G-SI4 Letter
Original

September 3, 1986

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Dear
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:

INPUT is pleased to provide you with the latest in the series of Federal Information Systems and Services Program (FISSP) Market Analysis Reports, Federal Systems Integration Market, 1986-1991. This report is a major revision of our previous systems integration report published in 1985. The changes include a special focus on turnkey systems, additional analysis of the competitive environment, and identification of new turnkey and systems integration opportunities.

The enclosed materials completely replace the 1985 report and should be inserted with the new slipcovers in the existing binder. If you have any questions about this information or about the FISSP, please call us.

Sincerely,

John E. Frank
Vice President

JEF:ml

Enclosure

Litton **Mellonics** Systems Development

P.O. BOX 3407
1001 W. MAUDE AVENUE
SUNNYVALE, CALIFORNIA 94088-3407
(408) 245-0795 X221,207,208

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FEDERAL SYSTEMS INTEGRATION MARKET, 1986-1991

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INPUT
11820 Parklawn Drive
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Rockville, MD 20852
(301) 231-7350

Federal Information Systems and Services Program (FISSP)

Federal Systems Integration Market, 1986-1991

FEDERAL SYSTEMS INTEGRATION MARKET, 1986-1991

ABSTRACT

INPUT estimates that the federal government market for systems integration and turnkey systems opportunities will increase from $2.0 billion in 1986 to $4.1 billion by 1991, an average annual growth rate of 15%.

This update of the 1985 integration report presents the results of research and analyses of various operational aspects and strategies of the integration market, especially turnkey systems. The many changes in this update include:

- A revised forecast of the systems integration and turnkey systems market, including current and outyear funding.
- An updated list of open opportunities and recent awards.
- An update of the market share of major turnkey systems vendors.
- An examination of issues impacting federal government turnkey systems vendors.

This report contains 198 pages, including 44 exhibits.

FEDERAL SYSTEMS
INTEGRATION MARKET, 1986-1991

CONTENTS

FEDERAL SYSTEMS
INTEGRATION MARKET, 1986-1991

EXHIBITS

I INTRODUCTION

- The increasing federal government market demand, both to replace obsolete systems and to add new in-house data processing resources, has created numerous systems integration (SI) and turnkey systems (TS) opportunities. These opportunities have come even more to the front as agencies strive to meet ADP demands in a restricted funding environment. Customer interest in hardware/software integrated solutions on a "packaged" basis is at an all-time high.

- INPUT researched, analyzed, and reported on these markets in a 1984 report, Federal Systems Integration Market, 1985-1990, and updated the systems integration portion of the report in 1985 as a part of the Federal Information Systems and Services Program (FISSP).

- This current report is an updated and revised edition of the turnkey systems portions of that earlier report. This report provides both changed and new information reflecting the budget and policy of the GFY 1986 Authorization and Appropriation Acts and the proposed GFY 1987 federal budget.

- This report was based on research and analyses of several sources including:

  - INPUT's Procurement Analysis Report (PAR).

  - OMB Five-Year Information Technology Plans for 1986-1991.

- Discussions with INPUT's FISSP clients.

- Interviews with leading federal turnkey systems vendors.

- Interviews with federal agency officials with active turnkey systems programs.

A. SCOPE

- This report covers those turnkey systems and systems integration programs listed in the OMB/GSA/NBS Five-Year Plans for government fiscal years (GFY) 1986-1991, related federal agency long-range automated data processing (ADP) plans, and federal agency GFY 1986 and 1987 Information Technology Budgets.

- The period of interest is GFY 1986 to 1991. Although GFY 1986 will be in its final quarter at the time of this report's publication, a number of 1986 program initiations were delayed by the passage of the Gramm-Rudman-Hollings deficit reduction act and other funding restrictions.

- The vendors selected for the original interviews were identified as contractors of record for ongoing integration programs or listed as vendors for turnkey systems or systems integration services in INPUT's Company Analysis and Monitoring Program data base for 1985. Interviews for this update were obtained from leading turnkey systems vendors in terms of 1985 revenue derived from turnkey systems contracts with the federal government.

- The agencies selected for interview were identified in one or more of the above plans as proposing to contract with turnkey systems or systems integration vendors.

- For the purpose of this report, the federal integration market was divided into two major components--turnkey systems and systems integration (also see the definitions in Appendix B).

  - Turnkey systems are packaged, off-the-shelf hardware/software systems for specialized industry and cross-industry applications such as:

    . CAD/CAM.

    . CIM.

    . Training and simulation.

    . Finance and budget.

    . Maintenance and job tracking.

    . Energy management.

    . Graphics and mapping systems.

    . Cargo and transportation scheduling.

  - Systems integration, on the other hand, is essentially a custom effort in which the integrator is responsible for bringing together the hardware, software, professional services, and telecommunications required to develop a total ADP solution. Specifically, the effort may include:

    . Hardware systems, including CPUs, memory, and input/output peripherals, generally complete with operating system software.

- Applications software products, either off-the-shelf or modified, that support the total configuration.

- Professional services, including:

  - System design.

  - System engineering and integration.

  - Site preparation and installation.

  - Applications software (new).

  - Applications code conversion.

  - Independent validation and verification of performance.

- Data telecommunications services, including:

  - Communications controllers.

  - VANs and LANs.

  - Dedicated media systems.

B. METHODOLOGY

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

- The available agency long-range ADP plans for GFY 1985-1990 and 1986-1991 were researched for major system replacements, conversion from out-of-agency data processing services, and new system initiations (new starts).

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

  - Federal agency officials selected for interview included:

    . Information Resource Managers.

    . Contracting Officers (buyers).

    . Program Managers (users).

    . Data Center Managers (users).

  - Vendor executives selected for interview included:

    . Company executives.

    . Marketing executives.

    . Operations executives.

- The original questionnaires were developed from the initial client discussions and reviewed with them to include areas of interest. In 1986, the vendor questionnaire was revised to focus on changes in the turnkey systems marketplace.

  - The agency questionnaire was designed to acquire information about plans for replacement and new systems and applications.

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

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

C. REPORT ORGANIZATION

- The report has been organized into the five sections listed below. Those sections that have been extensively updated from the earlier reports are noted with an "*."

  - *Executive Summary.

  - *Market Analysis and Forecast.

  - Agency Requirements.

  - *Systems Integration Vendors.

  - *Systems Integration Opportunities.

- Several appendices are provided to aid in report use:

  - *Interview Profiles.

  - *Definitions.

  - *Glossary.

- *Policies, Regulations, and Standards.

- *Related INPUT Reports.

- *Questionnaires.

II EXECUTIVE SUMMARY

- This Executive Summary is designed in a presentation format to:
  - Help the busy reader quickly review key findings.
  - Provide a ready-to-go executive presentation, complete with a script and visual aids.
- Key points of the entire report are summarized in Exhibits II-1 through II-8. On the left-hand page facing each exhibit is a script explaining the exhibit's contents.

A. FEDERAL MARKET PRESSURES

- Prospects for the federal systems integration market during the remainder of the decade have risen considerably with the government focus on upgrading its in-house information resources.

- Heavy commitment of the federal workforce and vendor support for maintaining existing systems emphasizes the need to reduce the life cycle maintenance costs by a variety of techniques.

- Continuing increase in the ratio of software-to-hardware costs lends emphasis to the utilization of efficient, commercially designed and developed ADP systems.

- Wary of late delivery and/or cost overruns, federal agencies are sharing implementation risks with vendors by changing the types of contracts used. Acquisition reforms have been introduced under FAR and FIRMR to simplify the process for agencies, but not for vendors.

- Executive directives now require federal agencies to utilize contractors rather than perform the work in-house if outside contracting proves to be cost-effective and to implement new systems.

INPUT®

FEDERAL MARKET PRESSURES*

- Improve Information Resources
- Reduce Maintenance Expense
- Use Commercial Products
- Share Implementation Risks
- Employ Contractor Personnel

*Updated 7/86

B. MARKET FORECAST

- INPUT estimates that the federal government systems integration market will increase from $2.0 billion in FY 1986 to $4.1 billion by 1991, at an average annual growth rate of 15%.

- The growth rate in the early years will be slower, but will increase as large acquisitions that were delayed by the 1986 deficit reduction measures get underway.

- Initiatives that require turnkey systems will show the strongest growth rate as agencies opt for packaged systems approaches. Demand for custom developed systems integration will also remain high.

- The hardware component associated with these SI programs will show only modest growth as falling hardware prices and the desire to integrate existing hardware into the new integrated configurations take effect.

- The forecast excludes budgeting estimates for post-installation facilities management, maintenance beyond warranty periods in systems integration programs, and subsequent custom software development.

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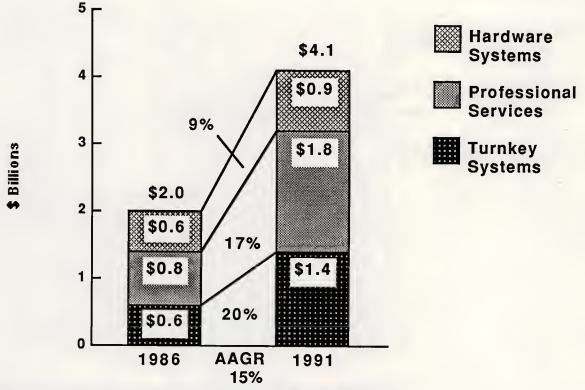
FEDERAL SYSTEMS INTEGRATION MARKET FORECAST*



Note: Dollars Rounded to Nearest $100 Million.

*Updated 7/86

C. APPLICATION TARGETS

- Scientific and engineering turnkey systems applications (CAD, CAE, CIM, etc.) are most prevalent in the latest government planning documents.
  - Other applications include records management, medical systems, publishing, and computer-assisted education and training.
  - Nontraditional turnkey applications growth is evidenced by the proportion of requested funds (59%) they require.
- Focus is shifting in the distribution of initiatives by agency.
  - Defense agency use of scientific/engineering turnkey systems accounts for only 15% of the identified initiatives and 41% of the requested funding in the current plans.
  - Energy and Treasury as well as NASA share the civil agency spotlight, both in terms of number of planned initiatives and funding request level.
  - Graphics and mapping systems are evident in Census, Geological Survey, Bureau of Mines, Weather Service, and many other civilian activities.

APPLICATION TARGETS OF SELECTED TURNKEY SYSTEMS INITIATIVES

APPLICATION	INITIATIVES, 1986-1991	
	NUMBER (Percent)	FUNDING (Percent)
Scientific/Engineering	79%	41%
Document Handling	12%	30%
Personnel Management	8%	27%
Other	1%	2%
Total	100%	100%

D. COMPETITIVE FORCES

- Recent systems acquisition programs vary from separate contracting for systems design/engineering/integration, hardware systems, hardware peripherals, software conversion, and prime contracts like the VIABLE and PHASE IV programs. Systems integration specialists in systems houses, aerospace firms, and the FCRC nonprofits appear as the strongest contenders.

- Early teaming discussions and long-term relationships with suppliers are becoming key proposal evaluation factors for agency source selection boards.

- Subcontractor specialists in software, fabrication, training, and special applications are playing increasingly important roles, frequently at the suggestion of the agency.

- Packaged turnkey system solutions are being emphasized by GSA and the senior information resource management offices.

- Interest in the size of the systems acquisition budget of the federal government is growing among "nontraditional" companies with proven capabilities.

INPUT®

COMPETITIVE FORCES*

- Prime Versus Integration Contractors
- Early Vendor Teaming
- Subcontract Specialist Role
- Packaged Turnkey Solutions
- Nontraditional Competition

*Updated 7/86

E. SELECTION CRITERIA

- Agencies and vendors indicate some differences of opinion in the significance of contract or selection criteria. The agencies' ranking was influenced by those with prior systems integration experience.

- Most agencies and experienced systems integration vendors prefer fixed-price contracts with a mix of CPFF for design/development and FP for implementation as a second choice.

- More stringent and effective program management practices appear essential to both contract award and profitable completion.

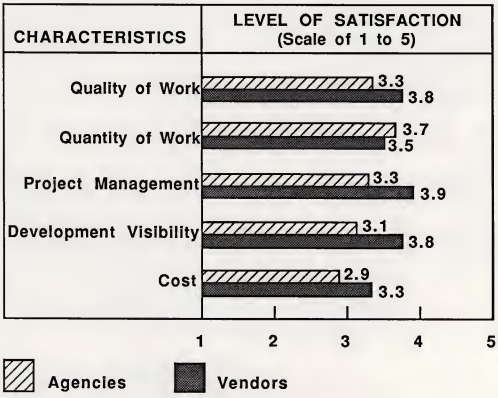
SELECTION CRITERIA SIGNIFICANCE: SYSTEMS INTEGRATION CONTRACTS

RANK	AGENCIES	VENDORS
1	Technical Solution	Technical Solution
2	Life-Cycle Cost	Risk Containment
3	Contract Type	Life-Cycle Cost
4	Risk Containment	Initial Cost
5	Initial Cost	Contract Type
6	Project Management	Project Management

F. AGENCY SATISFACTION

- Agencies are far less satisfied with the quality of work, vendor project management, and visibility of system development than vendor management perceives or is led to believe by their project leaders.
  - Agencies believe they lack enough qualified system planners and program managers for exercise of tighter control over system integration projects.
  - Agency executives prefer greater vendor risk sharing and that responsibility for on-time completion be placed on the contractors. Recent fixed-price awards as well as multiple-type contract awards are attempts to move risk to the vendor.
- Vendors believe that they provide higher levels of program management and visibility because of the nearly continuous audits and surveys of DCAA, nongovernment system managers, and agency maintenance/control document specialists.
  - Vendors believe that costs are understood by the contract specialists and project technical representatives, but are often misstated by higher level agency officials.
  - Vendors have begun to protest awards that are priced low to win and renegotiated soon afterward.

AGENCY SATISFACTION WITH SYSTEMS INTEGRATION VENDORS



G. DEFENSE VERSUS CIVIL AGENCY MARKETS

- The number of opportunities may not reflect the entire market.
  - A number of civil agency system replacement programs now planned for in-house integration may go to contract if staffing budgets remain at their current levels.
  - Some agencies identify planned turnkey systems buys on a site or function basis; others lump numerous buys within one program. Energy, for example, identified 44 individual initiatives totaling $100 million while Treasury's initiatives totaled $137 million from four programs.
  - Also, many turnkey systems fall under the A-11 reporting threshold of $1 million life-cycle cost and are not, therefore, specifically identified in agency documents.

DEFENSE VERSUS CIVIL AGENCY MARKETS

AGENCY	TURNKEY SYSTEMS		SYSTEMS INTEGRATION	
	NUMBER	BUDGET ($ Millions)	NUMBER	BUDGET ($ Millions)
Defense	13	$262.2	26*	$2,448.3
Civil	73	$376.9	19*	$1,030.0
Total	86	$639.1	45	$3,478.3

*One program excluded because funding information was not available.

H. RECOMMENDATIONS

- Hardware and software systems houses need to improve pre-bid and proposal strategic planning to increase the prospect of award.

- Systems integration vendors need to invest more effort in understanding the agency's mission and its information resource requirements in order to find an appropriate system solution rather than modifying the requirements to meet an available solution. Agency policy officials voiced this concern repeatedly.

- Professional services vendors with experience in the federal government sector should initiate marketing strategies to penetrate both the systems integration vendor and federal agency segments to improve awareness of special skills and capabilities.

- Software product vendors need to substantially improve their awareness of federal software requirements and increase the visibility of their products.

- Turnkey systems vendors should find the means to increase the margins between hardware costs and "value added." One viable approach is for those vendors to become custom hardware assemblers/manufacturers.

INPUT®

RECOMMENDATIONS*

- Improve Bidding Strategy
- Understand Mission and Needs
- Penetrate Agency and Bidders
- Increase Visibility of Products
- Improve Value-added Margins

*Updated 7/86

GS14J

III MARKET ANALYSIS AND FORECAST

A. OVERVIEW

- During the two most recent administrations, presidential task forces have investigated the problems and technological status of the federal government's information processing resources. Among the findings are:

  - The government has not taken advantage of the technological advances of the private sector.

  - A substantial amount of the ADP inventory is obsolete or rapidly becoming obsolete.

  - Federal executives have not managed ADP resources effectively.

  - Major initiatives are urgently needed to bring federal information management to the level needed for regulation, taxes, security, and services to the public.

- INPUT believes that the demand for integrated systems in the federal government will be sustained at least through 1991 before leveling off, unless impacted earlier by one or more critical national economic issues.

- The delay in replacement timetables enhances the prospect of increased vendor-furnished systems integration.

- Future year funding of current acquisition programs and approval of funding for the next budget year are always in doubt in the federal government market.

  - Authorization of an agency budget and the requested information resources by the agency oversight committee does not assure the agency or vendors that funds will be provided.

  - Appropriation Acts for the agencies approve the TOA (Total Obligational Authority) for certain large systems, but not the fiscal year or years in which the funds will be expended (called outlays).

  - General election years see the largest budget cuts, which could affect the fiscal year beginning October 1, 1988.

  - Sensitivity, both economically and politically, to the growing national deficit could negatively impact a number of SI acquisitions in the "less than critical" defense and civil technology sectors.

  - Presidential election years (1988) always imply budgeting for political, not practical, reasons.

  - Major ADP systems already approved are likely to continue in preference to unapproved programs.

  - Deficit control measures, especially those under Gramm-Rudman-Hollings, could force agencies to cancel programs that do not meet stringent productivity improvement requirements and, in some cases, delay or stretch out those that do.

- Major civil systems affect service to the public and have greater political appeal than research programs.

- Systems acquisitions in the second half of the 1980s are addressing needed improvements in management, administration, human resources, and logistics functions which have not been provided with newer data processing resources in more than a decade.

  - Congress urgently needs more precise and timely data for the legislative process.

  - Administration decisions require complete data on domestic issues and regulatory affairs to satisfy congressional mandates.

  - Agency executives need trend analyses and status reports that accurately portray funding, staffing, and performance progress against mission objectives.

  - The public is pressing for solutions to delays and errors in processing payments and to delays in satisfying information requests.

- Key government agencies--OMB, GSA, GAO, and NBS--have initiated a progression of acquisition reforms intended to accelerate the acquisition and improve the management of information resources (ADP and telecommunications) while fostering wider competition.

B. MARKET FORECAST

- The federal systems integration market includes turnkey systems, professional services, and hardware systems, as defined in Appendix B. Analysis and forecast of the market has been rearranged into separate exhibits for clarity of presentation.

