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THE BROOKS ACT, IS IT RELEVANT TODAY?

by

Charles I. Willis

June, 1994

Thesis Co-Advisors: Barry Frew
Mark Stone

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This paper analyzes the long term effect of Congressional legislation and how it affects the acquisition process. Understanding the basics behind the Brooks Act and how the environment surrounding information technology (IT) acquisitions has changed, is necessary to make an evaluation of how this Act affects the acquisition of Automated Data Processing Equipment (ADPE).

After synthesizing the bottom-line necessity for the Act, a progression through the law's subsequent changes, and a review of legislative, environmental, and Governmental changes that occurred since 1965, it was concluded that: the Congressional intent behind the Brooks Act has been overcome by events and the Act and various Governmental regulations should be eliminated to allow Federal agencies and employees the ability to adjust to rapidly changing technologies. Recommendations included repeal of the Brooks Act and/or implementation of National Performance Review (NPR) and other acquisition streamlining initiatives.

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The Brooks Act, is it Relevant Today?

by

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Submitted in partial fulfillment
of the requirements for the degree of

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ABSTRACT

This paper analyzes the long term effect of Congressional legislation and how it affects the acquisition process. Understanding the basics behind the Brooks Act and how the environment surrounding information technology (IT) acquisitions has changed, is necessary to make an evaluation of how this Act affects the acquisition of Automated Data Processing Equipment (ADPE).

After synthesizing the bottom-line necessity for the Act, a progression through the law's subsequent changes, and a review of legislative, environmental, and Governmental changes that occurred since 1965, it was concluded that: the Congressional intent behind the Brooks Act has been overcome by events and the Act and various Governmental regulations should be eliminated to allow Federal agencies and employees the ability to adjust to rapidly changing technologies. Recommendations included repeal of the Brooks Act and/or implementation of National Performance Review (NPR) and other acquisition streamlining initiatives.

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I. INTRODUCTION

A. PURPOSE

This paper analyzes the long-term effect of Congressional legislation and how it affects the acquisition process. In particular, it analyzes Public Law (P.L.) 89-306 the Brooks Act (the "Act") and its impact on the acquisition of Automated Data Processing Equipment (ADPE). To start, a historical analysis of the original Act begins with an evaluation of Senate Report 938 which is used to determine the Congressional intent and reasoning behind the Act. This analysis requires an understanding of the total business and technological environment surrounding the information technology (IT) industry. After synthesizing the bottom-line necessity for the Act, a progression through the law's subsequent changes, and a review of significant new legislation affecting Government contracting sets the stage for the current IT acquisition process.

Understanding the underpinnings of the Brooks Act and how the environment surrounding IT acquisitions has changed, is necessary to make an evaluation of how this Act affects the acquisition process. While a number of commissions, panels, and studies have examined the acquisition problems facing DoD and industry, little substantive improvements or stream-lining

has occurred in the Government acquisition process. The recent Report of the Department of Defense Acquisition Law Advisory Panel, generally known as the Section 800 Panel Report, recommended that DoD be exempt from the requirements established in the Brooks Act. However, since the Panel's charter focused on DoD related procurements, they did not address the basic issues in procurement of IT. This paper addresses these issues and recommends possible solutions.

B. OBJECTIVES

The main objective of this research is to provide an evaluation of the Brooks Act and to determine if or to what extent it is relevant today. In achieving this goal, this research assesses: 1) how the act has been affected by subsequent legislative and administrative actions, 2) how business and technological advances have changed the IT market, 3) how the first two areas have affected the IT acquisition process, and 4) what existing acquisition change recommendations and alternatives are available which provide solutions to IT acquisition difficulties.

C. RESEARCH QUESTIONS

1. Primary Research Question

- What was the Congressional intent behind the Brooks Act and to what extent is it relevant today?

2. Subsidiary Research Questions

- What was the state of the IT industry and the procurement regulatory environment when the Brooks Act was passed and how has it evolved?

- Is the Brooks Act's definition of ADP and ADPE adequate or should it be altered?

- What has been the effect of the Brooks Act on IT acquisitions?

- What were the Section 800 Panel's recommendations concerning the Brooks Act and what do they signify?

- To what extent is the Brooks Act necessary today?

