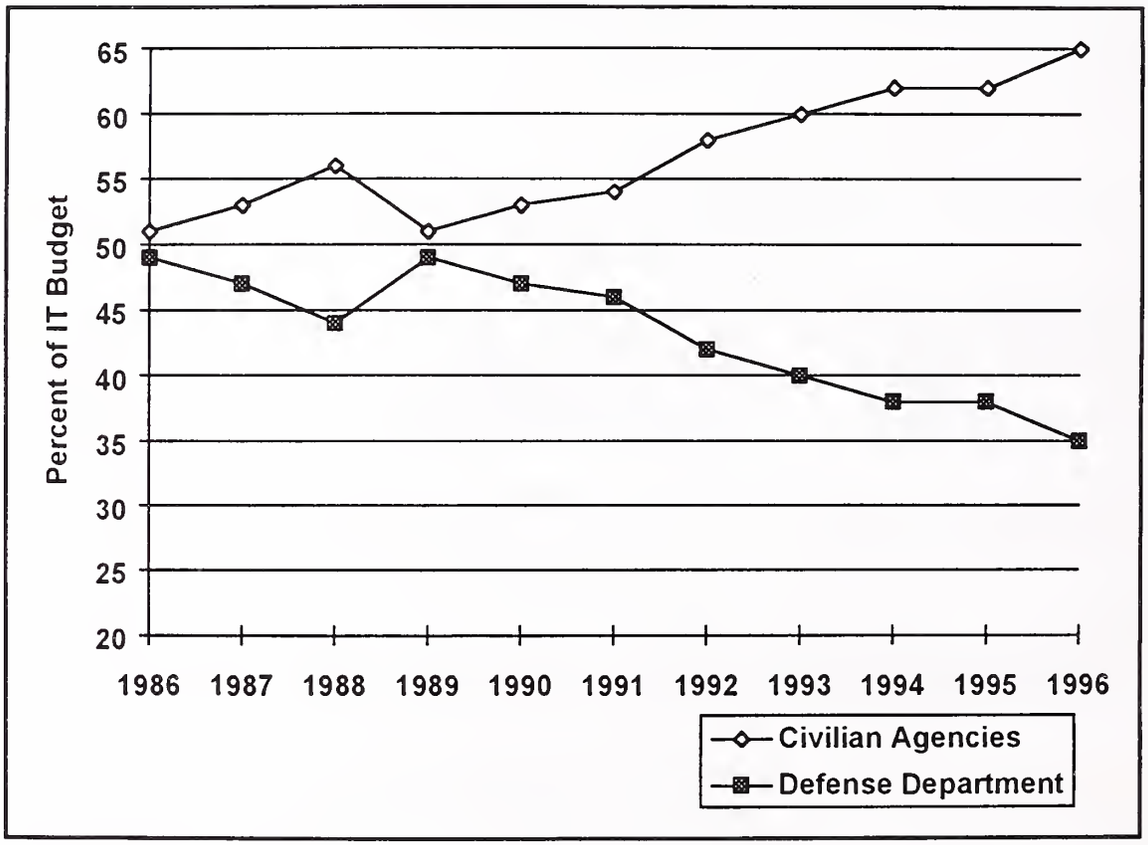
INPUT expects that even with pressures to support sustained base capabilities, the decline of the Defense IT budget should continue. Any

significant international crisis could reverse that pattern, but most spending would go toward expendables (ammunition) rather than additional IT equipment.

In contrast, the civilian agencies are expected to increase IT outlays steadily during the next five years. Growth application areas include planning, administrative systems, communications and document management.

Exhibit II-16

Defense Versus Civilian Agency Progression: Fiscal Years 1986–1996



Source: OMB

E
Information Technology Market Factors

The principal market factors influencing how IT will be procured have some relationship to the budget deficit and to the Administration's focus on improving service and efficiency. These market drivers are shown in Exhibit II-17. Federal spending slows with the following:

- **Downsizing process** - as the federal workforce shrinks, less computing power is required to run government.

- **Budget cuts** - some agencies will have to cut IT expenditures to meet their fiscal requirements. The budget knife is even starting to get to the IRM staff.

- **Commodity pricing** - agencies are seeking to turn as many IT buys into commodity buys to leverage their buying power.

- **BPR** - process re-engineering requirements are increasing. If agencies reap the expected benefits, then new processes may require less IT to accomplish.

- **IT productivity gains** - if the gains are realized through the use of IT, then we may see less need for IT as we reduce staffing through automation, etc.

- **Federal programs to states** - through block grants and the like, funds are being directed away from the federal arena to the state.

Federal spending increases with the following:

- **Staff reductions** - agencies seek to do more with fewer people by automating more of their processes.

- **New initiatives** - agencies will always be legislated more functions to perform, requiring more automation.

- **COTS initiatives** - the trend is away from home-grown systems to store-bought, but agencies are spending many times the purchase price to customize solutions to their *unique* needs.

- **IT fever** - agencies feel IT offers the closest thing to the "silver bullet."

- **NPR** - the current administration is promoting the use of IT to fix the government's efficiency and effectiveness problems.

- **Distributed computing** - the move away from centralized computing power relies heavily on a strong infrastructure, which commands huge sums of money (i.e., PCs are relatively cheap at $2,500 each, but 50,000 of them add up).

Exhibit II-17

Federal IT Market Drivers

❑ Spending Slows	❑ Spending Increases
⇒ Downsizing Process	⇒ Staff Reductions
⇒ Budget Cuts	⇒ New Initiatives
⇒ Commodity Pricing	⇒ COTS Initiatives
⇒ BPR	⇒ IT Fever
⇒ IT Productivity Gains	⇒ NPR
⇒ Federal Programs to States	⇒ Distributed Computing

Source: INPUT

There are no signs of diminished public demand for improved service from government programs — both efficiency and effectiveness. There are pressures to reduce federal involvement in deference to state and local administration. In either case, in order to avoid the high expense of additional staff, government entities are looking to substantial improvements from IT productivity. This means faster throughput, reduced or static personnel levels and a shifting of information services to those interfacing the public and Congress. Improved connectivity, data interchange and functionally reengineered agency programs are being emphasized.

Principal among several initiatives to improve public services is the development of a national information infrastructure. The sharing of information and data resources over a national network architecture is expected to enhance efficiency and improve productivity. Storage, access and transfer standards can be expected to play a large role in supporting these shared resources. The cost of this endeavor is burdensome on existing programs, which are dedicating development dollars to the undertaking. Principal among market solutions to this issue is the Internet.

With the recent acquisition reforms, agencies are evaluating their procurement options. Program office and IRM officials seek the path of least resistance to acquiring IT goods and services. The reform has shifted the most desirable procurement vehicle from indefinite delivery, indefinite quantity (IDIQ) contracts to GSA Multiple Award Schedules (MAS). This reform features simplified competition strategies, revised roles for GSA and OMB, a major adjustment to the protest process and a reduced burden on both agencies and industry. Agencies already are taking steps to improve the acquisition process by issuing smaller contracts and by breaking up the larger ones into more manageable segments. GSA and OMB are developing performance measures to

assure improved results from contracts. The Past Performance initiative is being piloted to determine effective ways to assure continued high-quality performance from contractors.

The government has backed off imposing requirements for across-the-board standards such as the Government Open Systems Interconnection Profile (GOSIP) and the Portable Open System Interconnection Exchange (POSIX). Interest in digital standards and encryption is still growing because of concerns for network access control and security. Standards for Electronic Data Interchange (EDI), as part of an overall thrust toward electronic commerce, have received considerable attention. The future will see a shift of attention to standardizing various aspects of the Internet. Close attention will be paid to data security and privacy. The government has already started to use the Internet as the transmission medium for electronic commerce.

F
Conclusions

Government-wide IT priorities continue to shift as agencies attempt to improve performance at lower costs; cross-agency programs are centralized; and agency reorganizations remove unneeded programs. Government has the IT fever, whether Defense's electronic warfighter or the civilian agency's electronic government. Some of INPUT's significant conclusions are listed in Exhibit II-18.

The beginning of the 1990s saw a gradual decline in the growth rate of IT acquisition. The growth rate held steady for the first four years, with the FY 1995 actuals showing a sharp increase. The FY 1996 and FY 1997 budgets are aligned at this new plateau. The FY 1994 budget demonstrated increased interest in reducing capital expenses while seeking more commercial services contracts. The FY 1995 budget focused on increased use of commercial products. FY 1996 sees the agencies scrambling after the delayed budget process, the furloughs and the effects of an election year. Several key contracts were postponed with delayed increases in outyear spending. Overall, IT spending will increase at a modest level until improved performance can be measured and demonstrated.

Exhibit II-18

Conclusions

- IT fever under attack
- Decision point - privatize, outsource, insource
- IT brain drain continues
- Unpredictable procurement process
- Year 2000 Wild Card!

Source: INPUT

Watch for the following to unfold:

- **IT fever under attack** - under severe pressure to reduce the federal deficit, cost-reduction measures are being imposed on agency programs. IT Management Reform Act of 1996 focuses on mission, cost-effectiveness and performance of implemented IT. OMB is the new enforcer in town. Agencies are being judged on performance and results-based management techniques. Agency budgets are being linked to capital planning and investment control. Baseline measurements are being sought for IT. Efficiency and effectiveness comparisons to a relevant reference group (private industry, other federal agencies, state government, etc.) are necessary to justify future IT discretion.

- **Decision point** - existing programs are being examined for possible downsizing or termination. Failing that test, government programs are being scrutinized for privatization opportunities or, at a minimum, outsourcing of the function. If a government function remains in-house, then performance measures for both government and contractors are being developed. (Note new A-76 rules from OMB.)

- **IT brain drain** - the buyouts of the last two years have depleted agencies of institutional knowledge and technical expertise. The new, younger workforce is far more transient. Acquiring and retaining the necessary IT skills, particularly those of emerging technologies, is a losing proposition. As the government "hollows out," industry will be invited to fill in. Agencies will move with a vengeance toward commercial products.

- **Unpredictable procurement process** - procurements will become more of a relationship buy — favoring larger vendors. Vendor capture costs to increase as agencies let a series of smaller contracts versus the massive, multi-year systems of the past. As the FIRMR goes away and agencies decide their level of procurement discretion, a given agency procurement process is less predictable. Vendors will most certainly have to deal with a variety of processes in the future. Take care not to underestimate the new negotiation tactics agencies are developing.

- **Year 2000** - federal agencies will spend only $31.1 billion from FY 1996 through FY 1999 on total services contracted out. Of that, only $7.7 billion are earmarked for software development. With estimates upward of $30 billion to fix the Year 2000 problem in all of government, there is not enough money to address the problem. This issue may be the single greatest deterrent to IT growth within the federal government.

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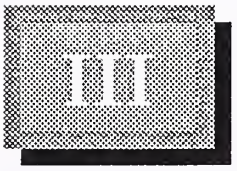


Market Trends

Many factors operate concurrently to influence the federal IT market. There is no single factor that acts alone in influencing budget and spending levels. This chapter identifies and discusses the major factors influencing the market today and over the next five years. These factors include, but are not limited to, the following:

- Attempts to reduce the federal deficit
- Targeted increases in IT spending
- Influences toward the use of commercial services
- Pressures to downsize the federal workforce
- Acquisition and IT management reforms
- Growing dependency on COTS products.

A Federal Market Overview

1. Economic Factors

The nation continues to address a number of highly visible and sensitive operational issues. Both the Administration and Congress have proposed budget resolutions that would balance the federal budget within the next seven years. With limited success, the market can expect to see either smaller scopes in existing programs or termination of some programs to decrease overall government spending. Whether these scenarios will limit spending on information technology products and services remains to be seen. However, the likelihood at this time of significantly reduced budgets for IT spending is very low.

The final report of the National Performance Review (NPR), released to the public September 7, 1993, posed a number of new directions for federal agencies. The two most significant ones from the perspective of federal information technology systems and services vendors were procurement reform and the "re-invention" of government through more effective use of IT. The NPR report mandates improved service at lower cost. Improved service is coupled with the requirement of related federal programs to "inter-operate." Business process re-engineering, client/server architecture and acquisition of commercial products all have been identified as enablers of improved performance at lower cost. The public awareness of the NPR has diminished during the past year, but initiatives will continue at least through FY 1996 and likely well into the next Administration, if it is a Democratic one.

The Federal Acquisition Reform Act of 1996 and the Information Technology Management Reform Act of 1996 have set the tone for major changes in federal IT contracting. This legislation makes the procurement process more streamlined and more like commercial processes — further encourageing the use of commercial products.

Economic stability at the national level has been declared by most economists. With only a slight inflation rate increase expected over the next few years, the nation is in an improved position to reduce its national debt. On the international level, monetary problems continue to confound the nation's ability to settle its foreign trade imbalance and to compete on a broader, worldwide base. The focus of this imbalance is expanding beyond automobiles to include other manufactured products such as photographic equipment.

Other national programs, such as law enforcement, health care reform and social reform, faced major political conflict related to both definition of service and cost of implementation during 1996. These political conflicts, some of which were resolved during 1996, can have a significant negative impact on the current deficit crisis if they are not resolved within the final years of this Administration. Lack of clear resolution also may reduce the likelihood that the current officials will be re-elected. A turnover in Administration likely would call for a redesign and spending adjustment of many of the major national programs.

Structural adjustments continue in national programs as a result of slow economic recovery. Massive layoffs of workers in the industrial complex, further downsizing of the defense program and closings of military bases, and spiraling costs of entitlement programs are among the issues driving the adjustments. Redistribution of federal tax dollars through proposed increases in block grants will further redefine the services industry in particular.

Spending reductions, joined with a middle class tax cut proposed by the Administration, head up activities that will influence the rate of economic recovery through the year 2002. Added to fiscal uncertainty are the concerns that the President's economic recovery program will continue to have problems in Congress and will result further in a growing lack of public confidence in the Administration's programs. With the campaign season already underway for the 1996 elections, a great deal of attention will be paid to economic growth and reduced deficit spending.

a. FY 1996 Federal Budget

Reported actual spending for FY 1995 was considerably higher than estimated last year. Estimated spending for FY 1996 in on par with FY 1995 spending levels. Actual spending has been on a decline since FY 1992. Forecast levels for FY 1996 and outyears anticipates spending increases at modest levels. The FY 1996 budget process was marked with concerns for spending reductions and improved government services. The process for FY 1997 will be marked with difficult decisions on the closing of several federal agencies, the merging of more than 270 agency programs that have similar missions, and the closing down of as many as 130 outdated federal programs. Although a budget resolution was passed by Congress that projects to balance the federal budget by the year 2002, major political conflict is expected to follow during the national elections in 1996.

The budget and the economy operate together, each influencing the other as changes occur. A slackening in economic growth tends to increase the size of the deficit. Increasing unemployment rates influence lower GDP growth. This lessening, in turn, increases federal outlays for entitlement programs such as food stamps and unemployment compensation. The significant factors affecting the spending are the deposit insurance payments and increases in the recession-driven benefits programs. The White House estimates that the deficit will continue to fall as a percentage of GDP to 2.1 percent, its lowest level since 1979. The Congressional Budget Office (CBO) does not expect federal spending to decline from its current rate of 25% of GDP to 22% until at least FY 1997, when spending will be similar to levels in the late 1970s.

b. Entitlements versus Discretionary Funds

Under the Budget Enforcement Act of 1990 (BEA), the budget is divided into two exclusively separate categories: discretionary and direct (entitlement). Discretionary spending refers to programs in the Administration's operating plan. Spending for such programs is limited through FY 1998 to receipts such as tax collection and service fees. Spending on discretionary programs that exceed appropriated outlays triggers a sequester to eliminate overspending.

Entitlement programs include guaranteed payments to congressional programs such as food stamps, social security, and Medicare/Medicaid. Entitlement spending continues as the largest category of federal spending. It represents 52% of outlays in FY 1995 and is expected to grow to 57% by FY 2000. This upward trend will continue unless Congress drastically curtails the eligibility formulas (not under the control of the Administration). Unlike the annually authorized and appropriated discretionary expenditures, entitlements are defined by eligibility, not by population size, taxes or Administration initiatives.

c. Law Enforcement

In 1994, Congress enacted the Violent Crime Control and Law Enforcement Act, one of the Administration's major initiatives. Most of the provisions of this legislation will be carried out at the state and local levels, but federal program budgets will be increased to assure a successful implementation. A total of $21.5 billion in discretionary spending in FY 1996 will result from the initiative, most as federal support to local programs.

The federal agencies to gain from budget increases from this legislation are listed in Exhibit III-1.

Exhibit III-1

Law Enforcement Spending by Agency

Agency	FY 1995	FY 1996	Change
Office of Justice Programs	1.1	2.1	91%
Immigration and Naturalization Service	1.4	1.8	29%
Drug Enforcement Administration	0.8	0.8	13%
Bureau of Prisons	2.6	3.0	12%
Federal Bureau of Investigation	2.2	2.4	9%
U.S. Attorneys	0.9	0.9	0%
U.S. Customs Service	1.5	1.5	0%
Bureau of Alcohol, Tobacco and Firearms	0.4	0.4	0%
U.S. Secret Service	0.5	0.5	0%

Figures in $ Billions *Source: Budget of the United States Government, Fiscal Year 1996*

Note: Percent of change is calculated on a number more detailed than the one shown.

d. Environmental Cleanup

In another major attempt to coordinate programs between federal, state and local agencies, the Administration embarked on a clean environment program. In the belief that support to economic programs would result in a healthier economy, budget increases and new programs were identified to

fundamentally change the way government protects the environment and health. The largest initiatives in this program are listed in Exhibit III-2. Approximately $600 million of the federal budget will be transferred by the Environmental Protection Agency (EPA) to states through grant funds, specifically earmarking them for the target programs. Overall spending in these categories represents an increase over FY 1995 of more than 10 percent.

Exhibit III-2

Proposed Spending for Environmental Cleanup

	Lead Agency	FY 1996
EPA's Operating Program	EPA	3.4
Water Quality	EPA	1.6
Superfund	EPA	1.8
Federal Facilities Cleanup	DOE/DoD	6.6
Energy Conservation	DOE	0.9
Solar and Renewable Energy	DOE	0.4
Wetlands Protection	USDA	0.9

Figures in $ Billions *Source: Budget of the United States Government, Fiscal Year 1996*

e. Research and Development

Research and development spending has been on a gradual decline in defense-related areas. Today, defense R&D spending is below the level of that of FY 1990. R&D for non-defense programs has been on a slight increase over the same period of time. Exhibit III-3 shows the different directions these two budgets have taken over the last five years. Science and Space (6% annual growth) and Health (10% annual growth) represent the largest non-defense research and development spending. NASA accounts for 79% of the R&D budget for Science and Space. Approximately $12 billion is spent each year on research at the nation's universities.

Exhibit III-3

Research & Development Spending Trend

	FY 93 Actual	FY 95 Estimated	FY 96 Proposed
Science and Space	10.9	11.9	12.1
Energy	6.9	6.6	7.1
Transportation	0.6	0.7	0.8
Health	10.5	11.7	12.1
Agriculture	1.5	1.6	1.5
Resources/Environment	1.2	1.3	1.4
All Other	2.0	2.6	2.7
National Defense	38.9	36.3	35.2
Total	72.5	72.7	72.9

Figures in $ Millions *Source: Budget of the United States Government: Fiscal Year 1996*

High-performance computing and communications (HPCC) initiatives are imbedded in the science and technology R&D budgets. Exhibit III-4 shows the distribution of spending for these initiatives across the federal agencies. The HPCC program involves nine agencies and is designed to ensure U.S. leadership in information and communications technologies. It will lay the groundwork for the National Information Infrastructure (NII).

Exhibit III-4

High-Performance Computing and Communications R&D Spending

Agency	FY 93 Actual	FY 95 Estimated	FY 96 Proposed
Defense	298	384	403
Health and Human Services	47	68	78
Energy	100	113	114
NASA	82	131	131
NSF	233	297	314
Commerce	2	32	50
EPA	*	15	12
Veterans Affairs	*	24	24
Education	*	16	17

*Note: * - None reported* *Source: Budget of the United States Government, Fiscal Year 1996*
Figures in $ Millions

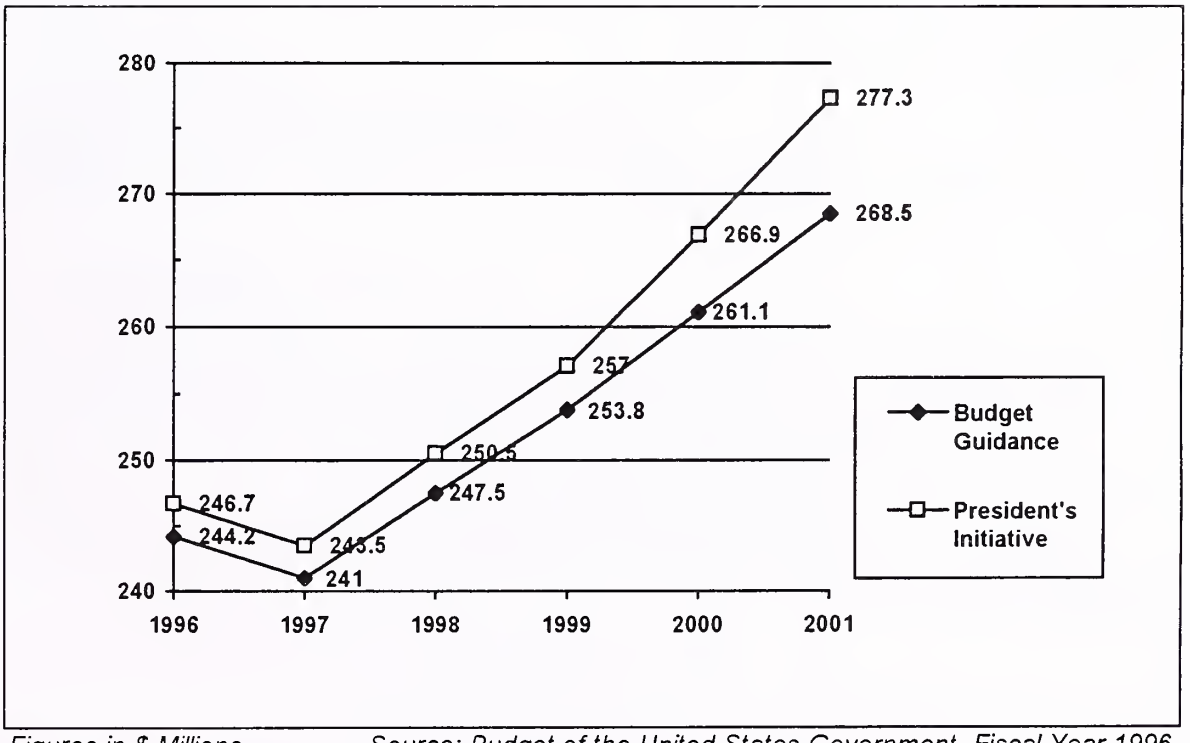
f. National Defense

DoD is faced with conflicting requirements both to scale down and to be able to support two simultaneous regional wars. The concept of capability for two simultaneous regional wars grew out of the Bush Administration. This concept continues in this Administration's budget for national defense. The "bottom-up review," carried out in FY 1993, that was associated with preparation for such a capability, is still in place.

President Clinton is holding to his plan to further reduce the military to 1,445,000 active troops by the year 2000. From a declining budget through 1997, growth is proposed through the end of the century. Exhibit III-5 shows the funding levels resulting from the President's Defense Funding Initiative introduced early in FY 1995. The President expects to increase defense spending beyond guidance levels throughout the five-year period, with real increases from FY 1997 on out.

Exhibit III-5

President's Defense Fund Initiative



Figures in $ Millions *Source: Budget of the United States Government, Fiscal Year 1996*

g. Reinventing Government

As a result of the President's National Performance Review Initiative, five major themes evolved to improve the government's overall performance at lower operating costs. Restructuring proposals for five agencies were issued. Through reinvention, the agencies were expected to reduce the deficit more than $22 billion by the year 2000. These agencies are listed in Exhibit III-6.

Exhibit III-6

Expected Savings From Five Reinvented Agencies

Agency	Expected Savings
Housing and Urban Development	700
Energy	14,121
Transportation	6,435
General Services Administration	1,400
Office of Personnel Management	30

Figures in $ Millions *Source: Budget of the United States Government, Fiscal Year 1996*

In the second phase of the NPR, "Performance Leaderships" have been identified with state and local governments. A total of 292 programs have been earmarked for the new partnership through six cabinet departments. Exhibit III-7 lists the departments and shows the number of programs involved within each that would be shared with state and local government entities.

Exhibit III-7

Cabinet Departments With Performance Partnerships

Departments	Number of Programs
Agriculture	14
Labor	70
Health and Human Services	108
Housing and Urban Development	60
Transportation	30
Environmental Protection Agency	12

Source: Budget of the United States Government, Fiscal Year 1996

h. Federal Aid to State and Local Governments

Many of the congressionally legislated government services are administered at the state and local levels with "flow through" funds provided by federal programs. Public education, road construction, water supply and sewage treatment and law enforcement are among many services delivered at state and local levels. Grants, loans and tax subsidies are the forms that revenue relief take for these programs. The functions with the largest amount of grants and loans are health and income security. Together they total $155.7 billion for FY 1996. Exhibit III-8 shows the distribution of federal grants by function. While social programs continue growing at a rapid rate, law enforcement (Justice) emerges as a significant growth market segment.

Exhibit III-8

Federal Grants By Function

	FY 1994 Actual	FY 1995 Estimated	FY 1996 Proposed
Defense	0.2	0.1	0.1
Energy	0.5	0.5	0.5
Resources and Environment	3.8	4.1	4.1
Agriculture	0.9	0.9	0.8
Transportation	23.6	24.8	24.2
Regional Development	7.8	9.3	10.1
Education and Social Services	32.7	36.1	38.5
Health	86.3	93.2	100.7
Income Security	51.5	55.1	55.0
Veterans Benefits	0.2	0.2	0.2
Justice	1.0	1.3	2.0
General Government	2.1	2.3	2.3
Total	210.6	228.0	238.5

Figures in $ Billions *Source: Budget of the United States Government, Fiscal Year 1996*

i. Other Budget Restrictions

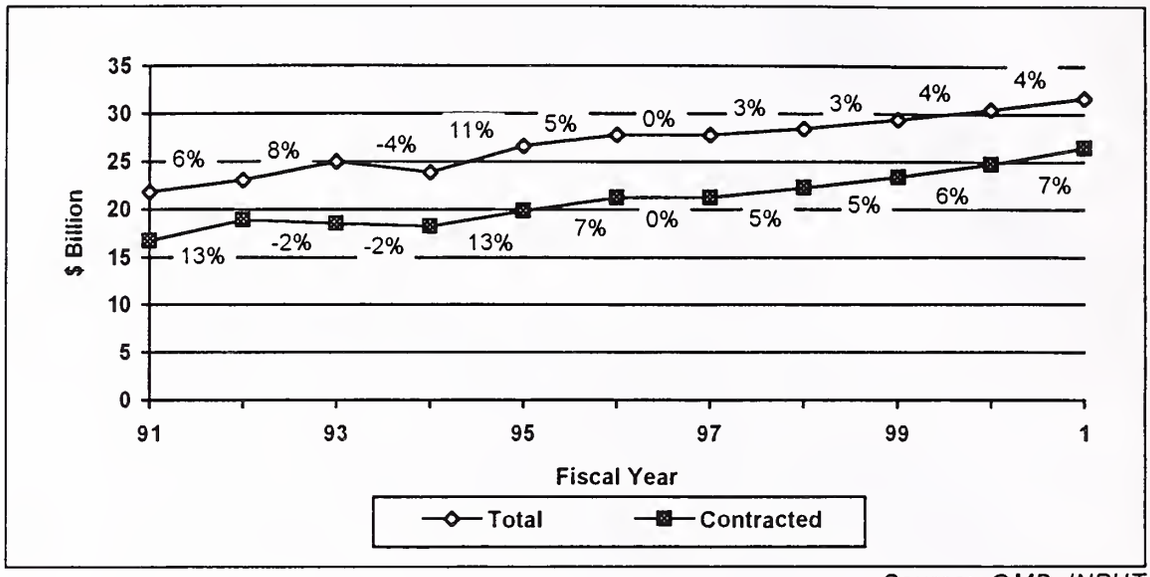
The outlook for deficit reduction over the next five years has improved. Overall discretionary spending levels have dropped, and the rate of deficit growth has diminished. Nevertheless, deficit spending remains a major impediment to full economic recovery. In a continuing effort to improve the deficit position, IT-supported improvements are voiced by both Administration officials and Congress. Any productivity gains expected in the federal sector will depend on reengineering processes and replacement of inadequate systems.

2. Information Technology Budgets

FY 1995 saw the largest differential in total federal IT expenditures, a $1.9 billion increase (of which $1.7 billion was in defense), between projected expenditures and actual outlays. The previous record increase was $1.0 billion. See Exhibit III-9.

Exhibit III-9

Total Federal IT Expenditures, FY 1991–2001



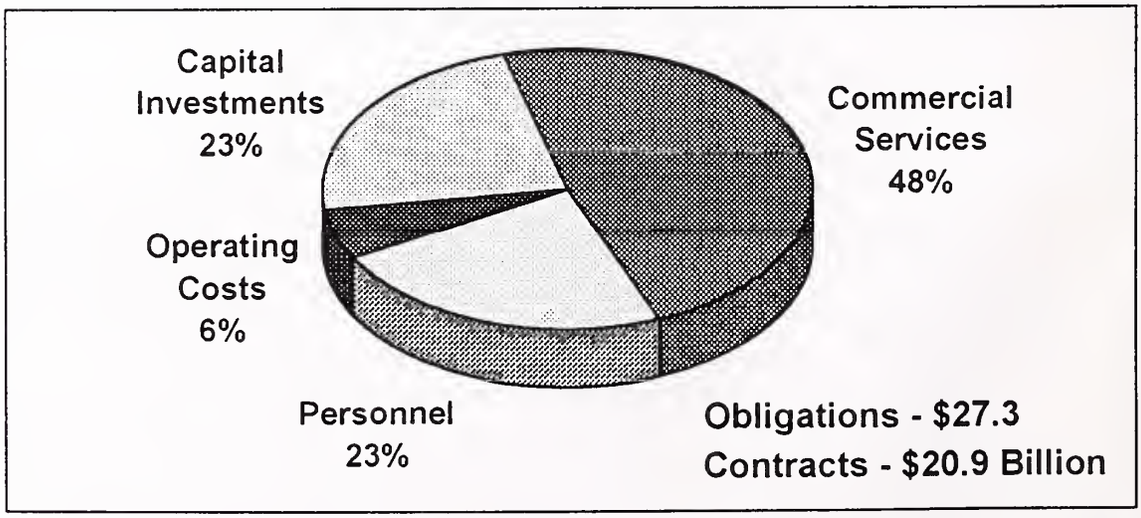
Source: OMB, INPUT

FY 1996 will see another healthy increase of 5% on total federal IT expenditures and 7% on the contracted portion. The outyears see total expenditures increasing 3% going to 4% around the turn of the century. The effects of federal workforce downsizing will see a faster increase in the contracting portion of 5% growth going to 7% at the turn of the century.

The IT budget request of $27.3 billion for FY 1997 is an increase of 0% from the $27.2 billion estimated for FY 1996. The addressable portion of the FY 1997 IT budget, shown in Exhibit III-10 as $20.9 billion, is a 0% increase over the estimate for FY 1996. This portion of the IT budget is for contracted goods and services and shows a steady federal government dependency on the private sector for support.

Exhibit III-10

Information Technology Budget, FY 1997



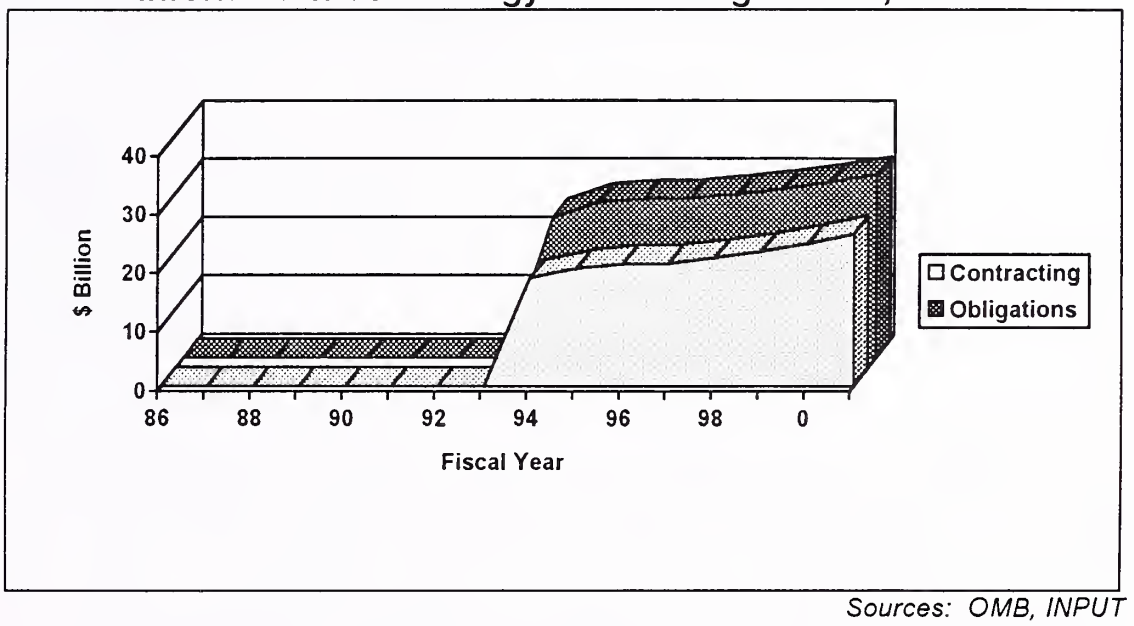
Source: OMB, INPUT

a. Budget Categories

Contracting will go from 77% of the FY 1994 federal IT budget to 84% in FY 2001. Defense is around 70% contracting, while civilian government is around 80%. See Exhibit III-11. This trend is driven by agency downsizing, outsourcing of people and the inability of IRM managers to maintain technical expertise in-house.