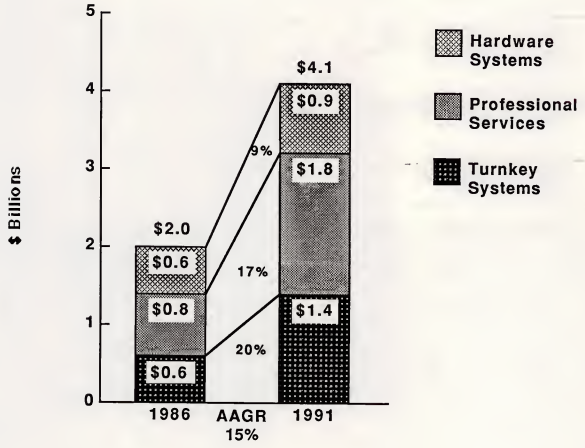
- Mode forecast.
  - . Hardware systems.
  - . Professional services.
  - . Turnkey systems.
- Agency forecasts.
  - . Turnkey systems.
  - . Systems integration.
- Applications forecast.
  - . Systems integration.
  - . Turnkey systems.

1. MODE FORECAST

- The service mode components of the integration forecast are illustrated in Exhibit III-1, including forecasts for hardware systems and professional services associated with systems integration and turnkey systems. The estimates were developed through a variety of sources, including agency budget requests and funding forecasts that are subject to administration and congressional budget approval cycles.

  - The forecast indicates a strong period of growth in 1986 and 1987 resulting from:

FEDERAL SYSTEMS INTEGRATION MARKET FORECAST*



Note: Dollars Rounded to Nearest $100 Million.

*Updated 7/86

- Delays in starting programs initially scheduled for 1985.

- Increasing amounts of outyear expenditures for programs started in the 1982-1985 period.

- New programs scheduled to start in 1986, with major outlays in 1987.

- The forecast also reflects the added costs of new starts, as opposed to upgrades or replacements, that have been a major thrust of agencies in the 1982-1985 period.

- This period will be replaced by another in the last two years of the forecast period. It is in these years that upgrades and replacements of systems installed in the early 1980s will receive major funding.

- While the total integration market is forecast at a 15% average annual growth rate (AAGR), individual market sectors will show varying rates.

  - Turnkey systems growth (20%) will be strong as the appeal of pre-packaged hardware/software solutions increases.

  - The professional services portion of systems integration will also show strong growth as agencies turn to vendors to provide the direction, development, and management for key efforts--replacing the in-house staffs reduced by recent budget reduction measures.

  - Packaged applications software and the hardware and software required to provide connectivity in a multi-vendor environment will be important ingredients in systems integration efforts.

  - The hardware systems required at the core of systems integration efforts will grow at a modest rate. Falling hardware prices and

agencies' desires to integrate current hardware within new solutions are key reasons for the slower rate.

2. AGENCY FORECAST

- The agency integration activity forecasts are based on a combination of long-range ADP plans, projection of previous Information Technology Budgets, programs described in the agency OMB A-11 Section 43 A & B budget requests, and interviews with policy officials and ADP center managers. Only those programs specifically identified by agencies in their planning documents and funding request submissions are included. Generally, this includes those programs with a life-cycle cost greater than $1 million. The number of identified integration programs is shown in Exhibit III-2 for turnkey systems and Exhibit III-3 for systems integration programs (individual programs are identified in Section VI).

  - No estimate is available for the cost or funding of planned conversion of applications from other information processing resources to new in-house systems.

    . Current resources included RCS, P-FM, and government data centers outside the agency.

    . Values of monthly costs of running the application were not provided.

  - Agency shares of SI programs are a combination of part of their ADP systems upgrade and replacement budgets and most of their new system acquisition budgets. The exceptions are the FAA portion of Transportation for the ATC Replacement and new Air Force and NASA systems to support the military and civilian space initiatives.

EXHIBIT III-2

TURNKEY SYSTEM INITIATIVES BY AGENCY, 1986-1991

AGENCY	INITIATIVES, COUNT		FUNDING REQUESTED	
	NUMBER	PERCENT	($ MILLIONS)	PERCENT
Air Force	3	3%	$54.6	9%
Army	4	5%	$163.8	26%
Navy	4	5%	$35.5	6%
USMC	1	1%	$3.1	>1%
DLA	1	1%	$5.2	>1%
Subtotal Defense	13	15%	$262.2	41%
Agriculture	1	>1%	$1.0	>1%
Commerce	2	>2%	$14.5	2%
Energy	44	51%	$100.0	16%
HHS	3	3%	$33.6	5%
Interior	2	2%	$30.6	5%
Transportation	1	>1%	$.1	>1%
Treasury	4	5%	$137.4	21%
NASA	13	15%	$36.0	6%
SEC	1	>1%	$19.8	3%
EOP	1	>1%	$.1	>1%
USIA	1	>1%	$3.8	>1%
Subtotal Civil	73	85%	$376.9	59%
Grand Total	86	100%	$639.1	100%

EXHIBIT III-3

SYSTEMS INTEGRATION INITIATIVES BY AGENCY, 1986-1991

AGENCY	NUMBER	FUNDING ($ Millions)
Defense		
Air Force	9	$888.3
Army	8	937.9
Navy	5	94.1
OSD	5	532.1
Subtotal	27	$2,452.4
Civil		
Commerce	2	$135.8
HHS	4	153.3
Interior	2	69.0
Transportation	1	3.3
Treasury	7	329.9
NASA	3	98.7
HUD	1	240.0
Subtotal	20	$1,040.0
Total	47	$3,492.4

- The proportion of agency programs designated as upgrades, replacements, and new systems is discussed in Section IV.

3. APPLICATIONS FORECAST

- Information resource applications are identified by a variety of titles between defense and civil agencies and between civil agencies with different governmental functions. Similar defense applications are coded or given acronyms by each of the military departments and defense agencies in the common commercial applications of personnel, payroll, distribution, and accounting.

  - Applications have been converted to standard terms defined in Appendix B, with variations on applications for particular functions grouped with the basic application.

  - The approximate distribution of "primary" and "secondary" applications for systems integration initiatives identified in the 1985 report are shown in Exhibit III-4. More detailed information on the opportunities is provided in Section VI.

- The applications forecast is not intended to be an accurate prediction, but merely representative.

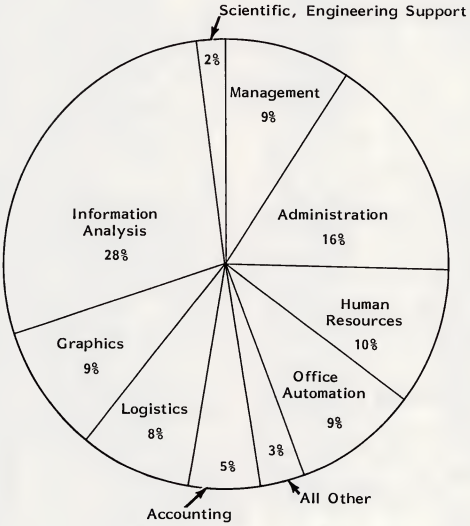
  - A number of SI programs note that additional applications will be added later in the program by either contract or in-house staff without specifying the application.

  - In SI replacement programs, not all of the resident applications that will be converted to the new machine are specified.

  - The implied trend of the identified operating systems and applications is discussed in greater detail in Section IV.

EXHIBIT III-4

FEDERAL SYSTEMS INTEGRATION MARKET
BY TYPE OF APPLICATION, 1985-1990*



n = 224 Primary and Secondary Applications Categorized

Note: Figures do not add up to 100% due to rounding.
*Updated 5/85

- Applications planned for conversion from non-agency processing centers--RCS, COCO (FM), government data centers, etc.--were also not adequately defined by type and number in the representative interviews.

- Turnkey systems buys will be applied to a variety of applications, as indicated in Exhibit III-5. Scientific/engineering applications dominate the number of different initiataives identified, but not the total funding proposed through the forecast period. Rather, document handling (library, records management, publishing) and personnel systems (medical, personnel management, training) account for some 57% of the funding.

  - The heavy weighting on scientific/engineering applications (79% of the programs identified) is, in part, the result of a significant number of individual turnkey system buys planned by the Department of Energy for use in computer integrated manufacturing (CIM).

  - The four records management initiatives, on the other hand, swing the proportion of funding to non-scientific/engineering applications.

  - Apparently, agency interest in packaged hardware/software solutions is very high across a wide spectrum of applications.

C. COMPETITION

- Competitors for systems integration projects vary to some degree with the projected value, application, sponsoring agency, and end user of the opportunity. Additional discussion on SI vendors and market share is provided in Section V.

EXHIBIT III-5

TURNKEY SYSTEMS INITIATIVES BY APPLICATION, 1986-1991

TYPE	FREQUENCY		FUNDING	
	NUMBER	PERCENT	$ MILLIONS	PERCENT
CAD	19	22%	$109.2	17%
CAE	2	2%	$3.7	1%
CIM	38	44%	$88.2	14%
Data Collection	5	6%	$46.6	7%
Graphics	4	5%	$17.4	3%
Library	1	1%	$1.0	<1%
Medical	1	1%	$8.1	1%
Personnel	2	2%	$77.4	12%
Publishing	5	6%	$28.3	4%
Records Management	4	5%	$159.4	25%
Retail Management	1	1%	$12.5	2%
Training	4	5%	$87.3	14%
Total	86	100%	$639.1	100%

- Potential and identified competitors for each category of systems acquisition are identified by service category. Some vendors compete in several categories because they offer products and/or services over a number of commercial and government market sectors.

  - Specialized integrated systems.

  - Mini/microcomputer-based systems.

  - Midi/mini/microcomputer networked distributed data systems.

  - Large CPU-based systems with or without distribution networks.

  - Supercomputer systems are frequently the host for several mainframes that may support distributed minicomputer and microcomputer terminals.

1. SPECIALIZED TURNKEY SYSTEMS

- The identified vendors are listed alphabetically in Exhibit III-6.

  - The list includes parent firms of specialized divisions.

  - A number appear in INPUT's 1985 industry report.

  - Some are specialists in defense systems.

2. PROFESSIONAL SERVICE VENDORS

- The larger professional service vendors are key competitors as both prime contractors and systems engineer/integrators in the SI market. Exhibit III-7 includes those identified in Exhibit V-1 of Section V of this report.

EXHIBIT III-6

SPECIALIZED TURNKEY SYSTEMS VENDORS*

American Microcad	IBM
Auto-Trol	Intergraph
Autographix	M/A COM Sigma Data
Avant-Garde	Megatek Corp.
Bunker Ramo	Sanders Associates
C^3 Inc.	Sperry
Charles River Data	Tektronix
Computer Consoles	Tera
Gould	Texas Instruments
Honeywell	TRIAD
HRB-Singer	TRW

*Updated 7/86.

EXHIBIT III-7

MAJOR PROFESSIONAL SERVICES VENDORS IN FEDERAL SYSTEMS INTEGRATION

Apharel	Martin Marietta
AT&T	Melpar
Boeing	Mitre
BDM, International	NDC
CSC	National Computer
EDS/GM	Northern Telecom
EG&G	Ocean Data
Ford Aerospace	PRC
GTE	RCA
Harris	SAIC
IMS	Syscon
Lockheed	TRW

*Updated 7/86.

- Smaller professional service vendors who are either seeking a role in SI or are involved through separate contracts with the contracting agency include:

  - Big Eight accounting firms, especially for financial, budget, and accounting applications:

    . Arthur Anderson.

    . Coopers and Lybrand.

    . Deloitte, Haskins and Sells.

    . Ernst and Whinney.

    . Peat, Marwick and Mitchell.

    . Arthur Young.

  - Management services firms are also candidates:

    . American Management Systems.

    . Bolt, Beranek and Newman.

    . Booz, Allen, Hamilton.

3. MAINFRAME VENDORS

- The major minicomputer, medium-, and large-CPU vendors are also contenders for SI programs because most offer upward-compatible CPUs for systems being replaced and newer systems with enhanced capabilities.

  - Burroughs.

  - CDC.

- Cray.
- Data General.
- DEC.
- Four Phase.
- Gould (SEL).
- Harris.
- Hewlett-Packard.
- Honeywell.
- IBM.
- NCR.
- Prime.
- Rolm (IBM).
- Sperry.
- Tandem.
- VION.

4. FOREIGN COMPETITION

- Improving trade relations with the Far East and the NATO countries introduces the prospect of hardware system competition for nonsensitive administrative, management, and office automation projects. The popularity of the "Made in America" campaign coupled with the government's desire to reduce the trade imbalance may again place restrictions on the amount or type of business foreign competitors secure.

  - Typical vendors include Hitachi, Fujitsu, ICL, Siemens, and Phillips.

D. INTEGRATION OPPORTUNITIES

- A list of major SI and TS opportunities is provided in Section VI.

  - Programs awarded earlier have been listed because they have multiple phases with contracts yet to be awarded.

    . Every SI contract has some prospect of being recompeted.

    . Some smaller SI programs have been defaulted and may be recompeted.

  - Programs listed for FY 1986 include a number in the solicitation and proposal stages for which awards have not been made.

  - Some programs listed for FY 1987 already have feasibility, preliminary design, and requirements underway, but the prime contract or SE&I contract has not been awarded.

- The program lists for GFY 1988-1991 are smaller because a number of candidate programs for those years have not been approved by the sponsoring agency.

E. FEDERAL POLICY AND REGULATIONS

- Federal ADP and telecommunications systems have been procured and managed for more than two decades by the FPRs, FPMRs, and ASPRs.
  - ADPE and services procedures were modified by the 1966 Brooks Bill and its subsequent amendments.
  - The Office of Federal Procurement Policy was created in 1976 to develop a single procurement code for the federal government.
    - It created OMB Circular A-109 for major systems acquisition, including ADP systems, which is still in effect but only for larger ($100-500 million) contracts or acquisition of "controversial" systems.
    - The final code, the Federal Acquisition Regulations (FAR), became effective April 1984.
    - Changes in the FAR are recommended by two agency representative groups:
      - Defense Acquisition Regulatory Council (includes NASA).
      - Civilian Agency Acquisition Council (all departments).

- The Paperwork Reduction Act was initiated for that purpose, but includes a number of provisions concerning information resource management:

  . Created the post of Information Resources Manager in each department and major agency.

  . Placed all but sensitive and mission-essential ADP under a new "mini-Brooks Bill."

  . Provided a separate approval procedure for national security and defense mission ADP.

  . Authorized annual preparation and publication of a Federal Agency Five-Year Plan for major ADP/Telecomm Acquisition by OMB and GSA.

- Under the authority of the Federal Administration Act and the Paperwork Reduction Act, GSA prepared and made effective in April 1984 a new regulation for information resources. The Federal Information Resource Management Regulation (FIRMR) supercedes the FAR's FPR and FPMR in information technology areas.

  - It combines in one regulation the acquisition, management, and use of all ADP and telecommunications not covered by separate statutes for reasons of sensitivity.

  - It is initially based on the related sections of the FPMR and the FAR and will include related provisions of DARC and CAAC-originated FAR amendments.

  - The FIRMR is expected to streamline the information resources acquisition process; how effective it will be depends on several factors:

- Incorporation of several temporary regulations and the Competition in Contracting Act (CICA).

- Education of contract officers and procurement specialists in the finer points of ADP equipment, software, and services acquisition.

- Extent of subsequent amendment to satisfy individual agency "special requirements."

- Other recent regulations that are changing the acquisition procedures inlcude:

  - The Competition in Contracting Act (CICA) of 1985, which provides expanded legal powers for ADP protest action via the GSA Board of Contract Appeals and GAO, increases the opportunity to employ negotiated contracts, and establishes seven more restrictive categories of exceptions that permit sole-source awards.

  - The Small Business Equal Competition Act (SBECA) of 1984, which requires publication in the CBD of an agency's intent to award sole-source contracts or GSA's intent to modify FIRMR or FAR in a manner that would require an increase in paperwork or eliminate competition from small businesses.

  - OMB A-76 (Policies for Acquiring Commercial Industrial Products and Services Needed by the Government), which recommends government reliance on the private sector for goods and services.

    - This policy has now become the administration's Productivity Improvement Program (PIP), putting even more emphasis on cost-effective performance of ADP and other services.

- The policy requires conduct of a comparison of the cost of in-house staff and contractor performance of services whenever an agency plans a major upgrade, replacement, or new start of ADP resources. This comparison is an attempt to determine if in-house is, in fact, cheaper than commercial acquisitions.

- Systems integration acquisitions are conducted under either the FIRMR or FAR as appropriate to the function of the system.

  - FIRMR applies to all ADP and telecommunications systems and services subject to the Brooks Bill--that is, general purpose systems of all agencies.

  - FAR (with DAR modifications) applies to those ADP and telecommunications identifiable as intelligence or mission critical information resources under the Warner Amendment to the Paperwork Reduction Act.

  - Changes in competitive practices, sole-source awards, and protest procedures of the Competition in Contracting Act (CICA) 1984 have been included via a Temporary Regulation effective May 1985.

  - A rule change to allow agencies to select the system validation procedure suitable to the degree of risk to the government was released effective early 1986.

- Agency source selection activities and acquisition policy officers have observed growing failure of the vendor community to become familiar with the bidding and evaluation conditions imposed by FIRMR and FAR.

F. UNCERTAINTIES AND ISSUES

- OMB Circular A-109 and its Defense Department counterpart DD-5000.1 are expected to continue in force for major ADP/telecommunications systems acquisition for all agencies. The principal effect of the new FIRMR has been an increase of the effective thresholds for application to each agency.

  - The reactions of agencies and vendors to the policy during the 1985 interviews are seen in Exhibit III-8.

  - Most IRMs believed A-109 would be imposed on all systems large enough to attract congressional attention.

- The FY 1984 Defense Appropriations Act mandated the exercise of purchase options or competitive replacement of most leased DoD-based ADP equipment.

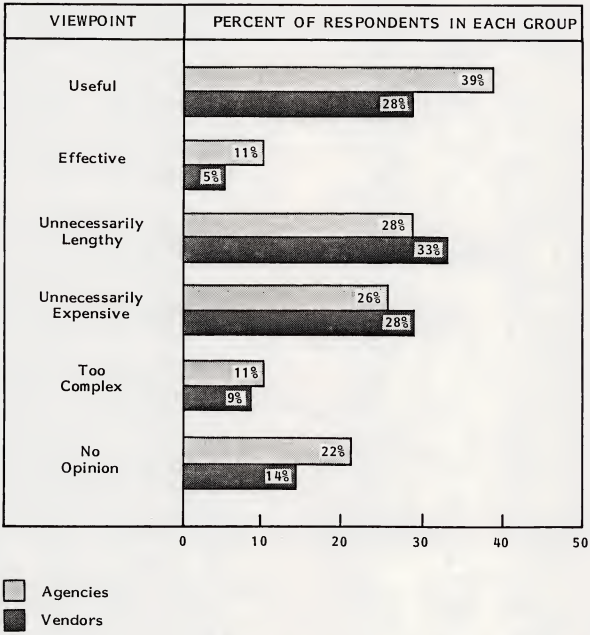
  - Although the DoD "Buy-Not-Lease" mandate was not fully funded in GFY 1984-1986, it could have far-reaching implications in DoD where more than $2.1 billion of leased ADPE is scheduled to be replaced in the next three years.