- Given a different IT industry and procurement regulatory environment, what administrative actions can be taken to improve IT acquisitions today?

D. SCOPE OF THE THESIS

This study reviews the Brooks Act and subsequent legislative and administrative actions taken to implement this law. Research was conducted on the complexity of the process of acquiring IT and the procedures used to follow the principles of the Brooks Act. The study is generic to all contract types. The primary focus is on understanding how the Brooks Act has affected the contracting process, in an effort

to determine if the Act is still required to address the original Congressional intent, and developing solutions to enhance the IT acquisition process.

B. LITERATURE REVIEW AND RESEARCH METHODOLOGY

The overall research is an archival-based review of publications, reports, legislation, regulations, and studies on this subject. Initially the research focuses on the Brooks Act and its legislative history. The original Brooks Act is provided as Appendix A and the latest amended version is provided as Appendix B. A review of common information technology and Governmental terminology is provided in Appendix C. The field of Government IT acquisitions, especially DoD related IT acquisitions, has received much Congressional attention since the passage of the original Brooks Act. Therefore, this research includes a review of all major Government acquisition related legislation. In addition, key legislation affecting IT and its administrative management is included as an area of interest, and a synopsis is provided in Appendix D.

The general literature research includes a custom bibliography from the Defense Logistics Study Information Exchange (DLSIE). To augment the DLSIE information, numerous Government related studies, GAO reports, and case histories of computer related acquisitions were reviewed to identify common

problem areas. In addition, to complete this historical perspective various computer and management related books, periodicals, journals, and encyclopedias were reviewed to provide an understanding of the advances in technology beyond 1965. Appendix E is a quick reference for a historical synopsis of IT technological advances.

F. ORGANIZATION

This thesis is organized in five chapters. The remainder of this thesis is organized as follows:

- Chapter II, "Background," provides a general background and historical prospective of the Brooks Act.

- Chapter III, "The Current Environment," provides an overview of Governmental IT acquisition procedures, and the changes and challenges occurring inside the Government and the IT industry.

- Chapter IV, "Data Analysis," provides an analysis of the key issues and major problems surrounding IT acquisitions and how the Government is responding to these issues.

- Chapter V, "Conclusions and Recommendations," identifies the overall conclusions and recommendations of this research.

II. BACKGROUND

A. INTRODUCTION

Any review of aging legislation and its impact on the current environment must begin with an historical review of the legislation as well as an overview of the changes Congress has made to the legislation. This review is better understood when it is placed in context with the surrounding business and technological environment. The initial focus here is to determine the Congressional intent and reasoning behind the Act. Secondly, a review is made of major legislative and administrative actions which have changed the Act to its present version. To provide a complete background, a synopsis of the dynamic changes in the IT industry, Government procurement policies, and general management science techniques, is necessary to understand the total impact of the Act through its twenty-eight year life.

In 1965 there were 25,000 computers of American manufacture in use worldwide and an estimated 10,000 additional systems on order. The Federal Government was the largest user of IT in the world with annual expenditures exceeding $3 billion or approximately 3 percent of the Federal Budget. (U.S. Code, 1966) Computers were extremely large, technologically complex, and very expensive to operate and

maintain. The management science of computer technology was in its infancy and several General Accounting Office (GAO) reports to Congress had pointed out the need for better IT management within the Government. Congress answered GAO reports by passing the Brooks Act:

> An Act, to provide for the economic and efficient purchase, lease, maintenance, operation, and utilization of automatic data processing equipment by Federal departments and agencies. (U.S. Code, 1966)

B. DEFINITION OF RELEVANT TERMS

Throughout this paper a clear understanding of some key terms is required. The terms that are provided here and in Appendix C are frequently used in industry and Government without precision. The key terms are:

- Automatic Data Processing (ADP)- the automatic processing of data by electronic digital computers. (Stern,1983)

- Automatic Data Processing Equipment (ADPE)- any equipment or interconnected system of subsystems of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information...such term includes(i) computers,(ii) ancillary equipment, (iii) software, firmware, and similar procedures, (iv) services including support services, and (v) related resources as defined by regulations issued by the Administrator for General Services.(FIRMR, 1994)