Exhibit III-11

Information Technology Contracting Trends, FY 1997

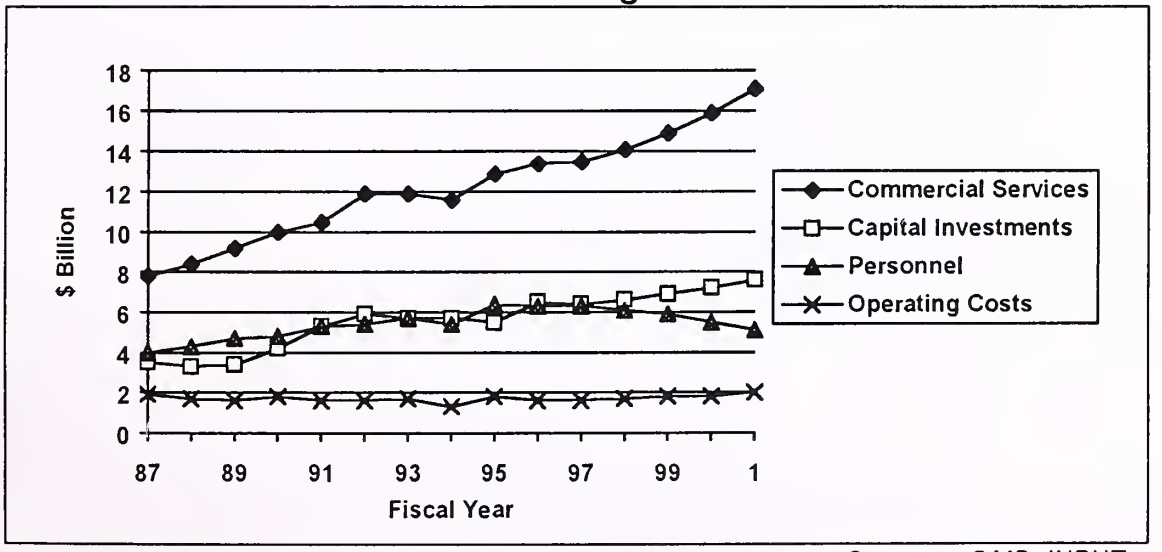


Sources: OMB, INPUT

The compound annual growth rate (CAGR) from FY 1996 to FY 2001 will be 5.0% for commercial services, 3.8% for operating costs, 3.5% for capital investments and -4.1% for personnel. See Exhibit III-12. CAGR for total contracted IT from FY 1996 to FY 2001 will be 4.5%.

Exhibit III-12

Federal IT Budget Trends

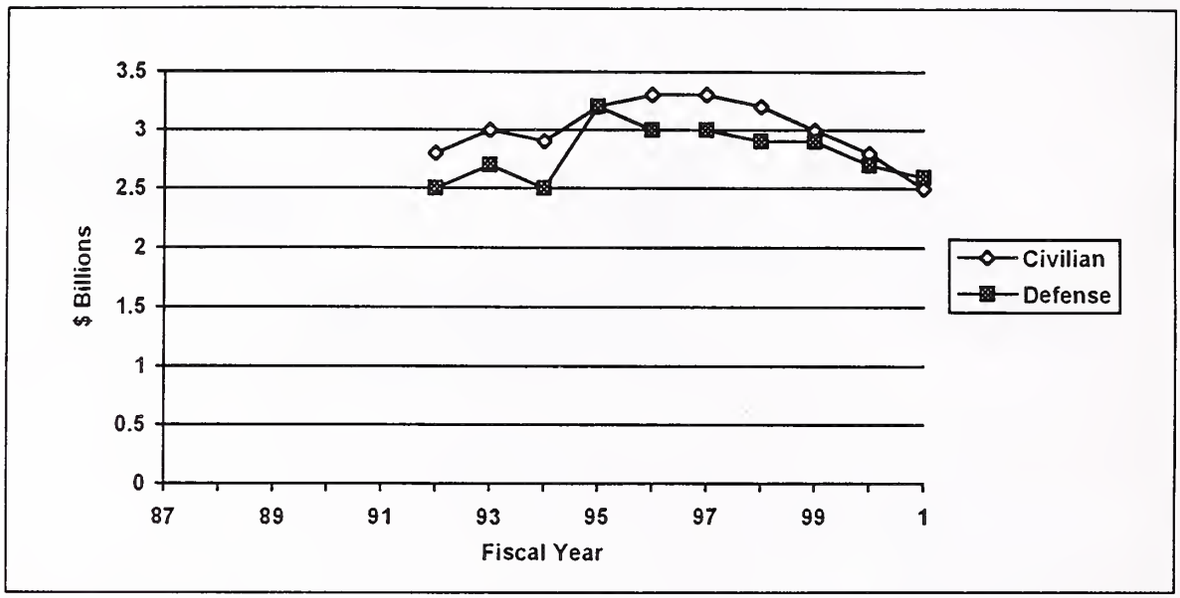


Sources: OMB, INPUT

Defense had an unexpected rise in personnel costs but is still below the civilian total. Since DoD has already made most of its personnel cuts, Defense will see a -3.0% CAGR from FY 1996 to FY 2001, while the civilian side will decrease at -5.3% CAGR. See Exhibit III-13. The continued strong surge in civilian outsourcing will drive the civilian personnel cost below defense by FY 2001.

Exhibit III-13

Federal IT Personnel Trends



Sources: OMB, INPUT

b. IT Budget Trends

The IT budget representation in Exhibit III-10 relates to the proposed outlays or expenditures for FY 1997, not the budget request submitted to Congress. The latter identifies additional funding needed to cover various funds transfers for services among agencies and from other projects.

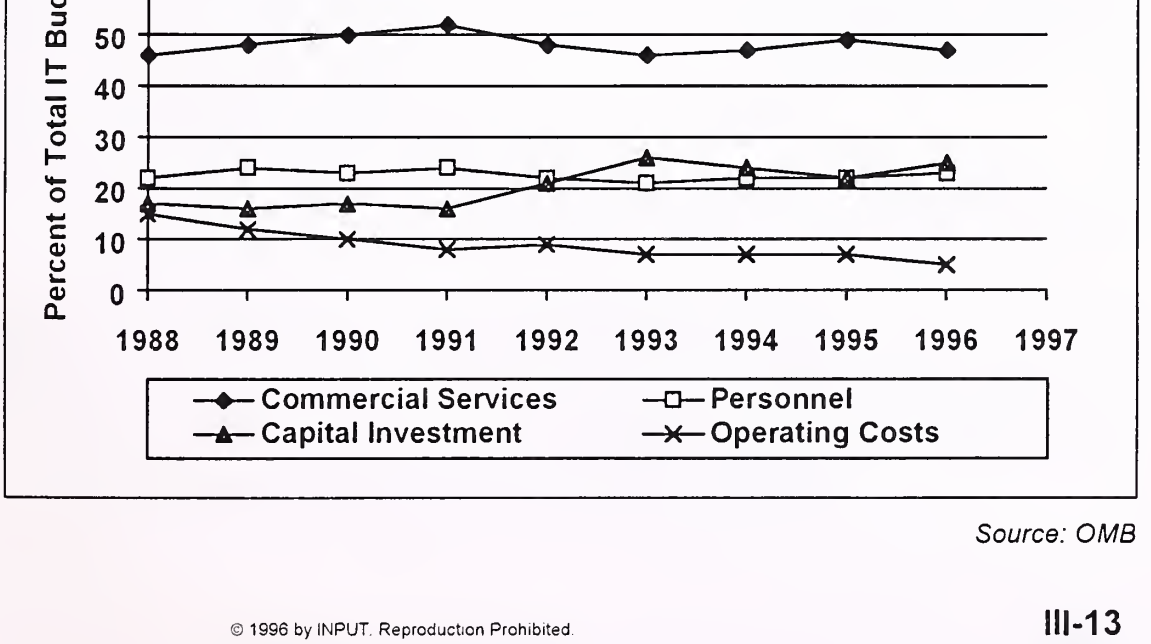
The proportion of the budget spent in each of these segments has varied considerably in the past decade. In the period FYs 1987 through 1996, there have been progressive changes, as illustrated in Exhibit III-14. Commercial services spending is the only segment growing as a proportion of the total IT budget. Proportions for the other categories are on a downward progression:

- Beginning in FY 1988, commercial services steadily increased about 2% per year to 52% in 1991, indicating a growing reliance on private-sector sources. Outlays fell in FY 1992 to only 48%, and held about 47% of the requested funding through FY 1994, reflecting the substantial increase in planned capital investment. The proportional growth in commercial services spending for FY 1995 returned to 50%, but the proportion declined to 47% for FY 1996 because of the unusually large growth in capital investment.

- At the other end of the budget spectrum, operating expenses have declined over the same period. The inventory of computer leases was terminated in response to congressional mandates in 1987–1988. The decreasing proportion seen in FY 1995 for operating costs at 7% has fallen in FY 1996 to 5%.
- The decline in capital investment prior to FY 1992 paralleled the reduction in cost-per-MIPS, accelerated PC acquisitions, and the cancellation or slippage of a number of projects over this time frame. The significant jumps in FY 1992 and FY 1993 support release of more than $1 billion by the Corporate Information Management (CIM) project office, increased spending by Treasury, and emergency upgrades needed by a number of older information systems. Until FY 1995, budget levels declined as a percent of overall IT budget, mostly because of increased competition in the PC market and overall drop in hardware prices. With the move to commercial products, software and hardware, rather than developmental products, the increased investment in capital products has reoccurred.
- Federal personnel costs were at their lowest in 1987, when a number of older data processing suites were removed from service. Through FY 1991, agencies partially reversed the outward flow of qualified people. In FY 1992 and FY 1993, however, the proportion of the IT budget again declined, although the current dollars were actually higher. The active reduction in the federal workforce in FY 1994–1996, led by NPR which seeks a total reduction of 252,000 in federal civilian workforce, and targeted staff reductions in the Department of Defense, will contribute to the further decline in in-house personnel support.

Exhibit III-14

Federal IT Budget Progression
Fiscal Years 1988–1997



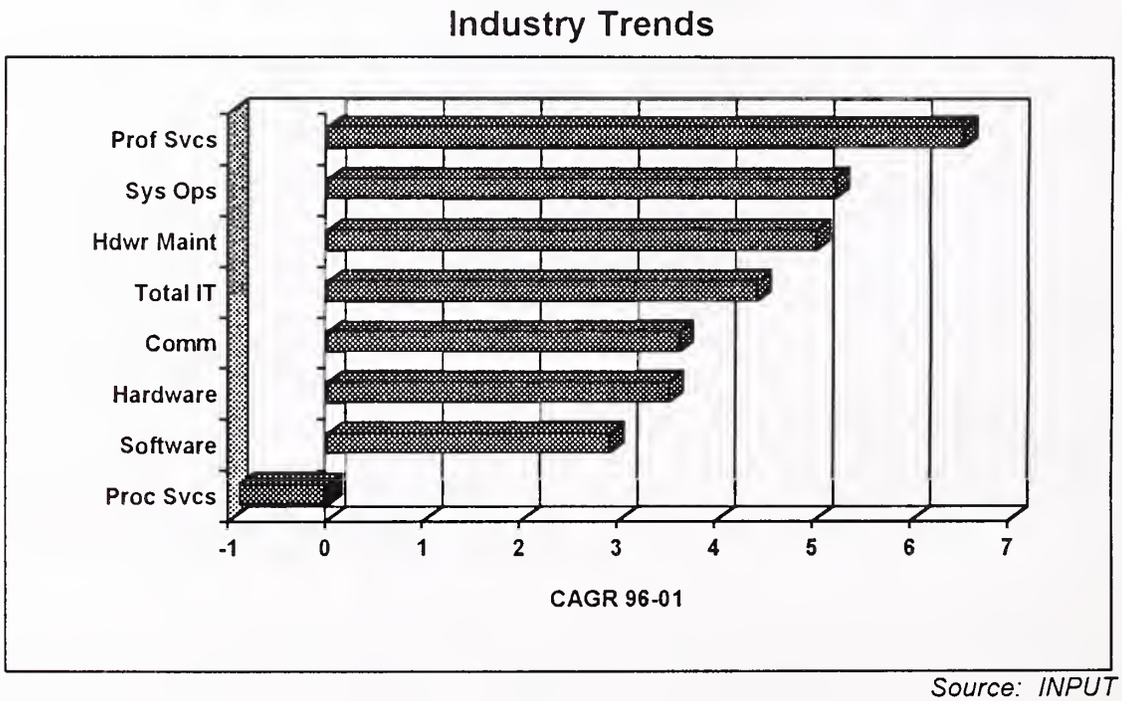
Source: OMB

The sub-markets doing better than the federal market as a whole (Exhibit III-15) are:

- **Professional Services** - all segments doing well (software development at 6.8% CAGR; design and consulting at 6.6% CAGR; education and training at 5.5% CAGR)
- **Systems Operations** - Government-Owned, Contractor-Operated (GOCO) facilities management at 5.2% CAGR and Contractor-Owned, Contractor-Operated (COCO) facilities management at %.0% CAGR
- **Hardware maintenance** - 5.0% CAGR.

Other sub-markets of note are communications professional services at 6.1% CAGR and software O&M at 5.0% CAGR.

Exhibit III-15



Source: INPUT

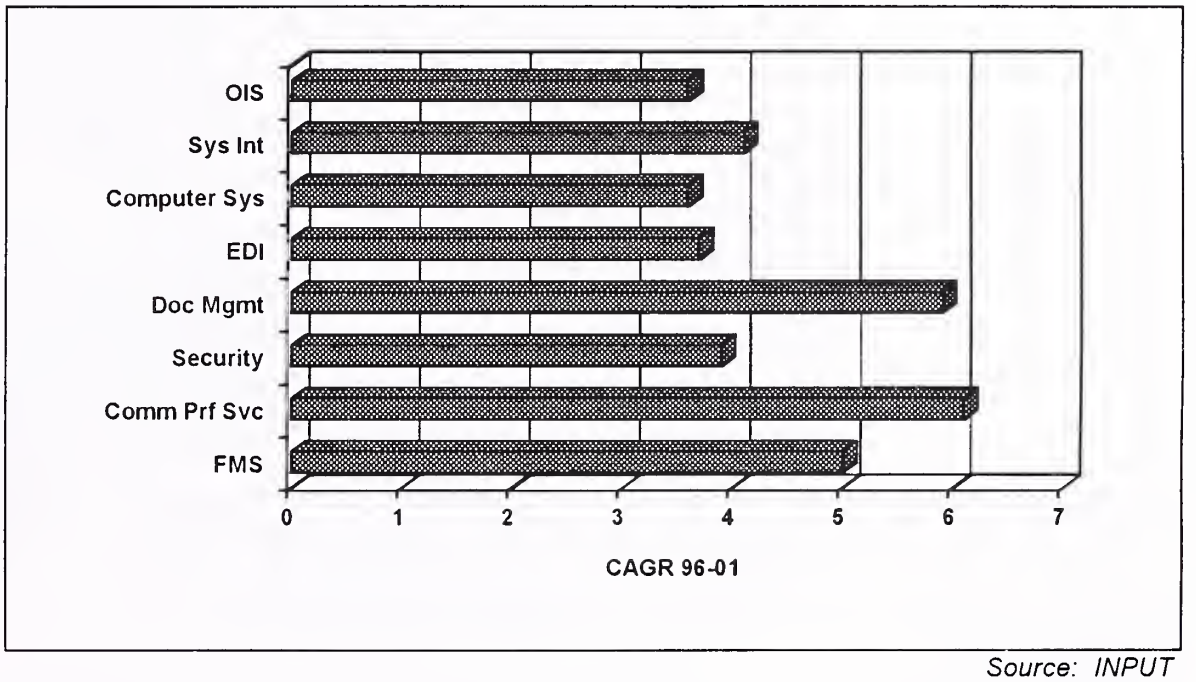
The drivers of growth in the sub-markets (Exhibit III-16) are:

- **Office Information Systems (OIS)** - professional services at 6.5% CAGR
- **Systems Integration** - professional services at 6.8% CAGR
- **Computer Systems** - supercomputers at 4.6% CAGR; workstations at 4.6% CAGR
- **EDI** - professional services at 6.5% CAGR

- **Document Management** - professional services at 7.6% CAGR; maintenance at 5.9% CAGR
- **Security** - professional services at 5.8% CAGR
- **Telecommunications Professional Services** - all segment are strong (software development 7.0% CAGR; systems integration at 6.8% CAGR; facilities management at 5.0% CAGR; design & consulting at 5.9% CAGR; education & training at 5.9% CAGR).

Exhibit III-16

Technology Trends



Source: INPUT

c. Budget Variances

Exhibit III-17 lists actual outlays for each of four budget segments from FY 1987 through FY 1994. The outlays present a slightly different distribution than requested in the budget for each year. The changes are caused by a number of actions.

- Some proposed systems or hardware procurements are canceled or reduced by Congress. Agriculture, Energy, and Defense spending will likely be lower than projected because of congressional threats to major program budgets.
- Other expenditures increased in response to activities added by Congress in the Budget Authorization and/or the Appropriation Acts. Social Security Administration and Internal Revenue Service spending levels will increase because of supplemental appropriations.

- Reductions in commercial contracts occurred because of uncertainty in the future of programs.
- Leases are converted to ownership or are terminated.

Exhibit III-17

Actual Outlays of Federal Information Technology Budget
FY 1987–1994

	1987	1988	1989	1990	1991	1992	1993	1994
Comm Svcs	7.8	8.4	9.2	10.0	10.5	11.9	11.9	11.6
Capital Invst	3.5	3.3	3.4	4.2	5.3	5.9	5.7	5.7
Personnel	4.0	4.3	4.7	4.8	5.3	5.4	5.7	5.4
Oper Costs	1.9	1.7	1.6	1.8	1.6	1.6	1.7	1.3
Total	17.2	17.7	18.9	20.8	22.7	24.8	24.9	24.0

Figures in $ Billions *Source: OMB*

A comparison of the government's IT budget forecasts with the actual outlays for the same time frame indicates the relative closeness of the two, especially in FYs 1987, 1989, 1992 and 1993, as shown in Exhibit III-18. In FY 1988, DoD froze Research, Development, Test and Engineering (RDT&E) expenditures in midyear because earlier outlays were exceeding authorizations. By the third quarter, the Secretary of Defense authorized resumption of research programs, but denied expenditures for information technology. In FY 1994, reductions or postponements in commercial contracts occurred because of uncertainty in the future of programs.

Exhibit III-18

IT Budget Requests Versus Outlays
FY 1987–1994

	1987	1988	1989	1990	1991	1992	1993	1994
Request	17.1	18.9	18.4	19.5	21.4	24.5	25.4	25.7
Outlay	17.2	17.7	18.9	20.8	22.7	24.8	24.9	24.0
Variance	+0.1	-1.2	+0.5	+1.3	+1.3	+0.3	-0.5	-1.7

Figures in $ Billions *Source: OMB*

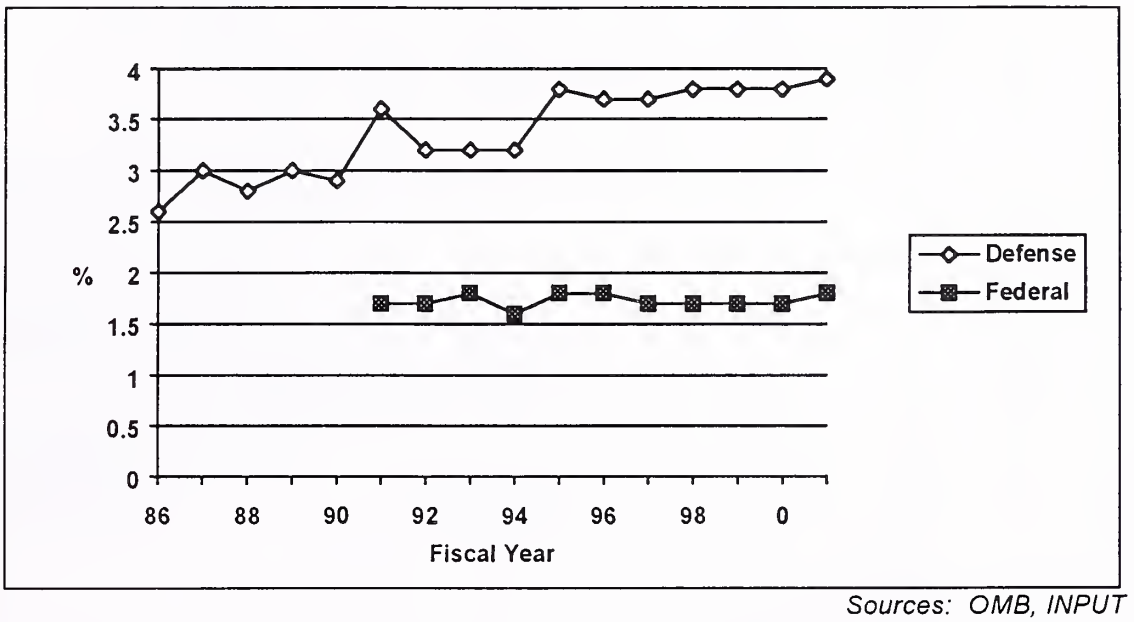
FY 1990 and FY 1991 were affected by midyear increases in outlays authorized by Congress to meet defense and civilian agencies' needs. The likelihood of outlays exceeding budget in FY 1994 was low because of pressures to reduce federal spending.

3. OMB Five-Year Plans

IT represents 1.7% of the overall federal budget for the operating year FY 1997. See Exhibit III-19. This proportion has held steady since FY 1992. As a proportion of the government operating budget, IT represents 4.9%. This is an increase of 0.4% over last year. The operating budget excludes mandatory spending, such as Medicaid/Medicare.

Exhibit III-19

IT Share of U.S. Budget, FY 1986–2001



Sources: OMB, INPUT

Since FY 1991, agencies anticipating IT expenditures of less than $2 million are not obligated to submit Exhibit 43 to OMB.

The FY 1991 issue of the Five-Year Plan illustrated a growing reliance on the values in the plan. Congress demanded improved compliance of agency budgets with the terms of the Revised Paperwork Reduction Act. This annually updated plan progressively identified more of the proposed IT budget until 1995. (See Exhibit III-20.) The percentage of the budget represented by major programs increased over the twelve-year period. Plan programs amounted to 27% of the FY 1983 IT budget and in FY 1991 reached 43%.

The value of an agency's major program funding in a given fiscal year has no fixed relationship with the requested IT budget. This dissimilarity also is noted in the federal processing services market:

- Although defense IT budgets account for half of the total for processing services each year, major ADP procurements for general-purpose resources were slightly less than one-fourth of the total funding for each year.

- The total value of major systems and services being acquired over the twelve-year period is not revealed by the annual budget and OMB plan forecasts.

- The total does not include funding for the early years of several very large systems integration programs.

- The IT budget did not include expenditures for the FAA Advanced Automation Program (for Air Traffic Control) prior to 1991, because it was funded by the off-budget Airways Improvement Fund. Since then, Congress has directed that these expenditures be given greater visibility by including them in the IT budget.

- Strategic Defense Initiative (SDI) supercomputers were special purpose to that program and were included in project funds, rather than in the IT budget.

- Beginning in 1992, Congress no longer requires independent agencies to file Section 43A&B if they do not expect to spend more than $2 million on information technology acquisitions.

- IT budgets and OMB plans also exclude planned expenditures of the public corporations, such as the Postal Service, TVA, BPA, etc., because they are considered off-budget expenditures.

- Since the 1991 version of the Five-Year Plan, OMB no longer includes listings of the major IT acquisitions planned by each agency. Instead, it provides profiles of significant long-range plans and outlines of some of the major projects needed to accomplish the missions.

- For FY 1995 IT budget reporting, OMB changed the definition of the exhibits. For this year, agencies reported major spending for financial and accounting programs. For FY 1996, a new structure and reporting requirement occurred, which revised the categories.

Exhibit III-20 also illustrates why INPUT's Federal Information Technology Procurement Program PARs and INPUT's Federal Systems and Services Market Program reports are important to vendor clients. Although some agencies identify a larger proportion of their IT spending in five-year projections (A-11) (e.g., Education, Justice, NASA and Transportation), many do not (Commerce, Defense, Energy and HHS). A large number of programs fall under the reporting threshold. The Five-Year Plan does not cover many of the services recompetitions and critical low-level front-end studies for larger programs.

Exhibit III-20

Federal IT Budgets Comparison of Major Acquisition Plans to Total IT Budgets FYs 1983, 1987, 1991, 1994, 1995

	FY 1983		FY 1987		FY 1991		FY 1994		FY 1995	
Agency	IT Budget	OMB Plan	IT Budget	OMB Plan	IT Budget	OMB Plan	IT Budget	OMB Plan	IT Budget	OMB Plan
Agriculture	445	248	558	579	760	662	841	804	934	624
Commerce	281	136	457	271	456	311	619	346	737	284
Defense	7723	1852	8906	1806	9374	1890	9692	2243	10070	1674
Education	68	76	65	54	84	53	237	112	299	243
Energy	876	128	1225	157	1519	291	1776	211	1996	183
EPA	84	51	183	116	271	132	330	149	314	96
GSA	132	1083	1693	1677	1325	1323	1507	1502	1545	75
HUD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1445	50
HHS	1518	189	792	246	821	349	1524	457	1524	163
Interior	267	76	324	121	393	180	490	194	503	155
Justice	389	232	480	354	605	689	825	886	842	658
Labor	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	159	63
NASA	797	522	1325	1057	1751	1350	1912	1297	1718	1567
State	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	377	184
Transportation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2098	2090
Treasury	518	729	1247	899	1332	1044	2098	2062	2129	1459
VA	320	10	403	132	520	81	547	183	641	182

Figures in $ Millions *N/A = Not Available*

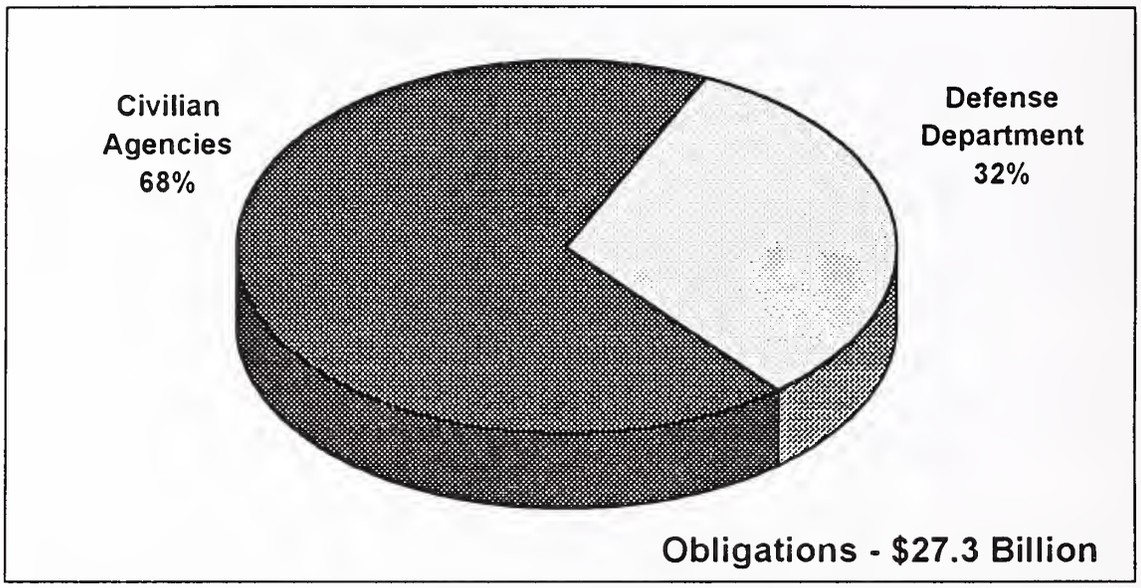
Sources: Five-Year Plan (OMB/GSA/NBS) 1983, 1987, 1991, 1994; OMB A-11, 1983, 1987, 1991, 1994, 1995.

4. Defense versus Civilian IT Budgets

The proposed Defense (including military services) IT budget for FY 1997 is 32% of the entire budget, as shown in Exhibit III-21. It will be even less if the House Armed Services Committee is successful in implementing additional budget cuts. With very few discretionary IT spending levels remaining, further budget cuts will reduce operational spending levels. The majority of the proposed outlays will acquire equipment and integrated systems, like the Army's Sustained Base Information System, the Reserve Component Automation System (RCAS) and the changes authorized for the Joint Logistics Systems Center.

Exhibit III-21

Defense Versus Civilian IT Budgets (FY 1997)

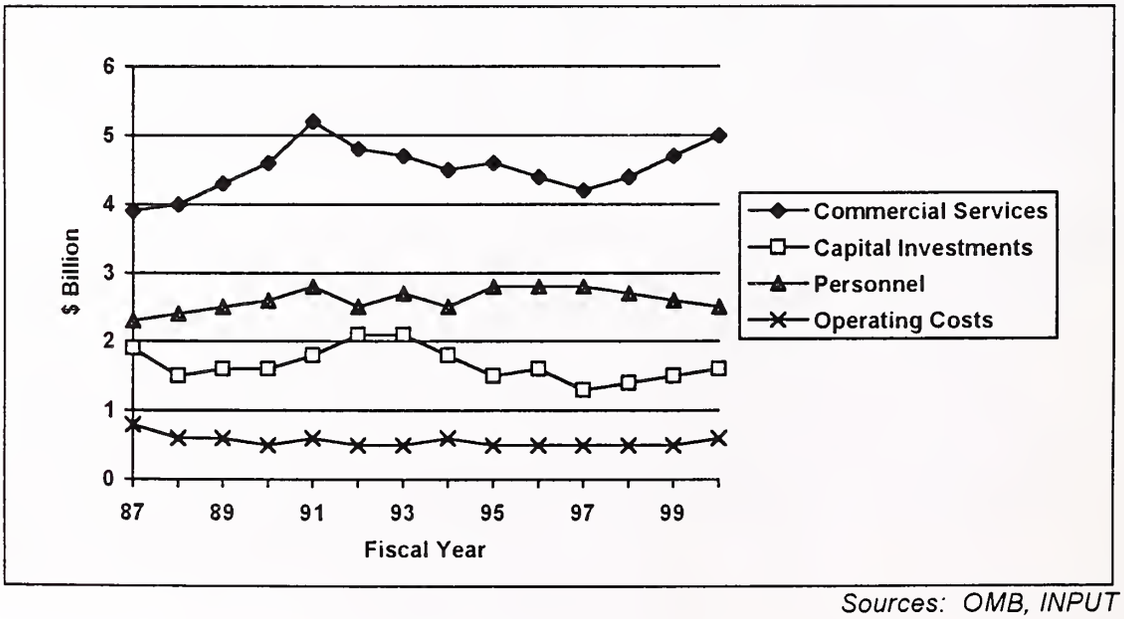


Source: OMB

The net increase in the FY 1997 forecast for the total federal government IT budget over FY 1996 is 0%. Defense spending declined for capital investment in FY 1996 and declines further for FY 1997. Operating costs also showed a loss, but are above the level for FY 1994. Defense spending for commercial services in FY 1997 declined by $144 million (2.8%). See Exhibit III-22.

Exhibit III-22

Defense Budget Trends

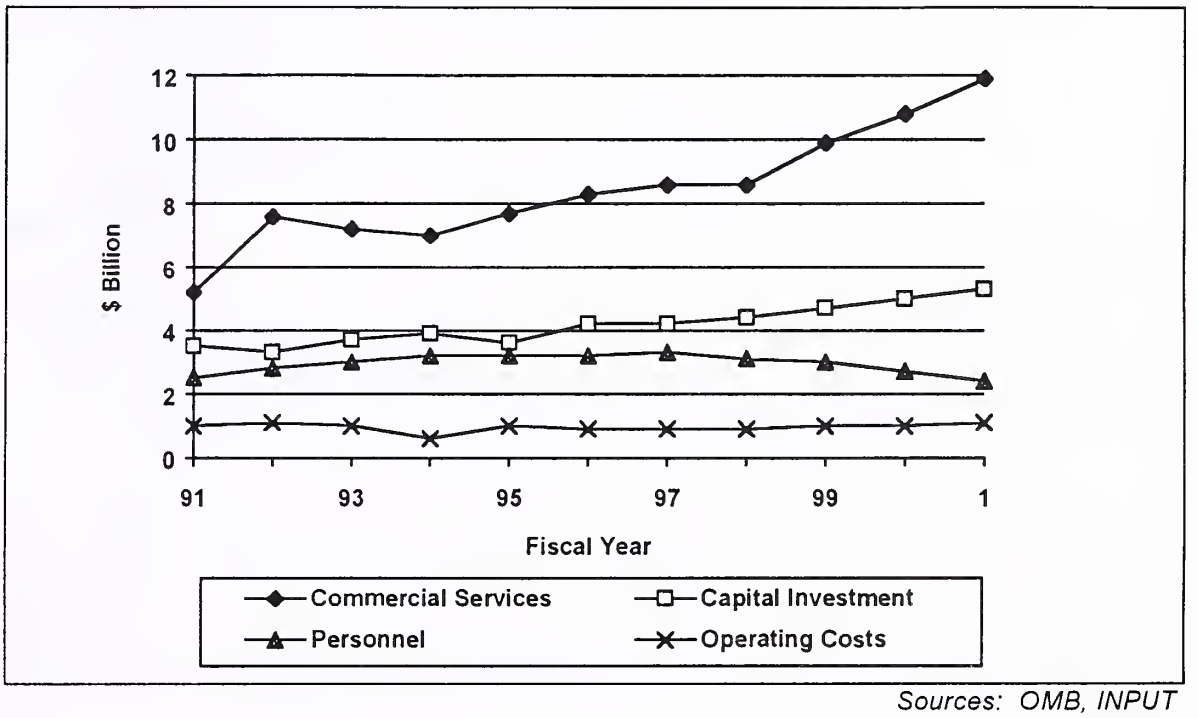


Sources: OMB, INPUT

The FY 1997 civilian agency IT market continues to grow, increasing by $274 million (2%) over the amount estimated for FY 1996. Civilian spending increased for commercial services in the same period by $275 million (3.3%). See Exhibit III-23.