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

- Because of the additional funding that would be directed toward purchase of equipment, one possibility is a slowdown in the upgrading process to new, more modern equipment and an increase in the amount of maintenance required to keep obsolete equipment (and the software designed to run on that equipment) operational until it is replaced.

EXHIBIT III-8

OMB-A109/DD-5000.1/5000.2
ACQUISITION POLICY – AGENCY VERSUS VENDOR VIEWPOINTS



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

- Four federal agencies (the Department of Agriculture, the Department of Health and Human Services, the Department of the Navy, and the National Aeronautics and Space Administration) have agreed to participate in the General Services Administration "Go for 12" Program.

- The program is designed to streamline the lengthy process required for the acquisition of automatic data processing and telecommunications resources to a point where major systems acquisitions are accomplished within a 12 month period.

- Each agency will work with GSA in one of three pilot projects designed to model and test different aspects of the acquisition process. The three aspects of the program are the elimination of unnecessary bottlenecks in the acquisition process, the potential for parallel review of acquisitions, and the provision for special training in ADP and telecommunications acquisitions.

- The results and recommendations will be used to develop new procedures to be used throughout the government.

IV AGENCY REQUIREMENTS

A. AGENCY SHARE

- The distribution of integration initiatives identified by agency and type of effort is indicated in Exhibits IV-1 and IV-2.

- New starts represent 40% of the programs in FY 1986 to FY 1991. Turnkey systems (TS) new starts are notable in Energy (14), Army (4), HHS (3), and Treasury (3). New systems integration (SI) programs are most evident in Army (5), OSD (4), and Treasury (4).

- TS replacements are dominated by Energy with 9 programs. SI replacement programs are most notable in the program plans of the Navy (3), Treasury (3), and HHS (3).

- Upgrades of turnkey systems are frequent in Energy (21), NASA (10), and Navy (3), while SI upgrades in Air Force (5) represent the largest number of integration upgrades.

B. HARDWARE SYSTEMS

- ADP hardware requirements are only partially defined in the systems integration programs.

EXHIBIT IV-1

TURNKEY SYSTEMS OPPORTUNITIES BY AGENCY AND TYPE OF EFFORT, 1986-1991

AGENCY	TYPE OF EFFORT			TOTAL
	UPGRADE/ EXPANSIONS	REPLACEMENT	NEW START	
Defense				
Air Force	1	1	1	3
Army	-	-	4	4
Navy	3	-	1	4
USMC	-	1	-	1
DLA	1	-	-	1
Subtotal	5	2	6	13
Civil				
Agriculture	-	-	1	1
Commerce	-	1	1	2
Energy	21	9	14	44
HHS	-	-	3	3
Interior	2	-	-	2
Transportation	1	-	-	1
Treasury	1	-	3	4
NASA	10	1	2	13
SEC	-	-	1	1
EOP	-	-	1	1
USIA	-	1	-	1
Subtotal	35	12	26	73
Total	40	14	32	86

EXHIBIT IV-2

SYSTEMS INTEGRATION OPPORTUNITIES BY AGENCY AND TYPE OF EFFORT, 1986-1991

AGENCY	TYPE OF EFFORT			TOTAL
	UPGRADE/ EXPANSIONS	REPLACEMENT	NEW START	
Defense				
Air Force	5	2	2	9
Army	1	2	5	8
Navy	-	3	2	5
OSD	1	-	4	5
Subtotal	7	7	13	27
Civil				
Commerce	-	1	1	2
HHS	1	3	-	4
Interior	-	1	1	2
Transportation	1	-	-	1
Treasury	-	3	4	7
NASA	1	-	2	3
HUD	-	1	-	1
Subtotal	3	9	8	20
Total	10	16	21	47

- Under A-109 guidelines, the hardware systems are only functionally described until selection of the final contractor.

- New system acquisitions below the A-109 thresholds do not specify particular brands pending completion of system architecture design.

  . In a number of Defense administrative, accounting, and human resource applications, one vendor may supply, under a requirements-type contract, computers to several systems with bulk purchase discounts.

- The distribution of type of target hardware as presented in the 1985 study indicated a continuing need for mainframe computers, although smaller systems (mini and micro) now represent 40% of the different types (see Exhibit IV-3).

  - The number of microprocessors, consisting of PCs and specialized workstations, accounts for only the planned major systems. The number of microprocessors to be acquired for a variety of smaller applications may be ten times higher.

  - The already large government inventory of minicomputers is expected to at least double over the next five years.

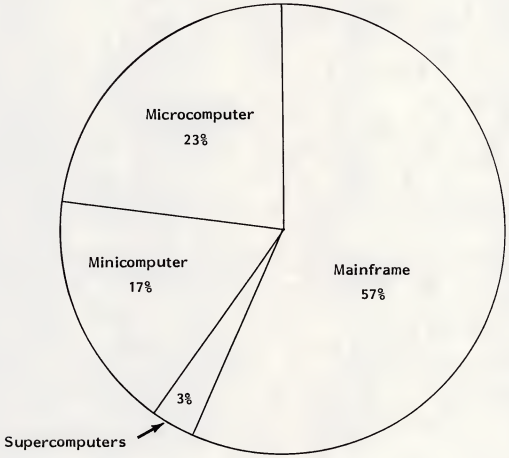
    . Some will serve clusters of microprocessors as network nodal processors or concentrators.

    . Others will be employed as communications controllers and large memory interfaces.

  - Medium to large computers are planned as DBMS and RDBS hosts and intermediary processors for the supercomputers.

EXHIBIT IV-3

DISTRIBUTION OF TYPE OF TARGET HARDWARE SYSTEMS
FOR SYSTEMS INTEGRATION PROGRAMS*



*New 5/85

C. SYSTEM APPLICATIONS

- A wide variety of applications were listed in the reference documents and the interviews for systems integration programs consulted in the 1984 report. Since this information is indicative of the current opportunities, they are included here as well. For convenience of discussion, the information has been divided into three categories:

  - Operating systems.

  - Primary applications.

  - Secondary applications.

- Operating system software, other than that provided with a basic hardware system, is depicted as a percentage of the total requirements in Exhibit IV-4 and by year in Exhibit IV-5. The definitions are noted in Appendix B of this report.

  - The number of systems identified are to be considered representative of the requirements of systems within the FY 1985 to FY 1990 period.

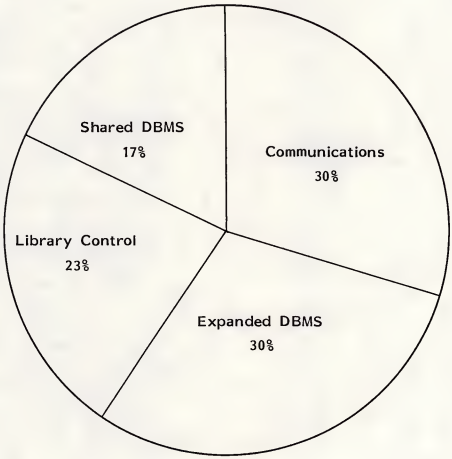
  - Communications management packages, which increase with the growth of distributed data processing networks around mid-sized CPU hosts, peaked in 1985.

  - Shared data base applications and expanded DBMS reflect the agency plans to support networked systems.

  - Library control software needs may be the initial step to both retaining applications in the host machine and downloading programs when required (similar to current RCS vendor offerings).

EXHIBIT IV-4

PRIMARY OPERATING SYSTEM SOFTWARE REQUIREMENTS,
1984-1989*

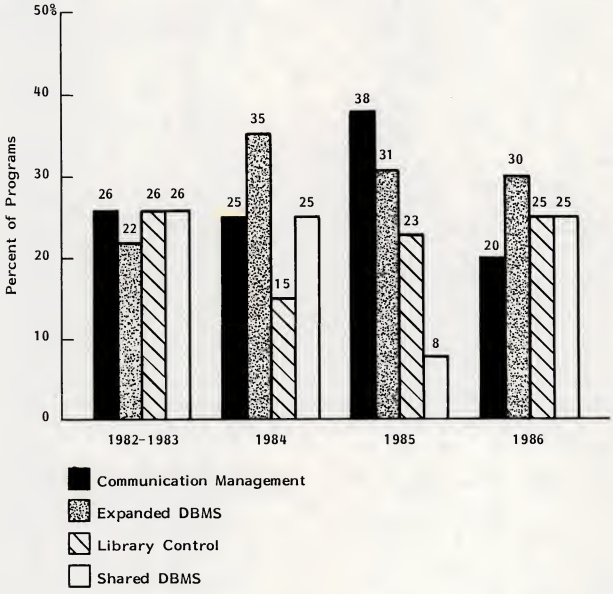


N = 118 Programs

*Updated 5/85

EXHIBIT IV-5

TRENDS IN PRIMARY OPERATING SOFTWARE REQUIREMENTS*
1982-1986



*New 5/85

- Primary and secondary applications examples are illustrated in Exhibit IV-6. Again, the number identified should be considered only representative of systems integration requirements.

  - Information analysis, human resource, and office automation applications are indicative of the shift to better automation of data collection and analysis by the agencies. The secondary applications of administrative and management systems also support this trend.

  - Graphics applications on larger systems in addition to the standalone integrated graphics systems continue to increase in a number of agencies for both data displays and mapping. Secondary applications in this area, primarily linked to the primary applications of information analysis and office automation, also are increasing.

  - Logistics and distribution, as well as accounting applications, are part of the system upgrade initiatives of the Defense agencies.

- The relationship between the primary application and the type of program is depicted in Exhibit IV-7.

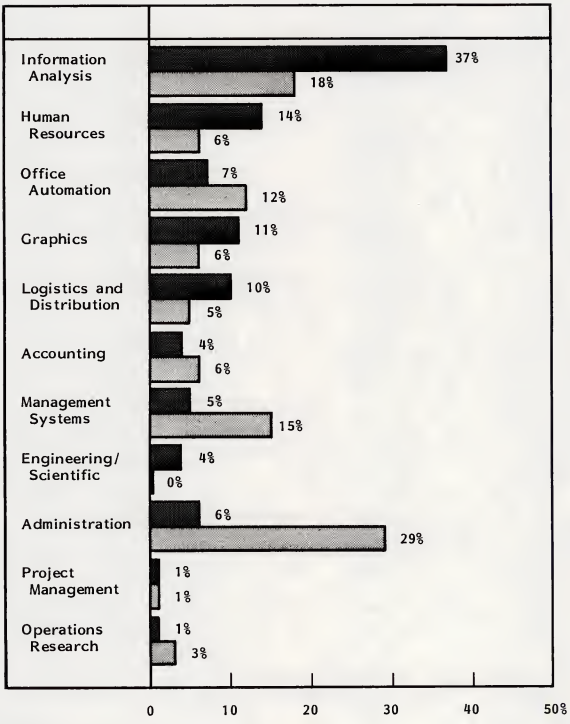
  - Major upgrades of current systems are planned for human resources, management, administrative, and scientific/engineering applications. Part of this thrust reflects an increasing awareness by agency executives to the uses of their information.

  - Replacement of systems is most noted in office automation, graphics, and scientific/engineering applications where the rapidly changing hardware technology continues to obsolete these systems at a fast pace.

  - Some agencies have planned for new starts in the "traditional" areas of information analysis and accounting. In general, these programs represent attempts to bring computer-based productivity improvements to smaller headquarters locations and remote field office locations.

EXHIBIT IV-6

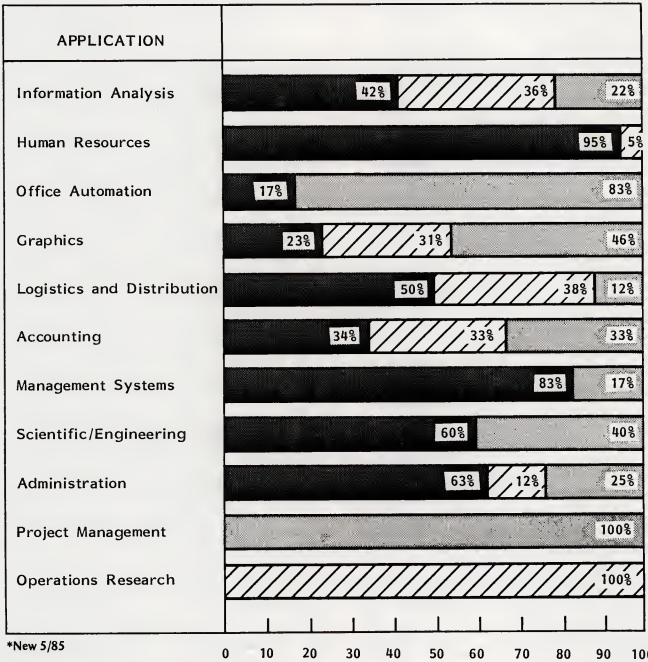
PLANNED PRIMARY AND SECONDARY APPLICATIONS OF SYSTEMS INTEGRATION PROGRAMS*



*Updated 5/85

EXHIBIT IV-7

PRIMARY APPLICATION BY TYPE OF PROGRAM*

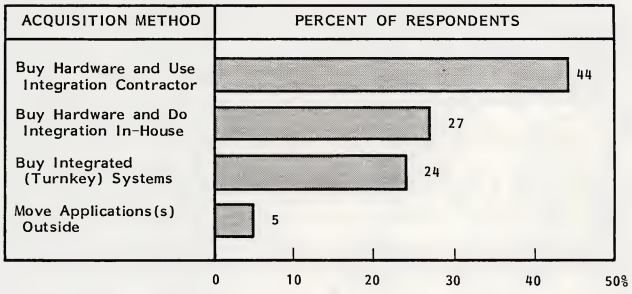


D. ACQUISITION PLANS AND PREFERENCES

- Both the agencies and vendors interviewed were asked to comment on their perception of how integration programs are now acquired and how they may be acquired in the future.
  - The agency sample included those with prior SI contract experience and those planning SI acquisitions.
  - Agencies sampled also ranged from those with large SI system acquisitions experience to those with smaller SI experience.
  - Only the policy officials interviewed at that time were acquainted with the proposed FIRMR and the new FAR.
  - Buyers interviewed were familiar with FAR and the predecessor DARs and/or FPRs.
  - ADP system users and program managers were either unaware of FAR and FIRMR or had read only news releases about both.
- Nearly half of the agency personnel interviewed preferred "unbundled" or separate acquisition of the system components and use of a systems engineer/integration contractor, as shown in Exhibit IV-8.
  - The remainder were nearly split between the acquisition of a turnkey integrated system and in-house integration.
  - About 5% preferred moving a new application to an RCS or a government data center.

EXHIBIT IV-8

AGENCY PREFERENCE FOR SYSTEM ACQUISITION METHODS



- Agency personnel indicated a clear preference for a fixed-price SI contract vehicle, as shown in Exhibit IV-9.

  - Interviewees felt there was greater motivation to complete the project on time and within budget under fixed-price conditions.

  - Unlike the vendors, only about one-fourth of the agencies favored a mix of CPFF for design and development, and fixed-price for implementation.

  - Those who preferred CPFF, Basic Ordering Agreements, or had no opinion, were about evenly divided.

  - Only 2-5% preferred fixed-price incentive contracts, considered a poor choice by vendors.

  - With the exception of the FPI option, agencies with SI experience were consistently less enthusiastic about all types of contracts. Their increased reluctance was not explained.

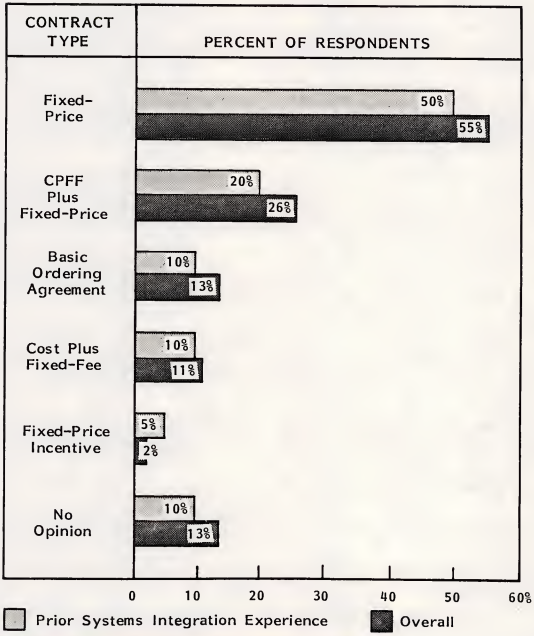
- In the 1985 update these agency preferences were contrasted with actual contracts for the SI programs analyzed. Several discrepancies were uncovered in the analysis (see Exhibit IV-10).

  - Fixed-price contracts, primarily for the purchase of the hardware components of the SI program, were more frequent than the agency representatives would have preferred. FF contracts were, however, clearly preferred and implemented a majority of the time.

  - CPFF plus fixed-price contracts, where the design and development is CPFF and the implementation fixed-price, were preferred by 24% of the respondents, but implemented in only 2% of the cases studied.

EXHIBIT IV-9

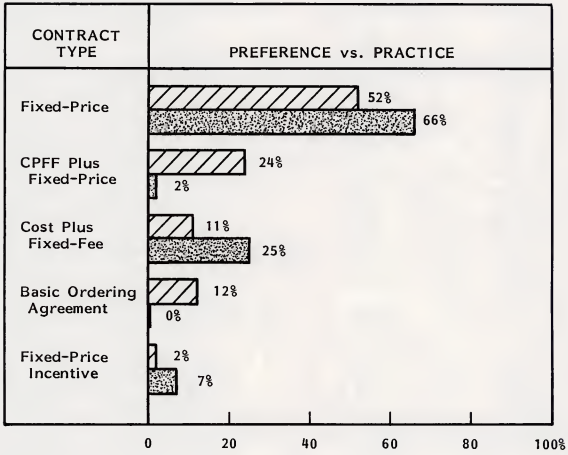
AGENCY PREFERENCE FOR SYSTEM INTEGRATION TYPE CONTRACT



Note: Figures do not add up to 100% due to multiple responses.