- Information - any communication or reception of knowledge such as facts, data, or opinions, including numerical, graphic, or narrative forms, whether oral or maintained in

any medium, including computerized data bases, paper, microfilm, or magnetic tape. (Federal Register, 1985)

- Government Information - information created, collected, processed, transmitted, disseminated, used, stored, or disposed of by the Federal Government. (Federal Register, 1985)

- Information System (IS)- the organized collection, processing, transmission, and dissemination of information in accordance with defined procedures, whether automatic or manual. (Federal Register, 1985)

- Information Technology (IT)- the hardware and software used in connection with government information, regardless of the technology involved, whether computers, telecommunications, micrographics, or others. (Federal Register, 1985)

C. HISTORICAL REVIEW OF THE BROOKS ACT

In 1959 the Bureau of Budget (BOB), the predecessor of the Office of Management and Budget (OMB), published a report that indicated a need for dynamic leadership of the Government's IT resources. In the next six years, the Comptroller General issued over 100 audit reports severely criticizing Government IT management. In addition to the audits, the GAO presented four comprehensive IT management studies to Congress illustrating improvements that could be made through Government-wide coordination of IT management. During the decade of the 1960s, the United States reached the zenith of its economic power, through its commercial mass production

industries meeting an enormous post World War II economic demand (Hammer & Champy, 1993). The Ford Motor Company, a leader in the automotive industry, developed a highly centralized management structure used to achieve economies of scale. Secretary of Defense, Robert McNamara, using the management styles he learned at Ford Motor Company, consolidated many functions within the DoD resulting in significant operational improvements and large cost savings. In hearings before the House Subcommittee on Defense Appropriations on January 29, 1962, Secretary McNamara said:

> One of the most productive fields for economic application of centralized management is in the provision of common supplies and related services to all the military departments. After a rather comprehensive study of this entire problem, we came to the conclusion that considerable economy and efficiency could be gained, if all common supply management activities were consolidated in a single agency. (U.S. Code, 1966)

Congressman Jack Brooks, the chairman of the Government Activities Subcommittee of the Committee on Government Operations of the House, introduced the Brooks Bill (H.R. 4845) to amend title I of the Federal Property and Administration Services Act of 1949 to correct known deficiencies in Government ADP management. In Senate Report (S.R.) 938 to the Government Operations Committee, the following discussion points were highlighted to show the necessity for IT management legislation:

- Coordination is fundamental to good management.

- Inventory and fiscal information is needed to maintain policy and budgetary control, increase utilization, and provide more economical acquisition of equipment.

- There was widespread waste in available but unused Government computer time.

- A lack of competition in the computer market existed with International Business Machines (IBM) controlling 75 percent of the market.

- With the introduction of the third generation of computer equipment, the ever-increasing complexities of business and Government demanded more exploitation of IT potential in practically every field of endeavor.

- The current management structure of the executive department was inadequate and could not provide the leadership to control Government-wide programs.

- Standardization and compatibility were serious problems confronting the Government utilization of IT. (U.S. Code, 1966)

These seven discussion areas represent some of the problems that were identified by various GAO reports and provided insight into the Congressional mood of 1965. Spurred by GAO reports, Congress attempted to lay the groundwork for better management of this expensive Government resource. GAO reports always have the luxury of hindsight, and in GAO report B-115369 of March 1963, the GAO showed Government wastefulness in a study of the financial advantages of purchasing vice

leasing of computer processors. Using data from 16 different widely used ADP systems, the GAO multiplied cost inefficiencies by 523, from a universe of 1000 Government systems, to show that the Government had the potential to save $148 million over a five year period. This report displays GAO's methodology in illustrating the wastefulness caused by poor executive branch management.

Congress knew of past inefficiencies caused by poor management, as illustrated by the GAO, and the future possibilities of even larger financial losses were a serious Congressional concern. In S.R. 938, the future of ADPE was summed up by the following points:

- Computers will be larger, with more capabilities.

- Large computers will cost more but be more efficient.

- Users will not require additional large mainframe computer systems, instead they will use distant terminals linked to a large central computer via a communications link.

- Fewer units of Government will have sufficient requirements for processing capacity to justify sole utilization of these large computers. (U.S. Code, 1966)

Congress believed the future of IT was being determined by the type of equipment being produced at the beginning of the third generation of computer processors.