Exhibit III-23

Civilian Budget Trends

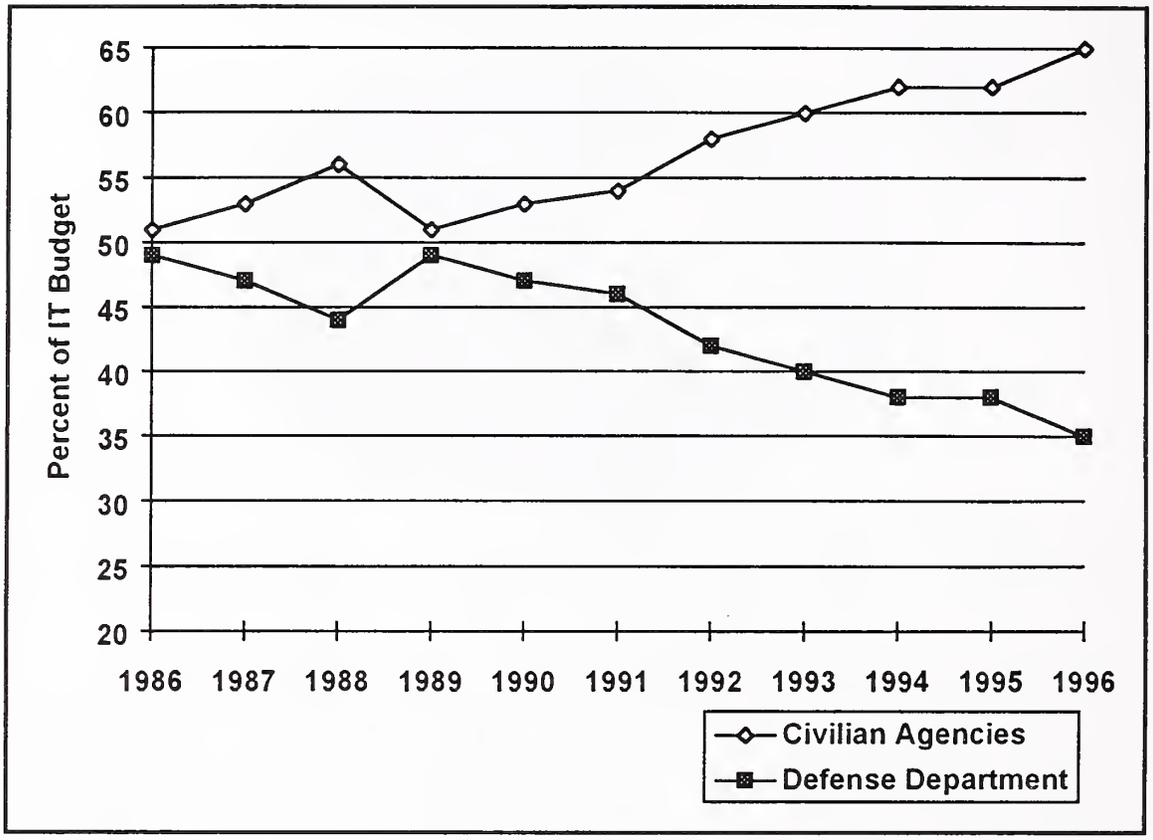


Sources: OMB, INPUT

As far back as the post-Vietnam era, the Defense portion of the IT budget was noticeably less than that of the civilian agencies. By 1983, DoD's share recovered and gradually improved, so that by 1986 Defense was at 49% of the IT budget, as illustrated in Exhibit III-24. Today, Defense accounts for only 32% of the total government IT budget. The "blip" of defense activity in FY 1995 is due to pent up demand because Defense is past their downsizing (now devoting full attention to mission); conducting military actions (Bosnia, etc.) and receiving fruits of electronic warfighter "fever."

Exhibit III-24

Defense Versus Civilian Agency Progression: Fiscal Years 1986–1996



Source: OMB

For FYs 1987 and 1988, Congress reduced the Defense budget requests because they were poorly justified, and GAO submitted several reports indicating failure to take corrective actions on several programs with Major Automated Information Systems Review Council (MAISRC)-identified defects.

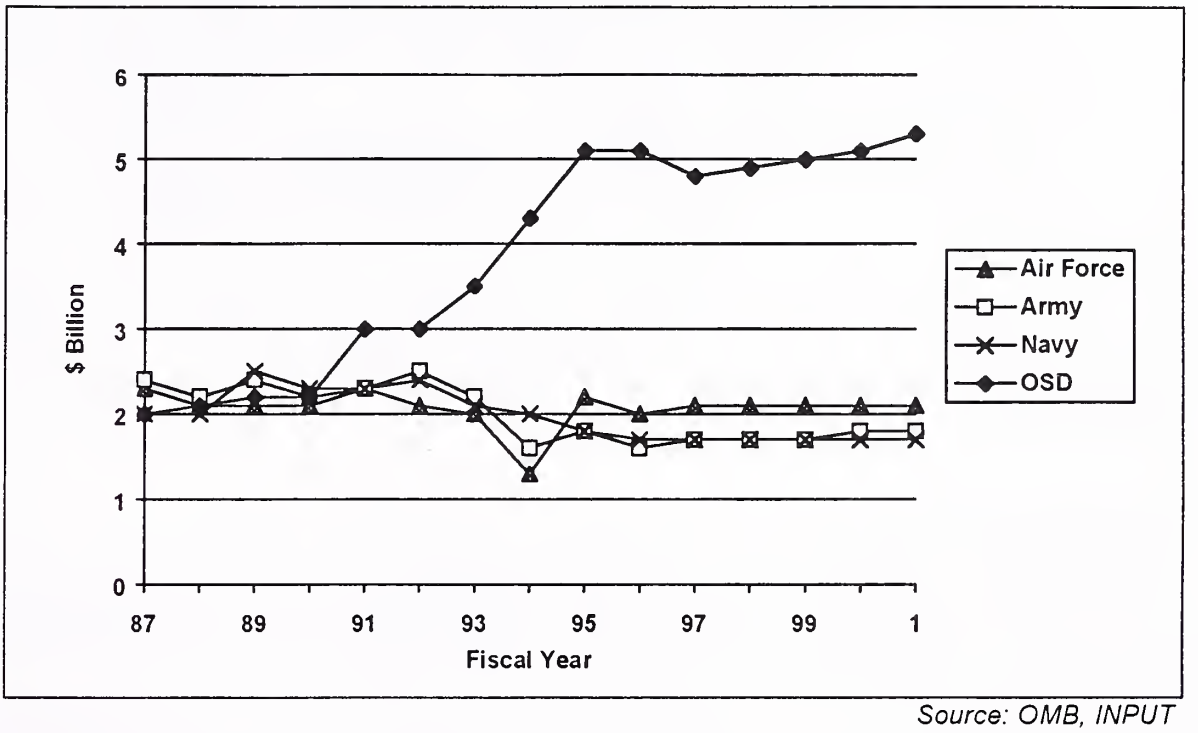
For FY 1989, delays in funding approval had several important programs in serious trouble, and Congress was convinced to allow the proportion to increase to 49%.

The following two years saw additional problems with World Wide Military Command and Control System (WWMCCS) modernization and disagreements on how Continuous Acquisition and Life-cycle Support (CALS) would be run. Then came Corporate Information Management (CIM), and Congress moved most of the new systems money under CIM control through the 1992 Armed Services Appropriations Act. Through FY 2001, INPUT does not see the overall growth of Defense spending significantly improving; others see a real decline. INPUT forecasts the defense IT CAGR for this period to be slightly less than 1%. The civilian agencies are expected to experience a CAGR of 5% over the same period.

Starting in FY 1991, the Office of the Secretary of Defense (OSD) has taken the IT budget dollars for Defense. See Exhibit III-25. The CAGR for 1996 to 2001 is 3.1% for OSD, 2.0% for Army, 1.9% for Navy and -0.1% for Air Force.

Exhibit III-25

Defense Agency Budget Trends

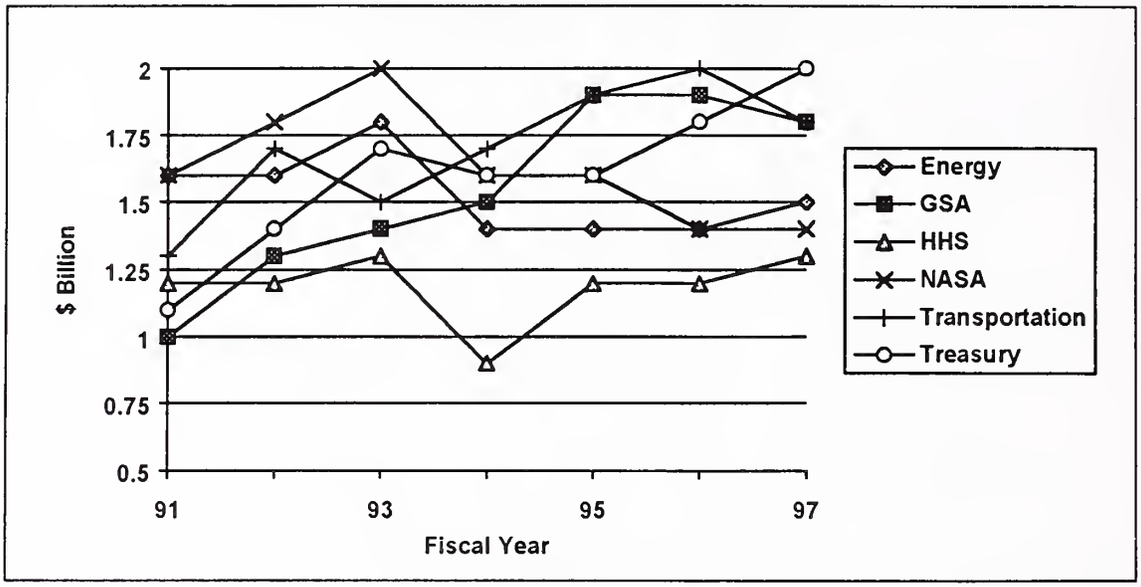


Source: OMB, INPUT

Civilian agencies when broken down by total IT budget show common budget trends in each category. In the billion dollar plus club, there is no IT budget growth since FY 1991. See Exhibit III-26. Agencies with IT budgets in the $500 million to $1 billion range have a very healthy growth rate. See Exhibit III-27. The next group of agencies, with IT budgets in the $100 million to $500 million range, have a minimal growth rate. Education is a notable exception with exponential growth. See Exhibit III-28. The smallest agencies are a mixed bag with some growing and others (AID, NRC and OPM) declining. See Exhibit III-29.

Exhibit III-26

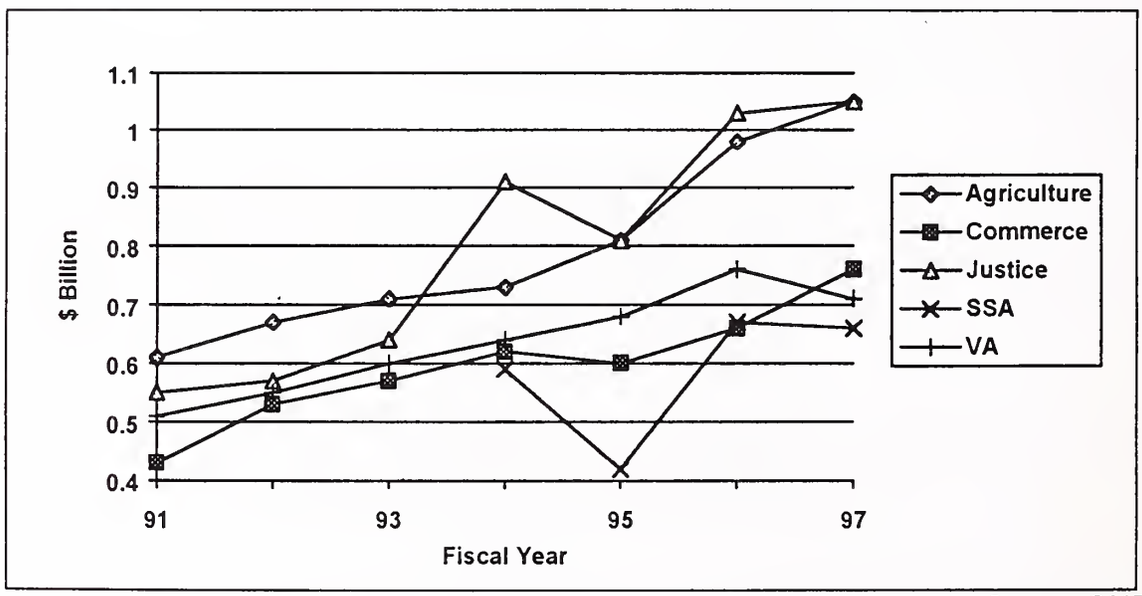
>$1 Billion Agency Budget Trends



Source: OMB

Exhibit III-27

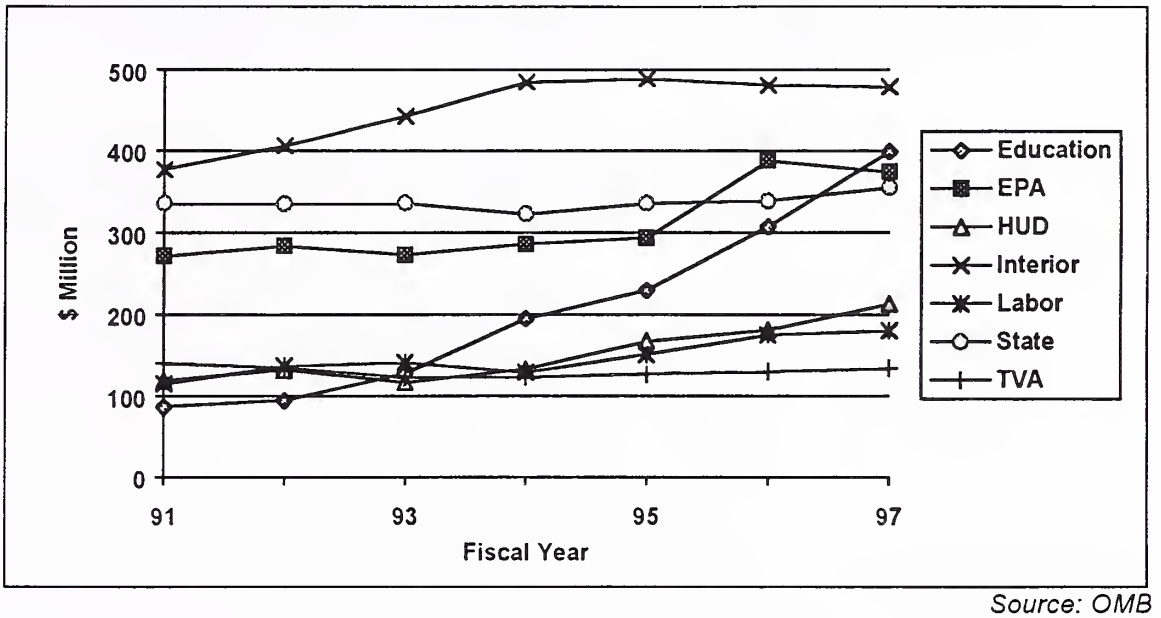
$500 Million - $1 Billion Agency Budget Trends



Source: OMB

Exhibit III-28

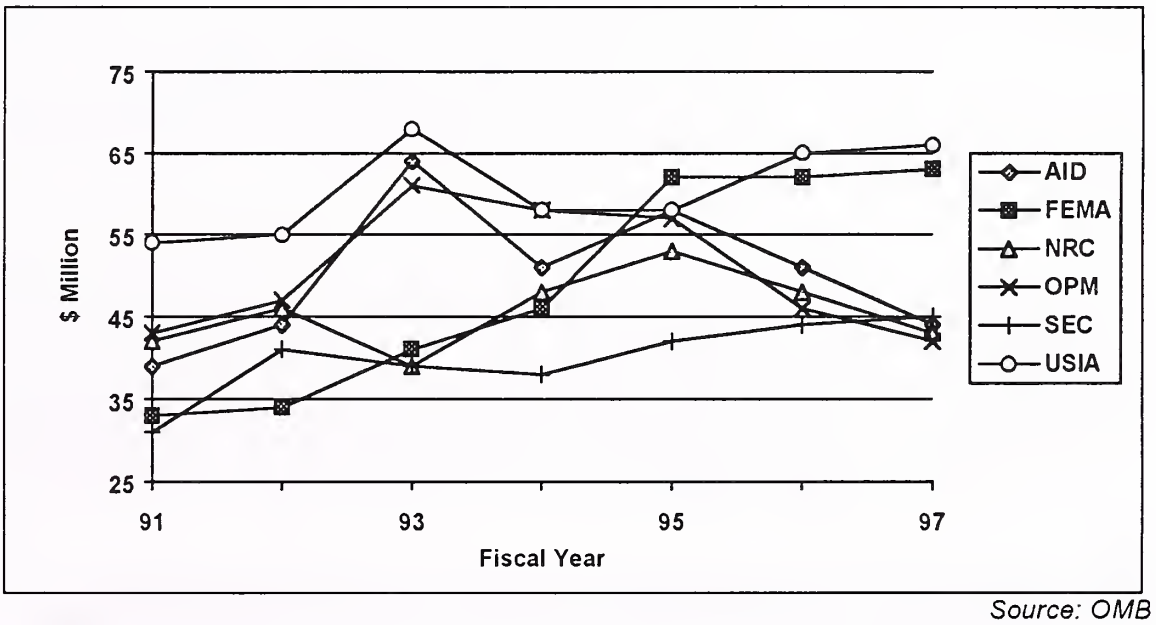
$100 Million - $500 Million Agency Budget Trends



Source: OMB

Exhibit III-29

<$100 Million Agency Budget Trends



Source: OMB

5. Embedded Computers

Embedded computer systems are not included in the Five-Year Plan nor in the annual IT budget. Therefore, an analysis of that market cannot be provided in this report:

- The earlier projected average annual growth through FY 1990 of the number of embedded computers in the DoD was 11% per year, prior to the Defense budget cuts of FY 1986 to FY 1988 and since FY 1990.
- The growth in the number of embedded computers supports increased professional services in operations and maintenance contracts. In addition, significant hardware maintenance functions are being employed.
- Outlays are declining dramatically, particularly for custom software development and services in the 1996–2001 time frame.
- If newer systems are not acquired, increased demands for updating software and key equipment modifications can be expected.
- The GAO reported to Congress that FY 1992 expenditures for embedded and classified systems software were running $24–$32 billion, or nearly 8% of the entire military budget. Further, GAO expects total costs to increase to $50 billion-per-year within the next five years, unless tighter controls are installed. DoD has procedures in place to monitor these costs and has promised Congress that costs would be controlled.

6. Classified Systems

The nature of INPUT's service in analyzing information in the public domain does not permit significant identification and analysis of IT outlays for classified national defense and intelligence programs. Although some intelligence collecting agencies, such as CIA, NSA, DIA, and DNA, acquire some hardware and systems software in the unclassified market, this is an exception rather than the rule.

B
Application and Technology Trends at Federal Agencies

1. Applications by Equipment Size

All platform sizes play roles in the increasingly decentralized and networked environments in government user organizations. The federal user community is demanding powerful shared resources that can support myriad department and data center functions.

Functional application demands for supercomputers have not kept pace with improved price/performance of desktop and floor-standing workstations. Supercomputers and large-scale parallel processors still are required, but more for infrastructure support. Functional applications are targeted for microprocessors platforms.

Infrastructure is not the sole domain of the supercomputer. Microcomputers and workstations are being employed more and more as network and small database servers. Unix workstations are increasingly used in support of high-speed networks and large databases.

Many functional applications are scaleable and run on more than one platform size; others are limited to specific platforms. Office systems run on all platform sizes except supercomputers. Communication support is provided by all platform sizes.

The role of microcomputers appears to be moving toward communication support and away from some applications. Workstations also are moving toward communications support and also are used increasingly to support office systems. The role of the midrange appears to be decreasing across most application areas. The role of the mainframe continues to be strong in support of functional systems, but less so for message-based operations. The supercomputer remains strong for scientific environments and information analysis.

Some agencies plan new starts in the traditional areas of information analysis and administration. In general, these programs represent efforts to bring computer-based productivity improvements to the functional operations of the agency.

In 1991, 52% of respondent agencies stated they were in the process of downsizing applications to smaller computer systems. The most popular application to be downsized was accounting/finance. However, in 1996, the mainframe continues to be the platform of choice for these enterprise-wide applications. Through consolidation and/or outsourcing, the number of mainframes is declining.

Some applications obviously cannot be downsized from a mainframe. Applications such as order processing, enterprise networking, analytical processing, large relational database programs and high volume account processing require a high level of computing power and speed that smaller computer systems still cannot provide.

2. Growth Applications

The sheer volume of transactions and complexity of operations within the federal government sector require a constantly changing focus as managers with an existing set of applications seek to apply new developments to a wide range of information service problems. Growth applications are shown in Exhibit III-30.

Exhibit III-30

Federal Growth Applications

- Planning
- Administrative Systems
- Communications
- Document Management

Source: INPUT

The Government Performance and Results Act (GPRA) requires agencies to change the traditional IRM measures of IRM outputs. The traditional way involved planning and budgeting, executing plans and budgets, and measuring and reporting outputs (accomplishments). With GPRA, agencies have the requirement and opportunity to develop a new type of "outcome measures" reflecting IT's contribution to agency mission goals and objectives. Next, annual performance plans with specific targets and measures are developed; plans are executed; and accomplishments (outputs to outcomes) are used in the process of managing the agency. Agencies need help aligning their IRM model with the agency mission model.

Administrative systems offer consistently high opportunities for vendors with past performance in the government. Competition is growing, but good return on investment is still possible. INPUT expects the federal financial management systems market to expand to $1.8 billion by FY 2000 — a CAGR of 8%.

Virtually every application in the federal government contains an element of communication. This is increasingly true as processing architectures are becoming decentral. Client server solutions push requirements for data communications, and the growing use of the Internet for data and document transfer requires robust communications networks. Collaborative computing (a.k.a. Lotus Notes and Microsoft Exchange) also drives network infrastructure.

The role of document management is moving from image acquisition, indexing, storage and retrieval to work flow processes. This transition

provides opportunities for hardware infrastructure, software applications, and services. In order to support government work flow applications, integration and services vendors should be familiar with the agency's operations.

3. Other Applications

Electronic commerce (EC) continues to evolve slowly and is key to the government's ability to provide improved services at lower cost. It accelerates the accurate interchange of procurement (EDI), logistics (CALS), financial (EFT), benefits (EBT), drawings (EDT), filing (EF) and other data, while improving the accuracy of these transactions. Because EC/EDI uses conventional data processing and telecommunications capabilities, the emphasis in the federal sector will be development of vendor-furnished networks, software and services to facilitate EC/EDI implementation.

Unfortunately, FACNET deployment was slowed by the recent acquisition reforms. Agencies now have until 2001 to implement FACNET.

4. Software Sources

a. Application Development and Maintenance Sources.

Research performed by INPUT in 1992 showed that the federal dependence on contractor sources for applications development was heavy. An analysis of 148 FY 1995 contract opportunities for applications development showed the same level of contractor dependency as in 1992. For FY 1997, the trend continues the dependency on contractor support software support, but developmental software is losing ground to commercial products.

The federal government continues to depend heavily on customized applications. Although COTS is growing in popularity, primarily to reduce application development and maintenance costs, a significant outlay continues for maintenance of existing and new applications. Because the government spends more than 50% of its application software costs for maintenance alone, cost savings can be identified in this market segment.

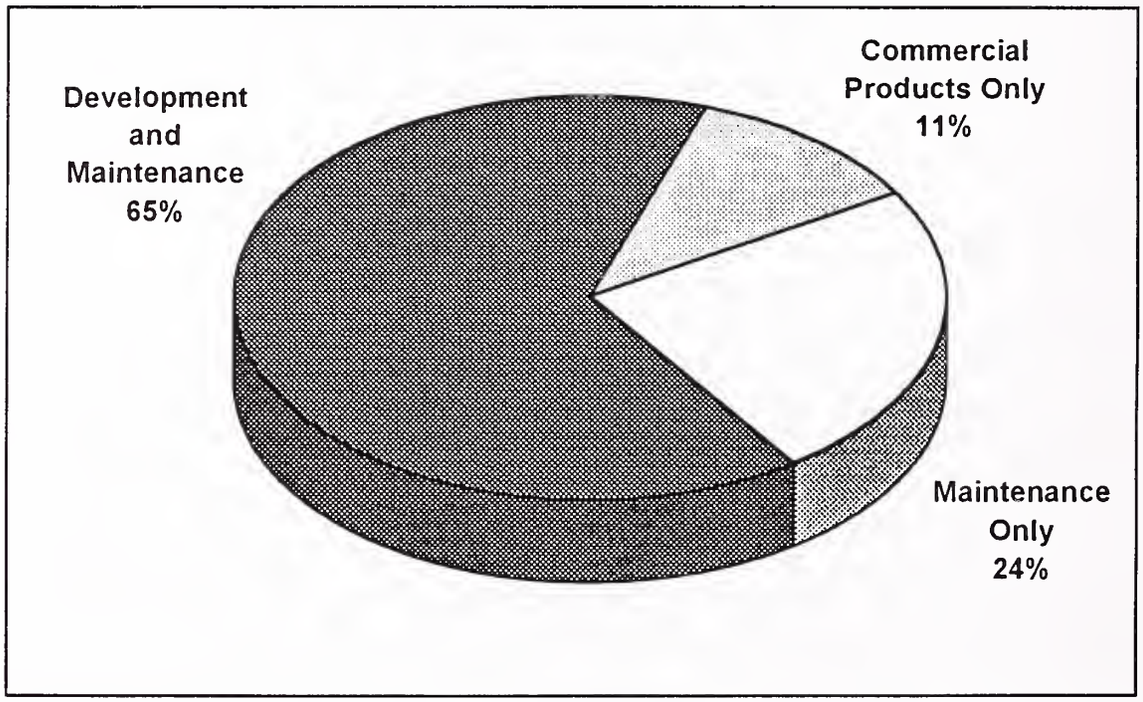
Demands on the internal (in-house) information systems (IS) staff to maintain older but critical custom software prevent them from assuming a greater role in developing new systems. GAO and NIST surveys have reported that more than 70% of the software life cycle costs are expended on maintenance and undermanaged enhancements.

In 1994, an INPUT survey of 42 federal application software support contract opportunities greater than $5 million appeared to prefer obtaining maintenance for application software from the developer rather than from a different vendor. In that survey, most application development contracts

(71%) required out-year maintenance from the same vendor. A similar study of 64 federal application software support contract opportunities greater than $5 million showed essentially the same results. As Exhibit III-31 shows, the preference for maintenance from the software development vendor continues (65%). In only a small percentage of programs analyzed did the agency identify requirements for maintenance from vendors other than the developer, although the developer may compete for these services in an open procurement. A growing percent of opportunities (24%) exists for maintenance of installed applications.

Exhibit III-31

Federal Agency Sources of Application Software Maintenance



Number of programs reviewed = 65 *Source: INPUT, 1995*

Commercially developed, off-the-shelf software demand is driven by the rapid growth of personal computer use. Packaged software is also available for the government's large inventory of minicomputers. The share of application development for this platform segment is expected to continue to grow only as these platforms are integrated into open, client/server architecture.

A smaller but very significant part of development will come from universities and not-for-profit organizations, especially in Artificial Intelligence (AI) supercomputers, and automation applications. Use of Ada as a defense standard application development language continues and is found in civilian agency programs, as well as in commercial applications. Unix-based systems and object-oriented systems development tools are gaining in importance because of client server solutions.

This is all proper, but the real challenge may be how agencies handle the Year 2000 issue. Besides the Social Security Administration (SSA), who started a 300 man-year effort to correct the Year 2000 problem in 30 million lines of code in 1989, most agencies are in denial. OMB has reacted to this by getting SSA to chair the Year 2000 Inter-agency Committee to help agencies cope with the Year 2000 issue. Most agencies are now represented and INPUT expects more affirmative action in the near term.

Federal agencies will spend only $31.3 billion from FY 1996 through FY 1999 on total services contracted out. Of that, only $7.7 billion are earmarked for software development. With estimates upward of $30 billion to fix the Year 2000 problem in all of government, there is not enough money to address the problem.

Most federal agencies have not set aside money in their FY 1996 or FY 1997 budgets. We see IT Research and Development (R&D) and program office funding as the first areas raided to make up the shortfall. The political process will turn up the heat on agencies, but with no funding relief in sight.

b. Impact of Technology

In an INPUT survey conducted in 1993, agency and industry representatives were asked to identify technological factors that would alter the federal government's spending for information services and applications development at agencies. Four of the five top-ranked factors in 1993 were again most frequently present in a survey of 252 contract opportunities in 1995. Exhibit III-32 indicates network expansion to be the top-ranked technology issue this year. With increasing interest in client/server architecture, operating systems also will affect government programs. Improved performance of data centers appeared this year, replacing AI in the list of the top technology issues affecting federal government programs.

Exhibit III-32

Technological Issues Affecting Federal Government Programs

- ❑ Expanded networks/LANS
- ❑ Advancements in operating systems
- ❑ Increased microcomputer capabilities
- ❑ Improved imaging/graphics
- ❑ Data center upgrades

Source: INPUT, 1995

The federal government continues to expand its computer networks. Sharing of data and information resources is important to many agencies faced with reduced operating budgets and demands for improved service. GSA's merger of local and long distance telephone services acknowledges a need for integration of data and voice technologies in distributed end-to-end architectures.

Plans to recompete the FTS2000 contract are essentially completed, and merging of long distance network requirements in both civilian and defense programs is strategic to the new contracts. The multiple functional contracts contracting approach provides the most effective strategy to assure state-of-the-art telecommunications services to support federal government programs and to expand circuits to state/local governments and international sites.

Increased computing power of microcomputers is improving their roles as network servers and processing platforms. New development tools and object databases improve the processing capability for both text and image data.

New technologies for graphics and improved imaging offer enhanced capabilities to agencies to support their information collection and analysis requirements. Advancements in these technologies will improve productivity at government agencies.

Requirements for data center consolidation and modernization of existing centers are fundamental to federal government downsizing. Both civilian and defense programs are expecting to benefit from fewer, but upgraded, facilities offering greater processing capability.

C
Major Issues and Driving Forces

1. Major Issues

Federal agencies face several major issues as they move forward to modernize and expand their information systems. These issues are shown in Exhibit III-33.

Exhibit III-33

Federal Government Sector Agency Issues

- Cost containment
- Acquisition and IT management reforms
- Budget deficit-control measures
- Program downsizing
- Outsourcing pressure
- Agency restructuring

Source: INPUT

Cost containment is a key issue to government agencies responding to the combined pressures of Congress and the continuing slowdown in Defense R&D expenditures. Many small vendors with federal contracts expect reductions in profits. To keep costs within the government's control, competitors now are required or encouraged to submit fixed-price bids on most systems integration and IS upgrade projects.

Both the Federal Acquisition Reform Act of 1996 and the Information Technology Reform Act of 1996, contained in the National Defense Authorization Act of 1996, usher in a new era of acquiring and managing IT. By streamlining purchasing practices and eliminating cumbersome regulations, the reform is intended to solve the following problems:

- Oversight too late in process
- Dual review slows down process
- Alternative or reengineered work processes not considered before automating
- Obsolete technology in use
- Wasteful IT spending
- Poor mission/program performance
- Government-wide expertise not leveraged
- Non-incremental approach to systems acquisition.

The reform places responsibility and accountability squarely on the agencies, while easing their regulatory burden (Exhibit III-34):

- Brooks Act repeal shifts responsibility from GSA to agencies
- Agencies can buy systems in smaller, incremental phases
- OMB Director and Chief Information Officer (CIO) to be held accountable
- Simplified procedures for buying COTS items valued up to $5 million
- Office of Federal Procurement Policy (OFPP) can waive any special government contract clauses for COTS items
- Agencies can limit which suppliers go into negotiation after initial proposals received.

Exhibit III-34

Procurement & IT Management Reform

Aspect	Brooks Act Era ('65–'96)	ITMRA Era ('96-->)
Focus	Technology and process	Mission, cost-effectiveness and performance
Emphasis	Single agency solutions	Interagency coordination; Sharing of expertise
Procurement Authority	Split	Agencies
Accountability	Diffuse	Agencies
Enforcers	GSA	OMB Director and CIOs
Accountability Tactics	GSA exclusive IT procurement authority	Agency budget linked capital planning and investment control; Agency performance and results-based management
Protest Jurisdiction	GSBCA	GAO
Implementation Tactics	Massive, multi-year systems development	Modular 12–18 month IT infusions
Regulation Tactics	DPA; FIRMR	no DPA; FIRMR on the way out
Acquisition Tactics	Agency investment	Multi-agency investment
Acquisition Process	Prove acquisition integrity	Prove mission/business processes; Plan before purchasing
Negotiation Tactics	All bidders through process	Bidders excluded after initial proposals
COTS	Option	Preferred approach
Industry communications	Cautious	Encouraged

Budget deficit control, whether provided under the terms of the BEA or direct congressional action, is expected to affect the rate and/or extent of IS modernization at the agencies. Continuing economic and political sensitivity to the rising budget deficit could negatively impact a number of acquisitions in the less-than-critical defense and civilian technology sectors.

Furthermore, the federal government currently does not have the requisite level of in-house staff to support the quality or quantity of ADP-supported services mandated by Congress and expected by the American people. The early retirement programs are continuing in some agencies, and many of the personnel taking advantage of the opportunity possess the necessary skills and knowledge, now lost, to develop and implement critical programs and automated systems — not to mention the institutional knowledge lost.

2. Driving Forces

The driving forces behind the federal market for information systems are summarized in Exhibit III-35. The federal government faces a number of important issues — namely to reduce costs and improve operations. Some of these issues involve improved processes; many involve a set of driving forces that continues from one year to another with little resolution. They involve an increasing workload, reduced operating resources, growing criticism from the public and the lack of a clear sustained focus on what is important and what should not be done. The forces not only drive the manner in which work gets done, but provide a basis for criticism.

Exhibit III-35

Federal Government Sector Driving Forces

❑ Spending Slows	❑ Spending Increases
⇒ Downsizing Process	⇒ Staff Reductions
⇒ Budget Cuts	⇒ New Initiatives
⇒ Commodity Pricing	⇒ COTS Initiatives
⇒ BPR	⇒ IT Fever
⇒ IT Productivity Gains	⇒ NPR
⇒ Federal Programs to States	⇒ Distributed Computing

Source: INPUT

Market drivers both push and pull at the federal marketplace. Federal spending slows with the following:

- **Downsizing process** - as the federal workforce shrinks, less computing power is required to run government.

- **Budget cuts** - some agencies will have to cut IT expenditures to meet their fiscal requirements. The budget knife is even starting to get to the IRM staff.

- **Commodity pricing** - agencies are seeking to turn as many IT buys into commodity buys to leverage their buying power.

- **BPR** - process re-engineering requirements are increasing. If agencies reap the expected benefits, then new processes may require less IT to accomplish.

- **IT productivity gains** - if the gains are realized through the use of IT, then we may see less need for IT as we reduce staffing through automation, etc.

- **Federal programs to states** - through block grants and the like, funds are being directed away from the federal arena to the state.

Federal spending increases with the following:

- **Staff reductions** - agencies seek to do more with fewer people by automating more of their processes.