EXHIBIT IV-10

SYSTEM INTEGRATION CONTRACT TYPES:
AGENCY PREFERENCE VERSUS ACTUAL PRACTICE
1984-1989*



Note: Figures exceed 100% due to rounding.

* Based on 46 interviews with agency representatives and an analysis of 44 federal programs.

* Updated 5/85

- CPFF, like FF, was more frequently used than preferred.

- When the contract types of these SI programs were compared to the type of SI program (see Exhibit IV-11), the contract choice logic became clearer.

  - Fixed-price was preferred when the major component was a hardware purchase. Replacements represent this type of situation; fixed-price contracts were used in 80% of the replacement programs.

  - Upgrades and new starts involve both design and development work and hardware purchase. With both tasks representing major portions of the funding, this type of contract satisfies both needs.

  - Contracts with incentives for early completion are generally the antithesis of the mission of a new start. A rushed design could lead to disaster in the system and so new start programs do not offer this incentive. On the other hand, upgrades and, to a lesser extent, replacements, are predicated on the notion that expedient changes in an existing system are more a matter of productivity than creativity. The incentive is an attempt to push productivity to its limits.

- Finally, the SI programs analyzed provide some indication of the trend in contract types.

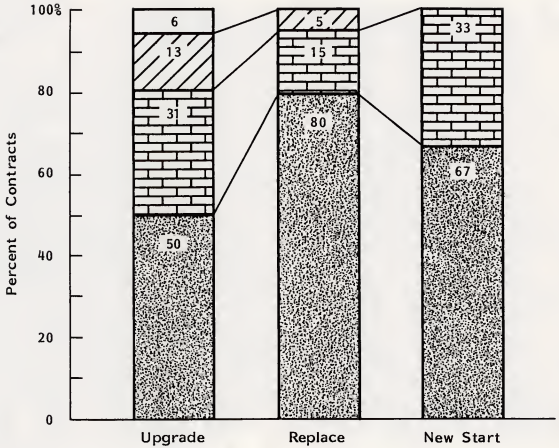
  - As Exhibit IV-12 depicts, fixed-price contracts will grow in frequency through the forecast period.

  - CPFF contracts will show a decline through the forecast period.

  - Other contract types, particularly incentive based and CPFF plus FP, will be used only as required by specific SI programs.

EXHIBIT IV-11

RELATIONSHIPS BETWEEN TYPE OF
PROGRAM AND TYPE OF CONTRACT*

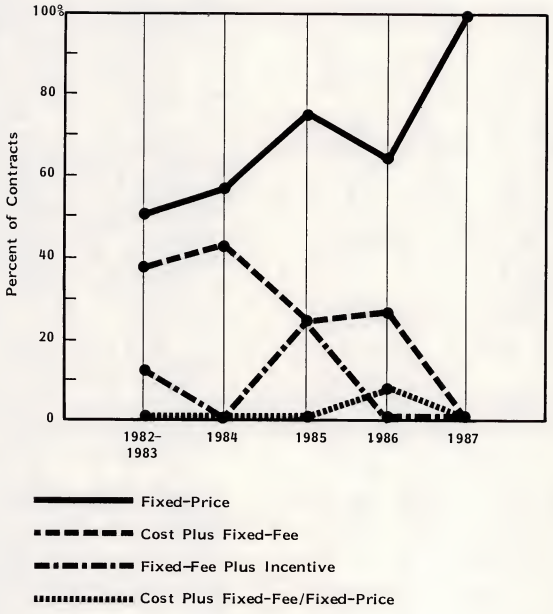


n = 45 Programs

*New 5/85

EXHIBIT IV-12

TREND IN CONTRACT TYPE,*
1984-1989



*New 5/85

- Agencies were almost as strongly in favor of using systems vendors for SI acquisitions as were vendors, as noted in Exhibit IV-13.

  - Agencies with prior SI contract experience felt that the systems vendor made design choices that better supported the agencies' operational needs than the other two sources.

  - Agencies were three times more inclined to use a nonprofit organization than vendors would like, as evidenced by the frequent use of MITRE, RAC, Battelle, and Aerospace Coroporation.

- Bid selection criteria, while varying among agencies and even among specific projects within each agency, usually involved:

  - Proposed technical solution; that is, the extent to which the proposed solution meets the requirements.

  - Cost, although this is considered by contracting personnel as a primary criterion only when two or more vendors propose similar approaches or equipment. Vendors frequently complain that the government gives "lip service" to total life-cycle costs but really buys on the basis of front-end costs.

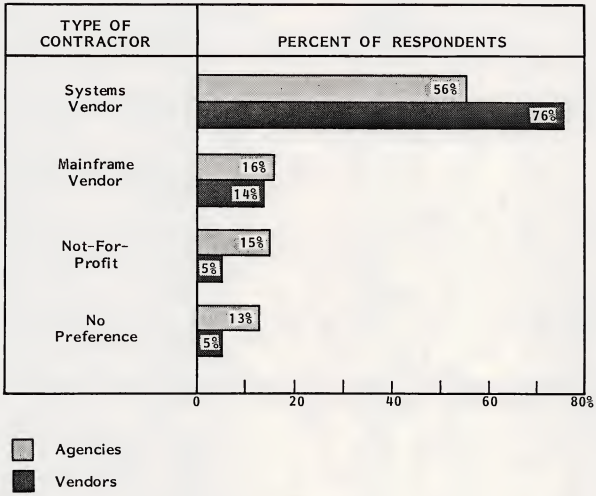
  - The type of contract, as discussed earlier, should be such that the agency has some assurances that costs and/or delivery schedules will not be overrun.

  - Risk containment procedures, including adequacy of reporting schemes and progress reports.

  - The high ranking of life-cycle cost and contract type is considered a reaction to the budgetary conflicts encountered on the way to project authorization and funding.

EXHIBIT IV-13

PREFERENCE FOR TYPE OF
SYSTEMS INTEGRATION CONTRACTOR



- Risk containment gains importance under CPFF-type contracts (according to the buyers interviewed) because the government is assuming a higher proportion of the risk than under FP contracts.

- Exhibit IV-14 shows the relative ranking of systems integration contractor selection criteria by agencies. The vendor ranking appears in Section V, and the two are compared in Exhibit II-5.

  . The technical solution is identified as the primary criterion for selection by both agencies and vendors.

  . Life-cycle cost is listed as the second most important criteria but is seldom used in actual contracting practice. Initial cost is frequently the second most important selection criterion.

E. VENDOR PERFORMANCE

- Agencies and INPUT clients suggested some variance of opinion about performance criteria and level of satisfaction in pre-research discussions. The vendor ranking of the relative importance of performance characteristics can be seen in Exhibit V-6 in Section V; the relative importance to agencies with prior SI contract experience and the importance across the agency sample are shown in Exhibit IV-15.

  - A cross-comparison exhibit was too complicated to illustrate the differences, so the comparable vendor ranking is shown on the right of Exhibit IV-15.

  - Both agencies and vendors concur that integration experience is most important and vendor location is least important. Location was more significant a decade ago under the former ASPRs.

EXHIBIT IV-14

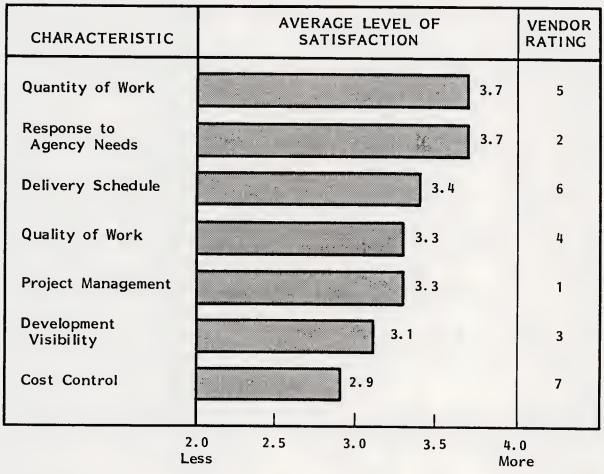
SELECTION CRITERIA SIGNIFICANCE
FOR SYSTEMS INTEGRATION CONTRACT AWARD

RANK	CRITERION
1	Technical Solution
2	Life-Cycle Cost
3	Contract Type
4	Risk Containment
5	Initial Cost
6	Project Management

Note: Ranking based on average of the level of information of agency respondents.

EXHIBIT IV-15

LEVEL OF SATISFACTION WITH
SYSTEMS INTEGRATION VENDORS



- There are wide differences of opinion on the relative importance of staff experience and federal government experience, but the remainder of the characteristics vary by only one or two levels of importance.

- Agencies with prior SI contract experience did not vary from the overall agency ranking of most characteristics, but did agree with vendors on the relative importance of price.

- The second comparison dealt with the perceived level of satisfaction with the work of systems integration vendors, and the agency ranking is listed in Exhibit IV-16. The vendor rating is shown in Exhibit V-7 in Section V, but the ranking has been added on the right edge of the agency exhibit (Exhibit IV-16) for comparison.

  - Vendors apparently agreed with agency levels of satisfaction on responsiveness, work quality, and cost control.

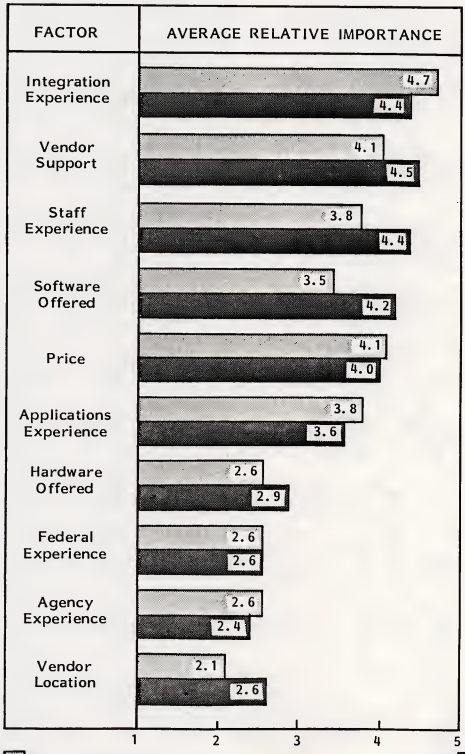
  - Vendors appear to believe that agencies are satisfied with their project management, but agencies are not, even though both concurred that it ranked sixth in selection criteria.

  - Agencies are also less satisfied with visibility of program development than vendors believe.

  - Agencies are substantially more satisfied with the quantity of work than with the quality. They assumed that higher quality levels would be a desirable objective for a successful contractor.

EXHIBIT IV-16

IMPORTANCE OF SYSTEMS INTEGRATION
CONTRACTOR PERFORMANCE CHARACTERISTICS



F. TRENDS

- Agency representatives were asked to identify those technological factors that could or might increase agency utilization of information processing resources. More than 40 factors were identified; the 12 that were named most frequently are listed in Exhibit IV-17.

  - About 33% of the respondents identified increased microcomputer availability as the most important factor in increased ADP usage.

  - Reduced (memory) storage costs, and expanded and distributed processing network availability were considered almost equally important factors.

  - The remaining eight factors include three that are communications oriented, two that suggest the need for software transportability or transparency, and two that involve the advanced technology being emphasized by military and commercial computer research.

- Agencies were also asked to identify those nontechnical factors that tend to impede increased systems acquisition. The nearly 50 suggestions have been combined into 11 factors in Exhibit IV-18.

  - As noted in Section III, Market Analysis and Forecast, more than half of the respondents identified budgetary limitations of various kinds as the largest single obstacle. Limitations in funding also contribute to the lack of available skilled staff and the difficulty in retaining them.

  - Both lack of internal concurrence and management interest in extending information automation represent the next largest restraint to increased systems acquisition and utilization.

EXHIBIT IV-17

TECHNOLOGICAL FACTORS THAT COULD INCREASE
AGENCY UTILIZATION OF INFORMATION PROCESSING RESOURCES

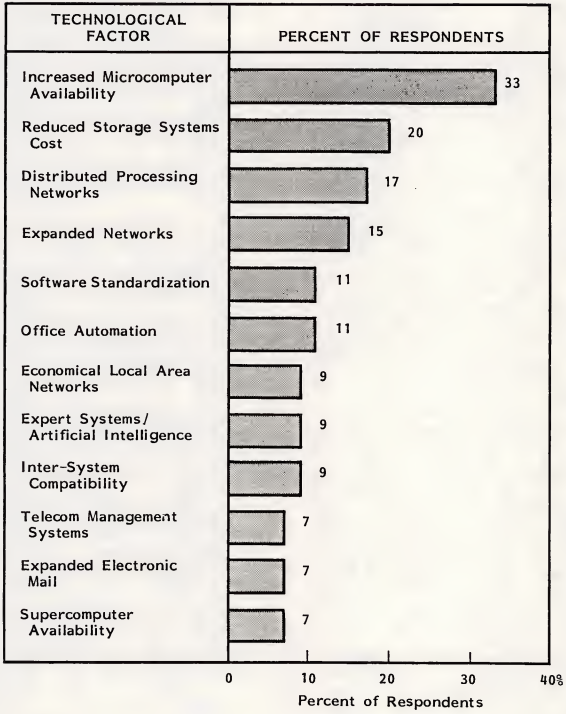
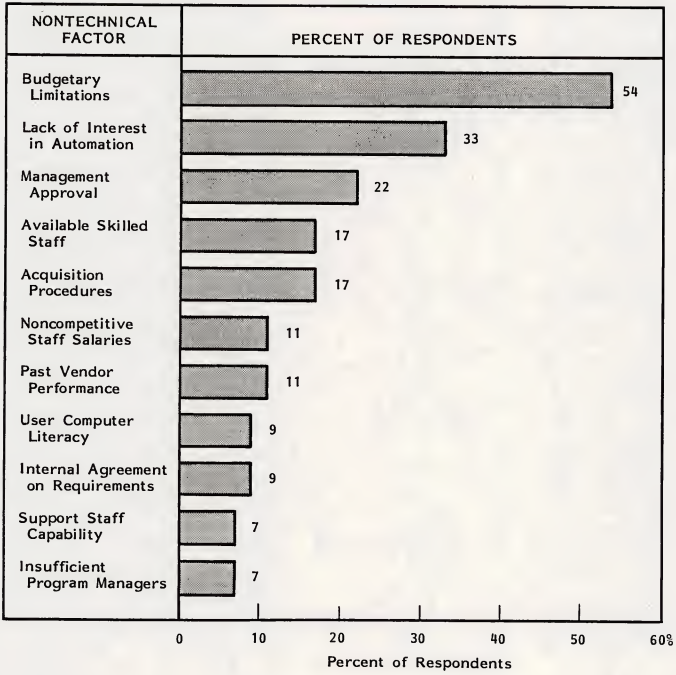


EXHIBIT IV-18

NONTECHNICAL FACTORS THAT IMPEDE
INCREASED SYSTEMS ACQUISITION



- Complex acquisition procedures and insufficient numbers of program planners and managers, coupled with less than desirable levels of user computer literacy, can become a third roadblock.

- Past vendor performance probably stands alone; it frequently occurs and is just as frequently justified by lowest price awards, inadequately defined requirements, and contract terms and conditions that are more complex than the system being developed.

V SYSTEMS INTEGRATION VENDORS

A. MARKET SHARE

- The large revenues enjoyed by systems integration contractors in 1984 and 1985 was due, in part, to the long delays encountered by most agencies in launching large systems integration projects originally scheduled for starts in the early 1980s.
  - These delayed programs primarily favored defense systems integration vendors.
  - The top vendors developed most of their revenue base on programs continued from the late 1970s.
  - The first year revenue of programs awarded in 1984 and 1985 did not significantly increase the base of ongoing programs.
    - Staffing during startup concentrates on design and specification efforts.
    - Related hardware acquisition expenditures lag behind the initial design review phases.

- INPUT's estimates of the leading SI vendors, based on GFY 1985 systems integration revenue, are indicated in Exhibit V-1. The estimates are based on "booked" revenue only and do not reflect some large awards in FY 1985 from which revenue has not been received.

- Program awards in the latter part of GFY 1984 and GFY 1985 changed the relative ranking of most of the SI vendors.

  - Army's VIABLE award to the EDS-led team is expected to grow to more than $1 billion.

  - Air Force Phase IV award to the Sperry-CSC team is expected to grow to more than $1-2 billion.

  - FAA's Air Traffic Control Replacement Program is estimated to reach $10 billion by the year 2000; Martin-Marietta's SE&I contract is valued at $640 million for the first ten years, with a ten-year renewal option.

  - Social Security Administration's Systems Modernization Program could exceed the earlier estimates of $650 million; systems integration contract to EDS may grow to $100 million.

  - Navy Inventory Control Point program award to EDS/IBM is estimated at $350 million, not including code conversion, testing, and work packages, for the base contract of eight years, with two eight-year renewal options.

  - U.S. Postal Service award to EDS for CAB-SUNSET is estimated at $200 million.

  - Navy STAFS award to the CSC/DEC team could grow to more than $200 million.

EXHIBIT V-1

TOP TEN SYSTEMS INTEGRATION VENDORS IN FEDERAL ADP SYSTEMS MARKET
BY 1985 U.S. REVENUE*

RANK	COMPANY	REVENUE†
1	Electronic Data Systems	200
2	Martin Marietta	180
3	Sperry	170
4	Science Applications International	120
5	Control Data Corporation	110
6	Computer Sciences Corporation	100
7	IBM	90
8	BDM	50
9	PRC	40
10	Ford Aerospace	20

*Updated 7/86
†INPUT Estimates in $ Millions

- WWMCCS Information System Integration contract to GTE is estimated at over $600 million.

- Navy's enlisted Personnel Administrative Support System (PASS) was awarded to Martin Marietta Data Systems for $230 million.

- Patent and Trademark Office's integrated office effort was awarded to MITRE (system engineer) and PRC (system integrator) and estimated at over $250 million.

- FEMA's National Warning System upgrade was awarded to Harris for $109 million.

- BDM won the Requirements Data Bank project of the Air Force Logistics Command, which is expected to exceed $120 million.

- Recent 1985-1986 awards are listed in Section VI. Among the most notable are:

  - Stock Control and Distribution (AFLC), with a value of $110 million, won by CSC.

  - Combat Ammunition System B (AFCAC) for $115 million, won by EDS.

- Turnkey systems for specialized applications is a much smaller but important segment of the federal integration market. Exhibit V-2 presents INPUT's estimate of leading vendors.