The Brooks Act was debated and passed by Congress to counteract the known and potential problems in Government IT management. The intent can be described in one short paragraph:

> While H.R. 4845 is not primarily concerned with determining policies, by providing the means with which adequate information can be obtained, joint effort efficiently applied, and new management techniques devised, this legislation makes it possible to determine effective policies and achieve control. (U.S. Code, 1966)

Congress was building a management structure that would allow the Executive Branch enough flexibility to correct existing problems and react to the future of IT as predicted in the legislative history. To fulfill this intent, the Act established a control structure over IT management and acquisition that is headed by Congress with its various committees in an oversight role. The functional IT management responsibilities were assigned as follows:

- BOB has an overall policy role,

- General Services Administration (GSA) has cognizance over procurement matters, and

- National Bureau of Standards (NBS) is charged with developing federal information processing standards.

This structure effectively gave GSA the responsibility to coordinate all Government ADP management, subject to BOB policy and fiscal controls. By consolidating IT management

within GSA, Congress was applying the same management techniques used by Ford Motor Company and Secretary McNamara to enhance efficiency and economy.

D. SUBSEQUENT LEGISLATION AND ADMINISTRATIVE ACTIONS THAT AFFECTED THE BROOKS ACT

Since the enactment of the original version of the Act the world has gone through dramatic change. During the defense buildup of the 1980s, some defense related procurement scandals led a Congressional charge to clean-up and enhance federal procurement oversight (Appendix D provides a synopsis of major legislation affecting acquisitions). Since initial passage, the Act has been amended three times. It was amended by the Deficit Reduction Act of 1984, the Paperwork Reauthorization Act of 1986, and the Fiscal Year (FY) Authorization Act of 1986. Appendix A and B are the original and amended Act respectfully. Some of the more significant changes from the original act are:

- The ADP Fund was removed from the Act and incorporated into the Information Technology Fund which was established in the Paperwork Reauthorization Act of 1986. These funds were established to allow GSA to make large volume purchases of computer equipment across fiscal years. The ADP Fund was a major reason for the original Act because it removed the impediment of fiscal year purchasing and allowed the Government to receive cash discounts for purchasing large volumes of computer equipment.

- ADPE was given a statutory definition. The original act did not specifically define the term ADPE because of the

dynamic nature of the IT industry and the desire to permit the Executive agencies some regulatory discretion.

- The Warner amendment, enacted in 1981, exempted DoD from the Act for certain DoD procurements of ADP equipment and services. This amendment was passed to ensure DoD and CIA autonomy in selecting technology required to perform in equipment and systems involving National Security Interest.

- Authorization for GSA to give blanket delegation of authority to procure ADPE to other agencies.

- Outline of procedures and rules to be used in connection with any procurement dispute resolution of ADPE subject to the Act. These sections establish the General Services Board of Contract Appeals (GSBCA) to be the primary authority in reviewing disputes.

In addition to the amendments to the Brooks Act several other legislative and administrative actions have influenced IT acquisitions. The Office of Federal Procurement Policy (OFPP) Act of 1972 established OFPP under OMB to be responsible for federal procurement policies and regulations. The Competition in Contracting Act (CICA) of 1984 established competition guidelines and policies for all Government procurements. OMB Circular's A-76, A-109, A-123, and A-130 affected acquisition policies of all executive agencies (see Appendix D for more detail). GSA developed and promulgated the Federal Information Resources Management Regulation (FIRMR) in 1984. The FIRMR is the primary regulation for use by executive agencies in their management, acquisition, and

use of ADPE equipment and services as defined in the amended Brooks Act. The Office of Information and Regulatory Affairs (OIRA), established in the Paperwork Reduction Act of 1980, is responsible to develop, in consultation with GSA, a five year plan for meeting the IT and telecommunications needs of the Government. The combined effect of all subsequent legislative and administrative actions has been an interweaving of responsibilities and authority over the many areas of IT resources by various executive agencies.

E. THE INFORMATION TECHNOLOGY INDUSTRY AND MANAGEMENT PHILOSOPHIES

The IT industrial development is generally described in characteristics of the various computer generations. There are four generally accepted generations:

- **First generation (1951-1958)**- technology was based on vacuum tubes with a processing speed of 2000 instructions per second and cost of $5.00 per function.