- **New initiatives** - agencies will always be legislated more functions to perform, requiring more automation.

- **COTS initiatives** - the trend is away from home-grown systems to store-bought, but agencies are spending many times the purchase price to customize solutions to their *unique* needs.

- **IT fever** - agencies feel IT offers the closest thing to the "silver bullet."

- **NPR** - the current administration is promoting the use of IT to fix the government's efficiency and effectiveness problems.

- **Distributed computing** - the move away from centralized computing power relies heavily on a strong infrastructure, which commands huge sums of money (i.e., PCs are relatively cheap at $2,500 each, but 50,000 of them add up).

The depressants and catalysts of the Defense marketplace are shown in Exhibit III-36. The unique depressing drivers follow:

- **Budget cuts** - with the base closings and other austerity measures, there will be less deployment of IT

- **Less discretionary IT** - Defense has always had less discretion with its spending. This inflexibility slows the spread of non-embedded IT solutions.

- **GAO's tighter controls** - GAO keeps a close eye on Defense spending, due to past problems in the acquisition and application of IT.

- **Continued realignment and consolidation** - Defense is realizing the benefits of consolidating IT in OSD. Further consolidations of like functions across the services will allow Defense to further leverage its IT spending.

On the other side of the coin, the catalysts are:

- **Increasing embedded computers** - automation is becoming an integral part of most everything Defense does.

- **Fewer new systems, more legacy maintenance** - legacy systems take time to be replaced, hence, past implementations are now claiming maintenance dollars. Particularly emerging technologies, such as client-server, are beyond the "new" stage and require ongoing maintenance.

- **Electronic Warfighter** - Defense wishes to automate all functions directly relating to and supporting the warfighter. Emerging technologies do well at meeting the increased automation needs of the warfighter.

- **Data security** - the age of the virus has placed new emphasis on data security. The research in "bugging" the enemy, has pointed to the vulnerabilities of our data security measures.

- **Acquisition reform** - less red tape and more discretion will not only promote faster acquisitions, but more acquisitions within Defense.

Defense spending grows ever so slowly. DISA is the key agency. Opportunities do exist in the following areas:

- Modeling and simulation

- Inventory management

- Financial management systems

- Communications

- Data security

- Electronic commerce.

Exhibit III-36

Defense Market Drivers

❑ Depressants	❑ Catalysts
⇒ Budget Cuts	⇒ Increasing embedded computers
⇒ Less discretionary IT	⇒ Fewer new systems, more legacy maintenance
⇒ GAO's tighter controls	⇒ Electronic Warfighter
⇒ Continued realignment and consolidation	⇒ Data Security
	⇒ Acquisition Reform

Source: INPUT

The civilian marketplace has a different set of key drivers. See Exhibit III-37. Spending is slowed by:

- **Cost containment** - the civilian agencies are very much in the public's and Congress' eye. Initially, the expectation was for IT to reduce expenditures. Now people expect a need for less IT as processes are re-engineered before being automated.

- **"Hollow" government** - civilian agencies are losing a tremendous amount of IT maturity and expertise through the "buyouts." The loss of institutional knowledge within the regulatory and service-providing agencies (i.e. GSA, OMB, etc.) is also diluting the effectiveness of IRM decision making. A lot of time will be spent going over the same ground.

Factors accelerating the civilian marketplace are:

- **Continuing service demands** - Congress and the public continue to make new demands of the civilian agencies. IT will continue to be viewed as the "silver bullet" to save a program or allow a new program to get off the ground.

- **Downsizing and outsourcing fever** - agencies continue to look at getting back to their core mission. This view drives many to unload pieces of the IRM function.

- **Internet fever** - this is the latest "silver bullet." The Administration has been pushing the agencies hard to find solutions through the Internet.

- **Acquisition reform** - agencies are viewing the new reforms as giving them considerable discretion when acquiring IT. This discretion is translating into more rapid implementations of IT solutions.

- **Business solutions** - agencies are following the lead of the private sector which has been on an IT rampage the last few years. Automation is seen as key to business solutions.
- **Electronic government** - agencies feel a need to automate every government function.

Exhibit III-37

Civilian Market Drivers

Depressants	Catalysts
⇒ Cost containment	⇒ Continuing service demands
⇒ "Hollow" government	⇒ Downsizing and outsourcing fever
	⇒ Internet fever
	⇒ Acquisition reform
	⇒ Business solutions
	⇒ Electronic government

Source: INPUT

The civilian agency market can be characterized as follows:

- Mission-support emphasis
- Major modernization programs
- COTS fever
- Looking for improvements in artificial intelligence, object database systems, imaging systems, reusable and modular software, high-performance computing and communications, and software productivity tools
- Reinventing government emerging as many different initiatives.

D
Conclusions

Industry and agencies recognize that a number of factors have slowed the explosive growth in information technology that characterized the 1980s. At the same time, there are factors that can influence the market for continued activity during the end of the 1990s decade, as listed in Exhibit III-38.

Exhibit III-38

Conclusions

- ❑ New procurement playing field
- ❑ Market prospects narrowing
- ❑ Heated competition
- ❑ Play the IT *fever*

Source: INPUT

1. New Procurement Playing Field

Look for the agencies to study the latest acquisition statute to determine their level of acquisition discretion. This will result in each agency going its own way when purchasing IT. Vendors now face less predictable procurement processes versus the one they had come to work so well.

Expect procurements to become more of a relationship buy. Vendor capture costs will increase to win the smaller, more numerous acquisitions of the future. If a vendor blinks, an opportunity is missed.

2. Market Prospects Narrowing

The overall downward shift in defense IT outlays leaves the Defense Information Systems Agency (DISA), which is embarking on continued downsizing, centralizing and standardizing, as the place to be for growth. While the overall IT market is still experiencing growth due to the significant jump in civilian agency initiatives, only certain sets of agencies will live up to this expectation.

The $500 million - $1 billion club (Agriculture, Commerce, Justice, SSA and VA) in IT budget size is growing at a very healthy clip. The next best group is the small agencies (less than $100 million in IT budget size). Finally, there are some individual agencies, such as Education, that are presently big IT spenders.

3. Heated Competition

The competition in the federal market will continue to evolve as the growth rates and number of significant opportunities decline. Many firms not doing business in the federal government are entering the market. Defense firms, such as aerospace firms, are examining the civilian agencies for replacement markets. Some firms are following the dollars that are leaving the federal arena for the states.

Established players are repositioning themselves to survive the new federal government environment. The large hardware and professional services firms with a strong market position are digging in and slimming down to capture new and recompetitive business. Smaller firms and niche market firms are either forming alliances or moving into the equally depressed commercial market. Competition in this market has become more sophisticated and fierce.

The changes in small business set-aside contracting and small and disadvantaged business, 8(a), has prompted new strategies by these firms for staying alive. Expect consolidations and many new teaming arrangements.

4. Play to the IT *fever*

Reinventing government is emerging as many different initiatives. However, there is a very strong inclination toward IT as the end-all solution. Federal agencies can improve their performance by reviewing their missions and automating after reengineering. Only those programs necessary in attaining the missions will be retained. The mission's emphasis will result in new priorities and redirected spending.

Vendors who have a plan for automating government functions — whether the warfighter, the civil servant or the citizen — will get the ear of federal IRM management.

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IV

Market Forecast

INPUT dissects the federal IT budget elements and recombines them into convenient industry terms. The first reassembling provides an overall perspective of that portion of the IT budget spent on contracts for systems and services. In the remainder of this section, INPUT provides forecasts and discusses trends of the individual delivery modes within the IT systems and services portion, as defined in Appendix B.

A
Overall Federal IT Market

The overall market planned for federal acquisition of information systems and services in FY 1997 is $20.9 billion, forecasted to reach $26.0 billion in FY 2001. This represents a compound annual growth rate (CAGR) of 4.5%, as shown in Exhibit IV-1.

Several economic and political factors discussed earlier may reduce this IT growth rate moderately to significantly. The current Administration continues to believe that IT holds the key to improved service. Over the next few years, benefits should be visible in the effort to reduce operating cost. Without demonstration of cost savings, Congress may withhold budgetary support to many large IT-based programs. Such scaling back is already evident in defense spending.

The largest component of the addressable information systems and services market in recent years has been commercial services. The FY 1995 spending level for commercial services estimated last year at $7.0 billion was reported as actual this year at $6.9 billion. The budget requests for FY 1996 are $7.4 billion, $527 million less than requested for FY 1995, with gradual increases in expenditures from this reduced baseline through FY 2001 expected. This market segment is expected to grow at a 6% CAGR to $9.9 billion in FY 2001. Commercial services include professional services, processing services, systems operations and maintenance. Current agency long-range plans indicate a continuing

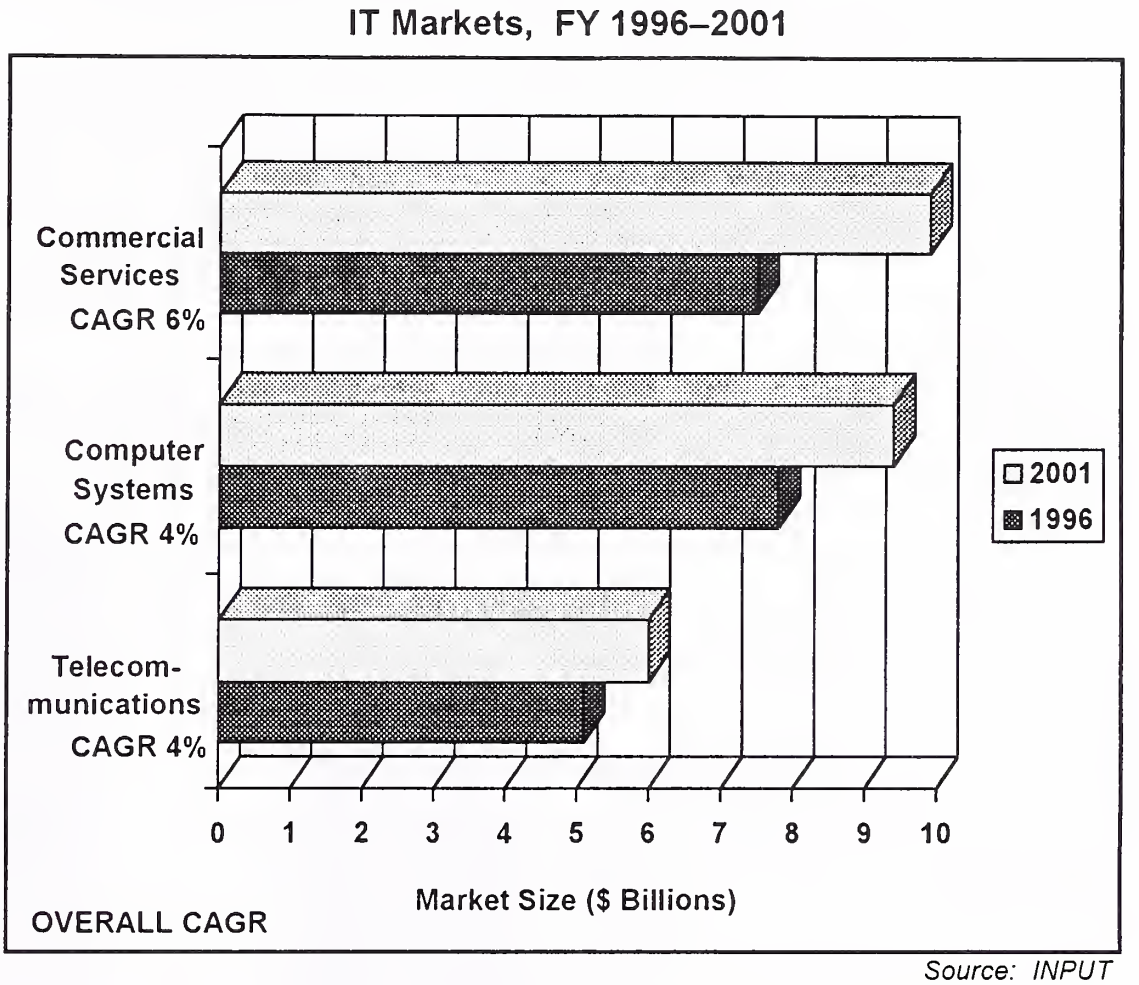
need for industry operational support, despite program cancellations and prospects of consolidating computing resources.

Estimated spending for computer systems is greater for FY 1996 than the actual spending that agencies reported for FY 1995. For some time, computer systems has been a gradually declining market, down from a CAGR of 5% projected in FY 1989. Prospects for computer systems spending growth are improved since last year. Levels will rise in FY 1997 and continue through FY 2001 at an increased rate (4%) than forecast last year. Computer systems is no longer the largest IT component as in the past. Computer systems includes systems integration, turnkey systems and major equipment additions and replacements.

The telecommunications market remains at steady growth through FY 2001, but not at the 10% CAGR forecast. Agencies reported lower anticipated spending this year for this segment through FY 2001. Actual spending in FY 1995 was lower than estimated last year, as agencies continue to benefit from reduced long distance rates, reliance on existing telecom infrastructure, and postponed telecommunications contracts in anticipation of the follow-on to FTS2000. The communications segment includes circuit/time charges under FTS2000, network services, and customer-premise equipment. INPUT expects these services to increase from $5.1 billion in FY 1996 to $6.0 billion in FY 2001. The forecast includes procurement of a number of dedicated data networks, more LANs and increasing digitization, but at decreasing tariffs.

The telecommunications market potential may be a great deal larger than anticipated from current federal agency use. In previous years, Congress has expressed its concern that the value of FTS2000 alone is at least one order of magnitude greater than was being reported by the agencies. It is not clear whether the agencies use operating funds instead of IT dollars to pay for telephone services, or whether someone in Congress is exaggerating for political effect. This issue may be one of inaccurate reporting. A real demand exists beyond currently reported needs; it goes to unanticipated network requirements that will result from architectural approaches to support enterprise-wide missions and information super-highway services, particularly across the Internet. The telecom segment in Exhibit IV-1 reflects only reported requirements.

Exhibit IV-1



Source: INPUT

The expenditures shown in Exhibit IV-1 are based on those requested by the agencies in their A-11 Section 43 reports.

B
Professional Services

Professional services includes consulting, design, education and training, and software development. This segment does not include the professional services associated with systems integration, systems operations and telecommunications.

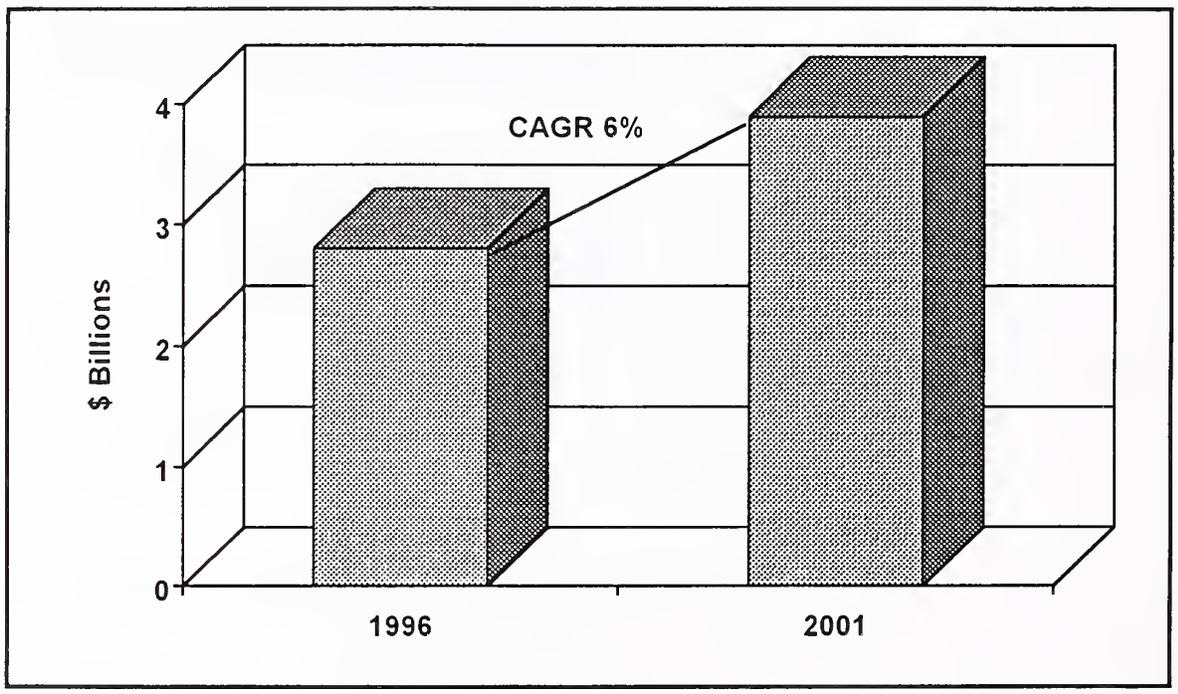
The federal professional services market is growing at the same CAGR forecast a year ago. Actual reported spending levels for FY 1995 were higher than estimated last year by the government. Although higher levels are forecast through FY 2001, the rate of growth is dropped from the 9% forecast FY 1994. The dependency on contractor sources for services already has begun to materialize, but reduced spending levels overall are being felt in this market. This market is projected to increase to $3.9 billion by FY 2001, at a CAGR of 6%, returning to the growth levels forecast in FY 1992 but less than the CAGRs of 7% in FYs 1991

and 1990, and 8% of FY 1989, and significantly below the 13% reported in FY 1988.

The projected need for contractor assistance makes the federal government the largest user group for professional services in the U.S. If all of the segments excluded from the basic professional services mode in systems integration and systems operations (outsourcing) were added, the entire professional services market represents a growth from $3.9 billion in FY 1996 to $5.4 billion in FY 2001 at a CAGR of 6%.

Exhibit IV-2

Professional Services Market

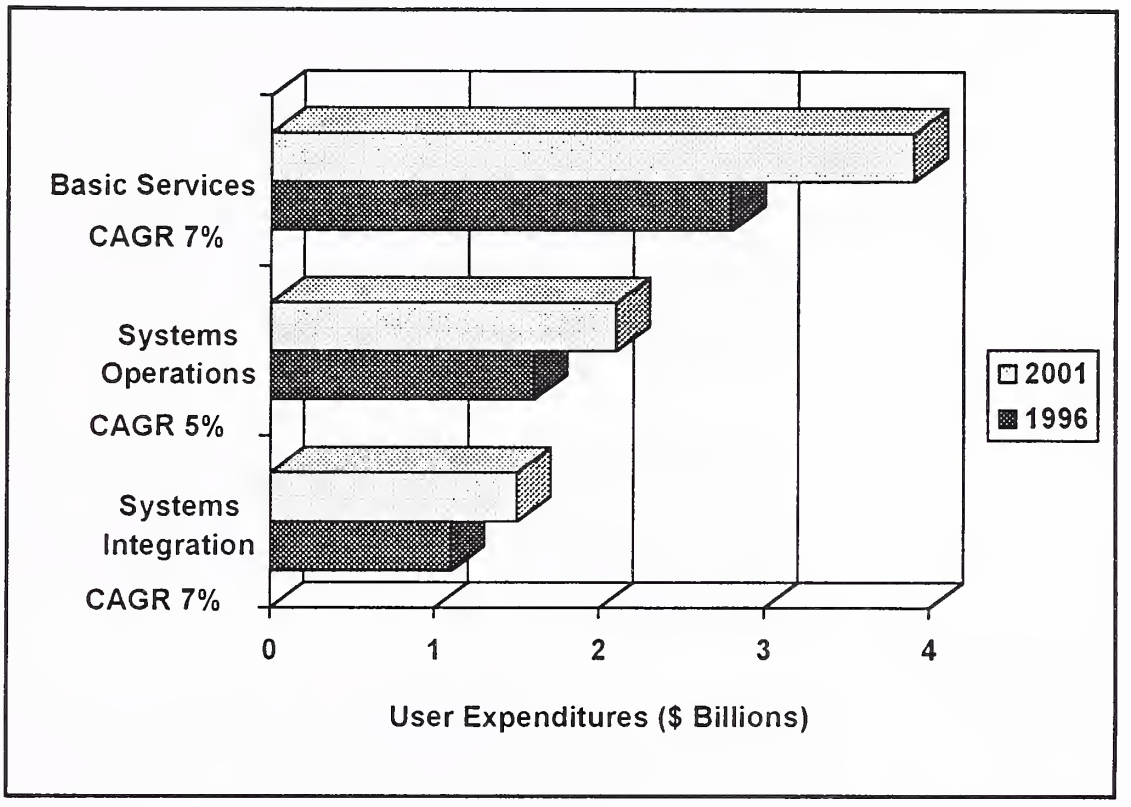


Source: INPUT

The relationship between the distributed modes of the professional services market is illustrated in Exhibit IV-3. The basic services sub-market, composed of software development, design and consulting, and education/training, represents the largest segment of the professional services market. Its growth is all the more impressive given that it starts with the largest numbers. Last year's CAGR forecast of 6% has now been adjusted to 7% to reflect renewed in spending, particularly for developmental systems. The systems integration component continues to grow at healthy levels, and systems operations show a moderate growth, and that growth is limited to operations of government-owned facilities.

Exhibit IV-3

Professional Services Market—All Segments



Source: INPUT

1. Programming and Analysis/Software Development

Programming and analysis services, also called software development, is forecast to grow from $1.7 billion in FY 1996 to $2.4 billion in FY 2001 at a CAGR of 7%, as shown in Exhibit IV-4. This is the same as last year's forecast, but it continues to represent a dependency on outside resources for software development. This dependency will continue through the outyears.

The software development submarket includes:

- Hardware and/or software system design
- Custom software development
- Modification of commercial software products
- Software testing of custom and commercial packages
- Software conversion
- Maintenance of custom applications software
- Independent verification and validation of software packages prepared by other vendors.

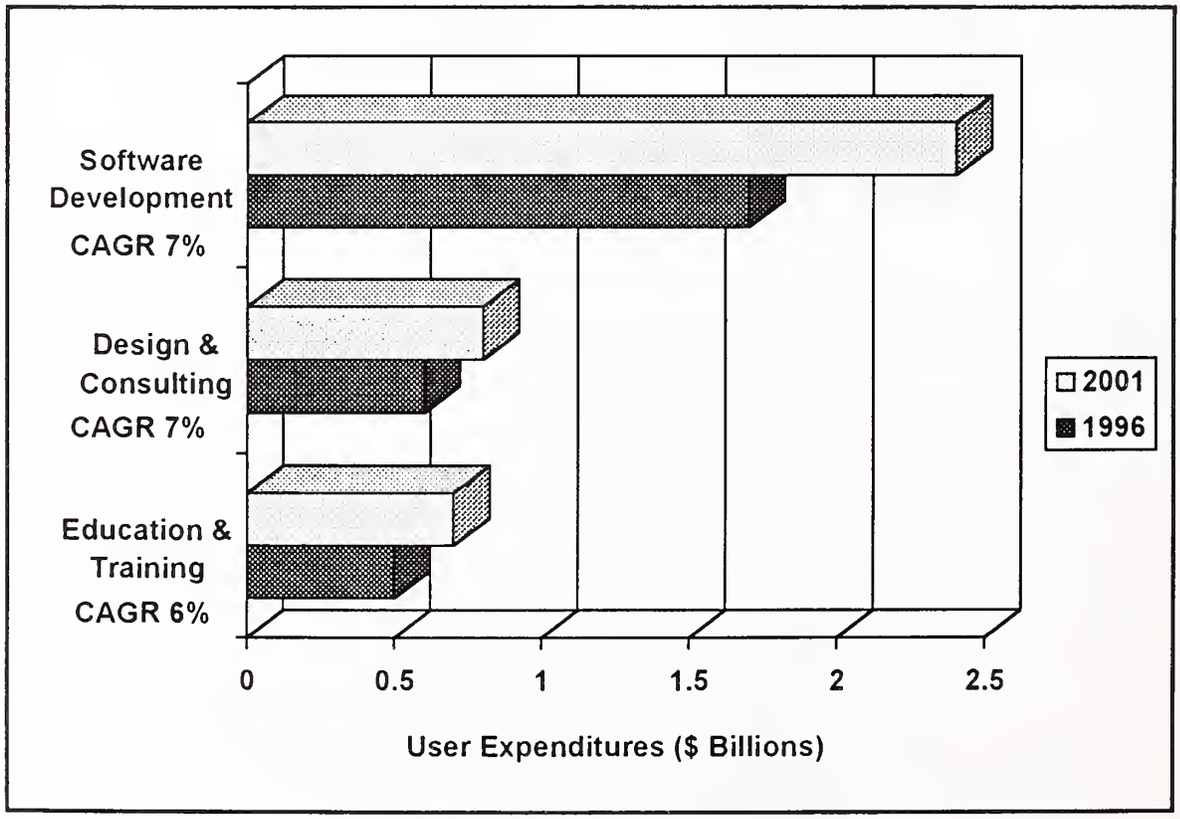
The declining availability of programming skills in the federal government is the most significant factor behind the projected growth. Government staffing limits and the backlog of software maintenance tasks at most government data centers contribute to the demand for vendor assistance in this service mode. The need to correct applications for the Year 2000 situation will keep this a healthy market.

A number of programs planned for near-term procurement should sustain the projected growth. Examples include NASA's Systems Engineering and Support Services, Navy's Corporate Information Management Standard Procurement, and DoD's Research and Engineering Network Inter-Site Services contracts.

Interoperability pressure (more specifically, the ability to exchange data) is the driving force behind the use of contractors in software development. Vendors can more readily provide the expertise needed to knit together different platforms and their applications software to accelerate data interchange.

Exhibit IV-4

Professional Services Submarkets



Source: INPUT

2. Design and Consulting Services

IT consulting services in the federal market will grow at a CAGR of 7%, from about $562 million in FY 1996 to $772 million in FY 2001. The growth forecast three years ago was depressed by the slowdown in CIM/DISA initiatives, but renewal of systems engineering and development activity for assessing the Year 2000 issue, plus the continuing shortfall of systems experts in the federal workforce, contributes to growth in this segment. This contributed to a 1% CAGR increase over last year's forecast.

The types of services contracted include:

- Feasibility studies
- ADP requirements analyses
- Systems audits
- System engineering and technical direction (SETD)
- System engineering and technical assistance (SETA)
- Software engineering and technical assistance.

The primary demand factor is agency need for assistance in producing the technical justification for planned improvements in information technology resources. Agencies are understaffed in the technical planning and evaluation areas.

In the past, congressional pressure was exerted on agencies to minimize the use of outsiders (and previous government employees) in functions perceived as governmental management. This is no longer an issue. Government agencies are encouraged more to rely on outsourcing services, even in the area of acquisition support.

3. Education and Training

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

The government normally contracts for the following separately from systems integration programs:

- Training programs
- Books and manuals
- Seminars
- Automated training systems.

In previous years, this delivery mode eroded under both budget pressures and inclusion of the services in systems integration programs.

The demand existed for training and education, but stretched IT budgets compromised the training component. Agency officials had to seek funding for training elsewhere, usually from within operating budgets. This submarket is recovering in response to acknowledged demands from the user community for educational services. The user demand grew from implementation of new software, tools, and sophisticated hardware.

Computer training on use of desktop technology and LAN administration was provided in-house by a number of larger agencies under their regular training budgets. Courses for user computing, LANs, distributed processing and new software tools are better generated by industry.

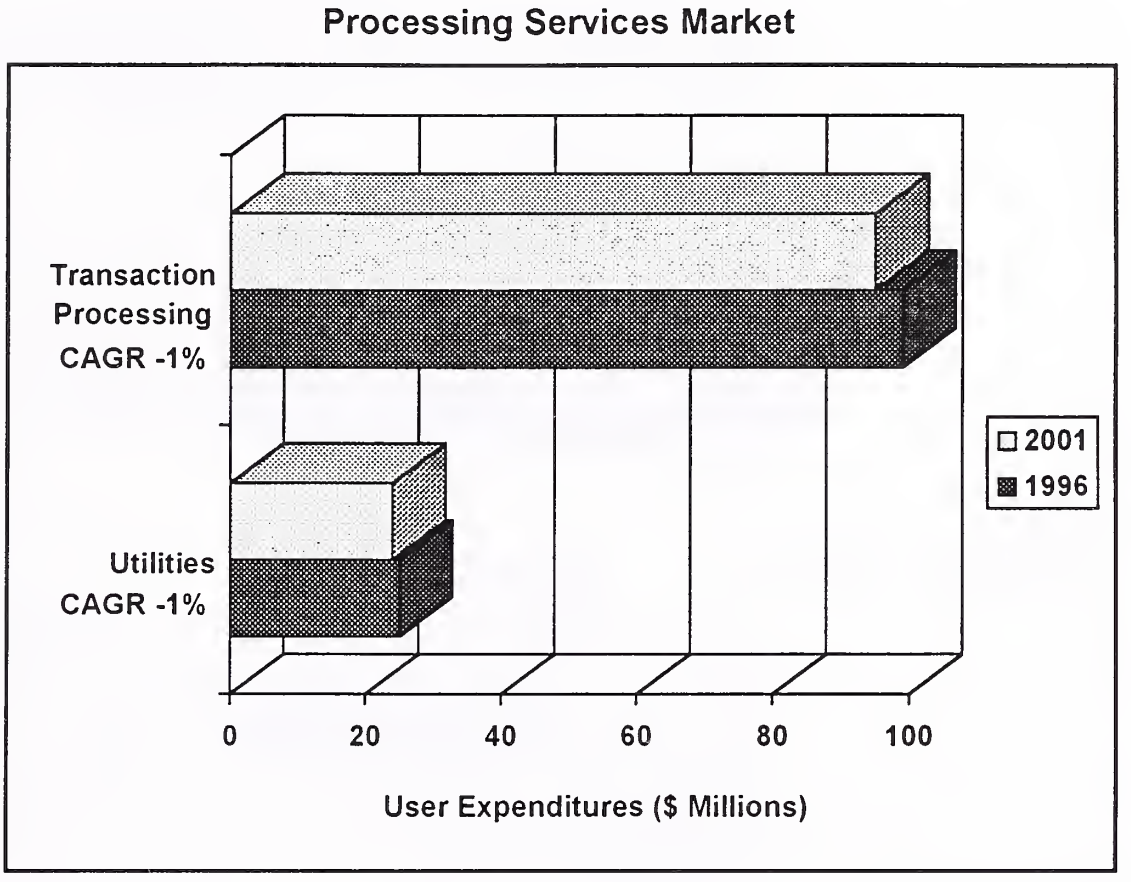
The forecast in previous years has been for no growth, maintaining current levels of annual spending. However, with growing client/server capabilities and network operations, the training demand is pushing this submarket upward, relative to other market segments. From an artificially depressed level of $400 million in FY 1994, the market is expected to grow to $708 million at a CAGR of 6% through FY 2001.

C
Processing Services

Processing services includes transaction processing with some batch-mode workloads. It previously included systems operations on contractor-owned equipment (COCO), now part of a separate delivery mode (systems operations) discussed later.

For the last half of the decade of the 1980s, this delivery mode continued to decline as installation of new distributed processing systems and desktop processors depressed the need for outside processing support. Exhibit IV-5 shows the "no growth" state of this market.

Exhibit IV-5



Source: INPUT

1. Transaction Processing

Transaction processing, previously called remote computing services (RCS) and identified as ADPE time in the federal IT budget, has continued to decline since FY 1984, when growth was projected at 13%. Transaction processing is lower now than in the 1980s, but remains active for agencies still waiting for new facilities. Many of the larger federal data centers continue to add capacity and take on processing for other agencies to justify partially their own operating expense.

Beginning with the IT budget for FY 1989, the funding for Medicaid and Medicare insurance provided by Health Care Finance Administration (HHS) was deleted and moved into a states-aid category. In addition, the demand for services under GSA's Teleprocessing Services Program (TSP) fell from $80 million in 1983 to $26 million in 1989, especially for support under MASC (Multiple Award Schedule Contracts). FY 1995 saw an increase of $19 million.

Network services were separated from this delivery mode in 1989 and are now included with the communications market forecast.

2. Utility and Batch Processing

Small amounts of utility and batch processing continue to appear in agency IT expenditures, but have declined to about $22 million per year. The bulk of this work appears in DoD budgets. FY 1995 saw a slight increase of $5 million.

Continued budget-deficit reduction actions that delay implementation of upgraded systems could lead to a stronger market than currently predicted, to meet agency productivity goals and mission objectives. This could support vendor-supplied disaster recovery systems, if the agencies cannot install equipment to satisfy their needs. Utilities are also a form of ADP insurance for agencies with marginal processing capacity.

D
Software Products

As shown in Exhibit IV-6, the federal software products market is expected to increase from $1.8 billion in FY 1996 to $2.1 billion in FY 2001 at a compound annual growth rate of 3%. This is less than the 17% forecast in 1989 and 13% in 1990, partly because of competitive pricing and the impact of requirements contracts that specify the application packages to be furnished in quantity. This is a slowdown over last year's growth because of the push for commercial products rather than developmental software.