  - Risk involvement to the agencies is substantially lower.

  - Requirements are better defined and attractive to smaller vendors.

  - C^3 Inc. is one of the better known integration specialists in the market.

EXHIBIT V-2

TOP TEN TURNKEY SYSTEMS VENDORS IN FEDERAL ADP MARKET

RANK	COMPANY	REVENUE*
1	Computervision	$40
2	C^3, Inc.	35
3	Intergraph, Inc.	27
4	Tektronix, Inc.	22
5	Control Data	20
6	Computer Consoles	17
7	Triad	12
8	Federal Data	10
9	Prime	8
10	Harris	4

*INPUT estimates in $ millions, based on OMB/FCRC data.

- A smaller part of major systems integration vendors' revenue comes from turnkey installations (BDM, CSC, PRC, SAI).

B. ATTRACTIONS OF FEDERAL INTEGRATION CONTRACTS

- Both federal and non-federal government-based vendors are attracted to the systems integration market by its growth potential and related benefits, as shown in Exhibit V-3.

  - Almost half of those interviewed cited anticipated growth as a key factor.

  - Past SI program success was listed by about one-third of the respondents, although they did not define what success meant to them.

  - The opportunity to apply new information technology to government needs was the next most frequently cited factor.

  - Other reasons for remaining in or entering the market include:

    . New procurement policies.

    . Career path prospects.

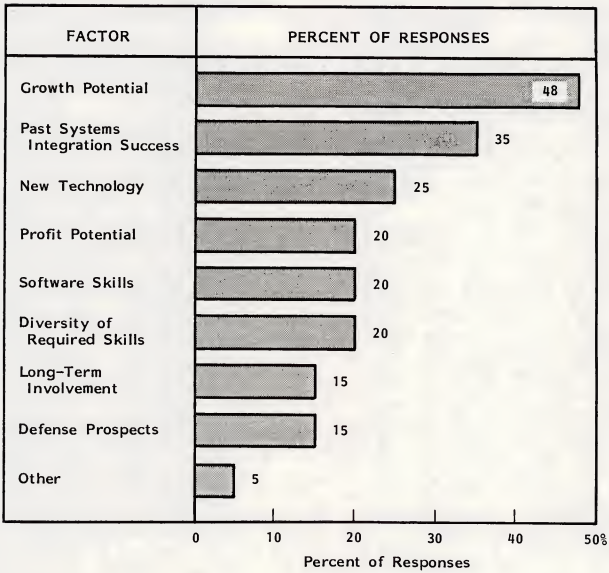
    . Long-term involvement.

    . Unique applications.

    . Contract size.

EXHIBIT V-3

FACTORS INFLUENCING DECISION TO
ENTER OR REMAIN IN FEDERAL SYSTEMS INTEGRATION MARKET



- Increasing opportunities for subcontractor specialists.

- Training prospects.

- A number of vendors voiced concern about the potential role of IBM in the SI market, specifically:

  - The existence of a large, obsolete IBM inventory that is not upwardly compatible with most mainframes of other vendors.

  - Future opposition to IBM by the House Government Operations Committee could be less than in the past, considering the reduction of IBM government share.

  - Recent changes in IBM pricing strategy offer attractive savings to the government.

  - IBM-only maintenance policies suggest IBM may team with systems or TPM vendors.

  - The IBM move to outside software vendors is accelerating the availability of a wide spectrum of applications software.

C. FEDERAL ACQUISITION PRACTICES

- The vendors interviewed were asked to comment on their perception of how the federal government is now and will be acquiring integration programs.

  - The vendor sample included large, medium, and small prime contractors and some typical subcontractors.

- Vendors questioned included both those with and without prior SI experience.

- At the time of the 1984 interviews, the new FAR (Federal Acquisition Regulations) were not in effect.

- These vendors were also not familiar with the proposed rules of the FIRMR (Federal Information Resource Management Regulations).

- Two-thirds of the vendors believe that future ADP systems will be acquired as turnkey systems, as shown in Exhibit V-4.

  - The SI contractor has prime responsibility, but may use specialized subcontractors and suppliers for:

    . Design.

    . Hardware acquisition.

    . Software development.

    . Site preparation and installation.

    . User staff training.

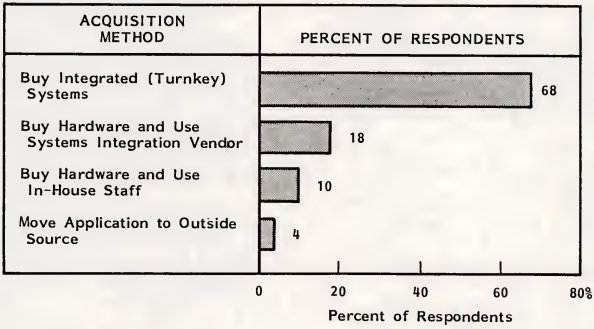
    . System maintenance (at least during warranty period).

    . Hardware systems bought competitively by the agency.

    . Separate contracts awarded for site preparation, conversion of existing applications software, validation, and verification.

EXHIBIT V-4

VENDOR VIEWS OF
FUTURE SYSTEMS INTEGRATION ACQUISITION METHODS



- Several respondents noted the increasing SE&I awards to nonprofit organizations.

- Some awards involve nonprofit organizations as SETA experts to review SE&I contract progress.

- Only about one-fifth believe that the government will use systems engineering and integration (SE&I) contractors.

- About 10% think that some agencies with staff ADP expertise will acquire hardware systems and perform systems integration in-house.

  . The Department of Energy is the major proponent of this approach.

  . Some agencies in the Department of Commerce also plan to do in-house integration.

- Very few see agencies moving new system requirements to outside sources (RCS, COCO, other government data centers).

• The vendors interviewed in 1985 perceive two forces impacting this market:

- On the one hand, agencies are under pressure (REFORM 88) to find new productivity savings in ADP.

  . They have read the Grace Commission report on the importance of automation.

  . They recognize the shortening life-cycle of hardware and software and the ever quickening pace of technology.

- They envision more computer systems tied together to exchange information.

- And, agencies also realize that:

  - Staff reductions hurt the agencies' abilities to develop the needed systems in-house.

  - Ever-increasing end-user involvement adds to an already crowded backlog of systems to be developed.

  - Tight budgets force constant re-examination of in-house and contractor expenditures.

- The outcome of these forces will shape the systems integration market in the coming years. While no vendor has the crystal ball to foresee this future, each has scenarios of what could unfold. Components of the various scenarios include:

  - An after-the-fact realization that the new systems currently being designed and implemented are not satisfactory--because of hardware/software advances or poor original designs--and must be replaced.

  - A decline in hardware and packaged software prices that makes it easier to make systems buys.

  - A reduction in agency system requirements and expectations that permits acceptance of packaged, off-the-shelf solutions and/or the further development of modifiable packages coupled with the systems support tools to make the modifications.

  - Additional attempts to do systems integration jobs in-house or with the aid of not-for-profit integrators.

- The piecemeal development of systems in an attempt to make large integration projects less visible.

- Whatever the scenario(s) that each vendor holds, most agree that the revenue potential of systems integration opportunities will increase.

  - By agency, the increases will continue to be with defense agencies, because their requirements will continue to call for complex solutions. However, as one vendor pointed out, some civil agencies have too many other problems and too many end users to satisfy to make it practical for the agencies to either ignore systems integration needs or attempt solutions in-house.

  - By application, vendors see opportunities in communications systems, including integrated offices and distributed data processing, as well as in integrated architectures that tie together data bases and in the analytic tools that create decision support systems.

- About two-thirds of the vendors prefer cost-plus-type contracts for government systems integration programs, as shown in Exhibit V-5. While cost-plus contracts regulate the margin of profit allowed, they clearly place the risk within government.

  - The long gestation period for the approval and funding of medium- to large-scale ADP systems supports the placement of risk on the buyer for several reasons.

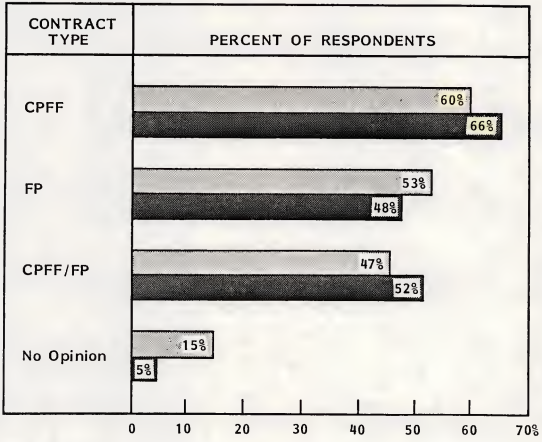
    . Availability of newer technology.

    . Increase in number of applications.

    . Increase in number and variety of interfaces with other systems.

EXHIBIT V-5

VENDOR PREFERENCE FOR TYPE OF CONTRACT
FOR SYSTEMS INTEGRATION ACQUISITION



CPFF = Cost Plus Fixed-Fee
FP = Fixed-Price

- Conversion of current software complicated by hardware and/or operating system changes.

- About half of the vendors would bid on fixed-price contracts when:

  - Requirements are fixed.

  - The agency has experienced in-house staff.

  - Hardware upgrade is compatible with existing systems.

  - No system currently exists.

- About the same number see a mix of CPFF and FP as desirable when risk-sharing shifts during implementation.

  - Design and development - CPFF.

  - Software production - CPFF.

  - Hardware and maintenance - fixed-price.

  - Straightforward (upwardly compatible) code conversion - fixed-price.

- Vendors with good SI experience appear more willing to bid fixed-price because they believe they have devised better risk containment procedures.

  - They use carefully worded and detailed project scope and work statements.

- They spread the risk among all first-tier and major second-tier subcontractors and suppliers.

- They devise and adhere to detailed Work Breakdown Schedules (WBS).

- They delineate the system requirements being met and how they will be satisfied.

- Until relatively recently, SI contract awards have generally been made to the lowest (price) bidder. Concern with potential "buy-ins," severe cost overruns, and defaulted contracts led to two-step and four-step negotiated procurement policies on large systems, especially in the Defense Department.

  - Improvements in the FPRs and FPMRs for acquisition of information resources have led to more balanced selection criteria.

  - Vendor response to the relative importance of the six key criteria is shown in Exhibit V-6.

  - Vendor ranking was based on recent experiences with significant programs and excluded some smaller procurements that deviated from the standard pattern of procurement.

    - Risk containment measures have become increasingly important to both buyer and bidders. Buyers are increasingly requiring bidders to bear more risk, to the point where bidders are increasing bids dramatically or refusing to bid at all on some jobs.

    - Especially with large, multiyear acquisitions, life-cycle cost has become a key factor.

EXHIBIT V-6

SIGNIFICANCE OF SELECTION CRITERIA
FOR SYSTEMS INTEGRATION CONTRACT AWARD

RANK	CRITERIA
1	Technical Solution
2	Risk Containment
3	Life-Cycle Cost
4	Initial Cost
5	Contract Type
6	Project Management

- Vendor maintenance is required after implementation.

- Systems are susceptible to frequent changes in application.

- Systems should be capable of growth without major rework.

. Unless otherwise limited by the RFP, bidders can propose alternate contract types.

. Vendors see project management as significant but not essential to systems acquisition. However, the vendors interviewed in 1985 added the criteria of vendor credibility and familiarity, reasoning that the "comfort level" of agencies with the vendor has become a key implicit ingredient.

D. VENDOR PERFORMANCE

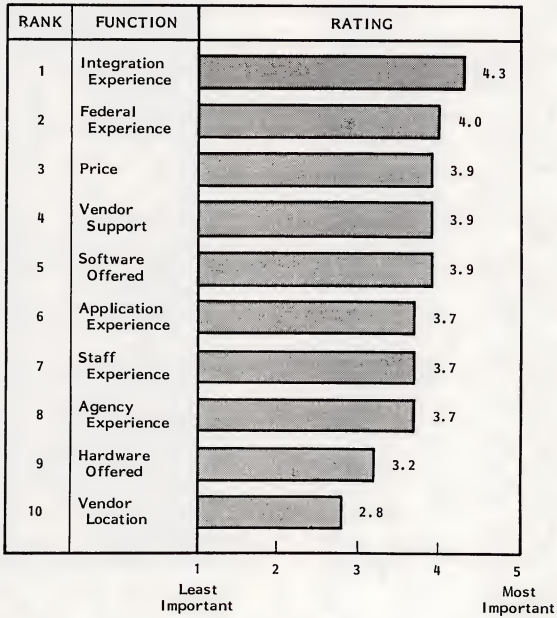
- In pre-research discussions with agencies and clients, there appeared to be some variance in opinion about contractor performance on past and current SI programs. From lists compiled with both groups, performance areas were chosen for inquiry. Vendor perceptions are ranked in importance in Exhibit V-7.

  - Prior integration experience and its benefit to overall contract performance was rated most significant by vendors and experienced agencies.

    . Sound engineering practices were employed.

EXHIBIT V-7

VENDOR RATING OF IMPORTANT VENDOR PERFORMANCE CHARACTERISTICS



- Problem areas were identified early.

- Contractor provided better visibility of progress to agency.

- Vendors believe that federal contract experience is next most important, although ranked eighth by the agencies.

  - Federal contract procedures are more complex than commercial.

  - Documentation delivery throughout the contract is more rigidly observed.

- Finally, in the latest interview, vendors pointed to the importance of financial solvency as a selection criteria.

  - Unless agencies are convinced that the bidder will be able to handle the financial strains of government contracting, there will be reluctance to award to these usually smaller vendors.

  - Recent reduction of the percentage of progress payments by DoD, from 90% to 80%, will further exacerbate the small vendor's problems.

  - Federal contracts include a number of socio-economic features not found in commercial contracts that drive up overhead and fringe benefit costs.

  - Prompt payment by law is largely policy, not practice, for many agencies.

- Price, vendor support, and software offered were held as equally important, but with somewhat more emphasis on price.

- Price was interpreted as staying reasonably close to the bid figure without consideration of agency-directed or contractor-proposed changes.

- Vendor support included response time for service calls, proximity to the installation, and management commitment.

- Experience with the intended applications, the agency and its mission, and the contractor staff backgrounds were also similar in importance.

  - Rapport with the agency project team and the ultimate user is more rapidly established and easier to maintain.

  - Operating objectives are better understood and met by the system.

  - Program execution is smoother.

- Hardware systems have less importance to the vendor:

  - In replacements, the selected hardware tends to be compatible with the existing system.

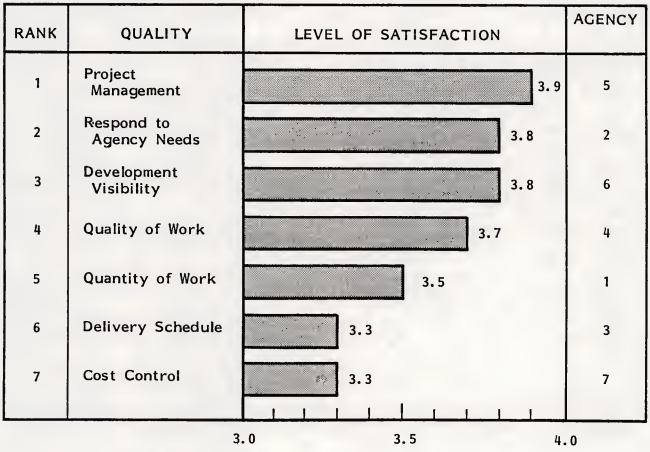
  - In new systems, hardware and hardware systems were selected or defined in the design phase.

- The importance of vendor location, once a major criterion in the 1970s, is much less significant to both vendors and agencies alike.

- Related to the importance of vendor characteristics is the agency's level of satisfaction with specific areas of vendor performance. Seven criteria were selected for evaluation by both groups. Vendor perceptions of the agencies' level of satisfaction are indicated in Exhibit V-8.

EXHIBIT V-8

AGENCY LEVEL OF SATISFACTION WITH
SYSTEMS INTEGRATION VENDORS -
VENDOR VIEWPOINT



- Project management is seen by most of the respondents as most significant.

  . Defaults occur when vendors fail to adequately manage the project.

  . Agencies react more favorably to strong project management.

  . Successful SI vendors believe agency satisfaction with project management was a key factor for success.

- Responsiveness to agency needs and agency visibility of progress and problems were viewed as next most satisfying on successful projects. Agencies were more amenable to schedule adjustments and contract changes when satisfied with performance in these areas.

- Quality of the work was held as more significant than quantity, since quality generally minimizes costly rework to overcome errors, especially in software development and interface definition.

- Agencies appear to vendors to be less satisfied with vendors' delivery schedules and cost control. These are the most visible outward signs of project progress and open to criticism from a wider spectrum of government oversight groups.

- A related vendor quality that appeared in the 1985 interviews concerned the prime contractor's relationships with highly specialized support vendors and the contractor's familiarity with specific technical applications. This becomes a key criterion in such high-tech areas as imaging, voice integration, and artificial intelligence.

E. TRENDS

- The vendors interviewed in 1985 were asked to identify technical and nontechnical trends that might influence the federal marketplace and systems integration procurement specifically. As should be expected, the perspectives varied with the primary level of business and degree of involvement in SI.

- Technical trends that were identified were of a wider variety than nontechnical. In descending order of frequency of mention, there were seven principal trends:

  - Microcomputer revolution or expansion was cited the most often:

    . Rapid increase in the number of personal computers in the government will shift information processing to the user.

    . Use of microcomputers will emphasize software transportability.

    . Increasing use of PCs will accelerate the need for English language commands and instructions.

    . With the aid of economical LANs (Local Area Networks), density of PCs will accelerate implementation and use of distributed processing.

  - Communications media and networking processes will undergo significant changes.

    . AT&T divestiture and escalating telecommunications costs have led to a GSA proposal of a new generation of federal voice/data communications network (FTS-2000).

- Interconnectivity of systems will be emphasized for rapid data transfer. There will be:
  - Development of transparent networks and/or standard protocols.
    - OSINET (Open Systems Interconnect Network).
    - MAP/TOP (Manufacturing Automation Protocols/Technical and Office Protocols).
  - Early implementation of fiber optic systems.
  - Imposition of federal data telecommunication standards.
    - OSI (Open Systems Interconnection) Standard.
    - Federal digital encryption standard.
    - ISDN (Integrated Services Digital Network) standards.

- Increased emphasis on development of expert systems and artificial intelligence by the military will be aided by similar demands of the regulatory agencies.