- **Second generation (1958-1964)**- technology was based on transistors with a processing speed of 1 million instructions per second and a cost of $0.50 per function.

- **Third generation (1964-1971)**- technology was based on integrated circuits (IC) with a processing speed of 10 million instructions per second and a cost of $0.05 per function.

- **Fourth generation (1971-19)**- technology is based on very large scale integrated (VLSI) circuits with a processing speed of 100 million to 1 billion instructions per second and a cost of $0.01 to $0.0001 per function. (Ralston,1993)

In the early 1950s, a number of small companies were formed by technically oriented people to develop and market computers. These new companies quickly learned that they needed the financial backing and marketing expertise of large corporations to succeed and survive. IBM, Remington Rand, National Cash Register (NCR), and Burroughs were in the business machine market which was likely to be displaced by this new technology. These large companies invested heavily and merged with developing firms to protect their market shares. An example was the Eckert-Mauchly Computer Company's (EMCC) merger with Remington Rand to form the Univac Division of Remington Rand. EMCC was formed by J. Presper Eckert and John Mauchly to build a computer for the Government Census Bureau. The merger provided EMCC the funds necessary for development of the new computer and gave Remington Rand access to computer technology. (Ralston, 1993) The only break in this pattern of early dominance by the business machine companies was RCA's introduction of the large scale BIZMAC computing system in 1956. The top five computer manufacturers in 1956 were: 1) IBM with 75.3 percent of the market share, 2) Sperry Rand with 18.6 percent, 3) Burroughs with 4.4 percent,

4) RCA with 1.6 percent, and 5) NCR with 0.1 percent. (Brock, 1975)

The computer market expanded dramatically during the second generation, from over one billion dollars worth of equipment installed in 1959 to over six billion dollars in 1965. The top five computer manufacturers in 1965 were: 1) IBM with 65.3 percent of the market share, 2) Sperry Rand with 12.1 percent, 3) Control Data with 5.4 percent, 4) Honeywell with 3.8 percent and 5) Burroughs with 3.5 percent. (Brock, 1975) The new entrants into the market were largely technically oriented companies seeking to take advantage of technological innovations, rather than business equipment companies attempting to protect their traditional markets. IBM built its success based on the management philosophy of continuous investment in research, incorporated into a steady stream of new, technology-intensive products that were more advanced than those offered by its competitors. (Flamm, 1988) Throughout the years, IBM strengthened its research organization which was an important step in maintaining their market dominance.

As previously stated, the Act was enacted at the beginning of the third generation of computer processors. This generation is noted for the use of integrated circuits (IC) and the development of small modules consisting of discrete devices laid onto a ceramic substrate called chips. ICs were originally developed for military applications by Texas

Instruments and Fairchild Semiconductors. (Ralston, 1993) During this generation large central computers were being linked to many users via telecommunications and the term Network was applied to this new application of technology. Small independent processors were developed to handle the transfer of data between the primary memory and peripheral devices that made up these networks. These machines were labeled input-output (I/O) devices.

IBM clearly dominated the world computer markets throughout the 1950s and 1960s. Indeed IBM's position was to fundamentally constrain the technological strategies open to competitors. To counteract IBM dominance the Government and industry competitors brought several antitrust law suits against IBM. In a 1956 descent decree, IBM agreed to permit independent organizations to acquire IBM technology. This allowed other manufacturers to build I/O machines that could integrate with IBM computers; the term for this technology is "plug compatible." In response to other lawsuits IBM decided in 1969 to "unbundle" certain computer products from one other. From the beginning IBM set the industry standard by pricing all hardware, software, and services into bundled contracts. This meant that customers had to buy or lease an entire computer system from IBM which reduced the opportunity for competition. This unbundling decision had major impacts on the computer industry, because IBM could no longer control the specifications for all associated peripheral computer

equipment and software. Within a short period of time new software, education and maintenance companies emerged bringing forth a rapid expansion of IT technology (Gilchrist, 1972).