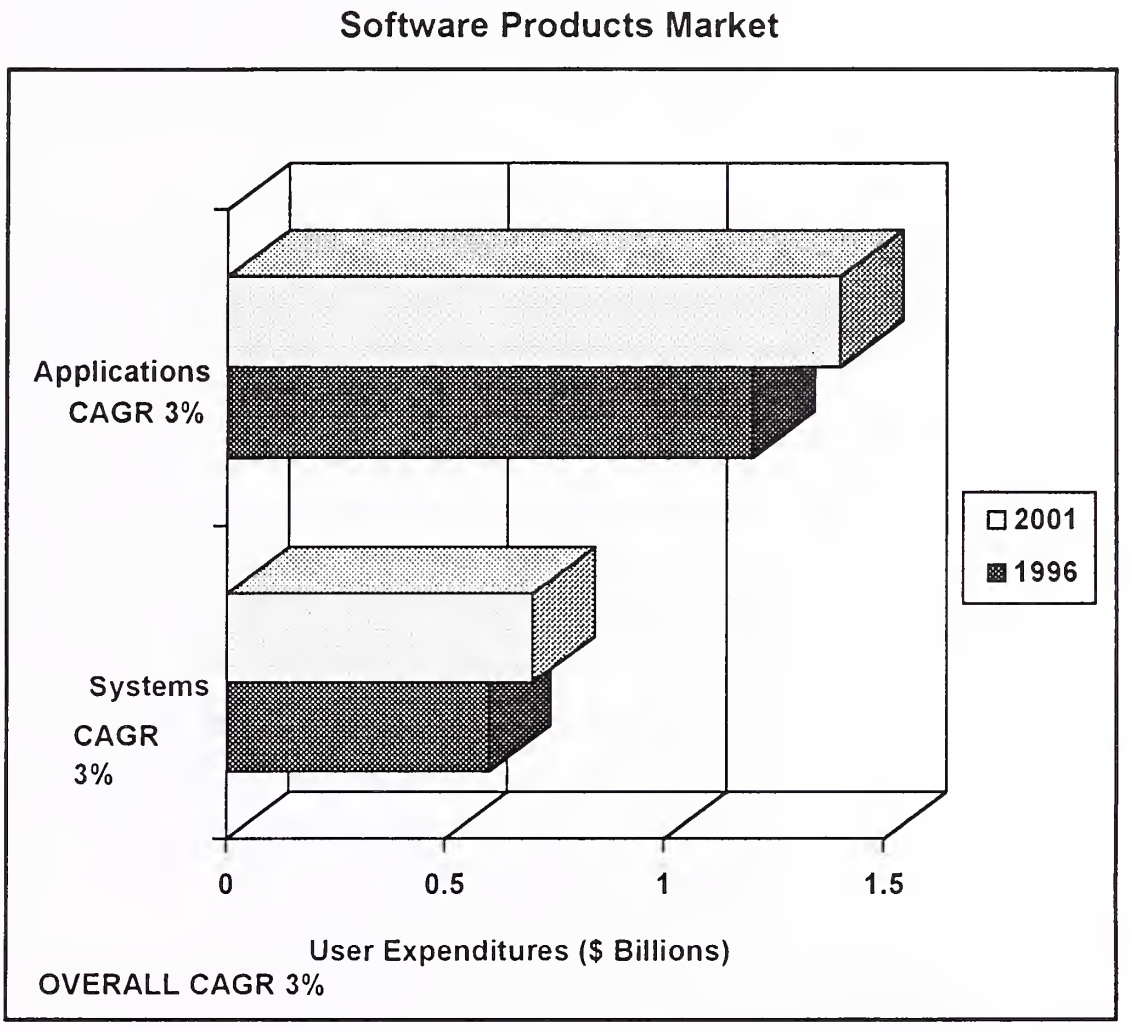
The software products market is being driven by the availability of commercial, shrink-wrapped applications. This, in itself, could result in lower levels of spending for the same level of software support. However, agencies may be overly optimistic that commercial products will be available and may actual spend more than planned on development. An additional downward market driver is software licensing. This contract condition allows an agency to purchase single copies of products and copy them for distribution to multiple installations.

1. Applications Software

INPUT divides the software products delivery mode into applications and systems. Applications software includes accounting, human resources, procurement and mission-unique support software. This latter category concerns software that directly supports the mission of the agency. The following examples are typical:

- IRS uses software to assess the audit of a taxpayer's return.
- The Defense Logistics Agency (DLA) uses software to track the movement of supplies at depots and warehouses.
- NASA uses software to evaluate the usability of pictures transmitted from space.

Exhibit IV-6



Source: INPUT

Applications software outlays are driven by the large desktop installed base and updates of existing mainframe suites. Price competition is considered the key factor, but the shortening of software upgrade cycles increases the demand for new products. The increased CAGR of 3% over the 4% CAGR of prior years reflects comparable growth in this segment, but is still far below the 15% CAGR in 1990. The market is expected to increase from about $1.2 billion in FY 1996 to $1.4 billion by FY 2001.

As a result of budget constraints and heavy pressure from OMB, many agencies are beginning to view their software requirements in other than unique terms. When they have a fairly standard application, particularly an administrative application, they acquire standard commercial packages more often than before. This leads vendors to increase development of packages that are suitable for government use and government-oriented marketing efforts. Commercial software products can be purchased at volume discounts as part of "application suites," or purchased centrally with rights to copy.

Beta testing of packages by agencies leads to bid solicitations for specific types of platforms under the QPL (Qualified Products List) procurement ground rules. This is particularly pertinent in the requirements-type IDIQ contracts.

2. Systems Software

Systems software usually is sold or leased with the hardware. Purchases after installation include DBMS, compiler controls, accounting and charge-back software, communications and software development tools. Recent price reductions and increased competition in this market are holding down growth rates. Unbundling of systems software from hardware platforms will make some of these products more visible, because they would be priced separately. The recent Department of Justice pressure against Microsoft Corp. emphasizes a need to unbundle operating system software for desktop processors and LANs. As a result, the market will show artificial signs of growth through FY 2001.

3. Software Modularity and Reuse

Two areas of vendor concern are the current and CIM-planned availability of government software for use by other agencies at minimal cost and constraints on commercialization of federal software under existing copyright laws.

The Department of Commerce National Technical Information Service, National Energy Software Center, and NASA's COSMIC (Computer Software Management and Information Center) catalog tapes, disks and documentation of both federally generated and federally funded software for use by other agencies. Commercially available software is listed for information, but requires agreement or lease from the vendor-owner.

DISA, under the CIM initiative, proposes to specify the preparation of defense software in modules and storage of them in a DISA Software Reuse Center, with electronic access for potential users. Industry and some agency software experts note the attendant problems of increased cost of modularity and determination of ultimate responsibility in the event the software fails to meet specifications.

Current law prohibits the copyright of federally developed software and constrains efforts to transfer the software to industry, according to senior administrators, patent attorneys and technology transfer officials. The GAO has submitted recommendations to Congress for modifying the current statutes.

The strong feeling among IT officials and GAO is that newer capabilities of software technology have been substantially oversold. The continual

release of newer, better, faster, more flexible, more user friendly software puts at risk the substantial current inventory and the improvement of data interchange between in-place systems.

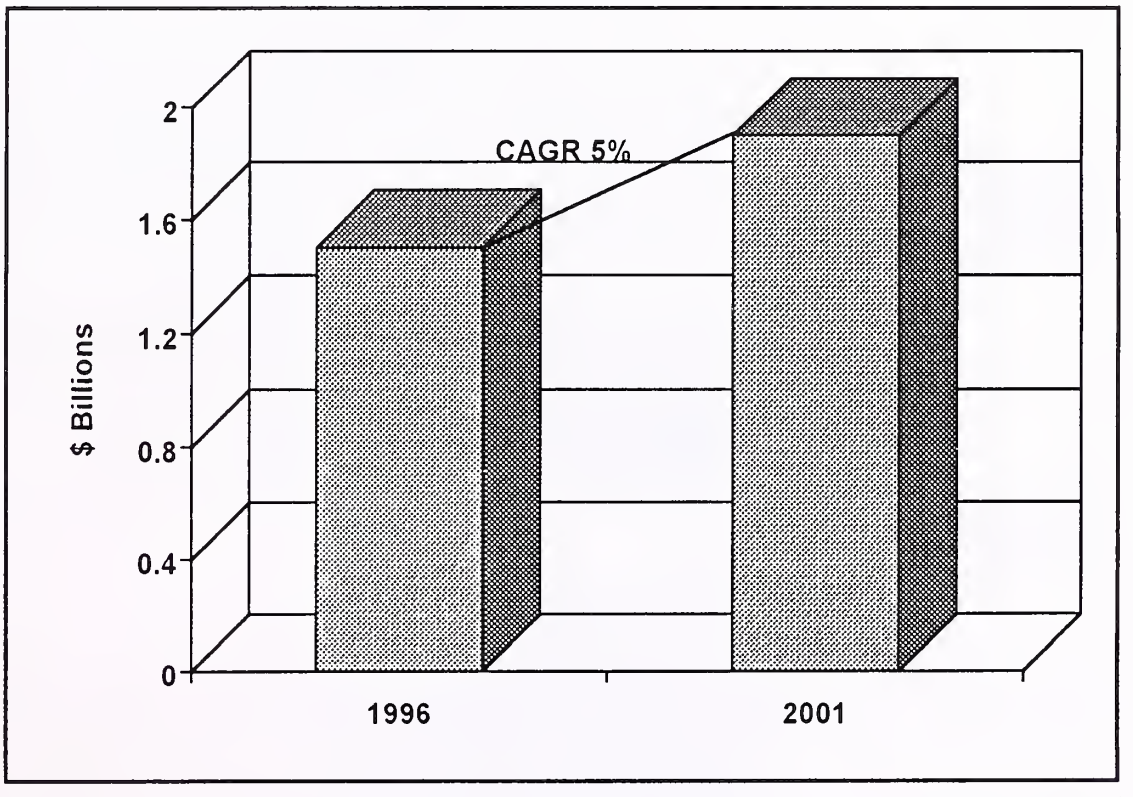
E
Turnkey Systems

Turnkey systems are value-added packaged hardware and software solutions to specific applications requirements that satisfy, with few modifications, commercial, industrial and government needs. This delivery mode's federal growth rate results from sharp Defense budget cuts in custom system appropriations. Exhibit IV-7 shows it will increase from $1.5 billion in FY 1996 to $1.9 billion in FY 2001. The growth rate has been holding constant at 5% for the past several years.

The full value of this market segment is not represented in these numbers. The price of some of the systems permits many of the acquisitions to fall beneath thresholds not requiring notification in the OMB A-11, and agencies are looking for commercially available systems that are readily adaptable to in-house applications.

Exhibit IV-7

Turnkey Systems Market



Source: INPUT

Scientific and engineering applications continue to be the largest area of agency turnkey system use. These include CAD, CAM, CIM and data collection packages. On the civilian side, Commerce, NASA and Energy have the greatest need for these systems and support most of the civilian growth. Defense also has growing requirements in this area, but budget limitations threaten DoD's ability to procure necessary levels of support.

Document handling represents the second largest application area. This includes, among other applications, DoD's initiatives on CALS. However, some CALS-related initiatives were cut from the current budget and others will be impacted by the DoD CIM program. Other document-handling applications of interest to federal agencies include library, graphics, mapping and publishing systems.

Other turnkey applications include:

- Human resources
- Fleet scheduling
- Maintenance tracking
- Medical drug information
- Financial systems.

Turnkey systems being procured by federal agencies include custom design and applications. The vendor provides the entire system, including applications software and special peripherals. Also, vendors install the system, train client personnel to operate it, and provide service during the warranty period.

Some agencies are initiating systems integration procurements whereby the standalone (also called "stovepipe") systems can be connected to mainframe and distributed database systems.

F
Systems Integration

1. Overall Market Potential

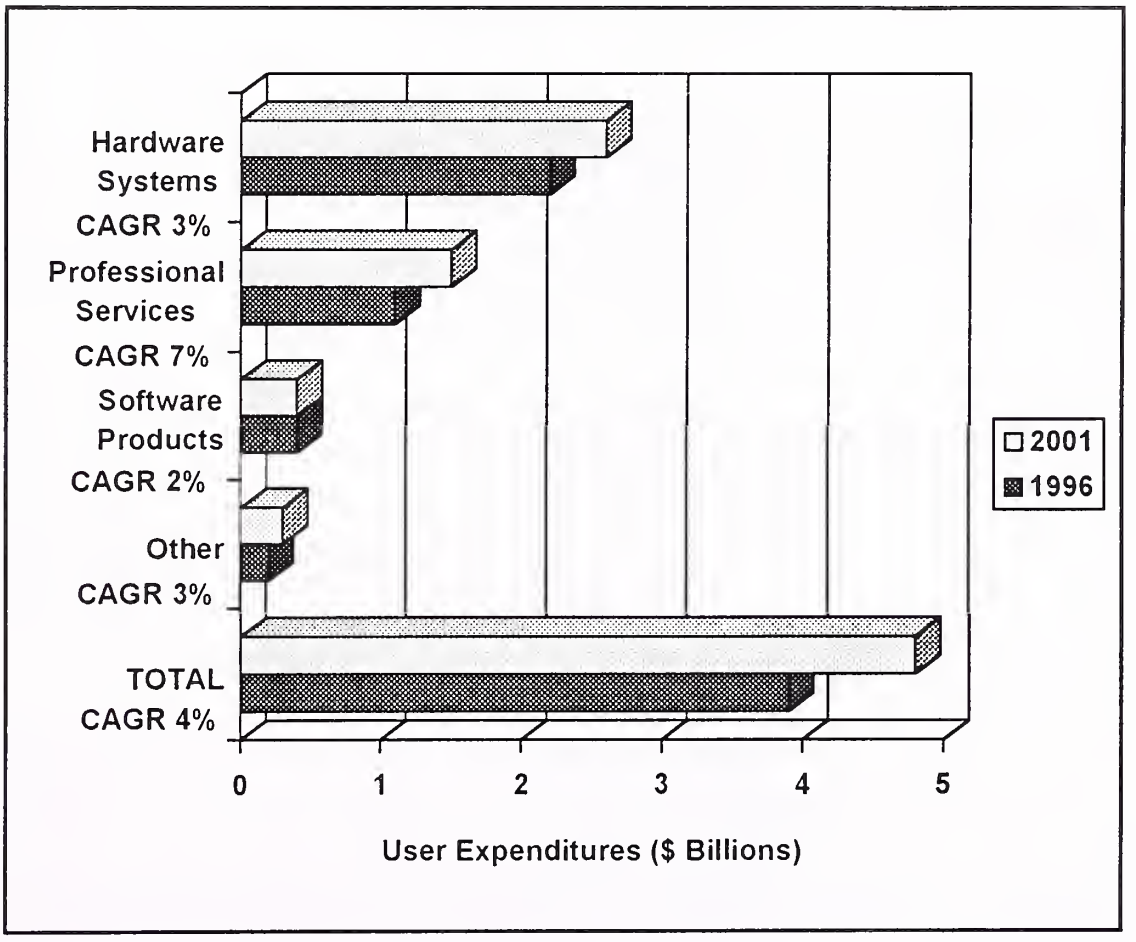
The market for systems integration (SI) is expected to slow down to 4% CAGR, from $3.9 billion in FY 1996 to $4.8 billion in FY 2001, as shown in Exhibit IV-8. The SI market is not growing as fast as most observers anticipated in 1991, but is still one of the fastest growing IT segments in the federal government. Growth rates for each of the components are holding steady over the last several years.

Unlike the commercial markets, hardware outlays are the predominant investment. The hardware segment was holding at 55% in recent years, but fell to under 50% last year, where the segment is expected to hold through FY 2001.

Hardware systems represents the largest dollar outlay in the systems integration market, but the software products component of the systems integration forecast shows a lower growth rate, as agencies move toward commercial software and upgrade existing commercial software systems. The equipment portion of SI was flat in the late 1980s, reflecting sizable budget cuts at many agencies, especially on the Defense side. But beginning in FY 1991 and continuing through FY 1996, there is a sizable increase in equipment acquisitions, replacing older mainframes and incorporating large numbers of workstations and PCs.

Exhibit IV-8

Systems Integration Market



Source: INPUT

2. Professional Services

Professional services grew at 17% per year in FY 1987 to 1989, but dropped to 15% in FY 1990. Reported expenditures for FY 1994 were $1.0 billion, less than the amount forecast for any period since FY 1991. However, increases are expected in this segment. Continued delays in spending for several DoD systems by and problems with Treasury programs account for most of the shortfalls in FY 1994. FY 2001 outlays now are expected to reach $1.5 billion, less than the $2.3 billion predicted in 1992.

In FY 1990, outlays for professional services were 51% of the total spent for SI. The proportion has since declined to 27% in FY 1994, but has increased in FY 1996 to 27% and is expected to increase to 31% by FY 2001.

The services included in this market are:

- Project management
- Consulting services
- Design services
- Integration services
- Custom software development
- Education and training
- Documentation
- Operation and maintenance (systems operations—only if specified in the contract).

3. Hardware Systems

Earlier, the amount of each program spent on equipment declined as a percentage of the overall project cost. The reduction was attributed to the progressive decrease in the cost-per-MIPS. But since 1990, the amount has risen to the level of about 1988, as the projects include more terminals/PCs for users and extensive networking is needed.

Reported expenditures for FY 1994 were $2.0 billion, less than anticipated. Expenditures fell again for FY 1995 to $1.9 billion, but increased to $2.2 billion in FY 1996. They will continue to rise to $2.6 billion in FY 2001, at a CAGR of 3%. More of the CPUs originally

planned for reuse have become obsolete and need replacement. LANs and network equipment also are adding to the rise in hardware costs.

4. Software Products

The size and growth rate of the software products component of SI is unchanged since the 1991 forecast. Outlays were $354 million in FY 1995, are estimated to be up slightly in FY 1996, but are growing at 2% CAGR to $447 million in FY 2001. Certainly, part of the unchanged spending profile stems from the increased use of microcomputer application products, which although growing, have undergone substantial price reductions.

Another factor is the continuing conversion of existing applications to minimize delays in cutting over to new systems. A significant problem in creating new systems from old ones is the matter of site licenses and restricted use of commercial, copyrighted software.

5. Other Services

The "other services" category, although relatively small in the federal market compared to the commercial market, includes transaction processing and network services during the implementation phase, site preparation, mechanical engineering, and initial data processing supplies. This segment is expected to grow at a 3% CAGR.

6. Trends

A number of awarded and near-term projects are driving the market:

- Sustained Base Information System for $500 million
- AWIPS-90 for NOAA at $122 million
- Defense Enterprise Integration System at $900 million
- Treasury's System 90 at $57 million
- Service Center Support System for IRS at $2.2 billion
- Air Force Integrated Command Control Communications Computers and Intelligence System at $900 million.

Currently, civilian SI spending exceeds that of Defense by approximately $1.6 billion. This reflects current budget constraints in DoD. INPUT expects these constraints to continue throughout the forecast period, largely driven by CIM plans to reduce Defense systems spending, and continued pressure on the budget by the House Appropriations

Committee. The Senate appears willing to continue a high investment in Defense information technology spending. For 1996, DoD expects to spend $10.6 billion on information technology, and the Senate has indicated a willingness to invest additional funds for modernization.

Not all major SI initiatives are being canceled; some may be deferred or stretched out. As a result, the Defense market will continue to lose ground to the civilian market demand over the next few years.

Most SI projects include provisions for communications. With the advent of FTS2000, cost estimating became difficult in the absence of firm rate data from the two FTS2000 contractors, AT&T, and Sprint. As a result of efforts to merge Defense communications (DISN) with FTS2000, the GSA is now involved in planning communications for Defense use as well as civilian use.

Risk management is heavily emphasized in the federal market. Despite system complexity and the government's reputation for stating incomplete requirements, the agencies want functioning solutions—not just the offering of sophisticated, interesting technology. Caution must be tempered by provisions for technology insertion (for instance, imaging systems) in the future.

G
Computer Equipment

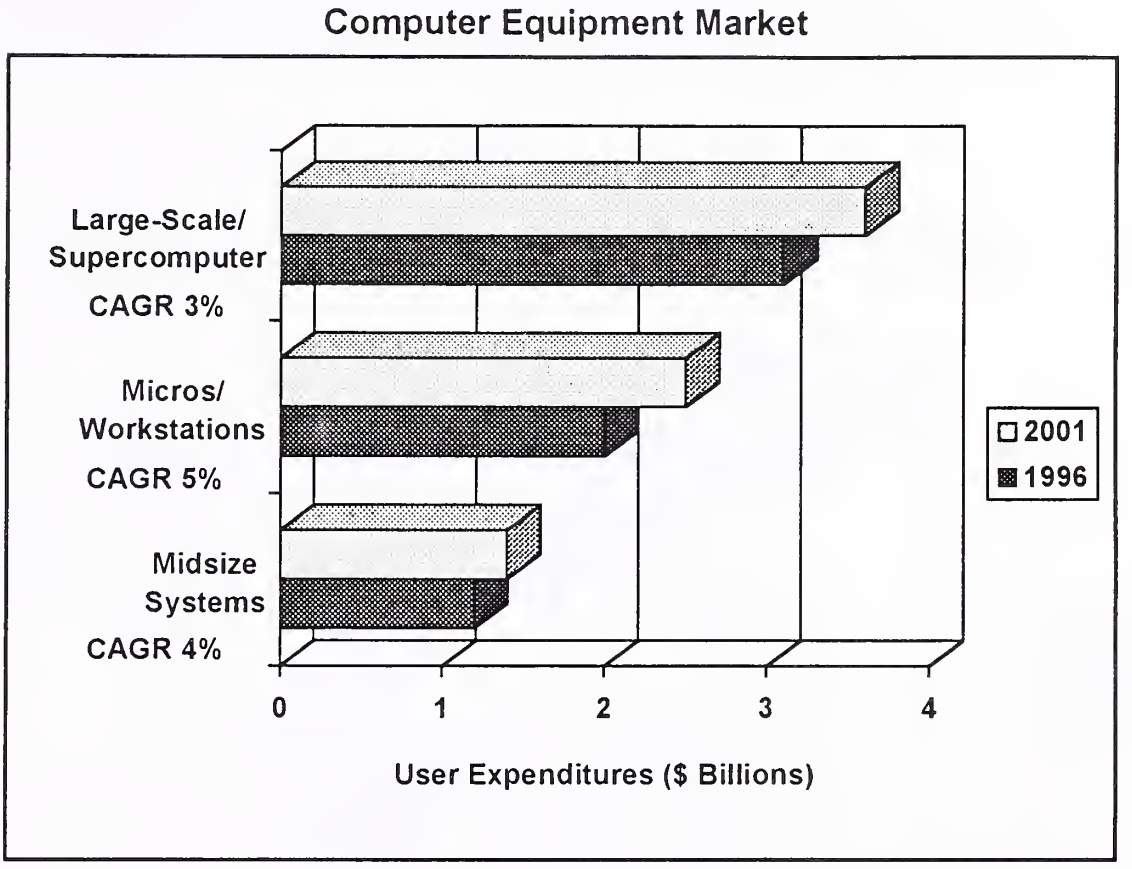
INPUT focuses on the information services industry and does not treat equipment as an independent research area, except for the components of systems integration and turnkey systems delivery modes. Federal vendor client interest in equipment, including PCs and office information systems, led to the preparation of several equipment-oriented reports and a forecast of likely trends, beginning in 1988. The results of INPUT's current federal research is seen in Exhibit IV-9.

1. Equipment Overview

In FY 1995, the federal agencies spent about $7.4 billion on computer equipment, with the primary emphasis on large-scale systems, which included mainframes and supercomputers. From present levels, the computer equipment market is expected to grow at a CAGR of 4% to reach $9.4 billion in FY 2001. This rate is a decrease from the 6% CAGR forecast in 1993, with the principal changes appearing in both microcomputers and workstations.

Some of the planned IDIQ requirements contracts could exceed reported request levels, if past experience applies.

Exhibit IV-9



Source: INPUT

2. Downsizing

Application downsizing is moving many midsize computer-based operations onto large microprocessor-based workstations and supported PCs. Large mainframes are becoming depositories for both data and applications software that can be downloaded to low-end, independently operated hardware.

3. Acquisition Trends

Microcomputer-based workstations and personal computers are being acquired via several channels. The Five-Year Plans indicate continuing intention to acquire hundreds of thousands of units through requirements contracts. Several medium-to-large programs include the acquisition and installation of hundreds of terminals linked to client/server architecture.

4. Equipment Modernization

Mainframes of the IBM 360/370 and Unisys 1100 class have been replaced largely because they have become too expensive to maintain or are not maintainable. More modern architecture off-loads overhead functions from the mainframe to networked workstations, permitting the mainframes to operate at or near designed transaction speeds.

Furthermore, higher performance replacement programs of the late 1980s moved onto both higher capacity mainframes or minicomputer-based distributed systems.

In the federal market, system upgrades and expansions involve replacement or addition of specific ADP elements. Five-Year Information Technology Plans continue to reflect significant investment for increasing memory systems and data communication hardware. Leases remain as acceptable strategies for obtaining newer technology mainframes and operating software when capital investment funds are not available.

For the 1990s, a number of expansion projects involve the addition or extension of networks. Some projects require networks to serve workstations. Still others will connect microcomputers and minicomputers, which in turn are tied to centralized databases. Software for these projects is either acquired separately through professional services vendors or developed in-house.

5. High-Performance Computing

Traditionally, federal agencies have used supercomputers for highly scientific and technical applications. NASA and the Department of Energy own the bulk of these systems, but major DoD agencies and a few civilian agencies also have supercomputers installed in both classified and unclassified establishments.

Federal computing is becoming more complex. The NII will be imposing new levels of processing requirements on the federal government. Massive data transfer must be accommodated through processing at terminals as well as driving the network traffic. INPUT expects agencies to find new applications for supercomputers based on NII activity, thus fueling continued market growth. INPUT's PAR database currently tracks 24 programs involving supercomputers.

H
Communications and Network Services

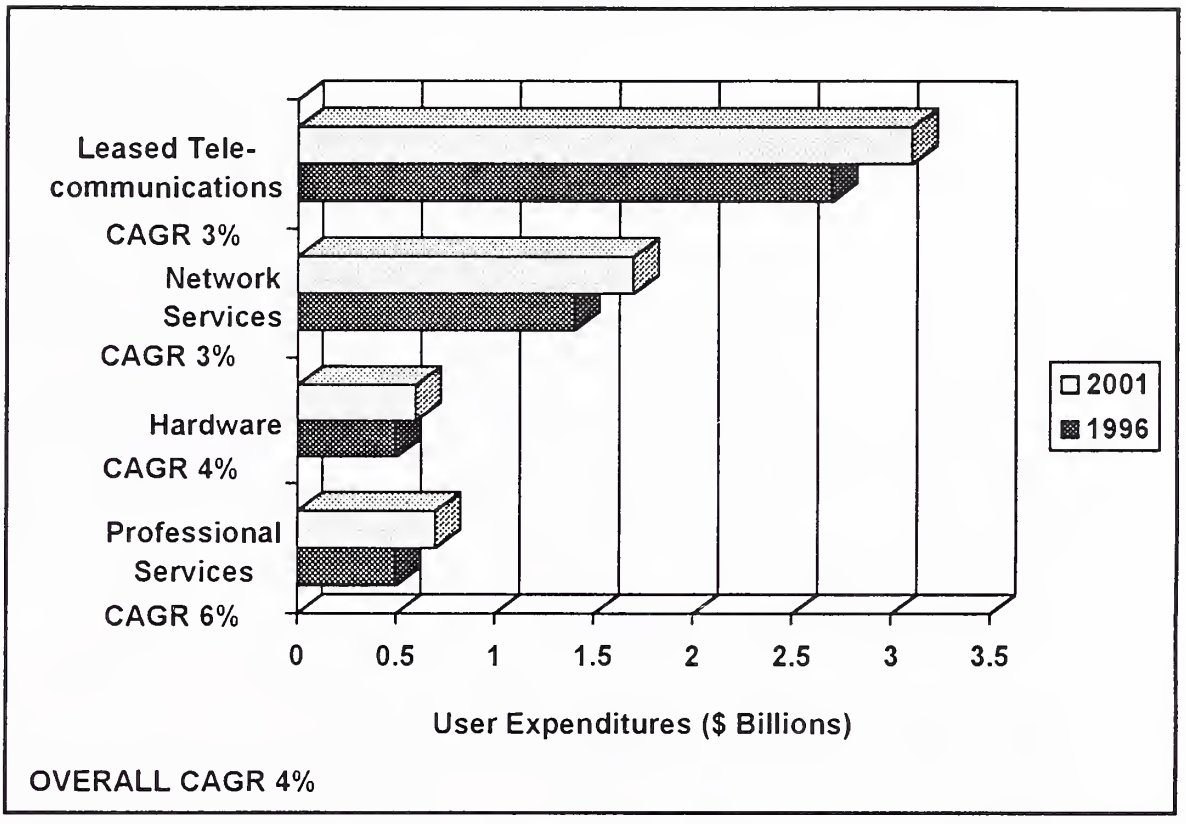
1. Overview

The federal market demand for communications and network services will increase from $5.1 billion in FY 1996 to $6.0 billion in FY 2001. Prices for leased circuits are falling as competition is opened up to companies other than FTS2000 contractors. This results in lower spending levels in outyears than anticipated last year. The professional services segment of this market continues to increase its growth rate as more requirements are identified for network support and with fewer government staff to accommodate the needs. The market for telecommunication products and

services will experience a decline to 4% CAGR through the five-year forecast period, as shown in Exhibit IV-10. This is approximately the level forecast in early 1990, but down significantly from levels in more recent years.

Exhibit IV-10

Communications and Network Services Market



Source: INPUT

2. Components

Network services is divided into two major segments: electronic information services selling information to users and network applications enhanced transport of user information processing needs. Earlier INPUT budget estimates developed from OMB A-11/Section 43 data were substantially undervalued because the funds were buried in the general telecommunications budget requests. Agencies have improved their reporting of telecommunications requirements in the A-11 in recent years. For FY 1996, OMB has relaxed its reporting requirement to separate out leased circuit spending from other communications categories. This will make future analysis more difficult.

Agency network services contracts typically last seven to ten years, and rarely are terminated by budget constraints. Separate new and replacement acquisitions may be deferred or canceled if an enhanced FTS2000 can meet their needs. Leased telecommunications circuits, principally obtained through the two FTS2000 contractors, include

services also leased from the RBOCs (Regional Bell Operating Companies) and the independent suppliers.

Leased circuit expenditures are expected to grow from $2.7 billion in FY 1996 to $3.1 billion in FY 2001, at a CAGR of 3%. These values should be at least twice the values noted in Congress, but the budget requests do not justify more. INPUT assumes that a lot of intraLATA leases are buried in administrative funds.

Professional services and equipment (hardware) are small in comparison to the media costs. Professional services is likely to increase from $494 million in FY 1996 to about $665 million in FY 2001.

Equipment outlays, largely CPE (Customer Premises Equipment) and ASP (Aggregated Switch Procurements), are nearly $478 million in FY 1996. Spending is expected to increase to $580 million in FY 2001, at 4% CAGR. The hardware market is more competitive than the other components because the specifications permit use of a variety of sources, many of them commercial-off-the-shelf. Nevertheless, the agencies appear to be adding new equipment to their networks to accommodate the need for faster data transfer and improved services.

3. Prospects

A number of projects listed by the agencies are funded outside the FTS2000 system. These include:

- Treasury: Communications System (U.S. Customs)
- Navy: Telecommunications Infrastructure Project
- DISA: DISN Integration
- Justice: Integrated Digital Communications System (IDCS)
- Defense: Defense Research and Engineering Network.

4. Trends

Despite proposed deficit reduction measures, INPUT believes that the effects of budget constraints will be mitigated somewhat in the federal communications market segment. Budget reductions actually may increase federal dependence on communications services. Teleconferencing and electronic message distribution will be emphasized to reduce travel and other costs.

Although the federal communications market has shown signs of increasing volatility, INPUT continues to believe that it will show

sustained but slow growth through the 1990s. Despite market growth in terms of spending, the number of distinct opportunities will probably decrease. The FTS2000 contract recompete may prove a major exception as the GSA appears ready to embrace a collection of acquisitions with different scopes rather than one contract, multiply awarded for all services.

Other factors that will drive the federal telecommunications market include:

- Agencies are more demanding and sophisticated in their communications requirements, either riding FTS2000 or, when appropriate, initiating their own requirements-type contracts.

- Pressures continue in Congress to further limit the expansion of services available on FTS2000 from the present contractors, AT&T and U.S. Sprint. Definitions for the FTS2000 as an integrated service for both civilian and defense agencies have not been developed. Neither has the acquisition strategy. Multiple awards are likely, but probably will not be limited to two suppliers for all services as before.

- Technological advances will change the market character. For example, as better network management tools become available, agencies will come to expect resulting economies and efficiencies.

- Competition is becoming more intense. Because this market still shows some of the vestiges of monopoly, the increase in competition will be even more dramatic, especially in the earlier phases of full digital service that will enhance data communications capabilities.

- Communications security requirements likely will increase. Most agencies consider communications to be the weakest link in information processing. Security considerations will prevent much interaction between local-area networks in DoD, at least in the near future. The market place has not yet voiced the level of demand for security that will drive upgraded technologies and services.

I

Electronic Commerce/Electronic Data Interchange

1. Overview

Electronic commerce/electronic data interchange (EC/EDI) continues to get good press for its potential in improving government services. Growth in the federal market lags behind that in the private sector.

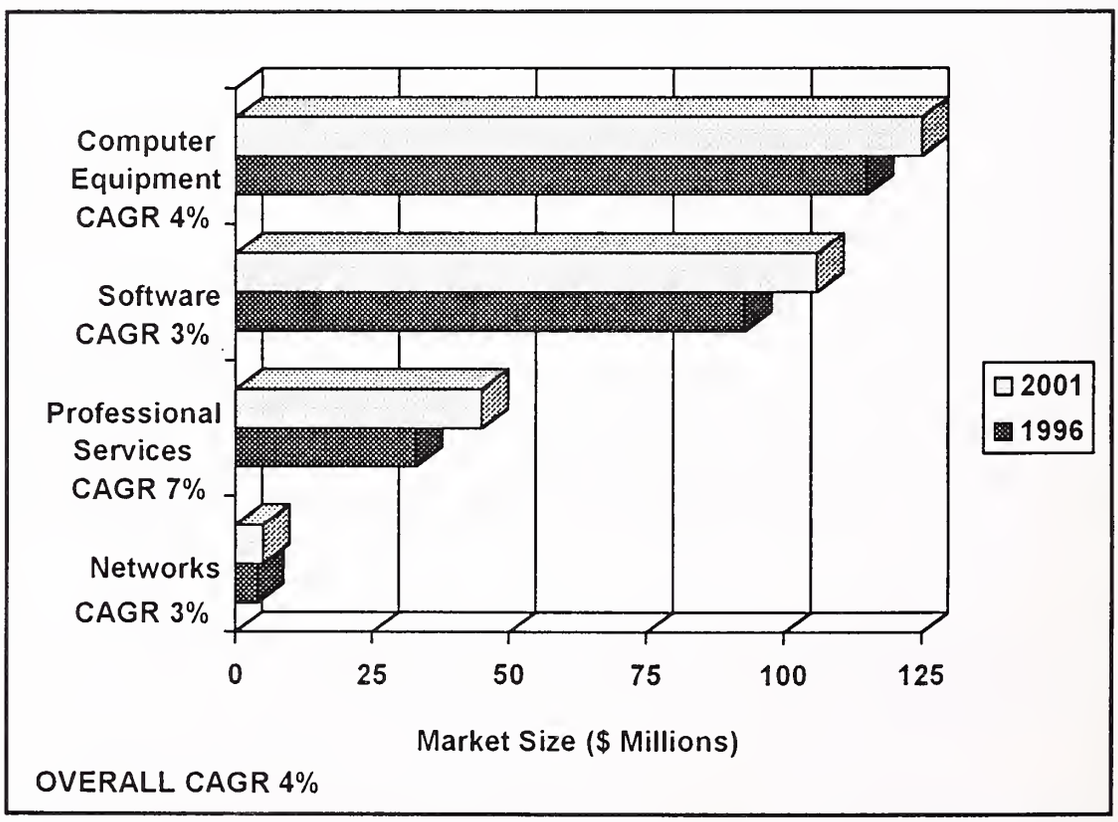
EC includes several modes: procurement (EDI), logistics (CALS), finance (EFT), benefits (EBT), drawings (EDT), filing (EF) and other data. INPUT expects the federal EC/EDI market to grow from $245 million in FY 1996 to $295 million in FY 2001, as shown in Exhibit IV-11.