- Demand is increasing for open architecture, more flexible DBMS, and development of relational data base systems to:
  - Reduce paperwork generation.
  - Open data bases to manager-operated PCs.
  - Simplify intra- and inter-agency data transfer.

- There is related interest in faster and cheaper large-memory systems, with demand exceeding the development rate of optical techniques.

- Reduction in demand is seen for large, centrally located CPUs. Substitution of upgraded minicomputer-to-microcomputer networks will:

  . Require more efficient software.

  . Increase demand for graphics capability to improve visualization of the data.

  . Feedback to the need for standard, economical networks.

- Increasing emphasis will be placed on automated software production and the use of functional commands that are either symbolic or voice recognized.

• Nontechnical factors that will impact the direction and rate of growth of SI acquisition were less diverse but considered more significant to the 1986-1991 era.

- Budget trends and widespread concern with potential actions by Congress and the Federal Reserve were the most significant citations:

  . Some deficit control measures could markedly reduce ADP budgets across all agencies, as typified by budget cuts in the past several years, including those of Gramm-Rudman.

  . Any reduction in U.S.-USSR tensions may sharply reduce defense spending in all categories.

  . Unless opposed successfully by the unions, a reduction in the government workforce could accelerate vendors' introduction of new ADP technologies.

- AT&T deregulation and the resurgence of IBM in the marketplace could quickly reduce the competition to subcontractor status (if they remain in business).

- Imposition of the new FIRMR needs training of more ADP/telecommunications-oriented acquisition and contracting personnel in the government, as addressed in the Senator Quayle Amendment of the GFY 1986 Defense Authorization Act.

- Foreign competition in both ADP and telecommunications could accelerate the price reduction for hardware and, later, software. This could offer improved cost/benefits to the government.

- Congressional micro-management of ADP continues to change the balance of competitive forces in the marketplace:

  - The "Buy-Not Lease" provision of the 1984 Defense Appropriations Act could negatively impact leasing vendors and improve prospects for SI vendors if supported by the GFY 1987 Defense Authorization Act.

  - OMB will continue its reluctance to enforce a single set of acquisition regulations on all agencies with no exceptions.

  - Congress will become more interested in forcing a range of socio-economic contract terms on a high-technology industry.

  - Endless studies and investigations of every major system acquisition will be fostered, including the political aspects of new system features.

- Vendors may be required to assume more risk without passing the risk back to the agency in the form of higher priced bids.

- Vendors need to establish and maintain relationships with other similar vendors, many of whom offer expertise in very technical areas and/or have the off-the-shelf package that, when modified, could result in the required solution.

- Perhaps the most serious business issues facing turnkey systems vendors are the narrow margins on the "value added" and the lack of sufficient recurring revenue.

  - The first problem not only means that turnkey systems are inherently unprofitable, but also that they provide no flexibility in pricing. Both of these results make vendors highly vulnerable to hardware manufacturers' actions.

    - The drastic pruning of R&D budgets in 1985 that reduced the flow of new products will have multiyear impacts on many vendors.

    - In recent years, turnkey systems vendors were able to maintain price levels while the cost of hardware was declining. But as this strategy fell apart in 1985, price/performance pressures increased and will likely continue in future years.

  - As with software products, turnkey vendors are trying to move their revenue base to recurring revenue.

- INPUT believes there is a real question as to the viability of the value-added reseller (VAR) concept. Few of these companies appear to be profitable—there is high turnover and the benefit to the manufacturers may be short-term and questionable.

- One fundamental problem is that the VARs do not charge enough for the "value added." Typically, hardware costs to the VAR are of the order of 40% of the delivered sale price. INPUT considers that they need to be about 20% in order to have sufficient margin for sales, support, marketing, software development, integration, operations, and profit.

- The second fundamental problem is that unlike most turnkey vendors, the VARs do not add enough value, making it very difficult to achieve a profit margin.

- However, if a VAR does achieve that margin, it is almost immediately attacked by head-on-head competitors who offer the product at a substantial price reduction. INPUT research has shown it is very difficult to retain price differentials of more than 25% in comparable products.

- This problem is exacerbated by the manufacturers who do not support exclusivity and indeed seem to actively work against it. This is probably because they wish to keep the VARs under control. "Divide and conquer" seems to be the spirit.

- The problem is that the failure of VARs damages the manufacturer's reputation in the user community.

- The only VARs that seem successful as a group in terms of profit and stability are those which have associated services. For these companies, a turnkey system (through a VAR relationship or otherwise) is simply another vehicle to deliver a solution, and because of strong customer relationships, profit margin and recurring revenue goals can be attained.

- In the turnkey market, the use of standard hardware from vendors such as IBM is the basis for most products. However, INPUT believes there is a real case to be made for custom hardware-based systems.

  - The immediate reaction of most services companies to this concept is rejection--"I don't want to be in the manufacturing business" is the response. This fails to recognize that to be in the custom hardware business a company does not have to be a manufacturer. Apple Computer was not a manufacturer during its rapid growth years; it was not even an assembler. Apple contracted the assembly of product. IBM did the same for the most part with its PC initially.

  - The "custom hardware" can actually be almost the same if not identical to the product from the computer manufacturer. Indeed, you can buy the boards that the computer manufacturer uses in some cases. Intergraph is buying DEC VAX boards for a few thousand dollars and assembling them into its own "boxes" versus paying over $100,000 for a VAX computer.

  - Maintenance is not a problem in that user self-maintenance, remote diagnostics, depot maintenance, and other techniques can be used, not to mention the availability of third-party maintenance (TPM) organizations.

  - Inventory, of course, can be a problem. Volume is necessary to keep the cost of the custom systems at the appropriate level. A strategy could be to build volume with low margin using the manufacturer's standard product, then move to a "plug compatible" custom system as an option to the buyer with a substantial price advantage.

  - The advantage of this process is that it reduces the hardware component to the level at which appropriate profits can be made.

- The key to the use of custom hardware is that it can operate the standard manufacturer's software. In other words, it must be plug compatible or, ideally, based on the manufacturer's subassemblies.

VI KEY OPPORTUNITIES

- This section describes specific opportunities in the federal information technology market. Three lists of programs are provided.
  - Recent Awards.
  - Future Systems Integration Opportunities.
  - Future Turnkey Systems Opportunities.
- Although neither opportunity list is all-inclusive, both consist of major programs which are typical of the federal market.
- The list of opportunities becomes smaller after FY87 because new programs have not yet been identified or initially approved by the responsible agency. Subsequent issues of this report and the INPUT Procurement Analysis Reports will include additional programs and detailed program information for the FY 1988 to FY 1991 timeframe.

A. PRESENT AND FUTURE PROGRAMS

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

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

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

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

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

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

- Classified program documentation available to qualified DoD contractors.

- Turnkey systems and systems integration opportunities may not be identified specifically as such in these documents.

  - Information technology planning documents usually identify mission requirements to be met by specific programs rather than methods for meeting these requirements.

  - Some mission requirements could be satisfied equally well either by custom system development or by turnkey system acquisition.

  - An agency decision to use a systems integration contractor may not be made until a program is well under way and an acquisition plan has

been formulated. Over the last several years, however, agencies have shown an increasing tendency to use systems engineering and integration contractors for larger, more complex systems.

- All funding proposals are based on cost data of the year submitted with inflation factors dictated by the Administration as part of its fiscal policy and are subject to revision, reduction, or spread to future years in response to Congressional direction. Some additional reductions will be likely in FY 1987 and beyond due to the deficit reduction constraints of the Gramm-Rudman-Hollings Act.

B. RECENT AWARDS

AGENCY/PROGRAM (PAR REFERENCE)	CONTRACTOR(s)	VALUE ($M)
DEPARTMENT OF DEFENSE - AIR FORCE:		
WWMCCS Information System (WIS) (V-I-32)	GTE IBM SRA	UNK 107.0 UNK
Command Readiness Exercise System (V-I-34) Phase I	BDM	12.0
Stock Control and Distribution (SC&D) Distribution System (V-I-38)	CSC	110.0
Maintenance Job Tracking - Service Data Collection (V-I-40)	Ford Aerospace	18.4
ATC TRIMS (V-I-52)	Hazeltine	UNK
Network Control Center (V-I-57)	Codex	1.6
Engineering Data Computer Assisted Retrieval (EDCAR) System (V-I-68)	AT&T Alpharel	UNK

Combat Ammunition System - B (CAS - B) (V-1-88)	EDS	115.0
Technical Integration Contractor Services (V-1-95)	AT&T	UNK
DEPARTMENT OF DEFENSE - ARMY:		
Tactical Army Combat Service Support Computer System/Division Level Data Entry Device ADP Aystem (V-2-7)	SDC	15.3
Maneuver Control System (V-2-12)	Ford Aerospace Ford Aerospace	UNK 5.1
DEPARTMENT OF DEFENSE - NAVY:		
Base Engineering Support Technical (BEST) Minicomputers (V-3-20)	Honeywell	4.6
Uniform Chart of Accounts (V-3-21)	Federal Data	45.0
NEDN Oceanographic Data Distribution and Expansion Systems/Satellite Processing and Display Systems (NODDES/SPADS) (V-3-45)	Ocean Data Systems	0.2
DEPARTMENT OF DEFENSE - DEFENSE LOGISTICS AGENCY:		
Engineering Drawing Automated Storage and Retrieval System (EDASRE) (V-4A-7)	INFODETICS	8.0
WWMCCS Information System (V-4B-3)	GTE Ford Aerospace	UNK UNK
CIVIL - COMMERCE:		
Workstations and User Services (VI-6-10)	SDC PRC	1.2 280.0
CIVIL - HEALTH AND HUMAN SERVICES:		
Processing Center Hardware Replacement (VII-8-8)	EDS	UNK
CIVIL - INTERIOR:		
Automated Land and Mineral Record System (ALMRS) (VII-9-11)	AMS	UNK

CIVIL - JUSTICE:		
Automated Intrusion Detection System (VII-10-4)	IBM	2.3
Automated Management Information Civil User System (AMICUS) (VII-10-8)	Four Phase	5.5
CIVIL - GENERAL SERVICES ADMINISTRATION:		
Office Automation Project (VIII-14-6)	C3, Inc.	73.6
CIVIL - NASA:		
Integrated Office Automation System (VIII-15-56)	CSC	14.9
Numerical Aerodynamic Simulator (NAS) Processing System Network (NPSN)	Sterling Software	UNK
High Speed Processor #2 (VIII-15-60)	GE MATSCO	UNK
CIVIL - VETERANS ADMINISTRATION:		
Expand Supply Processing and Distribution System (VIII-16-5)	SMS Data Products	1.8

C. SYSTEMS INTEGRATION OPPORTUNITIES BY AGENCY

AGENCY/PROGRAM	PAR REFERENCE	SCHEDULE	FY86-FY91 FUNDING ($M)
DEPARTMENT OF DEFENSE - AIR FORCE:			
System Engineering Support for NORAD Computer System	V-1-30	RFP 4QFY86	17.3
WWMCCS Information System (WIS)	V-1-32	RFPs FY-84-FY86	667.1
Command Readiness Exercise System (CRES) Phases II, III	V-1-34	RFPs FY86-FY87	21.6

Command Center Processing and Display Systems (CCPDS)	V-1-46	RFP 8/86	13.6
Technical Repair Center Technical Order Distribution (TRCTOD)	V-1-53	RFP 8/86	9.3
Embedded Computer Systems/ Configuration Management System (ECS/CMS)	V-1-82	RFP FY87	1.4
MAC IPS	V-1-101	RFP 8/86	119.7
Unified Local Area Network Architecture (ULANA)	V-1-102	RFP 7/86	30.0
Initial Computer Support for the Pipeline Management System			8.6
DEPARTMENT OF DEFENSE - ARMY:			
Project 80X - Phase II	V-2-2	AWD 5/87	116.7
World Wide Military Command and Control System (WWMCCS) Information System (AWIS)	V-2-8		390.4
SIDPERS - 3	V-2-13	RFP 5/85	74.3
Headquarters Integrated Office System (HIOS)	V-2-22		26.7
General Purpose Computing Requirement	V-2-29	RFP FY87	UNK
Integrated Procurement System (IPS)			163.1
Corporate Data Base (CDB)			24.3
DEPARTMENT OF DEFENSE - NAVY:			
Shipyard/Ordnance Electric System (SHORES)	V-3-4	RFP 1QFY87	80.0
21 Victor Follow-on	V-3-12		5.4
NICADMM	V-3-14	RFP 4QFY86	18.0
Navy Command and Control System Transition			58.4

Space Information Management System (SIMS)			8.5
DEPARTMENT OF DEFENSE - DEFENSE NUCLEAR AGENCY:			
WWMCCS Information System	V-4B-3	RFP 9/86	28.5
DEPARTMENT OF DEFENSE - DEFENSE CONTRACT AUDIT AGENCY:			
DCAA Integrated Information System (DIIS)	V-4C-1	RFP 9/86	36.5
DEPARTMENT OF DEFENSE - TRIMIS PROGRAM OFFICE:			
Composite Health Care System (CHCS)	V-4E-1	AWD 4QFY86	463.9
DEPARTMENT OF DEFENSE - WASHINGTON HEADQUARTERS SERVICES:			
Document Storage and Retrieval System	V-4E-3	FY87	1.7
Development of an Internaional Treaties Data System			1.4
CIVIL - DEPARTMENT OF COMMERCE:			
Census Electronic Publishing System	VI-6-22	Bid Closed 7/86	2.8
Advanced Weather Interactive Processing System (AWIPS)	VI-6-24	RFP 4QFY86	133.0
CIVIL - HEALTH AND HUMAN SERVICES:			
Processing Center Hardware Replacement	VII-8-8	RFP 4QFY86	53.1
PRISM	VII-8-20		44.6
Systems Engineering and Integration Contractor			36.0
Recompete Clinical Center Medical Information System			19.7
CIVIL - HOUSING AND URBAN DEVELOPMENT:			
HUD Integrated Information Processing Service (HIIPS)	VII-9B-4	RFP 1/87	240.0

CIVIL - INTERIOR:			
Automated Land and Mineral Record System (ALMRS)	VII-9-11	RFPs 3Q and 4QFY87	66.2
Systems Integration			2.8
CIVIL - TRANSPORTATION:			
Vessel Tracking System (VTS)	VII-11-22	UNK	3.3
CIVIL - TREASURY:			
Automated Criminal Investigation (ACI) MIS	VII-12-15	UNK	21.4
Automated Financial System	VII-12-29	RFP FY88	21.2
Integrated Collection System	VII-12-33	RFP 10/86	154.2
Counsel Activity Tracking System (CATS)	VII-12-34		16.8
Service Center Cost Accounting/ Integrated Management System (IMS)	VII-12-35	RFP 4/86	10.1
Real-Time Input Systems	VII-12-43		99.8
ADP Equipment	VII-12-47		6.3
CIVIL - NASA:			
Numerical Aerodynamic Simulator (NAS) Processing System Network (NPSN) - High Speed Processor #2	VIII-15-60	RFPs 2QFY87-FY88	32.3
Customer Data Operations System (CDOS)	VIII-15-62	RFP 11/86	UNK
Technical Management Information System (TMIS)	VIII-15-64	RFP 7/86	66.4

D. TURNKEY SYSTEMS OPPORTUNITIES BY AGENCY

AGENCY/PROGRAM	PAR REFERENCE	SCHEDULE	FY86-FY91 FUNDING ($M)
DEPARTMENT OF DEFENSE - AIR FORCE:			
ATC TRIMS	V-1-52	RFP FY87	6.4
Engineering Data Computer Assisted Retrieval (EDCAR) System	V-1-68		41.3
Purchase of ADPE to Support B-1B Computer Based Instruction System			6.9
DEPARTMENT OF DEFENSE - ARMY:			
Automated Drafting Systems	V-2-16	1QFY87	32.0
Computer Adaptive Testing (CAT)			45.0
Army Commissary Automation System (ACAS)			12.5
Joint Optical Information Network (JOIN)			74.3
DEPARTMENT OF DEFENSE - NAVY:			
Source Data Collection Automation	V-3-15	RFP 4QFY86	6.3
Printing Resources Management Information System (PRMIS) II	V-3-34	RFP 1QFY87	14.8
CADD System Expansion - Graphics Workstations	V-3-70	RFP 4QFY86	6.3
Tri-Service Laboratory System			8.1
SPAR (Stock Point ADP Replacement) O/A ADP Systems		RFP 4QFY86	225.0
DEPARTMENT OF DEFENSE - MARINE CORPS:			
Miniaturization/Automation of Personnel Records			3.1

DEPARTMENT OF DEFENSE - DEFENSE LOGISTICS AGENCY:			
Engineering Drawing Automated Storage and Retrieval System (EDASRE) Phase II	V-4A-7	1QFY87	5.2
CIVIL - AGRICULTURE:			
Integrated Library System			1.0
CIVIL - DEPARTMENT OF COMMERCE:			
Electronic Demand Printing	VI-6-20		8.2
Integrated Digital Photogrammetric Facility (IDPF)			6.3
CIVIL - ENERGY:			
Text Editor Processor Replacement	VI-7-42	RFP 4QFY85	1.4
CIM System			2.0
CIM System			4.4
CIM System			1.2
CIM System			2.8
CIM System			4.2
Computer Aided Engineering System			1.9
CIM System			1.8
CIM System			4.0
CIM System			4.2
CIM System			3.7
CIM System			3.0
CIM System			3.0
CIM Systems and Network			1.1
Weapons Related CIM System			1.2

CIM Systems and Network	1.4
CIM Production System	4.9
CIM Systems and Networks Expansion	5.6
CIM Automation	0.1
CIM Automation	1.7
Procode Automated Manufacturing System	0.3
Procode Automated Manufacturing System	1.7
CIM Systems and Network	1.0
Facilities CAD System	1.0
CIM Production System	4.1
CIM Replacement System	2.0
CIM Systems and Networks Expansion	3.2
Procode Automated Manufacturing System	1.5
CIM Computer Upgrade	2.0
CIM Workstations	2.0
Weapons Related CIM System	1.2
CIM Automation	1.2
Procode Automated Manufacturing System	2.0
CIM Workstation	2.0
CIM Production Schedule	3.5
Procode Automated Manufacturing System	1.3
CIM Workstations	2.0
CIM Computer Upgrade	2.0

Procode Automated Manufacturing System		1.1
CIM Workstations		2.0
CIM Computer Upgrade		2.0
Graphics Computer		1.0
CAD CPU Replacement System		1.5
Second Generation CADD System		5.0
CIVIL - HEALTH AND HUMAN SERVICES:		
Computer Based Training System		1.2
Computer Aided Drafting Design System (CADD)		3.5
CIVIL - INTERIOR:		
Automated Graphics Output	VII-9-3	9.0
Computer-Aided Drafting Design System		21.7
CIVIL - NASA:		
3 Computervision Systems for CAD		1.3
CAD Systems Maintenance		1.4
Interactive Graphics Design System Maintenance		6.4
Interactive Graphics Design System Central System Requirement		2.5
Interactive Graphics Design System Modifications		4.2
Interactive Graphics Design System Modifications		1.4
Interactive Graphics Design System Modifications		2.2
Interactive Graphics Design System Modifications		2.3

Interactive Graphics Design System Modifications			3.0
CAD Workstations			2.5
Computer Aided Development/Computer Aided Engineering			5.9
Interactive Graphics System			1.2
CAE Amendment 3			1.8
CIVIL - TRANSPORTATION:			
Computerized Typesetting System			0.1
CIVIL - TREASURY:			
OCR/MICR	VII-12-31	RFP 1QFY86	2.0
Files Archival Image Storage and Retrieval (FAISR)	VII-12-37		116.9
OCR Equipment			1.6
OCR - Federal Tax Deposits			16.9
CIVIL - SECURITIES AND EXCHANGE COMMISSION:			
Electronic Filing System (EDGAR)	VIII-23-3	AWD 4QFY86	19.8
CIVIL - EXECUTIVE OFFICE OF THE PRESIDENT:			
Institutional Memory and Records Management			0.1
CIVIL - US INFORMATION AGENCY:			
Procurement of a Text-Editing Facility			3.9

APPENDIX A: INTERVIEW PROFILES

A. FEDERAL AGENCY RESPONDENT PROFILE

1. CONTACT SUMMARY

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

- The distribution of job classifications among individual agency respondents for the 1985 analysis was as follows:

	Policy	Buyers	Users	Total
Respondents	22	5	6	33

2. LIST OF AGENCIES INTERVIEWED

- Respondents (1985 only) represented the agencies listed below, with the number in parentheses indicating the number of different contacts within the agency.