2. Components

Currently, growth is occurring primarily in the hardware and software products areas, reflecting OMB's growing emphasis on commercial products, at the expense of tailored software development (included under professional services). Total product expenditures of $208 million in FY 1996 will grow at a CAGR of 8% to almost $245 million in FY 2001.

Exhibit IV-11

Electronic Commerce/EDI Market



Source: INPUT

A dramatically improving federal computer equipment market will increase outlays from about $115 million in FY 1996 to $139 million in FY 2001 at a CAGR of 4%, an increase from last year's dollar forecast, and sustained at a higher rate of growth based on anticipated spending increases for the outyears.

Professional services growth from this year's $33 million to $45 million in FY 2001 suggests that planning and implementing EC/EDI is more organizational and less a technical problem. As in other market segments, professional services growth shows the extent that agencies will contract out support requirements.

The continuing surprise in this specialized market is the low level of network expenditures identified. The increase from $4.1 million in FY 1996 to $4.8 million in FY 2001 is hardly more than a ripple in the budget pond. The special services provided for these networks appear to be only preliminary to conversion to a fully equipped service. There is also a growing trend among some network providers to discount their federal offerings heavily.

Unlike most other delivery modes, EC/EDI prospects are actually enhanced by budget cuts. Federal managers can save much of their administrative expense by reducing paperwork. Greater automation of procurement, invoicing, human resources and other administrative functions through EDI will reduce expenses and increase accuracy and efficiency.

The DoD CALS effort continues to lead in EC/EDI development. However, other agencies, including Treasury's Customs Service, apply EC/EDI (EDIFACT) at the international level. Treasury's Financial Management Service has implemented electronic funds transfer technologies to facilitate financial processing for federal agencies. Through pilot programs applied in traditional fixed-price environments, agencies will increase their operating efficiencies with EC/EDI.

3. Prospects

Agencies are gaining greater awareness of EC/EDI through several highly visible EC/EDI applications being implemented through agency programs already operational. These include:

- The SEC EDGAR Project for electronic filing of corporate documents
- The Navy EDMICS Program for an engineering and image processing system

- The GSA Federal Supply Service Program for sending invoices and bills-of-lading to suppliers
- Defense Logistics Agency's EDI Value-Added Network, and supplier connections under JCALS (JCS Continuous Acquisition and Life-cycle Support)
- Transportation's Automated Document Transfer System
- Customs Service's EDIFACT program
- Navy's Commercial Standard Procurement System
- Air Force acquisitions at Wright Patterson AFB.

4. Trends

EC/EDI is now being included in system upgrades, not just in standalone EC/EDI acquisitions. It still is viewed by most agencies as a more productive alternative to other data interchange processes.

The policies and regulations impacting EC/EDI are still evolving. The DoD Process Action Team on Electronic Commerce/Electronic Data Interchange in Contracting was chartered in July 1993 for the purpose of assessing existing DoD EC/EDI systems and to develop a comprehensive plan for implementing a standard DoD-wide EC/EDI approach. DoD has been operating a standard DoD-wide EC/EDI procurement system since January 5, 1994.

The federal EC/EDI market will expand as advancements are made in standards. X.12 already has a strong foothold among most federal agencies. Furthermore, NIST made X.12 a mandatory FIPS standard in 1990. Nevertheless, expansion will occur only slowly. Even though agencies were expected to have electronic ordering of small purchases in place by August 1, 1995, they are only now beginning to move in that direction. FACNET, the federal acquisition network mandated by the Federal Acquisition Streamlining Act of 1994, is evolving. The Procurement Reform Act of 1996 gave federal agencies until 2000 to implement FACNET.

Further accommodation of agency electronic commerce requirements have been addressed by GSA through the new Schedule E for EC products. Capabilities offered by holders of Schedule E multiple award contracts range from single products to full systems. In the near term, most ordering is expected to occur at the product level. More than twenty companies currently hold Schedule E contracts.

The international standard, EDIFACT, is recognized in some application areas, such as U.S. Customs, as the only standard that allows for full participation among trading partners worldwide. However, protocol differences between X.12 and EDIFACT may delay the standardization of federal EDI.

Agencies will use GOSIP to integrate their multivendor networks and systems. However, INPUT expects many Defense agencies to continue to use TCP/IP, an incompatible approach, for the next three to five years.

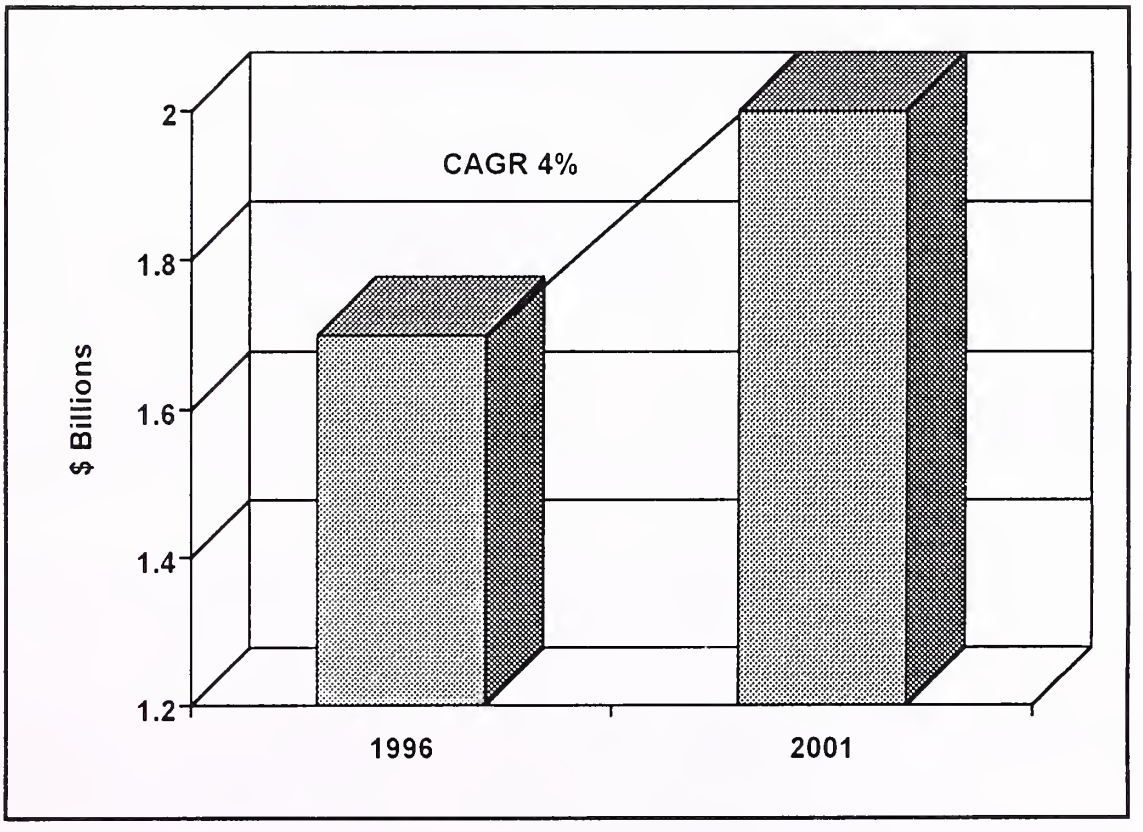
J
Office Information Systems

1. Overview

As shown in Exhibit IV-12, INPUT estimates that the federal government OIS market will increase from $1.6 billion in FY 1996 to $2.0 billion in FY 2001 at a 4% CAGR. Demand for office systems peaked five years ago and has been declining slightly since FY 1990. However, with groupware products and work group systems developed for office environments, this market will experience a rebirth over the next five years.

Exhibit IV-12

Office Information Systems Market—Overview



Source: INPUT

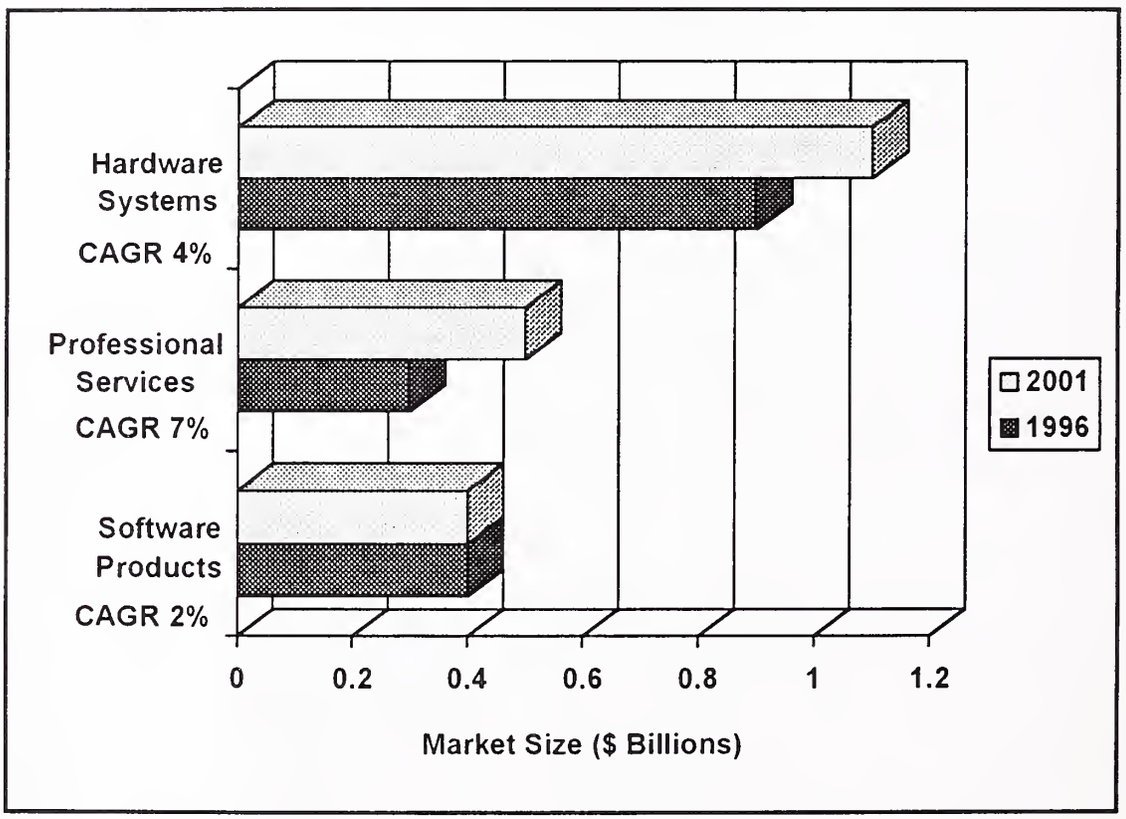
2. Components

Most federal OIS expenditures are concentrated in purchases of hardware components, but not to the extent seen in the late 1980s. Exhibit IV-13 notes that the CAGR for hardware will grow at 4% over the next five years, with anticipated budget levels going from $945 million in FY 1996 to $1.1 billion in FY 2001. That amount accounts for more than half of the expected outlays.

Professional services is now the fastest growing segment by hardware with healthy growth through the remainder of the 1990s at a 7% CAGR, as more functionality becomes available for office operations.

Exhibit IV-13

OIS Submarkets–I

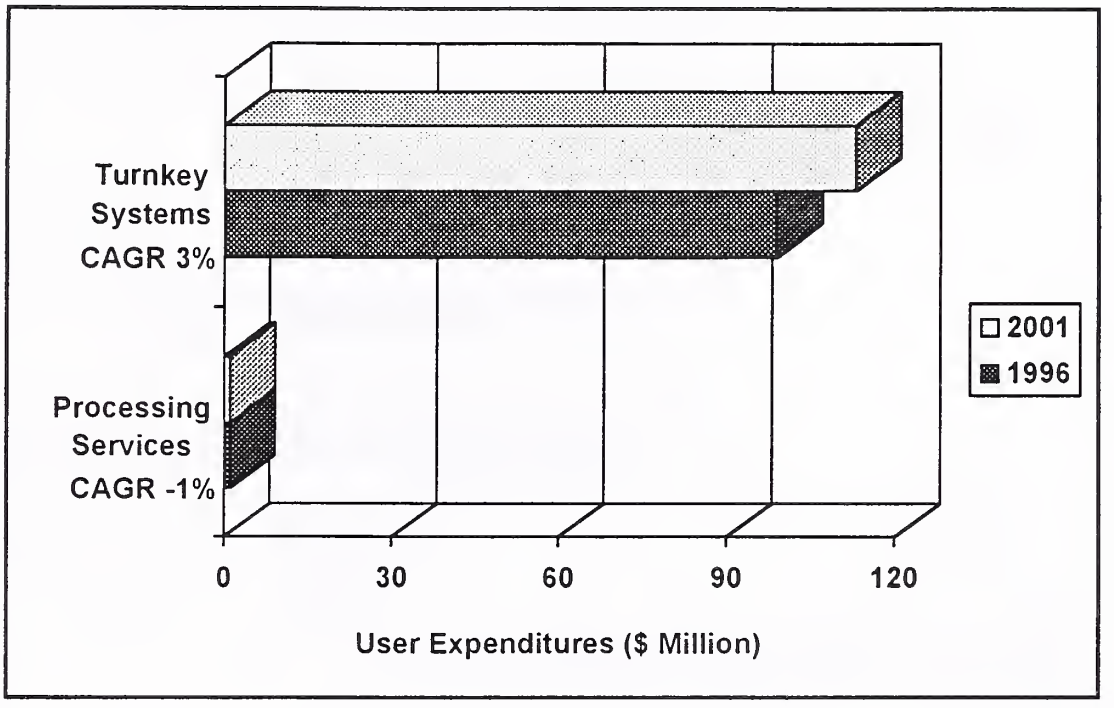


Source: INPUT

Some turnkey systems will continue to be ascribed for specific applications that are one of a kind in the office environment. These can be equipped for special assignment, like traffic control or vehicle tracking. Low-level spending is expected to continue through FY 2001, from $99 million in FY 1996 to $113 million. A small amount of processing services continues to be used for overflow support of major OIS. Both of these submarkets appear in Exhibit IV-14.

Exhibit IV-14

OIS Submarkets–II



Source: INPUT

3. Prospects

A number of projects in this segment of the federal market indicate continuing interest. Note that OIS is the object of several major systems integration programs.

- Justice: Consolidated Office Network
- Transportation: U.S. Coast Guard (SAIL)
- NASA: GSFC SEAS Program
- Agriculture: LM/Office Automation, and Inspection Coverage System
- State: Office Automation Recompete (SOAR)
- SSA: Social Security Administration (IWS/LAN).

4. Trends

The nature of office information systems and the location of the intended support are changing. Today, OIS implies work units with users tied together via LANs, and institution-level processing distributed to workstations or work units linked to these larger processors. Groupware products and software suites are gaining popularity in the office environment.

The rapid technical performance improvements of PCs and workstations using next generation Intel and Motorola processor chips are rapidly expanding the variety of applications available in the office environment for management support. The expanding product line for UNIX-based workstation processors also offers alternatives to processing scenarios of the early 90s.

Some OIS projects are called EIS (Executive Information Systems) or DSS (Decision Support Systems) to differentiate them from the earlier office automation context. As a result, many of these OIS automation efforts are influenced by, or under the control of, agency IS organizations.

Over the next five years, INPUT expects greater demands on agencies for office systems capabilities without an equally growing availability of OIS funds. This will force agencies to reorient their purchases toward more multipurpose systems instead of OIS-specific systems.

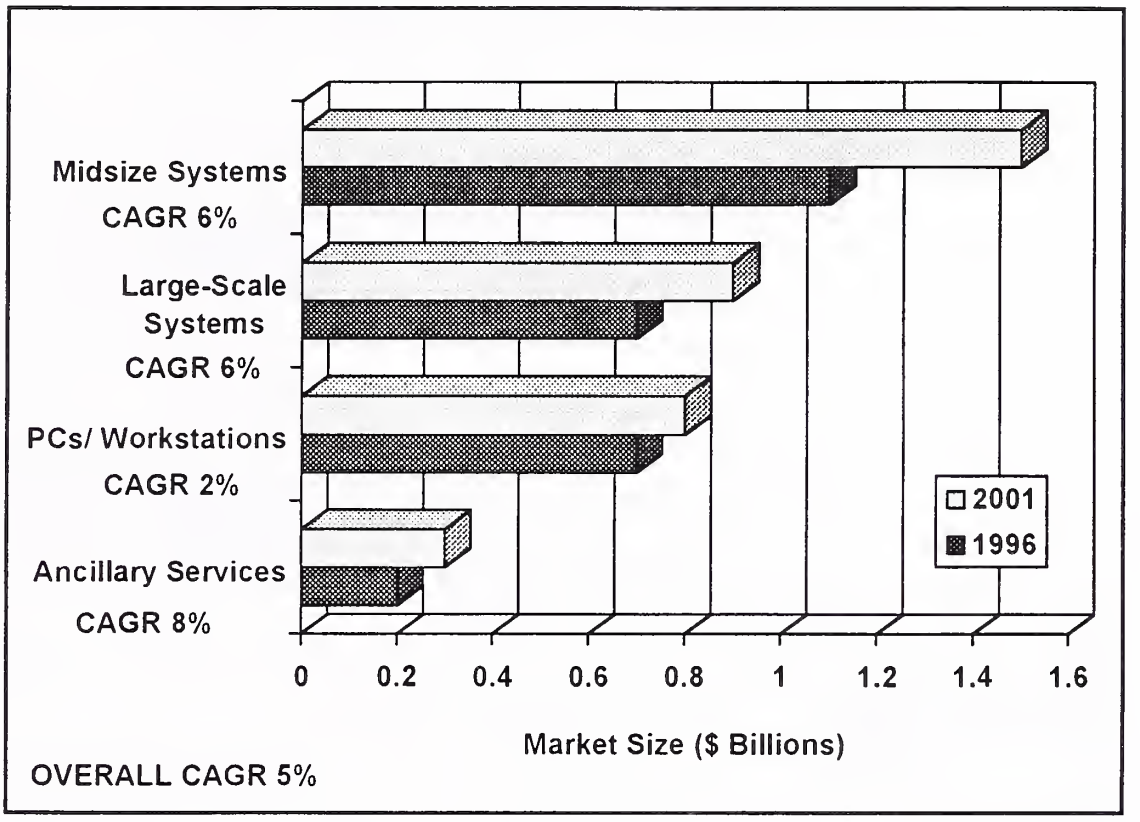
K
Computer Equipment Maintenance

1. Overview

Except for research conducted in the commercial market for customer services and third-party maintenance (TPM), INPUT had not previously analyzed the federal maintenance market. Client interest resulted in a market analysis report produced in 1990 that provided some insight into the maintenance market. As seen in Exhibit IV-15, INPUT's most recent analysis reveals a market of $2.7 billion in FY 1996, with prospects of a 5% CAGR that will reach $3.5 billion by FY 2001.

Exhibit IV-15

Computer Equipment Maintenance Market



Source: INPUT

INPUT may not have captured the entire equipment maintenance market. Some difficulty is encountered in separating IT maintenance from other non-ADP support functions at contractor-operated government facilities.

2. Size Emphasis

Note in Exhibit IV-15 that the largest segment of maintenance is associated with midsize systems, with the largest amount of older ADP equipment in the government inventory. (The Federal Equipment Data Center of GSA had reported more than 9,000 units with an average age of 12–13 years.) The $1.1 billion for maintenance of midsize systems in FY 1996 is expected to increase to $1.5 billion in FY 2001 at 6% CAGR.

Large-scale systems, which include supercomputers, have been upgraded so that the average age is less than eight years. Outside maintenance is required for the larger machines because of their complexity. INPUT believes that the $697 million estimated in FY 1996 will grow modestly to $939 million in FY 2001.

Despite the large number of PCs and workstations, their very newness results in low demand for maintenance support. About the time that they begin to require service, they are replaced by newer and more powerful

machines. Less than $685 million is estimated to be spent in FY 1996, and the addition of peripherals is expected to increase maintenance expenditures steadily through FY 2001.

3. Trends

Maintenance is provided by a variety of vendors, ranging from manufacturers of midsize to high-performance machines to third-party suppliers and maintainers. After some years of inattention to mixed-brand installations, the manufacturers recognize the desirability of account control. In this regard, upgrades can be accomplished piecemeal, with potential pre-eminence of incumbent equipment maintenance firms.

Maintenance of customer-premise equipment in the communications environment was separately treated in that market area. Further investigation of the maintenance market may reveal more specific agency trends and market shares of the leading vendors.

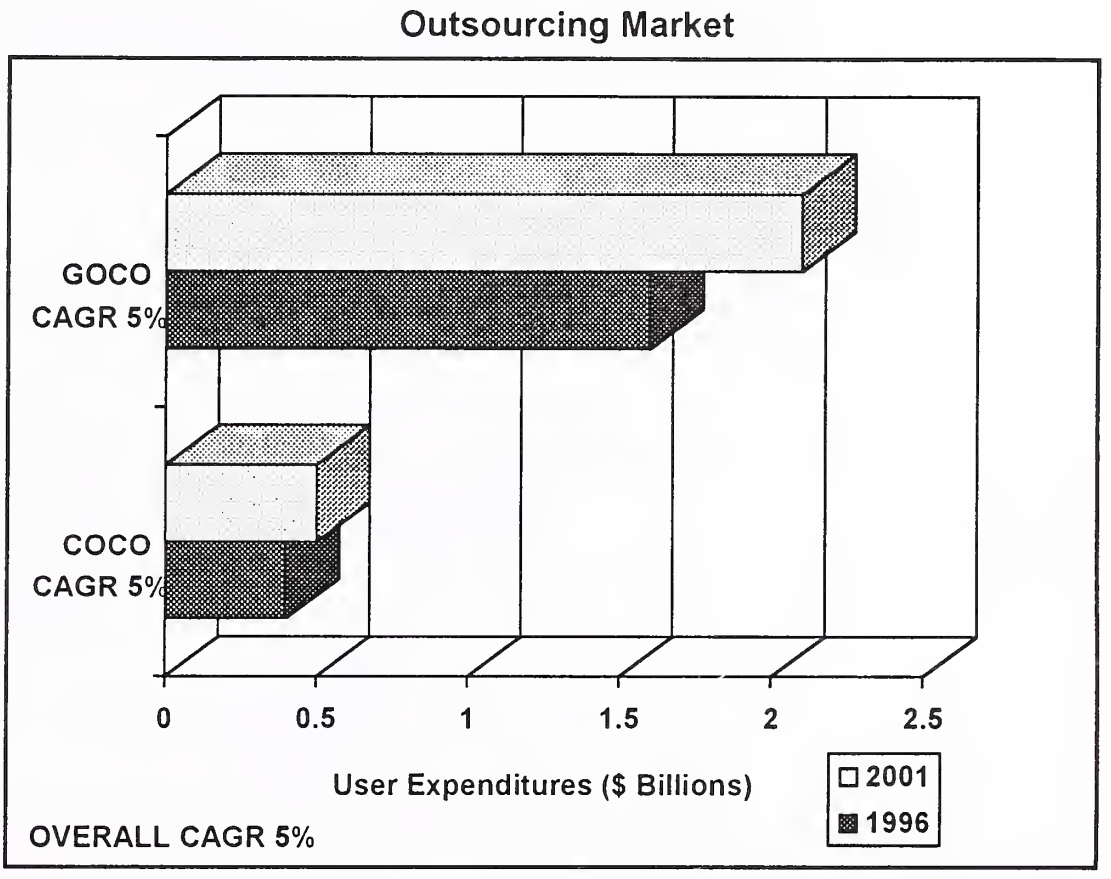
L
Outsourcing

1. Overview

The forecast in this market has been separated from the professional and processing services markets. The two modes are Contractor-Owned, Contractor-Operated (COCO) and Government-Owned, Contractor Operated (GOCO).

As noted in Exhibit IV-16, the federal systems operations expenditures are $1.6 billion in FY 1996, the same as in FYs 1992 through 1994, but are expected to grow slightly (CAGR of 5%) to $2.1 billion in FY 2001. The growth rate has increased slightly since the FY 1994 forecast but is not expected again to reach the 15% level predicted in 1989, unless applications are outsourced at greater levels than currently identified by agencies. This outsourcing would have to be accompanied by a significant increase in overall IT spending levels.

Exhibit IV-16



Source: INPUT

2. Systems Operations

Systems operations began to grow again in FY 1990, after experiencing CAGRs of 6%–8% since the cutbacks of FY 1983, when a number of new systems were implemented. The turnaround began with staffing restrictions and slowdown of new system acquisitions imposed by the Gramm-Rudman-Hollings Budget Control Act and a slowdown in defense spending.

The professional services segment (GOCO) is currently expected to improve at 5% CAGR, despite expectations of data processing center consolidations in Defense and in other civilian agencies. The dislocation of federal staffs is not expected to adversely affect the laboratories and experimental centers where the largest GOCO contracts are awarded.

COCO opportunities are fewer in number and contract value (about a third of the GOCO market). INPUT is optimistically showing a CAGR of 5% because the agencies cannot fund adequate disaster recovery facilities. A number of agencies are examining outsourcing of most data centers as a way of increasing productivity at a stable and predictable cost level.

3. Trends

A number of system outsourcing programs have been added to those due to be recompeted in the next few years.

- The leading operational COCO program is FAA's CORN, worth $1.5 billion over a ten-year period.
- Department of Education's Guaranteed Student Loan Program
- Laser System Test Facility for the Army
- Navy programs for PMTC Support, Science and Engineering Center Support, and PEPSU Software Maintenance.
- HFCA Data Center Facilities Management Contract
- Justice Automated Litigation Support recompete worth $130 million
- EPA will recompete the National Computer Center Operation contract, worth $300 million.

Although industry has used the methodology for years, NASA was the first federal agency to employ mission contracting, now used at all centers except Lewis. The Air Force uses the same type of contracts for a few centers, and other agencies are moving toward allowing the contractor to use the most efficient staff mix to meet mission data processing and communications requirements.

In addition to the prospect of winning a five-year contract, the next significant advantage is the opportunity to provide software and hardware add-ons during the contract term. This process is called "flow-through" and enables the incumbent vendor to improve profitability in a delivery mode (GOCO) associated with low fee rates.

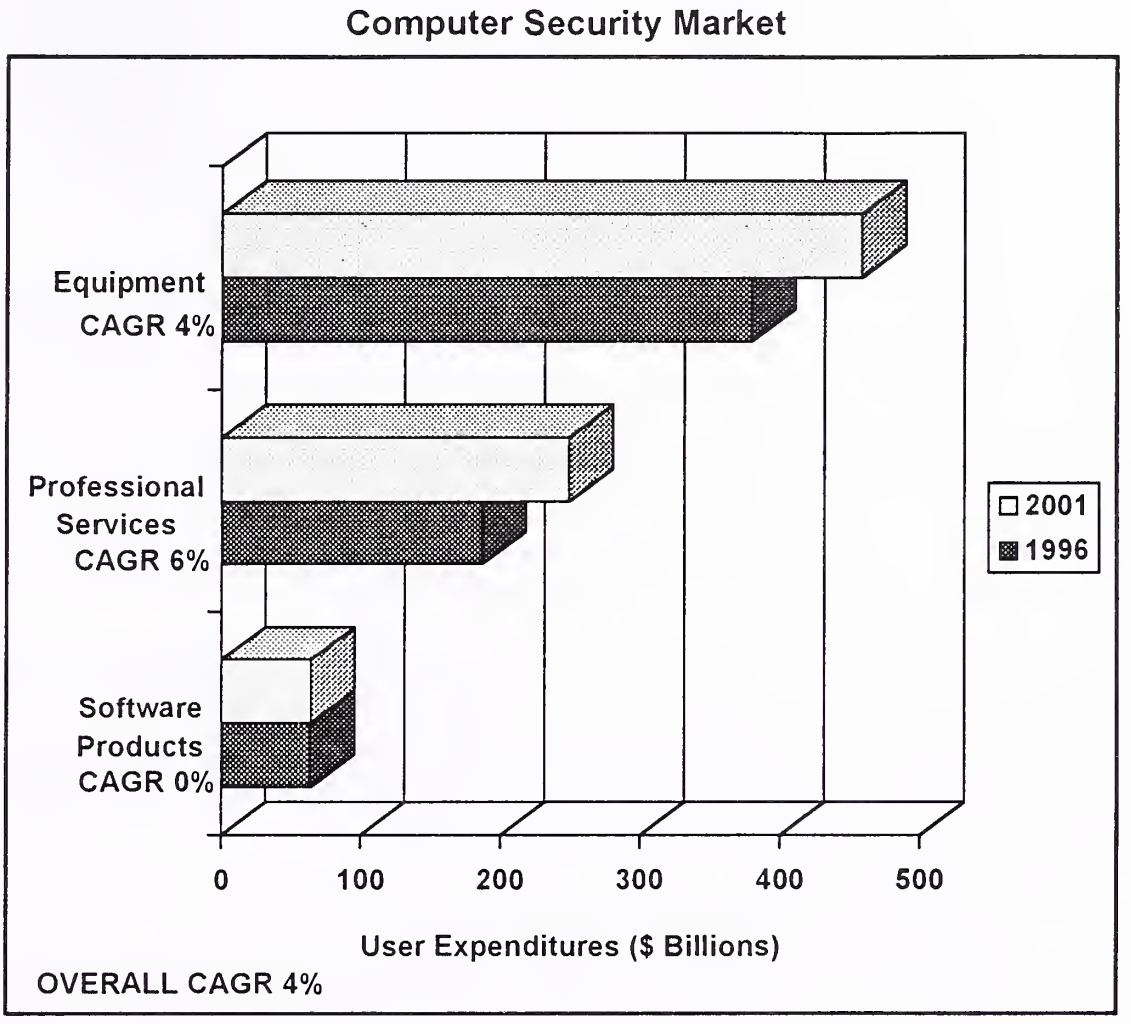
Vendors not involved in or allied with another vendor for SI may experience greater competition for the post-implementation support. A number of professional service firms are attracted to SI contracts because of systems operations prospects for five to ten years.

M
Computer Security

1. Overview

INPUT currently expects the market for federal computer security to improve from $631 million in FY 1996 to $770 million in FY 2001, at a 4% CAGR, as seen in Exhibit IV-17.

Exhibit IV-17



Source: INPUT

2. Security Elements

The continuing emphasis is on specialized equipment, comprising nearly 65% of the FY 1992, 60% in FY 1994, 60% in FY 1996 and 60% in FY 2001. Spending growth is expected to be only slight through FY 2001, unless some agency suffers grievous harm from a security breakdown. The equipment includes computers, peripherals and communications modems that are nonradiating.

Professional services will grow at a moderate rate of 6% CAGR. Attainment of software security is expected to be accomplished by the system designers and implementers of programs like the IRS Tax Modernization Program and SSA's Systems Modernization Program. Agencies like NASA established Computer Security Incident Response teams that include on-site vendor professionals.

The software products segment is the smallest segment of this market and is not expected to grow through FY 2001. The increasing availability of functional products for defining security needs and providing security

measures would influence growth, provided agencies seek software solutions. Currently, most administrators appear to prefer physical and equipment security measures. New interest in protection and recovery from computer viruses may be the key driver to network concerns. Because this is treated as a borderline issue, any acquisitions in this segment are not likely to be given any publicity.

3. Trends

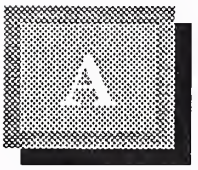
Although Congress mandated improved measures in the Computer Security Act of 1987, funding was provided only for development of a security plan and initiation of staff training. Under the Computer Security Act, support was and is provided for performing security evaluations and audits and assisting in development of physical, electronic and software security plans. Subsequent budget restrictions have further delayed any significant agency responses.

Unless Congress passes follow-up legislation with an appropriate level of funding, it is unlikely that this market will increase substantially. The agencies say that a significant and legally embarrassing incident must occur before the Administration or Congress will pay more than lip service to this legislation.

4. Network Security

Network security, consisting primarily of encryption equipment, is excluded from INPUT's forecast model because of the embedded nature of its processing. However, it still represents a major business opportunity in the federal market.

INPUT estimates this market to be approximately $650 million annually and expects it to remain fairly flat over the forecast period. Though demand is increasing, particularly among civilian agencies, the growing cost effectiveness of data encryption equipment is offsetting this growth, leading to the flat market size projection.



Forecast Databases and Reconciliation

A
Federal IT Budget Forecast Database

One of the features of the Federal Systems and Services Market Program (FSSMP), and earlier, the Federal Information Systems and Services Program (FISSP), is the creation of a computer-based forecast model for predicting the likely growth rates of federal IT expenditures. The model uses the data provided in Section 43 (Information Resource Plans and Budget Request) of the OMB Circular A-11 Federal Annual Budget Request Preparation Guidelines. This information provides the first two-year baseline of the five-year forecast.

Exhibit A-1 displays the overview of the four budget items and their components gleaned from the 43A documents, modified by the agency's long-range plans and interviews where the data are incomplete.

The FY 1996 column displays the estimates of the agencies of the ongoing fiscal year, previously authorized by Congress. The FY 1997 column is a summation of the requests made by the Executive Branch administrations, plus outlays planned by organizations not governed by the Amended Paperwork Reduction Act that have not been authorized by Congress. The plans of the non-Executive Branch entities are summarized in the line called "Off-IT Budget Adjustments."

The columns titled FY 1998 to FY 2001 are INPUT's forecasts of the likely rate of growth or decline of the government's budget elements. A principal caveat here is that these numbers are request-based and not yet specified by the government.

The forecast uses year-to-year growth rates established by INPUT each year (see the comments in the Introduction) and estimates of the CBO, OMB and economic projections of economic outlook groups in several agencies.

Exhibit A-1

Federal IT Budget Forecast, FY 1996–2001, Database

Federal Government Budget OMB A-11 Categories		Total 1996 Estim.	Total 1997 Forecast	Total 1998	Total 1999	Total 2000	Total 2001	CAGR '96–'01 (%)
Capital Investment	Hardware	4.8	4.9	5.1	5.3	5.5	5.8	4
	Software & Other	1.3	1.1	1.2	1.2	1.3	1.4	2
	Subtotal	6.1	6.0	6.3	6.5	6.8	7.2	4
Personnel		6.2	6.3	6.1	5.8	5.5	5.1	-4
Operating Costs	Lease of Equipment	0.2	0.2	0.2	0.2	0.2	0.2	-1
	Lease of Software	0.2	0.2	0.2	0.2	0.2	0.2	5
	Supplies & Other	1.2	1.2	1.3	1.3	1.4	1.5	4
	Subtotal	1.6	1.6	1.7	1.7	1.8	1.9	4
Commercial Services	ADPE Time	0.1	0.1	0.1	0.1	0.1	0.1	-1
	Leased Voice Telecom	2.3	2.3	2.4	2.5	2.6	2.7	3
	Leased Data Telecom	1.6	1.7	1.7	1.8	1.8	1.9	3
	Operations & Maintenance	4.4	4.4	4.6	4.9	5.2	5.6	5
	Sys Analysis/ Prog	3.5	3.6	3.9	4.2	4.6	4.9	7
	Studies/Other	1.0	1.0	1.0	1.1	1.2	1.3	6
	Use of IT	0.4	0.4	0.4	0.4	0.5	0.5	6
	Subtotal	13.3	13.5	14.1	15.0	17.0	17.0	3
Total Info. Technology		27.2	27.4	28.1	29.0	30.0	31.2	3
Subtotal of Contracted IT		20.4	20.4	21.3	22.5	23.8	25.4	5
Off-IT Budget Adjustments		0.4	0.4	0.5	0.5	0.5	0.6	5
Total to be Contracted		20.8	20.9	21.8	23.0	24.3	26.0	5

Figures in $ Billions

Sources: OMB, INPUT

To assure a degree of compliance of the service mode/market forecasts, the database for the federal government budget elements must be developed in greater detail. Each entry is based on formulas that are adjusted each year to track with the factors noted in the preceding years. The evidence of how closely the model tracks expenditure patterns will be demonstrated later in this Appendix under Forecast Reconciliation.

The most notable characteristic of the federal information technology budgets of the past five years has been the decline into single-digit growth rates of the four key budget elements. For FY 1997, a change in overall spending occurred with the increase in spending for commercial services and operating costs at the expense of capital investments. The compound annual growth rate (CAGR) is used to describe the five-year change in expenditures as a percentage of the base-year value.

B
INPUT's Federal IT Expenditure Forecast Database

As explained in the Introduction of this report, the data compiled in the Federal IT budget model (Exhibit A-1) is dissembled and regrouped in service modes that are more familiar to both INPUT's vendor clients and the technical program managers in the agencies. These are discussed in the main body of the report and defined in Appendix B that follows.

1. Part I—Primary Service Modes

The primary service modes that closely follow the IT budget elements are listed in the Part I - IT Market Database in Exhibit A-2. The most significant feature of this part of the forecast model is that the summation of expected expenditures for each fiscal year equals the amount calculated as the "Total Contracted-Out Spending" for each respective year in Exhibit A-1. (If the primary service modes exceed the budget/forecast then fund availability is unlikely.)

Exhibit A-2

Federal IT Market Forecast, FY 1996–2001, Database Part I

INPUT Service Modes Contracted Portion		Total 1996 Estim.	Total 1997 Forecast	Total 1998	Total 1999	Total 2000	Total 2001	CAGR '96-'01 (%)
CompSystems	Turnkey	1.5	1.6	1.6	1.7	1.8	1.9	5
	New	1.3	1.3	1.3	1.3	1.4	1.5	2
	Replacement	2.2	2.3	2.4	2.5	2.6	2.7	5
	Subtotal	5.0	5.2	5.3	5.5	5.8	6.1	4
Software Products	Application Software	1.2	1.1	1.1	1.2	1.3	1.4	3
	Sys Software	0.6	0.6	0.6	0.6	0.7	0.7	3
	Subtotal	1.8	1.7	1.7	1.8	2.0	2.1	3
Comm/ Ntwk Services	Leased Circuits	2.7	2.7	2.8	2.9	3.0	3.1	3
	Equipment	0.5	0.5	0.5	0.5	0.6	0.6	4
	Prof Services	0.5	0.5	0.5	0.6	0.6	0.7	6
	Network Svcs	1.4	1.4	1.4	1.5	1.6	1.7	3
	Subtotal	5.1	5.1	5.2	5.5	5.8	6.1	4
Processing Services	Transaction	0.1	0.1	0.1	0.1	0.1	0.1	-1
	Utility/ Batch	*	*	*	*	*	*	-1
	Subtotal	0.1	0.1	0.1	0.1	0.1	0.1	-1
Prof Services	Software Dev	1.7	1.8	1.9	2.0	2.2	2.4	7
	Design/Cons	0.6	0.6	0.6	0.7	0.7	0.8	7
	Ed/Trng	0.5	0.5	0.6	0.6	0.7	0.7	6
	Subtotal	2.8	2.9	3.1	3.3	3.6	3.9	7
SI - Prof Svcs		1.1	1.1	1.2	1.3	1.4	1.5	7
Outsourcing	Systems Ops (COCO)	0.4	0.4	0.4	0.4	0.5	0.5	5
	Systems Ops (GOCO)	1.6	1.6	1.7	1.8	1.9	2.1	5
	Subtotal	2.0	2.0	2.1	2.2	2.4	2.6	5
Comp Maint		1.8	1.8	1.9	1.9	2.1	2.3	5
Total Contracted-Out		20.8	20.9	21.8	23.0	24.3	26.0	5

** - Less than $50 million, Figures in $ Billions*

Source: INPUT

2. Part II–Alternative Markets

The primary service/delivery modes of the preceding database do not fit the markets that most of INPUT's vendor clients track. Six additional markets are identified in greater detail in the database shown in Exhibit A-3.

Because these markets are assembled from pieces of the so-called "primary markets," these results are not additive to those in the Part I database (a frequent difficulty of casual users of these forecasts).

Several of these markets have declined from double-digit growth because of stronger emphasis in Congress on reducing federal government spending. Some, like systems integration, have declined substantially from the 16%–18% foreseen in the late 1980s and 1990. Others, like electronic commerce/EDI and computer security, receive much press coverage but few significant funding increases.

There are several other versions of this data that have been prepared for the Market Analysis Reports in the FSSMP Program. Using the OMB A-11 submission of an agency, INPUT can develop a general model of how that agency is likely to spend its money. Within some limits of realism, secondary market characteristics can also be identified. However, as the level of detail increases, the sources rapidly become more unreliable, even for past fiscal years.

C
Reconciliation of INPUT's 1995 and 1996 Forecasts

Outside forces can substantially change the direction of any market. In this market, the expected economic, physical and competitive factors are further skewed by domestic and international geopolitical forces that are highly unpredictable. Outside events, like the problems with Asian foreign policy, the unstable political environment in Eastern Europe, the foreign trade imbalance and a difficult Republican majority all complicate the forecasting process. Forecast reconciliation is used by INPUT to see how closely these factors have been considered.

Two parts of the forecast will be considered. Part I addresses the primary service modes, and Part II addresses the alternate markets.

Exhibit A-3

Federal IT Market Forecast, FY 1996–2001, Database, Part II

INPUT Service Modes		Total 1996	Total 1997	Total 1998	Total 1999	Total 2000	Total 2001	CAGR '96-'01
SI Market	Prof Services	1.1	1.1	1.2	1.3	1.4	1.5	7
	Equip Sys	2.2	2.2	2.3	2.3	2.5	2.6	3
	Sft Products	0.4	0.4	0.4	0.4	0.4	0.5	2
	Other Svcs	0.2	0.2	0.2	0.2	0.3	0.3	3
	Subtotal	3.9	3.9	4.1	4.2	4.6	4.9	4
OI Systems	Process Svcs	*	*	*	*	*	*	-1
	Sft Products	0.4	0.3	0.4	0.4	0.4	0.4	2
	Prof Services	0.3	0.3	0.3	0.3	0.3	0.3	7
	Turnkey Sys	0.1	0.1	0.1	0.1	0.1	0.1	3
	Equipment	0.9	1.0	1.0	1.0	1.1	1.1	4
	Subtotal	1.7	1.7	1.8	1.8	1.9	1.9	4
EC/ EDI	Comp Equip	0.1	0.1	0.1	0.1	0.1	0.1	4
	Sft Products	0.1	0.1	0.1	0.1	0.1	0.1	3
	Prof Services	*	*	*	*	*	*	7
	Networks	*	*	*	*	*	*	3
	Subtotal	0.2	0.2	0.2	0.2	0.2	0.2	4
Equip Market	PCs	1.3	1.3	1.4	1.4	1.5	1.6	5
	Workstations	0.6	0.6	0.6	0.7	0.7	0.8	5
	Midsize Sys	0.8	0.8	0.8	0.9	0.9	0.9	4
	Large Scale	2.0	2.1	2.1	2.2	2.2	2.3	3
	Super-Comp	0.4	0.4	0.4	0.4	0.5	0.5	3
	Subtotal	5.1	5.2	5.3	5.6	5.8	6.1	5
Secur Market	Prof Services	0.2	0.2	0.2	0.2	0.2	0.3	6
	Sft Products	0.1	0.1	0.1	0.1	0.1	0.1	0
	Equipment	0.4	0.4	0.4	0.4	0.4	0.5	4
	Subtotal	0.7	0.7	0.7	0.7	0.7	0.9	4
Equip Maint	Large Scale	0.7	0.7	0.8	0.8	0.9	0.9	6
	Midsize Sys	1.1	1.2	1.2	1.3	1.3	1.5	6
	PCs/ Wks	0.7	0.6	0.6	0.7	0.7	0.8	2
	Ancillary Svc	0.2	0.3	0.3	0.3	0.3	0.3	8
	Subtotal	2.7	2.8	2.9	3.1	3.2	3.5	5

** - Less than $50 million. Figures in $ Billions.*

Source: INPUT

1. Part I Reconciliation

Part I compares the same primary service modes/markets as Exhibit A-2, which corresponds to the federal IT budget requests. Discussion will focus on those significant differences in money and as a percentage of the 1995 forecast. Each part will begin with examination of the FY 1996 near-term results and look at the out-year results for FY 2000. Exhibit A-4 shows this examination.

For FY 1996, the most significant difference is the continuing shift toward capital investment, particularly software products. Spending levels since FY 1993 have been growing only slightly, but beginning in FY 1996, agencies begin to increase spending dramatically. In large part, this is because of a push for commercial products. Agencies expect that open systems and interoperability requirements can best be met with commercial products. Many large programs that have been delayed will now require commercial, rather than developmental or proprietary, products.

Processing services and maintenance are continuations of existing capabilities. In previous years, they experienced substantial growths resulting from delays in other delivery modes. A decrease in processing services anticipated for FY 1996 indicates a decision to replace or upgrade many installed computer systems. With FY 1996, the emphasis on replacing legacy systems with less costly systems increases.

The flat growth rate of software development (7%) and the reduction in systems integration professional services (from 7% to 6%) suggest a continuation toward standard software products that have been tested successfully in the open market.

Variations in the outyears from last year's forecast demonstrate the results of postponed spending in the FY 1994–1995 periods. Spending levels anticipated for FY 2000 from the FY 1995 budget are now forecast from the FY 1996 budget to occur in FY 2001. The overall market shows a decline in contracted-out spending of almost $500 million from the 1995 forecast for FY 2000. The loss leaders appear to be computer systems ($867 million) and professional services ($305 million). Other significant losses occur in network equipment ($118 million). Leased circuits is up by 11%, a variance of $293 million, and leads all growth categories.

The continued shortfall in processing services also was discussed in Chapter IV. The decline of this market is less rapid than had been anticipated.

Overall, this year's FY 1996 estimate is 3% ($516 million) higher than forecast for FY 1995 last year. This year's forecast for FY 2000 is only 2% ($441 million) lower than forecast last year. The differences result from a renewed effort to reduce overall spending and agency postponement of spending for large systems because of uncertainties in program futures and even in the viability of sustained operations of certain agencies.

Exhibit A-4

Federal Market Forecast Reconciliation
1995 Versus 1996 Forecasts for FY 1996 and FY 2000, Part I

INPUT Service Modes	Forecast For FY 1996				Forecast For FY 2000				'95-'00	'95-'00
	1995 ($ bil)	1996 ($ bil)	Var. ($ mil)	Var. %	1995 ($ bil)	1996 ($ bil)	Var. ($ mil)	Var. %	CAGR '95(%)	CAGR '96(%)
Process Svcs	0.1	0.1	-18	17	0.1	0.1	6	6	-3	-1
Transactions	0.1	0.1	-14	16	0.1	0.1	5	6	-3	-1
Utility/ Batch	*	*	4	19	*	*	2	10	-3	-1
Prof Services	2.7	2.8	86	3	3.6	3.3	-289	8	7	7
Software Devel	1.7	1.7	52	3	2.2	2.0	-186	8	7	7
Design/Consult	0.5	0.6	18	3	0.7	0.7	-57	8	7	7
Education/Trng	0.5	0.5	16	3	0.7	0.6	-45	7	6	6
Outsourcing	1.6	1.6	48	3	1.9	1.8	-127	7	5	5
Systems Ops (COCO)	0.4	0.4	12	3	0.4	0.4	-29	6	4	5
Systems Ops (GOCO)	1.2	1.2	37	3	1.5	1.4	-98	7	5	5
Software Prod	1.5	1.8	297	19	1.8	2.0	128	7	5	3
Application	1.0	1.2	193	19	1.2	1.3	83	7	5	3
Systems	0.5	0.6	104	19	0.6	0.7	44	7	5	3
Comm/Netwrk	4.5	5.1	509	11	5.4	5.7	325	6	3	4
Leased Circuits	2.3	2.7	379	16	2.7	3.0	293	11	2	3
Equipment	0.6	0.5	-82	15	0.7	0.6	-118	18	5	4
Prof Services	0.5	0.5	13	3	0.6	0.6	-6	1	6	6
Network Svcs	1.2	1.4	198	16	1.4	1.5	98	7	2	3
SI - Prof Svcs	1.1	1.1	32	3	1.4	1.3	-116	8	8	7
Computer Sys	5.6	5.0	-571	10	5.3	6.3	-867	13	5	4
Turnkey	1.7	1.5	-116	7	2.1	1.8	-224	11	7	5
New	1.5	1.3	-174	12	1.6	1.4	-225	14	-6	2
Replacement	2.5	2.2	-283	12	3.0	2.6	-417	14	14	5
Comptr Maint	1.7	1.8	54	3	2.1	1.9	-132	6	4	5
Total Cont Out	20.3	20.8	516	3	24.8	24.3	-441	2	5	5

** - Less than $50 million*

Source: INPUT

2. Part II Reconciliation

This reconciliation deals with more specific markets than in Part I, covering the same markets as Part II of the market forecast database (Exhibit A-3). This material is shown in Exhibit A-5. None of the variances are as great as they were in the Part I comparison, with the exception of maintenance, discussed in Part I.

Exhibit A-5

Federal Market Forecast Reconciliation
1995 Versus 1996 Forecasts for FY 1996 and FY 2000, Part II

INPUT Service Modes	Forecast For FY 1996				Forecast For FY 2000				'95-'00	'95-'00
	1995 ($ bil)	1996 ($ bil)	Var. ($ mil)	Var. %	1995 ($ bil)	1996 ($ bil)	Var. ($ mil)	Var. %	CAGR '95(%)	CAGR '96(%)
Sys Integratn	4.0	3.9	-124	3	4.9	4.5	-419	8	8	4
Prof Services	1.0	1.1	32	3	1.4	1.4	-5	0	6	7
Comp Equip	2.4	2.2	-18	1	2.8	2.5	-374	13	9	3
Software Prod	0.4	0.4	22	6	0.4	0.4	-21	5	9	2
Other Svcs	0.2	0.2	6	3	0.3	0.3	-19	7	9	3
OI Systems	1.8	1.7	-78	4	2.1	1.9	-215	10	8	4
EC/EDI	0.2	0.2	3	1	0.3	0.3	-13	4	8	4
Comp Equip	8.1	7.89	-245	3	9.6	8.9	-742	8	8	5
PCs	2.0	2.1	-62	3	2.5	2.3	-195	8	11	5
Workstations	1.0	0.9	-30	3	1.2	1.1	-94	8	15	5
Midsize Sys	1.2	1.2	-37	3	1.4	1.3	-112	8	6	3
Large Scale	3.2	3.1	-98	3	3.7	3.4	-282	8	6	3
Super-comptr	0.6	0.6	-19	3	0.8	0.7	-60	8	9	3
Comp Secrty	0.7	0.6	-19	3	0.8	0.7	-60	8	6	4
Comp Maint	2.6	2.7	71	3	3.2	3.2	-29	1	4	5
Large Scale	0.7	0.7	19	3	0.9	0.9	-7	1	4	6
Midsize	1.0	1.1	29	3	1.4	1.4	-12	1	5	6
PCs/Wks	0.7	0.7	18	2	0.7	0.7	-6	1	0	2
Ancillary Svcs	0.2	0.2	6	2	0.3	0.3	-3	1	9	8

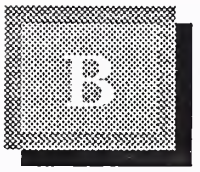
Source: INPUT

In Part II reconciliation, the computer equipment market shows a loss in strength over all other primary markets, resulting in a negative variance of $742 million, a 8% decrease for FY 2000 from the 1995 forecast. As noted earlier, agencies are aggressively pursuing lower unit costs and interoperability solutions from the commercial arena. This condition of decreased spending for computer equipment should continue through FY 2000, but the variance is not expected to show an increase over levels already identified by the agencies.

Significant downward adjustments continue to occur in the systems integration mode. This year's forecast for FY 1996 spending is $124 million less than (or 3% reduction in) 1995's forecast for FY 1996 spending. This continued reduction shows overall concern for large system spending. Procurement reform initiatives emphasize the need to reduce spending for large systems, with particular emphasis on reduction of spending for developmental systems (professional services).

Other service modes of the market, including workstations and midsized systems, show a similar reduction in percent of spending. The role of these two platform sizes should increase as more and more networks are connected and databases are upgraded for the platforms to be shared across the enterprise.

The largest FY 2000 negative variance of $419 million for systems integration indicates a sustained intention to reduce the size of large development systems efforts in favor of integrating commercial solutions. The negative variance in systems integration is mostly the result of a significant decrease in computer equipment as part of a systems integration contract. The across the board decline in all categories from the FY 1995 forecast reflects the continuing trend to downsize government, reduce the federal deficit and overall spending.



Definitions

The definitions in this appendix include hardware, software, services and telecommunications categories to accommodate the range of information systems and services programs described in this report.

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

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

A
Overall Definitions and Analytical Framework

Information Services. Include computer/telecommunications-related products and services that are oriented toward the development or use of information systems. Information services typically involve one or more of the following:

- Processing of specific applications using vendor-provided systems (called *Processing Services*)
- A combination of hardware, packaged software and associated support services that will meet a specific application processing need (called *Turnkey Systems*)
- Packaged software (called *Software Products*)
- People services that support users in developing and operating their own information systems (called *Professional Services*)

- Bundled combinations of products and services in which the vendor assumes responsibility for the development of a custom solution to an information system problem (called *Systems Integration*)
- Services that provide operation and management of all or a significant part of a user's information systems functions under a long-term contract (called *Systems Operations*)
- Services associated with the delivery of information in electronic form, typically network-oriented services such as value-added networks, electronic mail and document interchange, on-line databases, on-line news and data feeds, video text, etc. (called *Network Services*).

In general, the market for information services does not involve providing equipment to users. The exception is the case in which the equipment is bundled as part of an overall service offering such as a turnkey system, a systems operations contract, or a systems integration project.

The information services market also excludes pure data transport services (e.g., data or voice communications circuits). However, where information transport is associated with a network-based service (e.g., EDI or VAN services), or cannot be feasibly separated from other bundled services (e.g., some systems operations contracts), the transport costs are included as part of the services market.

The analytical framework of the *Information Services Industry* consists of the following interacting factors: overall and industry-specific business environment (trends, events and issues); technology environment; user information system requirements; size and structure of information services markets; vendors and their products, services and revenues; distribution channels; and competitive issues.

All *Information Services* Market forecasts are estimates of User Expenditures for information services. When questions arise about the proper place to count these expenditures, INPUT addresses them from the user's viewpoint: expenditures are categorized according to what users perceive they are buying.

By focusing on user expenditures, INPUT avoids two problems that are related to the distribution channels for various categories of services:

- Double counting, which can occur by estimating total vendor revenues when there is significant reselling within the industry (e.g., software sales to turnkey vendors for repackaging and resale to users)
- Missed counting, which can occur when sales to users go through indirect channels such as mail order retailers.

Product/Service Markets are defined as specific products and services that satisfy a given user need. While Market Sectors specify who the buyer is, *Product/Service Markets* specify what the user is buying.

Of the eight delivery modes defined by INPUT, five are considered primary products or services:

- Processing Services
- Network Services
- Professional Services
- Applications Software Products
- Systems Software Products.

The remaining three delivery modes represent combinations of these products and services, bundled together with equipment, management and/or other services:

- Turnkey Systems
- Systems Operations
- Systems Integration.

Section B describes the delivery modes and their structure in more detail.

Outsourcing is defined as the contracting of IS functions to outside vendors. Outsourcing should be viewed as the opposite of insourcing: anything that IS management has considered feasible to do internally (e.g., data center operations, applications development and maintenance, network management, training, etc.) is a potential candidate for outsourcing.

IS has always bought systems software, as it is infeasible for companies to develop it internally. However, all other delivery modes represent functions or products that IS management could choose to perform or develop in-house. Viewed this way, outsourcing is the result of a make-or-buy decision, and the outsourcing market covers any product or service for which the vendor must compete against the client firm's own internal resources.

B
Industry Structure and Delivery Modes

1. Service Categories

Exhibit B-1 presents the structure of the information services industry. Several of the delivery modes can be grouped into higher-level Service Categories, based on the kind of problem the user needs to solve. These categories are:

- *Business Application Solutions (BAS)*—are prepackaged or standard solutions to common business applications. These applications can be either industry-specific (e.g., mortgage loan processing for a bank), cross-industry (e.g., payroll processing) or generic (e.g., utility time sharing). In general, BAS services involve minimal customization by the vendor and allow the user to handle a specific business application without having to develop or acquire a custom system or system resources. The following delivery modes are included under BAS:
  - ⇒ Processing Services
  - ⇒ Applications Software Products
  - ⇒ Turnkey Systems.
- *Systems Management Services (SMS)*—are services that assist users in developing systems or operating/managing the information systems function. Two key elements of SMS are the customization of the service to each individual user and/or project and the potential for the vendor to assume significant responsibility for management of at least a portion of the user's information systems function. The following delivery modes are included under SMS:
  - ⇒ Systems Operations
  - ⇒ Systems Integration.

Each of the remaining three delivery modes represents a separate service category:

- Professional Services
- Network Services
- Systems Software Products.

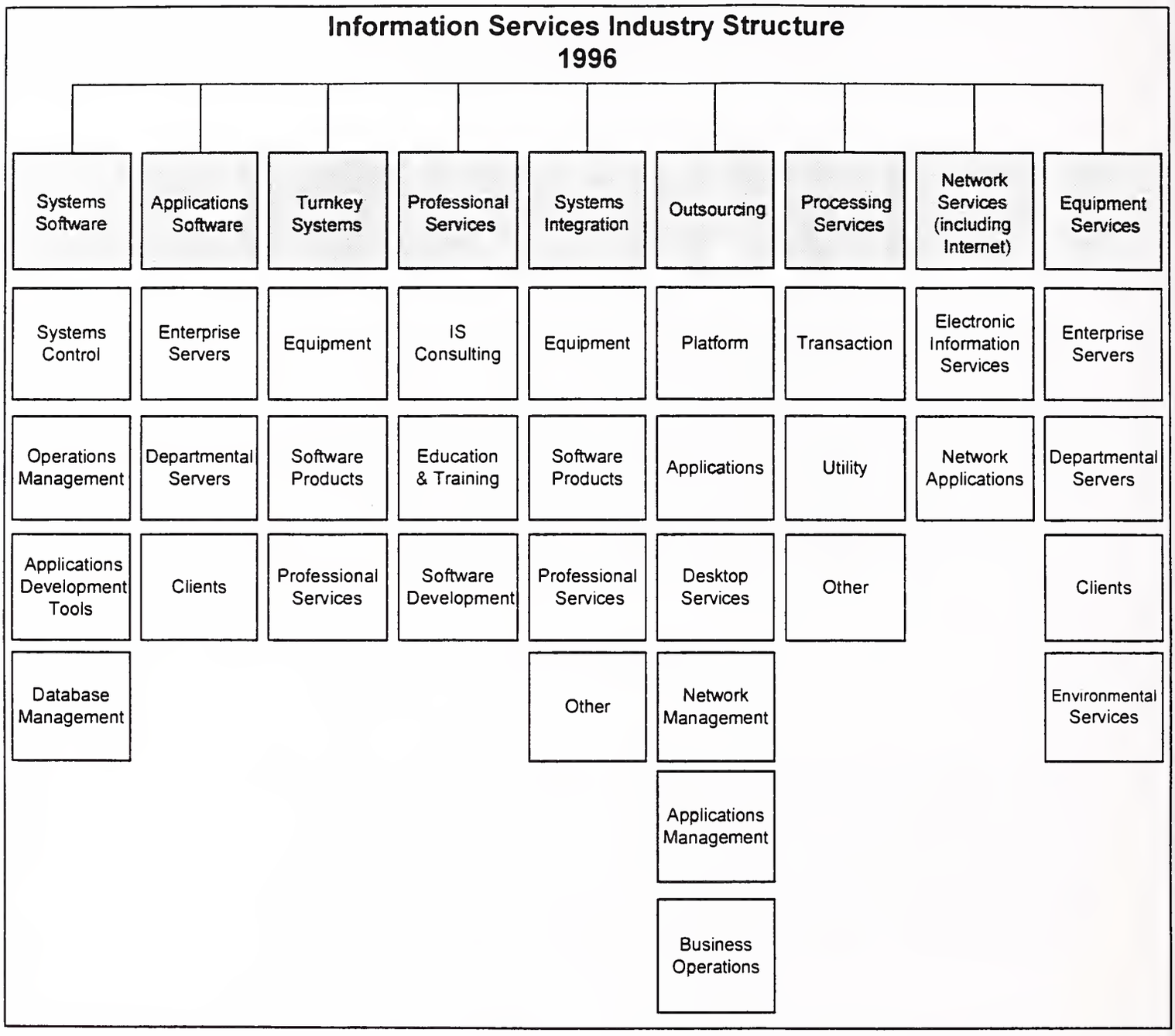
Note: These service categories are a new concept introduced in 1990. They are purely an aggregation of lower-level delivery mode data and do not change the underlying delivery modes or industry structure.

2. Software Products

There are many similarities between the applications and systems software delivery modes. Both involve user purchases of software packages for in-house computer systems. Included are both lease and purchase expenditures, as well as expenditures for work performed by the vendor to implement or maintain the package at the user's site. Vendor-provided training or support in operation and use of the package, if bundled in the software pricing, is also included here.

Expenditures for work performed by organizations other than the package vendor are counted in the category of professional services. Fees for work related to education, consulting, and/or custom modification of software products are counted as professional services, provided such fees are charged separately from the price of the software product itself.

Exhibit B-1



Source: INPUT

Software products have several subcategories, as indicated below and shown in Exhibit B-2.

3. Systems Software Products

Systems software products enable the computer/communications system to perform basic machine-oriented or user interface functions. These products include:

- *Systems Control Products* - Include software programs that function during application program execution to manage computer system resources and control the execution of the application program. These products include operating systems, emulators, network control, library control, windowing, access control and spoolers.

- *Operations Management Tools* - Include software programs used by operations personnel to manage the computer system and/or network resources and personnel more effectively. Included are performance measurement, job accounting, computer operation scheduling, disk management utilities and capacity management.

- *Applications Development Tools* - Include software programs used to prepare applications for execution by assisting in designing, programming, testing and related functions. Included also are traditional programming languages, 4GLs, data dictionaries, database management systems, report writers, project control systems, CASE systems and other development productivity aids. Also included are system utilities (e.g., sorts) that are directly invoked by an applications program.

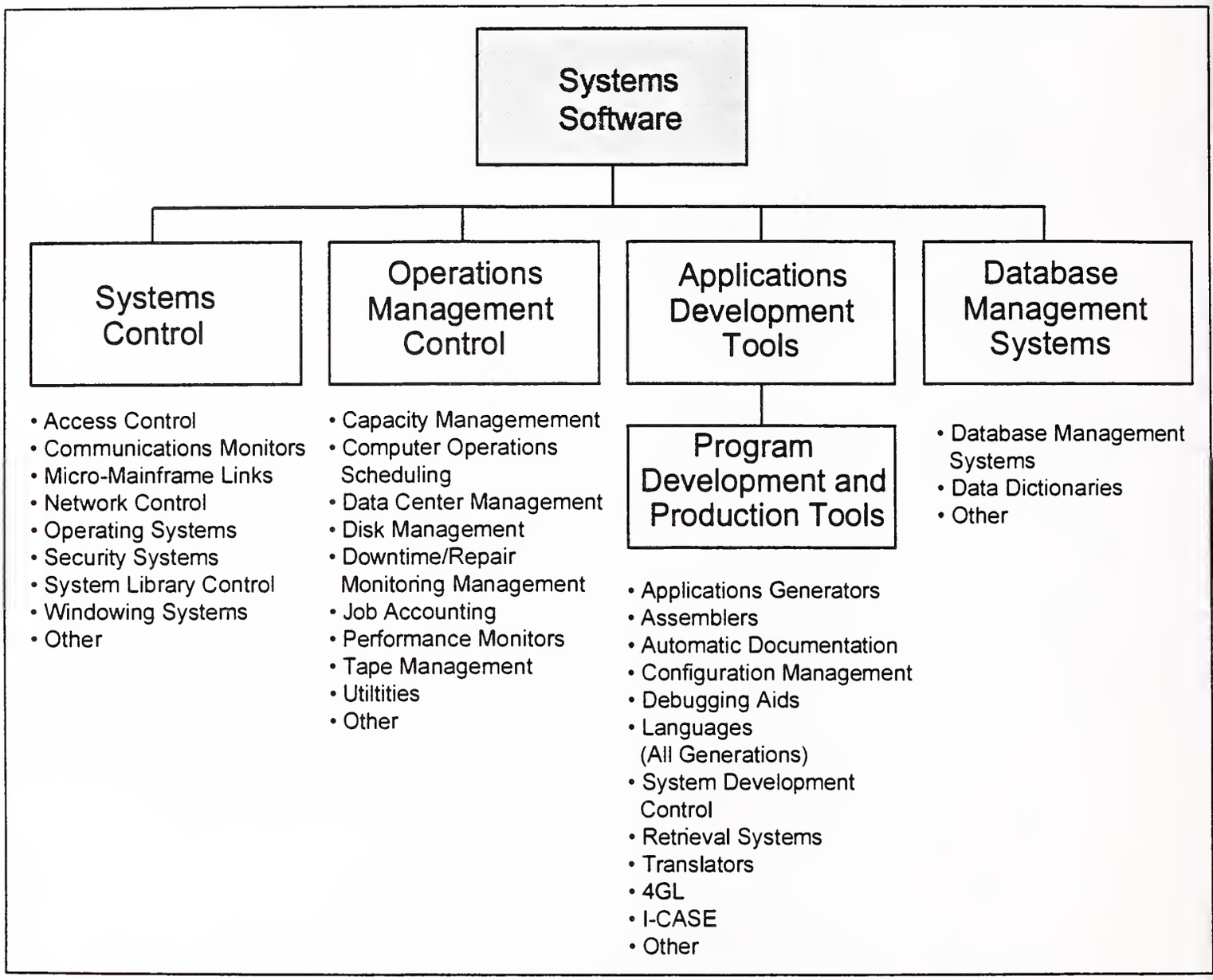
4. Applications Software Products

Industry-Specific Applications Software Products - Include software products that perform functions related to solving business or organizational needs unique to a specific vertical market and sold to that market only. Examples include demand deposit accounting, MRPII, medical record keeping, automobile dealer parts inventory, etc.

Cross-Industry Applications Software Products - Software products that perform a specific function that is applicable to a wide range of industry sectors. Applications include payroll and human resource systems, accounting systems, word processing and graphics systems, spreadsheets, etc.

Exhibit B-2

Systems Software Products Market Structure



Source: INPUT

5. Turnkey Systems

A turnkey system is an integration of equipment (CPU, peripherals, etc.), systems software, and packaged or custom application software into a single system developed to meet a specific set of user requirements. Value added by the turnkey system vendor is primarily in the software and support services provided. Most CAD/CAM systems and many small business systems are turnkey systems. Turnkey systems utilize standard computers and do not include specialized hardware such as word processors, cash registers, process control systems or embedded computer systems for military applications.

Hardware vendors that combine software with their own general-purpose hardware are not classified by INPUT as turnkey vendors. Their software revenues are included in the appropriate software category.

Most turnkey systems are sold through channels known as value-added resellers.

- *Value-Added Reseller* (VAR) - A VAR adds value to computer hardware and/or software and then resells it to an end user. The major value added is usually applications software for a vertical or cross-industry market, but also includes many of the other components of a turnkey systems solution, such as professional services.

Turnkey systems are divided into two categories:

Industry-Specific Systems - Include systems that serve a specific function for a given industry sector, such as automobile dealer parts inventory, medical record keeping or discrete manufacturing control systems.

Cross-Industry Systems - Include systems that provide a specific function that is applicable to a wide range of industry sectors, such as financial planning systems, payroll systems or personnel management systems.

6. Processing Services

This category includes transaction processing, utility processing and other processing services.

Transaction Processing - A client uses vendor-provided information systems including hardware, software and/or data networks at vendor site or customer site to process transactions and update client databases. Transactions may be entered in one of four modes:

- *Interactive* - Characterized by the interaction of the users with the system for data entry, transaction processing, problem solving and

report preparation: the user is on-line to the programs/files stored on the vendor's system.

- *Remote Batch* - When the user transmits batches of transaction data to the vendor's system, the vendor is allowed to schedule job execution according to overall client priorities and resource requirements.

- *Distributed Services* - Users maintain portions of an application database and enter or process some transaction data at their own site, while also being connected through communications networks to the vendor's central systems for processing other parts of the application.

- *Carry-in Batch* - Users physically deliver work to a processing services vendor.