- Department of Defense.
  - Air Force.
  - Army (3).
  - Navy (2).
  - Marine Corps.
  - Defense Logistics Agency.
  - Defense Nuclear Agency.
  - Office of the Secretary.
- Civilian Agencies.
  - Department of Agriculture (2).
  - Department of Commerce.
  - Department of Education.
  - Department of Energy.
  - Federal Emergency Management Agency.
  - General Services Administration (2).
  - Department of Health and Human Services.
  - Department of Housing and Urban Development.

- Department of Interior.
- Department of Justice.
- National Aeronautics and Space Administration.
- Securities and Exchange Commission.
- Department of State.
- Department of Transportation (2).
- Department of the Treasury (3).

B. VENDOR RESPONDENT PROFILE

- For the 1986 study, INPUT contacted a representative sample of vendors who provide turnkey systems to the federal government.
- Job classifications among individual vendor respondents included marketing as well as administrative executives.
- All contacts with vendor personnel were made by telephone.

APPENDIX B: DEFINITIONS

- The definitions in this appendix include hardware, software, services, and telecommunications categories to accommodate the range of integrated information systems 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 nontechnical terminology that is associated with applications, documentation, budgets, authorization, and the procurement/acquisition process is included in Appendix C, Glossary.

A. SERVICE MODES

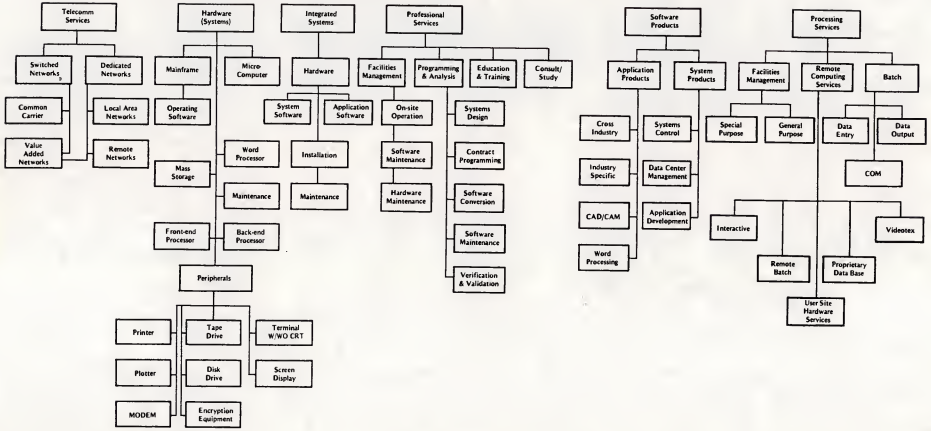
1. PROCESSING SERVICES

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

- REMOTE COMPUTING SERVICES (RCS) - Provision of data processing to a user by means of terminals at the user's site(s). Terminals are connected by a data communications network to the vendor's central computer. The most

EXHIBIT B-1

FEDERAL INFORMATION SYSTEMS AND SERVICES PROGRAM
SYSTEMS AND SERVICES MODES



frequent contract vehicle for RCS in the federal government is GSA's Teleprocessing Services Program (TSP). RCS includes four submodes.

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

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

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

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

  - Access to a communications network.

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

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

  - Significant software as part of the service.

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

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

2. PROFESSIONAL SERVICES

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

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

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

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

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

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

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

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

3. TURNKEY SYSTEMS

- Also known as integrated systems, turnkey systems include systems and applications software packaged with hardware as a single entity. Most CAD/CAM

systems and many small business systems are integrated systems. This mode does not include specialized hardware systems such as word processors, cash registers, and process control systems.

4. SOFTWARE PRODUCTS

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

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

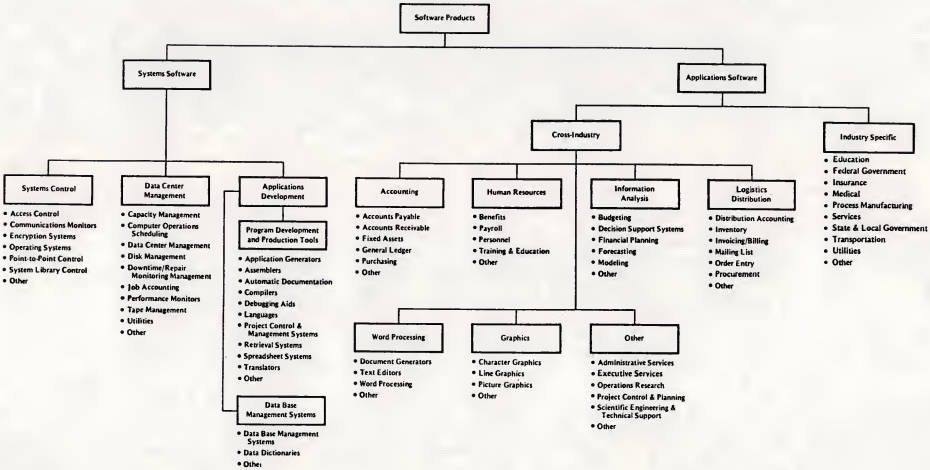
  - CROSS-INDUSTRY PRODUCTS - Used in multiple industry applications as well as in federal government sectors. Examples are payroll, inventory control, and financial planning.

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

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

EXHIBIT B-2

SOFTWARE PRODUCTS



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

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

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

5. HARDWARE AND HARDWARE SYSTEMS

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

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

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

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

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

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

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

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

    . Single-station or standalone.

    . Multi-station shared processor.

    . Teleprinter.

    . Remote batch.

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

    . Single-station.

    . Multi-station shared processor.

    . Teleprinter.

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

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

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

    . Integrated circuit package.

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

    . Console including keyboard and interfacing connectors.

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

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

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

    . Personal business computer.

    . Small laboratory computer.

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

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

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

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

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

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

    - Parallel processors.

    - Pipeline processor.

    - Vector processor.

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

6. TELECOMMUNICATIONS

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

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

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

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

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

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

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

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

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

    - Multiple channels through FDM or TDM.

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

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

  - MODE - may be either:

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

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

  - MEDIA - May be any of the following:

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

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

    . COAXIAL CABLE - A cable consisting of an insulated central conductor surrounded by a cylindrical conductor with additional insulation on the outside and covered with an outer sheath used in HF (high frequency) and VHF (very high frequency), single

frequency, or carrier-based systems; requires frequent reamplification (repeaters) to carry the signal any distance.

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

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

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

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

B. GENERAL DEFINITIONS

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

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

- 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 through appending of signal elements to the data.

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

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

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

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

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

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

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

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

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

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

- CO - Central Office--local telco site for one or more exchanges.

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

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

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

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

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

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

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

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

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

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

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

- DECNET - Digital Equipment Company's network architecture.

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

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

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

- DISOSS - IBM's DIStributed Office Support System--office automation environment, based on DCA and DIA, which permits document (text) transfer

between different hardware and software systems without requiring subsequent format or content revision.

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

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

- EBCDIC - Extended Binary Coded Decimal Interchange Code--eight-bit code typically used in IBM mainframe environments.

- EFT - Electronic funds transfer.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- HDLC - High-level Data Link Control.

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

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

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

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

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

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

- INTERCONNECTION - Physical linkage between devices on a network.

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

- ISDN - Integrated Services Digital Network--integrated voice and non-voice public network service which is completely digital. Not clearly defined

through any existing standards although FCC and other federal agencies are participating in the development of CCITT recommendations.

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

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

- MACHINE REPAIRERS - Individuals who install and periodically service computer systems.

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

- 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.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- PPM - Pulse Position Modulation.

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

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

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

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

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

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

- SDN - Software-Defined Network.

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

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

- SIMPLEX - Undirectional communications.

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

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

- SOFTWARE - Computer programs.

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

- SWITCHED CIRCUIT - Temporary connection between two network stations established through dial-up procedures.

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

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

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

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

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

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

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

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

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

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

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

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

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

C. OTHER CONSIDERATIONS

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

APPENDIX C: GLOSSARY OF ACRONYMS

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

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

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

A. FEDERAL ACRONYMS

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

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

BCA	Board of Contract Appeals.
Benchmark	Method of evaluating ability of a candidate computer system to meet user requirements.
Bid protest	Objection (in writing, before or after contract award) to some aspect of a solicitation by a valid bidder.
BML	Bidders Mailing List - qualified vendor information filed annually with federal agencies to automatically receive RFPs and RFQs in areas of claimed competence.
BOA	Basic Ordering Agreement.
B&P	Bid and Proposal - vendor activities in response to government solicitation/specific overhead allowance.
BPA	Blanket Purchase Agreement.
Budget	Federal Budget, proposed by the President and subject to Congressional review.
C^2	Command and Control.
C^3	Command, Control, and Communications.
C^4	Command, Control, Communications, and Computers.
C^3I	Command, Control, Communications, and Intelligence.
CAB	Contract Adjustment Board or Contract Appeals Board.
CADE	Computer-Aided Design and Engineering.
CADS	Computer-Assisted Display Systems.
CAIS	Computer-Assisted Instruction System.
CAPS	Command Automation Procurement Systems.
CAS	Contract Administration Services or Cost Accounting Standards.
CASB	Cost Accounting Standards Board.
CASP	Computer-Assisted Search Planning.
CBD	Commerce Business Daily - U.S. Department of Commerce publication listing government contract opportunities and awards.
CBO	Congressional Budget Office.
CCDR	Contractor Cost Data Reporting.

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

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

DOC	Department of Commerce.
DOE	Department of Energy.
DOI	Department of Interior.
DOJ	Department of Justice.
DOS	Department of State.
DOT	Department of Transportation.
DPA	Delegation of Procurement Authority (granted by GSA under FPRs).
DPC	Defense Procurement Circular.
DQ	Definite Quantity Contract.
DQ/PL	Definite Quantity Price List Contract.
DR	Deficiency Report.
DSN	Defense Switched Network.
DSP	Defense Support Program (WWMCCS).
DSS	Defense Supply Service.
DTC	Design-To-Cost.
ECP	Engineering Change Proposal.
ED	Department of Education.
EEO	Equal Employment Opportunity.
8(a) Set-Aside	Agency awards direct to Small Business Administration for direct placement with a socially/economically disadvantaged company.
EMC	Electro-Magnetic Compatibility.
EMCS	Energy Monitoring and Control System.
EO	Executive Order - Order issued by the President.
EOQ	Economic Ordering Quantity.
EPA	Economic Price Adjustment.
EPA	Environmental Protection Agency.
EPMR	Estimated Peak Monthly Requirement.
EPS	Emergency Procurement Service (GSA) or Emergency Power System.
EUC	End User Computing, especially in DoD.

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

• FTPS	Federal Telecommunications Standards Program administered by NCS; Standards are published by GSA.
• FTS	Federal Telecommunications System.
• FTS 2000	Proposed replacement for the Federal Telecommunications System.
• FY	Fiscal Year.
• FYDP	Five-Year Defense Plan.
• GAO	General Accounting Office.
• GFE	Government-Furnished Equipment.
• GFM	Government-Furnished Material.
• GFY	Government Fiscal Year (October to September).
• GIDEP	Government-Industry Data Exchange Program.
• GOCO	Government Owned - Contractor Operated.
• GOGO	Government Owned - Government Operated.
• GPO	Government Printing Office.
• GPS	Global Positioning System.
• GS	General Schedule.
• GSA	General Services Administration.
• HPA	Head of Procuring Activity.
• HSDP	High-Speed Data Processors.
• HUD	(Department of) Housing and Urban Development.
• ICA	Independent Cost Analysis.
• ICAM	Integrated Computer-Aided Manufacturing.
• ICE	Independent Cost Estimate.
• ICP	Inventory Control Point.
• ICST	Institute for Computer Sciences and Technology, National Bureau of Standards, Department of Commerce.
• IDAMS	Image Display And Manipulation System.
• IDEP	Interservice Data Exchange Program.
• IDN	Integrated Data Network.

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

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

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

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

MIPR	Military Interdepartmental Purchase Request.
MOD	Modification.
MOL	Maximum Ordering Limit (Federal Supply Service).
MPC	Military Procurement Code.
MYP	Multi-Year Procurement.
NARDIC	Navy Research and Development Information Center.
NASA	National Aeronautics and Space Administration.
NBS	National Bureau of Standards.
NCMA	National Contract Management Association.
NCS	National Communications System; responsible for setting U.S. Government standards administered by GSA; also holds primary responsibility for emergency communications planning.
NICRAD	Navy-Industry Cooperative Research and Development.
NIP	Notice of Intent to Purchase.
NMCS	National Military Command System.
NSA	National Security Agency.
NSEP	National Security and Emergency Preparedness.
NSF	National Science Foundation.
NSIA	National Security Industrial Association.
NTIA	National Telecommunications and Information Administration of the Department of Commerce; replaced the Office of Telecommunications Policy in 1970 as planner and coordinator for government communications programs; primarily responsible for radio.
NTIS	National Technical Information Service.
Obligation	"Earmarking" of specific funding for a contract from committed agency funds.
OCS	Office of Contract Settlement.
OFCC	Office of Federal Contract Compliance.
Off-Site	Services to be provided near but not in government facilities.

OFMP	Office of Federal Management Policy (GSA).
OFPP	Office of Federal Procurement Policy.
OIRM	Office of Information Resources Management.
O&M	Operations & Maintenance.
OMB	Office of Management and Budget.
O,M&R	Operations, Maintenance, and Repair.
On-Site	Services to be performed on a government installation or in a specified building.
OPM	Office of Procurement Management (GSA) or Office of Personnel Management.
Options	Sole-source additions to the base contract for services or goods to be exercised at the government's discretion.
OSHA	Occupational Safety and Health Act.
OSP	Offshore Procurement.
OTA	Office of Technology Assessment (Congress).
Out-Year	Proposed funding for fiscal years beyond the Budget Year (next fiscal year).
P-I	FY Defense Production Budget.
P^3I	Pre-Planned Product Improvement (program in DoD).
PAR	Procurement Authorization Request or Procurement Action Report.
PAS	Pre-Award Survey.
PASS	Procurement Automated Source System.
PCO	Procurement Contracting Officer.
PDA	Principal Development Agency.
PDM	Program Decision Memorandum.
PDR	Preliminary Design Review.
PIR	Procurement Information Reporting.
PME	Performance Monitoring Equipment.
PMP	Purchase Management Plan.
PO	Purchase Order or Program Office.
POM	Program Objective Memorandum.

PPBS	Planning, Programming, Budgeting System.
PR	Purchase Request or Procurement Requisition.
PS	Performance Specification - alternative to a Statement of Work, when work to be performed can be clearly specified.
QA	Quality Assurance.
QAO	Quality Assurance Office.
QMCS	Quality Monitoring and Control System (DoD software).
QMR	Qualitative Material Requirement (Army).
QPL	Qualified Products List.
QRC	Quick Reaction Capability.
QRI	Quick Reaction Inquiry.
R-1	FY RDT&E Budget.
RAM	Reliability, Availability, and Maintainability.
RC	Requirements Contract.
R&D	Research and Development.
RDA	Research, Development, and Acquisition.
RDD	Required Delivery Date.
RD&E	Research, Development, and Engineering.
RDF	Rapid Deployment Force.
RDT&E	Research, Development, Test, and Engineering.
RFI	Request For Information.
RFP	Request For Proposal.
RFQ	Request For Quotation.
RFTP	Request For Technical Proposals (Two-Step).
ROC	Required Operational Capability.
ROI	Return On Investment.
RTAS	Real Time Analysis System.
RTDS	Real Time Display System.
SA	Supplemental Agreement.
SBA	Small Business Administration.

SB Set-Aside	Small Business Set-Aside contract opportunities with bidders limited to certified small businesses.
SCA	Service Contract Act (1964 as amended).
SCN	Specification Change Notice.
SDN	Secure Data Network.
SEC	Securities and Exchange Commission.
SE&I	Systems Engineering and Integration.
SETA	Systems Engineering/Technical Assistance.
SETS	Systems Engineering/Technical Support.
SIBAC	Simplified Intragovernmental Billing and Collection System.
SIMP	Systems Integration Master Plan.
SIOP	Single Integrated Operations Plan.
SNAP	Shipboard Nontactical ADP Program.
Sole Source	Contract award without competition.
Solicitation	Invitation to submit a bid.
SOR	Specific Operational Requirement.
SOW	Statement of Work.
SSA	Source Selection Authority (DoD).
SSAC	Source Selection Advisory Council.
SSEB	Source Selection Evaluation Board.
SSO	Source Selection Official (NASA).
STINFO	Scientific and Technical INFOrmation Program - Air Force/NASA.
STU	Secure Telephone Unit.
SWO	Stop-Work Order.
Synopsis	Brief description of contract opportunity in CBD after D&F and before release of solicitation.
TA/AS	Technical Assistance/Analyst Services.
TEMPEST	Studies, inspections, and tests of unintentional electromagnetic radiation from computer, communication, command, and control equipment that may cause unauthorized disclosure of information; usually applied to DoD and security agency testing programs.

TILO	Qualified Requirements Information Program - Army.
TM	Time and Materials contract.
TOA	Total Obligational Authority (Defense).
TOD	Technical Objective Document.
TR	Temporary Regulation (added to FPR, FAR).
TRACE	Total Risk Assessing Cost Estimate.
TRCO	Technical Representative of the Contracting Offices.
TREAS	Department of Treasury.
TRP	Technical Resources Plan.
TSP	GSA's Teleprocessing Services Program.
TVA	Tennessee Valley Authority.
UCAS	Uniform Cost Accounting System.
USA	U.S. Army.
USAF	U.S. Air Force.
USCG	U.S. Coast Guard.
USMC	U.S. Marine Corps.
USN	U.S. Navy.
U.S.C.	United States Code.
USPS	United States Postal Service.
USRRB	United States Railroad Retirement Board.
VA	Veterans Administration.
VE	Value Engineering.
VHSIC	Very High Speed Integrated Circuits.
VIABLE	Vertical Installation Automation BaseLine (Army).
VICI	Voice Input Code Identifier.
WBS	Work Breakdown Structure.
WGM	Weighted Guidelines Method.
WIN	WWMCCS Intercomputer Network.
WIS	WWMCCS Information Systems.

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

B. GENERAL AND INDUSTRY ACRONYMS

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

- UPS — Uninterruptable Power Source.
- VLSI — Very Large Scale Integration.

APPENDIX D: POLICIES, REGULATIONS, AND STANDARDS

A. OMB CIRCULARS

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

B. GSA PUBLICATIONS

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

C. DoD DIRECTIVES

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

D. STANDARDS

• ADCCP	Advanced Data Communications Control Procedures; ANSI standard X3.66 of 1979; also NBS FIPS 71.
• CCITT G.711	International PCM standard.
• CCITT T.0	International standard for classification of facsimile apparatus for document transmission over telephone-type circuits.
• DEA-1	Proposed ISO standard for data encryption based on the NBS DES.

• EIA RS-170	Monochrome video standard.
• EIA RS-170A	Color video standard.
• EIA RS-464	EIA PBX standards.
• EIA RS-465	Standard for Group III facsimile.
• EIA RS-466	Facsimile standard; procedures for document transmission in the general switched telephone network.
• EIA RS-232-C	EIA DCE to DTE interface standard using a 25-pin connector; similar to CCITT V.24.
• EIA RS-449	New EIA standard DTE to DCE interface which replaces RS-232-C.
• FED-STD 1000	Proposed Federal Standard for adoption of the full OSI reference model.
• FED-STD 1026	Federal Data Encryption Standard (DES) adopted in 1983; also FIPS 46.
• FED-STD 1041	Equivalent to FIPS 100.
• FED-STD 1061	Group II facsimile standard (1981).
• FED-STD 1062	Federal standard for Group III facsimile; equivalent to EIA RS-465.
• FED-STD 1063	Federal facsimile standard equivalent to EIA RS-466.
• FED-STDs 1005, 1005A - 1008	Federal standards for DCE coding and modulation.
• FIPS 46	NBS Data Encryption Standard (DES).
• FIPS 81	DES Modes of Operation.
• FIPS 100	NBS standard for packet switched networks; subset of 1980 CCITT X.25.
• FIPS 107	NBS standard for local area networks, similar to IEEE 802.2 and 802.3.
• IEEE 802.2	OSI-compatible IEEE standard for data-link control in local area networks.
• IEEE 802.3	Local area network standard similar to Ethernet.

• IEEE 802.4	OSI-compatible standard for token-bus local area networks.
• IEEE 802.5	Local area network standard for token-ring networks.
• MIL-STD-188-114C	Physical interface protocol similar to RS-232 and RS-449.
• MIL-STD-1777	IP - Internet Protocol.
• MIL-STD-1778	TCP - Transmission Control Protocol.
• MIL-STD-1780	File Transfer Protocol.
• MIL-STD-1781	Simple Mail Transfer Protocol (electronic mail).
• MIL-STD-1782	TELNET - virtual terminal protocol.
• X.21	CCITT standard for interface between DTE and DCE for synchronous operation on public data networks.
• X.25	CCITT standard for interface between DTE and DCE for terminals operating in the packet mode on public data networks.
• X.75	CCITT standard for links that interface different packet networks.
• X.400	ISO application-level standard for the electronic transfer of messages (electronic mail).

APPENDIX E: RELATED INPUT REPORTS

A. ANNUAL MARKET ANALYSES

- Procurement Analysis Report, GFY 1985-1990.
- U.S. Information Services Industry Forecasts, 1985-1990.
- U.S. Professional Services Market, 1985-1990.
- U.S. Processing Services and Turnkey Systems Market, 1984-1989.
- U.S. Information Services Vertical Markets, 1985-1990.
- U.S. Information Services Cross-Industry Markets, 1985-1990.

B. INDUSTRY SURVEYS

- Information Services Industry Report, 1985.
- Eighteenth Annual ADAPSO Survey of the Computer Services Industry, 1984.
- Directory of Leading U.S. Information Services Vendors, 1983.

C. MARKET REPORTS

- Federal Government Professional Services Market, GFY 1985-1990.
- Turnkey Systems Pricing: Trends and Opportunities, 1985.
- Commercial Systems Integration: Opportunities and Challenges, 1985.
- Management, Technology, and Strategy for Large Systems, 1983.
- Trends in Processing Services and Integrated Systems Pricing, 1983.

A. SYSTEMS INTEGRATION - AGENCY

1. Does your agency plan to expand, upgrade, or replace any of its current computer systems in the next five years?

☐ Yes ☐ No

If No, go to Question 3.)

(If Yes):

a. How many will be expanded? _____

_____

_____

b. How many will be upgraded? _____

_____

_____

c. How many will be replaced? _____

_____

_____

d. What applications will be changed with these systems?

_____ _____

_____ _____

_____ _____

_____ _____

2. Does your agency plan to add new in-house computers in the next five years?

☐ Yes ☐ No ☐ Don't Know

If No, go to Question 4)

a. What kind of computers/systems will be added?

_____ _____

_____ _____

_____ _____

_____ _____

b. What applications will be supported by these new computers/systems?

_____ _____

_____ _____

(If Don't Know):

c. Who could tell us what kind of systems and applications are being considered?

Name: _____

Title: _____

Telephone: _____

3. Does your agency currently use outside computing resources or services to satisfy information processing requirements?

☐ Yes ☐ No

(If No, go to Question 5)

(If Yes):

a. Why does your agency use outside services?

_____ _____

_____ _____

_____ _____

b. What applications are supported by outside services?

_____ _____

_____ _____

_____ _____

c. What outside services does your agency use? (Check all that apply.)

☐ Other Agency Data Centers

☐ Remote Computing Service

☐ Dedicated COCO

d. Does your agency plan to convert any of these services or applications to in-house services?

☐ Yes ☐ No

(If No, go to Question 4)

(If Yes):

1. Which Services?

_____ _____

_____ _____

2. Which Applications?

_____ _____

_____ _____

_____ _____

3. Why? _____

4. (If the answer to Questions 1, 2, and/or 3 was "Yes"):

How does your agency plan to accomplish the change and/or addition of computer systems?

- ☐ Buy integrated (turnkey) system(s).
- ☐ Buy hardware separately and use an integration contractor.
- ☐ Buy hardware separately and do integration in-house.
- ☐ Move the applications to outside sources such as:
  - ☐ Other Agency Data Centers
  - ☐ Remote Computing Service (for instance, Teleprocessing Services Program)
  - ☐ Contractor-Owned Contractor-Operated Facilities

5. How would you rank the following systems integration vendor (contractor) characteristics with respect to performance for your agency?
(1 = Definitely Not Important, 2 = Somewhat Important, 3 = Important, 4 = Very Important, 5 = Crucial)

Characteristic	Rank				
1. Application Experience	1	2	3	4	5
2. Integration Experience	1	2	3	4	5
3. Staff Experience	1	2	3	4	5
4. Hardware Offered	1	2	3	4	5
5. Software Offered	1	2	3	4	5
6. Support	1	2	3	4	5
7. Federal Contract Experience	1	2	3	4	5
8. Agency Experience	1	2	3	4	5
9. Price	1	2	3	4	5
10. Location	1	2	3	4	5
11. Other _____	1	2	3	4	5

6. What level of satisfaction, on a scale of 1 to 5, have you or your agency experienced with system integration vendors in the past regarding:

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

7. What would you like to see vendors do in the next 2-5 years to make their services more valuable?

_____

_____

_____

_____

_____

8. Which type of vendor or organization appears more desirable for performing systems integration?

☐ Mainframe Manufacturer ☐ Systems House (Non-Hardware)

☐ Not-For-Profit

Why? _____

_____

_____

9. What type of contract does your agency prefer for systems integration?

☐ Cost Plus ☐ Fixed Price ☐ Mix of Both

10. How does your agency view the OMB-A109 Major System Acquisition Guidelines (DD5000.1/5000.2 for DOD)?

☐ Useful ☐ Effective ☐ No Opinion

☐ Unnecessarily Lengthy ☐ Unnecessarily Expensive

☐ Other (What?) _____

11. What would be the controlling criteria in selection of a systems integration contractor?

☐ Proposed Technical Solution

☐ Risk Containment Procedures

☐ Contract Type

☐ Initial Cost

☐ Life Cycle Cost

☐ Other_____

☐ Don't Know

12. Could you identify those factors (non-technical) that would have the greatest impact on your agency's computer systems plans?

_____

_____

_____

13. What technological changes might alter the way your agency accomplishes information processing?

_____

_____

_____

B. SYSTEMS INTEGRATION - VENDOR

COMPANY BACKGROUND DATA

Company Name: _____

Address 1: _____
Address 2: _____
Address 3: _____
City: _____ State: __ Zip: _____
CEO's Name: _____ Title: _____
Telephone: (___) _____

Parent Organization: _____
Address 1: _____
Address 2: _____
Address 3: _____
City: _____ State: __ Zip: _____
CEO's Name: _____ Title: _____
Telephone: (___) _____
Relationship: Subsidiary ( ) Division ( ) Other _____

Full-time Employees:	NUMBER	% OF TIME FEDERAL	EQUIVALENT FEDERAL
Product/Service:	_____	_____	_____
Sales/Marketing:	_____	_____	_____
General/Admin.:	_____	_____	_____

ORGANIZATION CHART

(Names and titles of at least 3 layers of organization beginning with top management and including the federal group(s). Include other layers to show where system integration and turnkey systems fit within federal and overall organization.)

AGENCY EXPERIENCE AND CURRENT CONTRACTS

Agency	Previous	Description	Award Date	Length Options	Dollar Value
Army	__	_____	__/__	__/__	_____
Navy	__	_____	__/__	__/__	_____
Air Force	__	_____	__/__	__/__	_____
Defense	__	_____	__/__	__/__	_____
NASA	__	_____	__/__	__/__	_____
HUD	__	_____	__/__	__/__	_____
HHS	__	_____	__/__	__/__	_____
Commerce	__	_____	__/__	__/__	_____
Energy	__	_____	__/__	__/__	_____
Education	__	_____	__/__	__/__	_____
Interior	__	_____	__/__	__/__	_____
DOT	__	_____	__/__	__/__	_____
State	__	_____	__/__	__/__	_____
Justice	__	_____	__/__	__/__	_____
Treasury	__	_____	__/__	__/__	_____
Labor	__	_____	__/__	__/__	_____

PRINCIPAL BUSINESS ACTIVITIES / REVENUE

Fiscal Year End (Month): _____

	REVENUE ($Millions) 1983	1984	1985
Total Company	____	____	____
Information Systems and Services	____	____	____
Non-Captive Information Systems and Services	____	____	____
Non-Federal Systems Integration	____	____	____
Non-Federal Turnkey Systems	____	____	____
Federal Information Systems and Services	____	____	____
Federal Systems Integration	____	____	____
Federal Turnkey Systems	____	____	____

MODE	KEY PRODUCT/SERVICE	APPLICATION	%FED
Processing			
RCS	_____	_____	____
Data Base	_____	_____	____
Fac. Mgmt.	_____	_____	____
Software			
Systems	_____	_____	____
Applic.	_____	_____	____
Prof.Serv.			
S/W Dev.	_____	_____	____
Consult	_____	_____	____
Educ/Train	_____	_____	____
Fac. Mgmt.	_____	_____	____
Sys. Int.	_____	_____	____
Turnkey Sys.			
Systems	_____	_____	____
Support	_____	_____	____
H/W.			
	_____	_____	____
Telecomm.			
Network	_____	_____	____
LAN	_____	_____	____

(If there are no "hits" on either systems integration or turnkey systems)
Do you provide any turnkey products or systems integration services?

YES _____ NO _____

If YES, what? _____

_____

If NO, do you plan to offer turnkey products or systems integration services?

YES _____ NO _____

If YES, what? _____

_____

If NO, end interview.

FEDERAL MARKET STRATEGIES

The following questions may be asked of both turnkey and systems integration vendors. In the event that the vendor provides both, two separate answers may be required.

1. In your opinion, which agencies provide the most attractive opportunities for your company?

_____

_____

_____

_____

_____

2.a. What differences do you see between commercial markets and the federal market for your products and services?

_____

_____

_____

_____

_____

b. Why do these differences exist? (Prompts: Technical, Regulatory, Funding, etc.)

_____

_____

_____

_____

_____

3. What should be the controlling criteria in selection of a (turnkey system, systems integration) vendor?

TS	IS	
_____	_____	Proposed technical solution
_____	_____	Contract type
_____	_____	Risk containment procedures
_____	_____	Initial cost
_____	_____	Life cycle cost
_____	_____	Other (specify)_____
_____	_____	Don't know

4. Which of your company's services or product capabilities do you think agencies find most attractive?

5. Which of your company characteristics do you think agencies find most attractive?

6. What "new" technologies do you think will affect major federal information systems and services procurements in the next 5 years?

7. What do you believe vendors need to do over the next 5 years to make their products and services more valuable to the federal government?

ABOUT INPUT

Company Profile

Founded in 1974, INPUT has become a leading international planning services firm. Clients include over 200 of the world's largest and most technically advanced companies.

Through market research, technology forecasting, and competitive analysis, INPUT supports client management in making informed decisions. Continuing services are provided to users and vendors of computers, communications, office systems, and information services. Clients receive reports, presentations, access to data on which analyses are based, and continuous client support.

INPUT is a service company. Through advisory/research subscription services, multiclient studies, and proprietary consulting, INPUT serves clients' on-going planning information needs.

INPUT Planning Services

INPUT offers five continuous information services addressing U.S. markets and two programs covering Western European markets:

- **Market Analysis and Planning Service (MAPS)** provides up-to-date market analyses, five-year forecasts, trend analyses, and sound recommendations for action. MAPS is designed to satisfy planning and marketing requirements of information services vendors.

- **Company Analysis and Monitoring Service (CAMS)** is a comprehensive reference service covering more than 4,000 U.S. information services vendor organizations. CAMS is often used for competitive analysis and pre-screening of acquisition and joint venture candidates.

- **Information Systems Program (ISP)** is designed for executives of large information systems organizations and provides crucial information for planning, procurement, and management decision making. The program examines new service offerings, technological advances, user requirements for systems and services, MIS spending patterns, and more. ISP is widely used by both user and vendor organizations.

- **Customer Service Program (CSP)** provides senior customer service organization management with data and analysis needed for marketing, technical, financial, and organizational planning. The program pinpoints user perceptions of service received, presents vendor-by-vendor service comparisons, and analyzes and forecasts the following markets:

- Large systems service.
- Small systems service.
- Telecommunications systems service.
- Software maintenance.
- Third-party maintenance.

- **Federal Information Systems and Services Program (FISSP)** presents highly specific information on federal procurement practices, identifies vendor opportunities, and provides guidance from INPUT's experienced Washington professionals to help clients maximize sales effectiveness in the government marketplace.

- **Western European Customer Service Program** parallels the U.S. Customer Service Program, dealing with comparable issues in European markets.

- **Western European Software and Services Planning Service (SSPS)** analyzes and forecasts information for European information services markets. Clients receive timely planning information through research-based studies, conferences, client meetings, and continuous client support.

Proprietary Services

The combination of INPUT's planning services and staff expertise provides clients with a uniquely qualified resource for custom research. These proprietary studies take two forms: **multiclient research services,** or in-depth analyses of issues common to multiple clients; and **custom consulting** for a single client. Some of the recent and more frequent topics are:

- Strategy planning and support.
- Service evaluation.
- Market penetration planning.
- Due diligence analysis and support.
- Customer attitude surveys.
- Acquisition research and support.
- Sales and marketing audits.

Clients also benefit from secondary research performed by INPUT for other programs and from INPUT's concentration on the information services industry in general.

Staff Profile

INPUT's professional staff have backgrounds in marketing, planning, information processing, and market research. Educational backgrounds include both technical and business specializations, and many INPUT staff hold advanced degrees.

Many of INPUT's professional staff have held executive positions in the following business sectors:

- Computer systems
- Software
- Turnkey systems
- Field service (customer service)
- Processing services
- Professional services
- Data processing
- Network services
- Communications

About INPUT. . .

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

For More Information. . .

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

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INPUT Offices

California (Headquarters)
1943 Landings Drive
Mountain View, CA 94043
(415) 960-3990
Telex 171407

Washington, D.C.
11820 Parklawn Drive
Suite 201
Rockville, MD 20852
(301) 231-7350

United Kingdom
INPUT Ltd.
41 Dover Street
London W1X 3RB
England
(441) 493-9335
Telex 27113

Japan
ODS Corporation
Dai-ni Kuyo Building
5-10-2, Minami-Aoyama
Minato-ku,
Tokyo 107, Japan
(03) 400-7090
Telex 26487

New York
Parsippany Place Corporate Center
Suite 201
959 Route 46 East
Parsippany, NJ 07054
(201) 299-6999
Telex 134630

Italy
Nomos Sistema SRL
20124 Milano
Viale Vittorio Veneto 6
Italy
228140 and 225151
Telex 321137

Sweden
Athena Konsult AB
Box 22232
S-104 22 Stockholm
Sweden
08-542025
Telex 17041