- *Utility Processing* - Vendor provides basic software tools (language compilers, assemblers, DBMSs, graphics packages, mathematical models, scientific library routines, etc.), generic applications programs and/or databases, enabling clients to develop their own programs or process data on vendor's system.

- *Other Processing Services* - Vendor provides services, usually at vendor site, such as scanning and other data entry services, laser printing, computer output microfilm (COM), CD preparation and other data output services, backup and disaster recovery, etc.

7. Systems Operations

Systems operations involves the operation and management of all or a significant part of the user's information systems functions under a long-term contract. These services can be provided in either of two distinct submarkets:

- *Professional Services* - The vendor provides personnel to operate client-supplied equipment. Prior to 1990, this was a submode of the Professional Services product/service market.

- *Processing Services* - The vendor provides personnel, equipment and (optionally) facilities. Prior to 1990, this was a submode of the Processing Services product/service market.

Systems operations vendors now provide a wide variety of services in support of existing information systems. The vendor can plan, control, provide, operate, maintain and manage any or all components of the user's information systems (equipment, networks, systems and/or application software), either at the client's site or the vendor's site.

Systems operations can also be referred to as "resource management" or "facilities management."

There are two general levels of systems operations:

- *Platform/network operations* - The vendor operates the computer system and/or network without taking responsibility for the applications.
- *Application operations* - The vendor takes responsibility for the complete system, including equipment, associated telecommunications networks and applications software.

Note: Systems Operations was introduced as a delivery mode in 1990.

8. Systems Integration (SI)

Systems integration is a business offering that provides a complete solution to an information system, networking or automation requirements through the custom selection and implementation of a variety of information system products and services. A systems integrator is responsible for the overall management of a systems integration contract and is the single point of contact and responsibility to the buyer for the delivery of the specified system function, on schedule and at the contracted price.

To be included in the information services market, systems integration projects must involve some application processing component. In addition, the majority of cost must be associated with information systems products and/or services.

The systems integrator will perform, or manage others who perform, most or all of the following functions:

- Program management, including subcontractor management
- Needs analysis
- Specification development
- Conceptual and detailed systems design and architecture
- System component selection, modification, integration and customization
- Custom hardware and software design and development

- Systems implementation, including testing, conversion and post-implementation evaluation and tuning
- Life cycle support, including:
  - ⇒ System documentation and user training
  - ⇒ Systems operations during development
  - ⇒ Systems maintenance
  - ⇒ Financing.

9. Professional Services

This category includes consulting, education and training, and software development:

- *Consulting* - These services include management consulting (related to information systems), information systems consulting, feasibility analysis and cost-effectiveness studies, and project management assistance. Services may be related to any aspect of information systems, including equipment, software, networks and systems operations.
- *Education and Training* - Products and services related to information systems and services for the professional end user, including computer-aided instruction, computer-based education and vendor instruction of user personnel in operations, design, programming and documentation.
- *Software Development* - Services include user requirements definition, systems design, contract programming, documentation and implementation of software performed on a custom basis. Conversion and maintenance services are also included.

10. Network Services

Network services typically include a wide variety of network-based functions and operations. Their common thread is that most of these functions could not be performed without network involvement. Network services is divided into two major segments: Electronic Information Services, which involve selling information to the user, and Network Applications, which involve providing some form of enhanced transport service in support of a user's information processing needs.

11. Electronic Information Services

Electronic information services are databases that provide specific information via terminal- or computer-based inquiry, including items such as stock prices, legal precedents, economic indicators, periodical literature, medical diagnoses, airline schedules, automobile valuations, etc. The terminals used may be computers themselves, such as communications servers or personal computers. Users typically inquire into and extract information from the databases. Although users may load extracted data into their own computer systems, the electronic information vendor provides no data processing or manipulation capability and the users cannot update the vendor's databases.

The two kinds of electronic information services are:

- *On-line Databases* - These are structured, primarily numerical data on economic and demographic trends, financial instruments, companies, products, materials, etc.

- *News Services* - Includes unstructured, primarily textual information on people, companies, events, etc.

While electronic information services have traditionally been delivered via networks, there is a growing trend toward the use of CD ROM optical disks to support or supplant on-line services, and these optical disk-based systems are included in the definition of this delivery mode.

12. Network Applications

Value-Added Network Services (VAN Services) - VAN services are enhanced transport services that involve adding such functions as automatic error detection and correction, protocol conversion and store-and-forward message switching to the provision of basic network circuits.

Originally, VAN services were provided solely by specialized VAN carriers (Tymnet, Telenet, etc.). Today these services are also offered by traditional common carriers (AT&T, Sprint, etc.). Meanwhile, the VAN carriers have also branched into the traditional common carriers' markets and are offering unenhanced basic network circuits as well.

INPUT's market definition covers VAN services only, but includes the VAN revenues of all types of carriers.

- *Electronic Data Interchange* (EDI) - Includes application-to-application exchange of standardized business documents between trade partners or facilitators. This exchange is commonly performed using VAN services. Specialized translation software is typically employed to convert data from organizations' internal file formats to EDI

interchange standards; this software may be provided as part of the VAN service or may be resident on the organization's own computers.

- *Electronic Information Exchange* (EIE) - Also known as Electronic Mail (E-Mail), EIE involves the transmission of messages across an electronic network managed by a services vendor, including facsimile transmission (FAX), voice mail, voice messaging, and access to Telex, TWX and other messaging services. This also includes bulletin board services.

- *Other Network Services* - This segment contains video text and pure network management services. Video text is actually more a delivery mode than an application. Its prime focus is on the individual as a consumer or in business. These services provide interactive access to databases and offer the inquirer the capability to send as well as receive information for such purposes as home shopping, home banking, travel reservations, etc.

Network management services included here must involve the vendor's network and network management systems as well as people. People-only services, or services that involve the management of networks as part of the broader task of managing a user's information processing functions are included in Systems Operations.

C
Hardware/Hardware Systems

- *Hardware* - Includes all computer and telecommunications equipment that can be separately acquired with or without installation by the vendor and not acquired as part of an integrated system.

- *Peripherals* - Includes all input, output, communications and storage devices (other than main memory) that can be connected locally to the main processor, and generally cannot be included in other categories such as terminals.

- *Input Devices* - Includes keyboards, numeric pads, card readers, light pens and track balls, tape readers, position and motion sensors, and analog-to-digital converters.

- *Output Devices* - Includes printers, CRTs, projection television screens, micrographics processors, digital graphics and plotters.

- *Communication Devices* - Includes modem, encryption equipment, special interfaces and error control.

- *Storage Devices* - Includes magnetic tape (reel, cartridge and cassette), floppy and hard disks, solid state (integrated circuits), and bubble and optical memories.

- *Terminals* - Three types of terminals are described below:

A. *User Programmable* - Also called intelligent terminals, including the following:

⇒ Single-station or standalone

⇒ Multistation, shared processor

⇒ Teleprinter

⇒ Remote batch.

B. User Nonprogrammable

⇒ Single-station

⇒ Multistation, shared processor

⇒ Teleprinter.

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

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

- *Microcomputer* - Combines all of the CPU, memory, and peripheral functions of an 8-, 16-, or 32-bit computer on a chip in various forms including:

⇒ Integrated circuit package

⇒ Plug-in boards with increased memory and peripheral circuits

⇒ Console including keyboard and interfacing connectors

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

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

- *Workstations* - Include high-performance, desktop, single-user computers employing (mostly) Reduced Instruction Set Computing (RISC). Workstations provide integrated, high-speed, local network-based services such as database access, file storage and back-up, remote communications and peripheral support. Typical workstation products are provided by Apollo (now a unit of Hewlett-Packard), Sun, Altos, DEC (the MicroVAX) and IBM. These products usually cost more than $15,000. However, at this writing many companies have recently announced sizable price cuts.

- *Midsize Systems* - Describe superminicomputers and the more traditional business minicomputers. Because of steadily improving design and technology, the latter have outgrown traditional definitions (which defined small systems as providing 32-bit to 64-bit word lengths at prices ranging from $15,000 to $350,000). Increasingly, minicomputers and workstations meet the 32-bit definition, and may 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.

- *Large Computer* - Is presently centered on storage controllers, but likely to become bus-oriented and to consist of multiple processors or parallel processor. Intended for structured mathematical and signal processing and typically used with general-purpose, Von Neumann-type processors for system control. This term usually refers to traditional mainframes and supercomputers.

- *Supercomputer* - Includes high-powered processors with numerical processing throughput that is significantly greater than the fastest general-purpose computers, with capacities in the 100-500 million floating point operations per second (MFLOPS) range. Newer supercomputers, with burst modes over 500 MFLOPS, main storage size up to 10 million words and on-line storage in the one-to-four gigabyte class, are labeled Class V to Class VII in agency long-range plans. Supercomputers fit in one of two categories:

  ⇒ *Real Time* - Generally used for signal processing in military applications

  ⇒ *Non-Real Time* - For scientific use in one of three configurations:

  ⇒ Parallel processors

  ⇒ Pipeline processor

  ⇒ Vector processor.

- *Supercomputer* - Is also applied to micro, mini and large mainframe computers with performance substantially higher than that attainable by Von Neumann architecture.

- *Embedded Computer* - Is a dedicated computer system designed and implemented as an integral part of a weapon, weapon system or platform; critical to a military or intelligence mission such as command and control, cryptological activities or intelligence activities. Characterized by military specifications (MIL SPEC) appearance and operation, limited but reprogrammable applications software, and permanent or semipermanent interfaces. These systems may vary in capacity from microcomputers to parallel processor computer systems.

D
General Definitions

ASCII - (American National Standard Code for Information Interchange) Eight-bit code with seven data bits and one parity bit

Asynchronous - Communications operation (such as transmission) without continuous timing signals; synchronization is accomplished by appending signal elements to the data

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

Central Processing Unit (CPU) - The arithmetic and control portion of a computer; i.e., the circuits controlling the interpretation and execution of computer instructions

Circuit Switching - Connects two or more network stations and permits exclusive circuit use until the connection is released; typical of the voice telephone network, where a circuit is established between the caller and the called party

Constant Dollars - Growth forecasts in constant dollars make no allowance for inflation or recession; dollar value is based on the year of the forecast unless otherwise indicated

Computer System - Combination of computing resources required to perform the designed functions; may include one or more CPUs, machine room peripherals, storage systems and/or applications software

CPE - (Customer Premises Equipment) DCE or DTE located at a customer site rather than at a carrier site such as the local telephone company; may include switchboards, PBX, data terminals and telephone answering devices

Current Dollars - Estimates or values expressed in current-year dollars that, for forecasts, would include an allowance for inflation

Dedicated Circuit - A permanently established network connection between two or more stations; contrast with switched circuit

Distributed Data Processing - The development of programmable intelligence in order to perform a data processing function in which it can be accomplished most effectively through computers and terminals arranged in a telecommunications network adapted to the user's needs

DTE - Data Terminal Equipment - Hardware that is a data source, link or both, such as video display terminals, that converts user information into data transmission, and reconverts data signals into user information

EFT - Electronic Funds Transfer

Encryption - Electric, code-based conversion of transmitted data to provide security and/or privacy of data between authorized access points

General-Purpose Computer System - A computer designed to handle a wide variety of problems, including machine room peripherals, systems software and small business systems

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

Independent Suppliers - Suppliers of machine room peripherals, though usually not suppliers of general-purpose computer systems

Information Processing - Data processing as a whole, including use of business or scientific computers

Installed Base - Cumulative number or value (cost when new) of computers in use

ISDN - (Integrated Services Digital Network) Completely digital, integrated voice and nonvoice public network service; not clearly defined through any existing standards, although FCC and other federal agencies are developing CCITT recommendations

Leased Line - Permanent connection between two network stations; also known as dedicated or nonswitched line

Mainframe - The central processing unit (CPU or units in a parallel processor) of a computer that interprets and executes computer (software) instructions of 32 bits or more

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

Node - Connection point of three or more independent transmission points that may provide switching or data collection

Off-Line - Pertaining to equipment or devices that can function without direct control of the central processing unit

On-Line - Pertaining to equipment or devices under direct control of the central processing unit

Optical Disk - Storage device that uses laser technology to record data; optical disks provide high storage capacity, but cannot be overwritten

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

OSI Application Layer 7, providing end-user applications services for data processing

OSI Data Link Layer 2, providing transmission protocols, including frame management, link flow control and link initiation/release

OSI Network 3, providing call establishment and clearing control through the network nodes

OSI Physical Layer 1, providing the mechanical, electrical, functional and procedural characteristics to establish, maintain and release physical connections to the network

OSI Presentation Layer 6, providing data formats and information such as data translation, data encoding/decoding and command translation

OSI Session Layer 5, establishes, maintains, and terminates logical connections for the transfer of data between processes

OSI Transport Layer 4, providing end-to-end terminal control signals such as acknowledgments

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

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

Scientific Computer System - A computer system designed to process structured mathematics (such as Fast Fourier Transforms), and complex, highly redundant information (such as seismic data, sonar data and radar), with large, on-line memories and very high-capacity output

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

Software - Computer programs

Supplies - Includes materials associated with the use of operations of computer systems, such as printer paper, keypunch card, disk packs, and tapes

Synchronous - Communications operation with separate, continuous clocking at both sending and receiving stations

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

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

User (or End User) - One who is using a product or service to accomplish his or her own functions; the user may buy a system from the hardware supplier(s) and do his or her own programming, interfacing and installation; alternately, the user may buy a turnkey system from a systems house or hardware integrator, or may buy a service from an in-house department or external vendor

Verification and Validation - Process for examining and testing applications and special systems software to verify that it operates on the target CPU and performs all of the functions specified by the user

E
Other Considerations

When questions arise as to the proper place to count certain user expenditures, INPUT addresses the questions from the user viewpoint. Expenditures are then categorized according to the user's perception of the purchase.

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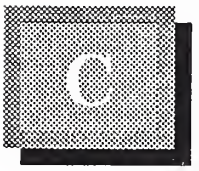


Glossary of Federal Acronyms

The federal government's procurement language uses a combination of abbreviations, 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.

Abbreviations 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 abbreviations have been included to the extent they are employed in this report.

A

Federal Agency Acronyms

8(a) Set-Aside	Agency awards direct to Small Business Administration for direct placement with a small, socially/economically disadvantaged company
AAS	Automatic Addressing System
AATMS	Advanced Air Traffic Management System
ACS	Advanced Communications Satellite (formerly NASA 30/20 GHz Satellite Program)
ACT-1	Advanced Computer Techniques (Air Force)
ACWP	Actual Cost of Work Performed
Ada	DoD high-order language

ADA	Airborne Data Acquisition
ADL	Authorized Data List
ADNET	Anti-Drug Network
ADS	Automatic Digital Switches (DCS)
AFA	Air Force Association
AFCEA	Armed Forces Communications Electronics Association
AGE	Aerospace Ground Equipment
AIP	Array Information Processing
AIPC	Automated Information Processing Center
AIS	Automated Information System
AMD	Acquisition Management Directorate
AMPE	Automated Message Processing Equipment
AMPS	Automated Message Processing System
AMSDL	Acquisition Management Systems Data List
AP(P)	Advance Procurement Plan
Appropriation	Congressionally approved funding for authorized programs and activities of the Executive Branch
APR	Agency Procurement Request
ARB	Acquisition Review Board
ARPA	Advanced Research Projects Agency
ARPANET	ARPA network of scientific computers
ASP	Aggregated Switch Procurement
ASR	Acquisition Strategy Report
ATLAS	Abbreviated Test Language for All Systems (for ATE Automated Test Equipment)

Authorization	In the legislative process programs, staffing and other routine activities must be approved by Oversight Committees before the Appropriations Committee will approve the money from the budget
AUSA	Association of the U.S. Army
BA	Basic Agreement or Budget Authority
BAFO	Best And Final Offer
Base level	Procurement, purchasing, and contracting at the military installation level
BCA	Board of Contract Appeals
BCE	Baseline Cost Estimate
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 of 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	Blanket Purchase Agreement
Budget	Federal Budget, proposed by the President and subject to Congressional review
BY	Budget Year or Base Year
C2	Command and Control
C3	Command, Control and Communications
C4	Command, Control, Communications and Computers
C3I	Command, Control, Communications and Intelligence
CAB	Contract Adjustment Board or Contract Appeals Board

CADE	Computer-Aided Design and Engineering
CADS	Computer-Assisted Display Systems
CAIS	Computer-Assisted Instruction System
CALS	Continuous Acquisition and Life-cycle Support (formerly Computer-Aided Acquisition and Logistics Support)
CAPS	Command Automation Procurement Systems
CAS	Contract Administration Services or Cost Accounting Standards
CASB	Cost Accounting Standards Board
CASP	Computer-Assisted Search Planning
CBD	(Commerce Business Daily) U.S. Department of Commerce publication listing government contract opportunities and awards
CBO	Congressional Budget Office
CCEP	Commercial Comsec Endorsement Program
CCDR	Contractor Cost Data Reporting
CCN	Contract Change Notice or Configuration Change Notice
CCPDS	Command Center Processing and Display Systems
CCPO	Central Civilian Personnel Office
CDA	Central Design Activity
CDR	Critical Design Review
CDRL	Contractor Data Requirement List
CFE	Contractor-Furnished Equipment
CFM	Contractor Furnished Material
CFR	Code of Federal Regulations
CIA	Central Intelligence Agency
CICA	Competition in Contracting Act (1984)

CIG	Computerized Interactive Graphics
CIM	Corporate Information Management or Center for Information Management
CINCs	Commanders-in-Chief
CIR	Cost Information Reports
CM	Configuration Management
CMI	Computer-Managed Instruction
CNI	Communications, Navigation and Identification
CO	Contracting Office, Contract Offices, Contracting Officer or Change Order
COC	Certificate of Competency (administered by the Small Business Administration) or Certificate of Compliance
COCO	Contractor-Owned, Contractor-Operated
CODSIA	Council of Defense and Space Industry Associations
COMSAT	Communications Satellite Corporation
CONUS	Continental United States
COP	Capability Objective Package
COSMIC	Computer Software Management Information Center (NASA)
COTR	Contracting Officer's Technical Representative
COTS	Commercial Off-The-Shelf (Commodities)
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)

CSIF	Communications Services Industrial Fund
C/SCSC	Cost/Schedule Control System Criteria (also called "C-Spec")
CWAS	Contractor Weighted Average Share in Cost Risk
CWBS	Contract Work Breakdown Structure
DAB	Defense Acquisition Board
DABBS	Defense Acquisition Bulletin Board System
DAC	Defense Acquisition Circular
DAL	Data Accession List
DAR	Defense Acquisition Regulations
DARC	Defense Acquisition Regulatory Council
DAS	Data Acquisition System
DBHS	Data Base Handling System
DBOF	Defense Business Operating Fund
DCAA	Defense Contract Audit Agency
DCAS	Defense Contract Administration Services
DCASR	DCAS Region
DCC	Digital Control Computer
DCS	Defense Communications System
DDA	Dynamic Demand Assessment (Delta Modulation)
DDC	Defense Documentation Center
DDL	Digital Data Link - A segment of a communications network used for data transmission in digital form
DDS	Defense Distribution System
DECCO	Defense Commercial Communications Office
DECEO	Defense Communications Engineering Office

D&F	Determination and Findings - required documentation for approval of a negotiated procurement
DFARS	DoD FAR Supplement
DFAS	Defense Finance and Accounting Service
DIA	Defense Intelligence Agency
DISA	Defense Information Systems Agency (Formerly DCA)
DHHS	Department of Health and Human Services
DIDS	Defense Integrated Data Systems
DISC	Defense Industrial Supply Center
DITSO	Defense Information Technology Systems Office
DLA	Defense Logistics Agency
DMA	Defense Mapping Agency
DMR	Defense Management Review
DMRD	Defense Management Review Decision
DNA	Defense Nuclear Agency
DO	Delivery Order
DOC	Department of Commerce
DoD	Department of Defense
DoDD	Department of Defense Directive
DOE	Department of Energy
DOI	Department of Interior
DOJ	Department of Justice
DOS	Department of State
DOT	Department of Transportation
DNA	Defense Nuclear Agency

DPA	Delegation of Procurement Authority (granted by GSA under FPRs)
DPC	Defense Procurement Circular
DPF	Defense Processing Facility
DQ	Definite Quantity Contract
DQ/PL	Definite Quantity/Price List Contract
DR	Deficiency Report
DRFP	Draft Request For Proposal
DSCS	Defense Satellite Communication System
DSN	Defense Switched Network
DSP	Defense Support Program (WWMCCS)
DSS	Defense Supply Service
DTC	Design-To-Cost
DTIC	Defense Technical Information Center
DTN	Defense Transmission Network
DVA	Department of Veterans Affairs
ECP	Engineering Change Proposal
ED	Department of Education
EEO	Equal Employment Opportunity
EMC	Electro-Magnetic Compatibility
EMCS	Energy Monitoring and Control System
EO	Executive Order issued by the President
EOQ	Economic Ordering Quantity
EPA	Economic Price Adjustment or Environmental Protection Agency
EPMR	Estimated Peak Monthly Requirement

EPS	Emergency Procurement Service (GSA) or Emergency Power System
ETR	Estimated Time to Repair
ESTSC	Energy Science and Technology Software Center (DOE)
FA	Formal Advertising
FAC	Federal Acquisition Circular
FAR	Federal Acquisition Regulations
FCA	Functional Configuration Audit
FCC	Federal Communications Commission
FCDC	Federal Contract Data Center
FCPC	Federal Computer Products Center
FCRC	Federal Contract Research Center
FDR	Formal Design Review
FEDSIM	Federal (Computer) Simulation Center (GSA)
FEMA	Federal Emergency Management Agency
FFP	Firm Fixed-Price Contract (also Lump Sum Contract)
FFRDC	Federally Funded Research & Development Center
FIPR	Federal Information Processing Resource
FIPS	Federal Information Processing Standard
FIPS PUBS	FIPS Publications
FIRMR	Federal Information Resource Management Regulations
FMS	Foreign Military Sales
FOC	Full Operating Capability
FOIA	Freedom of Information Act
FP	Fixed-Price Contract

FPAF	Fixed-Price Award Fee
FPIF	Fixed-Price Incentive Fee
FP-L/H	Fixed-Price Labor/Hour Contract
FP-LOE	Fixed-Price Level-Of-Effort Contract
FDPC	Federal Data Processing Center
FPMR	Federal Property Management Regulations
FPR	Federal Procurement Regulations
FSC	Federal Supply Classification
FSG	Federal Supply Group
FSN	Federal Stock Number
FSS	Federal Supply Schedule or Federal Supply Service (GSA)
FSTS	Federal Secure Telecommunications System
FT Fund	A revolving fund, designated as the Federal Telecommunications Fund, used by GSA to pay for GSA-provided common-user services, specifically including the current FTS and proposed FTS2000 services
FTSP	Federal Telecommunications Standards Program administered by NCS; Standards are published by GSA
FTS	Federal Telecommunications System, especially FTS2000
FY	Fiscal Year
FYDP	Five-Year Defense Plan
G&A	General and Administrative (Expense)
GAO	General Accounting Office
GFE	Government-Furnished Equipment
GFM	Government-Furnished Material
GFY	Government Fiscal Year (October to September)
GIDEP	Government-Industry Data Exchange Program

GOCO	Government Owned, Contractor Operated
GOGO	Government Owned, Government Operated
GOSIP	Government Open Systems Interconnection Profile
GPO	Government Printing Office
GPS	Global Positioning System
GRH	Gramm-Rudman-Hollings Act (1985), also called Gramm-Rudman Deficit Control
GSA	General Services Administration
GSBCA	General Services Administration Board of Contract Appeals
HAC	House Appropriations Committee
HASC	House Armed Services Committee
HCFA	Health Care Financing Administration
HHS	(Department of) Health and Human Services
HOL	Higher Order Language
HSDP	High-Speed Data Processors
HUD	(Department of) Housing and Urban Development
I-CASE	Integrated Computer-Aided Software Engineering
ICA	Independent Cost Analysis
ICAM	Integrated Computer-Aided Manufacturing
ICE	Independent Cost Estimate
ICP	Inventory Control Point
ICST	Institute for Computer Sciences and Technology, National Institute of Standards and Technology, Department of Commerce
IDA	Institute for Defense Analysis
IDAMS	Image Display And Manipulation System
IDEP	Interservice Data Exchange Program

IDIQ	Indefinite Delivery, Indefinite Quantity
IDN	Integrated Data Network
IFB	Invitation For Bids
IOC	Initial Operating Capability
IOI	Internal Operating Instructions
IPS	Integrated Procurement System
IQ	Indefinite Quantity Contract
IR&D	Independent Research & Development
IRM	Information Resources Management
IXS	Information Exchange System
IV&V	Independent Verification & Validation
JCS	Joint Chiefs of Staff
JCALS	Joint Computer-Aided Acquisition and Logistics Support
JFMIP	Joint Financial Management Improvement Program
JPO	Joint Program Office
JSIPS	Joint Systems Integration Planning Staff
JSOP	Joint Strategic Objectives Plan
JSOR	Joint Service Operational Requirement
JUMPS	Joint Uniform Military Pay System
JWAM	Joint WWMCCS ADP Modernization (Program)
LC	Letter Contract
LCC	Life Cycle Cost
LCMP	Life Cycle Management Procedures (DD7920.1)
LCMS	Life Cycle Management System
L-H	Labor-Hour Contract

LOI	Letter of Intent; Letter of Instruction
LRPE	Long-Range Procurement Estimate
LRIRP	Long-Range Information Resource Plan
LTD	Live Test Demonstration
LSI	Large-Scale Integration
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
MDA	Multiplexed Data Accumulator
MENS	Mission Element Need Statement or Mission Essential Need Statement (see DD-5000.1 Major Systems Acquisition)
MILSCAP	Military Standard Contract Administration Procedures
MIL SPEC	Military Specification
MIL STD	Military Standard
MIPR	Military Interdepartmental Purchase Request
MLS	Multilevel Security
MNF	Multi-National Force
MOD	Modification
MOL	Maximum Ordering Limit (Federal Supply Service)
MPC	Military Procurement Code
MTBF	Mean-Time-Between-Failures
MTTR	Mean-Time-To-Repair
MYP	Multi-Year Procurement

NARDIC	Navy Research and Development Information Center
NASA	National Aeronautics and Space Administration
NCA	National Command Authorities
NCMA	National Contract Management Association
NCS	National Communications System (evolving to DISN)
NDI	Non-Development Item
NICRAD	Navy-Industry Cooperative Research and Development
NIP	Notice of Intent to Purchase
NIST	National Institute of Science and Technology (was NBS)
NMCS	National Military Command System
NSA	National Security Agency
NSEP	National Security and Emergency Preparedness
NSF	National Science Foundation
NSIA	National Security Industrial Association
NTIA	National Telecommunications and Information Administration, Department of Commerce
NTIS	National Technical Information Service
Obligation	"Earmarking" of specific funding for a contract from committed agency funds
OA	Obligational Authority
OCS	Office of Contract Settlement
OFCC	Office of Federal Contract Compliance
Off-Site	Services to be provided near but not in government facilities
FMP	Office of Federal Management Policy (GSA)
OFPP	Office of Federal Procurement Policy
OIRM	Office of Information Resources Management

O&M	Operations & Maintenance
OMB	Office of Management and Budget
O,M&R	Operations, Maintenance and Readiness
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
OSADBU	Office of Small and Disadvantaged Businesses
OSHA	Occupational Safety and Health Act
OSI	Open System Interconnect
OSP	Offshore Procurement
OTA	Office of Technology Assessment (Congress)
Outyear	Proposed funding for fiscal years beyond the budget year (next fiscal year)
P-1	FY Defense Production Budget
P3I	Pre-Planned Product Improvement (program in DoD)
PAR	Procurement Authorization Request or Procurement Action Report
PAS	Pre-Award Survey
PASS	Procurement Automated Source System
PCO	Procurement Contracting Officer
PDA	Principal Development Agency
PDM	Program Decision Memorandum
PDR	Preliminary Design Review
PIR	Procurement Information Reporting
PME	Performance Monitoring Equipment

PMP	Purchase Management Plan
PO	Purchase Order or Program Office
POE	Panel Of Experts
POM	Program Objective Memorandum
POSIX	Portable Open System Interconnection Exchange
POTS	Purchase of Telephone Systems
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
QBL	Qualified Bidders List
QMCS	Quality Monitoring and Control System (DoD software)
QMR	Qualitative Material Requirement (Army)
QPL	Qualified Products List
QRC	Quick Reaction Capability
QRI	Quick Reaction Inquiry
R-1	FY Defense RDT&E Budget
RAM	Reliability, Availability and Maintainability or Random Access Memory
RC	Requirements Contract
R&D	Research and Development
RDA	Research, Development and Acquisition
RDD	Required Delivery Date

RD&E	Research, Development and Engineering
RDF	Rapid Deployment Force
RDT&E	Research, Development, Test and Engineering
RFB	Request For Bid
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
RSI	Rationalization, Standardization and Interoperability
RTAS	Real-Time Analysis System
RTDS	Real-Time Display System
SA	Supplemental Agreement
SAC	Senate Appropriations Committee
SADBU	Small and Disadvantaged Business Utilization
SAR	Selected Acquisition Report
SASC	Senate Armed Services Committee
SBA	Small Business Administration
SB Set-Aside	Small Business Set-Aside contract opportunities with bidders limited to certified small businesses
SCA	Service Contract Act (1964 as amended)
SCN	Specification Change Notice
SDB	Small/Disadvantaged Business
SDI	Strategic Defense Initiative

SDIO	Strategic Defense Initiative Office
SDN	Secure Data Network
SDR	System Design Review
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
SIC	Standard Industrial Classification
SIMP	Systems Integration Master Plan
SIOP	Single Integrated Operations 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) or Social Security Administration
SSAC	Source Selection Advisory Council
SSEB	Source Selection Evaluation Board
SSO	Source Selection Official (NASA)
STINFO	Scientific and Technical Information Program Air Force/NASA
STU	Secure Telephone Unit
SWO	Stop-Work Order
Synopsis	Brief description of contract opportunity in CBD after D&F and before release of solicitation

TA/AS	Technical Assistance/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)
TOD	Technical Objective Document
TQM	Total Quality Management
TR	Temporary Regulation (added to FPR, FAR)
TRACE	Total Risk Assessing Cost Estimate
TRCO	Technical Representative of the Contracting Offices
TREAS	Department of Treasury
TRM	Technical Reference Model
TRP	Technical Resources Plan
TVA	Tennessee Valley Authority
UCAS	Uniform Cost Accounting System
UPS	Uniform Procurement System
USA	U.S. Army
USAF	U.S. Air Force
USC	United States Code
USCG	U.S. Coast Guard
USMC	U.S. Marine Corps
USN	U.S. Navy

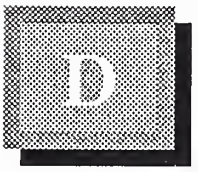
USPS	United States Postal Service
USRRB	United States Railroad Retirement Board
VA	Veterans Affairs Department
VE	Value Engineering
VHSIC	Very High-Speed Integrated Circuits
VIABLE	Vertical Installation Automation Baseline (Army)
VICI	Voice Input Code Identifier
VTC	Video Teleconferencing
WAM	WWMCCS ADP Modernization Program
WBS	Work Breakdown Structure
WGM	Weighted Guidelines Method
WIN	WWMCCS Intercomputer Network
WITS	Washington Interagency Telecommunications System
WIS	WWMCCS Information Systems
WPI	Wholesale Price Index
WS	Work Statement Offerer's description of the work to be done (proposal or contract)
WWMCCS	WorldWide Military Command and Control System

B
General and Industry Acronyms

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

CASE	Computer-Aided Software Engineering
CBEMA	Computer and Business Equipment Manufacturers Association
CCIA	Computers and Communications Industry Association
CCITT	Comite Consultatif Internationale de Télégraphique et Téléphonique; Committee of the International Telecommunication Union
COBOL	Common Business-Oriented Language
COS	Corporation for Open Systems
CPU	Central Processor Unit
DMBS	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 Organization for Standardization; voluntary international standards organization and member of CCITT
ITAA	Information Technology Association of America (Formerly ADAPSO)
ITU	International Telecommunication Unio
LSI	Large-Scale Integration
MFJ	Modified Final Judgment
RBOC	Regional Bell Operating Company
UNIX	Proprietary Operating System developed by AT&T; and now owned by UNIX Systems Laboratory, Novell, Inc.
UPS	Uninterruptable Power Source
VAR	Value-Added Reseller

VLSI	Very Large-Scale Integration
WORM	Write-Once-Read-Many times



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-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.

C
DoD Directives

DD-5000.1	Major System Acquisitions
DD-5000.2	Major System Acquisition Process
DD-5000.11	DoD Data Administration (C3I)
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-7920.2	Major Automated Information Systems Approval Process
DD-7935	Automated Data Systems (ADS) Documentation
DoDD 3405.1	Computer Programming Language Policy
DoDD 5000.11	DoD Data Administration (C3I)
DoDI 5000.12	Data Elements and Data Codes Standardization Procedure
DoDI 5000.18	Implementation of Standard Data Elements and Related Features
DoDD 5105.19	Defense Information Systems Agency
DoDD 5110.4	Washington Headquarters Services
DoDD 5118.3	Comptroller of the Department of Defense
DoDD 5137.1	Assistant Secretary of Defense (Command, Control, Communications and Intelligence)
DoDD 7740.1	DoD Information Resources Management Program

DoD 7740.1-G	DoD ADP Internal Control Guideline
DoDD 7740.2	Automated Information System (AIS) Strategic Planning
DoDI 7740.3	Information Resources Management (IRM) Review Program
DoDD 7750.5	Management and Control of Information Requirements
DoDI 7750.7	DoD Forms Management Program
DoDI 7920.2-M	Automated Information Systems (AIS) Life-Cycle Manual
DoDI 7920.4	Baselining of Automated Information Systems (AISs)
DoDI 7920.5	Management of End-User Computing (EUC)
DoDI 7930.1	Information Technology Users Group Program
DoDI 7930.2	ADP Software Exchange and Release
DoDD 7950.1	Automated Data Processing Resources Management
DoD 7950.1-M	Defense Automated Resources Management Manual of Information Requirements

D
Standards

ADCCP	Advanced Data Communications Control Procedures; ANSI Standard X3.66 of 1979; also NIST 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 NIST 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 that 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	Federal standards for DCE coding and 1005A-1008 modulation
FIPS 46	NIST Data Encryption Standard (DES)
FIPS 81	DES Modes of Operation
FIPS 100	NIST standard for packet-switched networks; subset of 1980 CCITT X.25
FIPS 107	NIST 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-Physical interface protocol similar to RS-232 and 188-114CRS-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)

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