The fourth generation of computer technology began in 1970, it combined a new energy of an unbundled market with the shrinking of IC chips, and the rapid expansion of the consumer, personal, and workstation computers. Rapid advances in micro-technology and software programming brought forth small and user-friendly computer products. The major reason for computer expansion was affordability. Technological advances and increased competition among computer manufacturers have driven the prices of all types of hardware down, and the market is flooded with computer products that affect all parts of modern life, from digital watches to programmable televisions and stereos. The rapid pace of technological change is such that software capability lags hardware capability by at least one iteration. In other words, the Intel 80486 chip-based personal computers do not fully use capabilities designed into this chip, and the follow on Pentium chip-based computers, which represent the next iteration, are already on the market.

This rapid pace of hardware innovation and the lagging response of software development made it impossible to harness the true power of IT innovation. This phenomenon was analogous to the similar effect of technology advances on management practices. The decade of the 1960's was the last

strong point of the industrial era. The United States was the world's strongest industrial nation; our manufacturing production was labor intensive with centralized control for economic and efficient operations of large scale production processes. Quantity and not necessarily quality was the emphasis of management. (Hammer & Champy, 1993) Top-down management systems focused employees on meeting demands established by top management decree. Computers were just like management systems in that they were large machines that were required to be operated continuously to achieve economies of scale. (U.S. Code, 1966) Management didn't understand the full potential of computers and just like software to hardware, management systems lag technological advances and the full potential of innovation is lost. It wasn't until the mid-1960s that management science started being applied to computer technology. The term Management Information System (MIS) was developed to describe a computer-based information system having applications in support of management activities.

The development of MIS as a science has increased in importance. Since the 1960s, the United States has evolved from an industrial based economy to an information based economy, because information technology acts as an enabler that allows organizations to do work in radically different ways. (Hammer & Champy, 1993) The ability of management to harness technology advances is important now that companies

are placing emphasis on quality. One of the major management philosophy's espousing quality has been labeled Total Quality Management (TQM), as described by Edward Deming. TQM emphasizes decentralization of management control and the importance of quality being designed into a process or production. TQM is a systematic method using quantitative and qualitative analysis of data to improve work processes at the lowest possible level of management. This economic era emphasizes the requirement for flexibility because of the ability to process large amounts of information necessary to make better management decisions. The clear trend today is toward more decentralization, which often means eliminating middle management and pushing decision making authority farther down the organization structure. IT is a key resource in providing management information rapidly throughout globally linked markets and the flexible entrepreneur can react quicker to changing trends. (Stoner and Freeman, 1992)

F. SUMMARY

This chapter introduces key terms and definitions that are required to understand the environment surrounding the Brooks Act. The Legislative history revealed that Congress used the Act to establish a state-of-the-art management system to control ADPE. Subsequent legislation and regulations grew out of the original Act and brought forth new problems and challenges in implementing Congressional intent and procuring

ADPE. Industrial and environmental changes had some profound effects on the developing IT industry and rapid technological changes out-paced management's ability to adapt and harness this innovative energy. New evolutions in management science developed to use IT as a tool to provide increased flexibility and better management.

III. THE CURRENT ENVIRONMENT

A. THE GUIDELINES USED DURING INFORMATION TECHNOLOGY RESOURCES ACQUISITIONS

Entering into the realm of Government contracting is like Alice jumping through the looking glass--once inside nothing is as it seems. The United States Government is set apart from all other commercial entities because it is a monopsony with the legal power of sovereign. This combination always puts the Government in a superior position, unless it concedes its position by law or action. The magnitude of federal buying, together with the comprehensive nature of the laws and regulations, almost compels the attention of professional buyers and the general public. However, Government procurement actions can confuse this interested audience unless Congressional intent is understood. (Sherman, 1991)

Acquisition policies and regulations direct procurement personnel in meeting the expectations of Congress, including the fulfillment of any social and economic objectives behind the law, even before the actual purchase of a particular product or service. Generally, Congressional objectives for procurement include buying in an efficient and economical manner. Congress also establishes many rules and procedures after hearing testimony from various competing interest

groups. This process tends to compromise issues and results in compounding the complexity of the acquisition process by creating rules that may not be compatible with economic objectives. (Sherman, 1991)

The Brooks Act starts the process of building a set of hurdles that include regulations and policies established by executive agencies to implement acquisition laws and the intent of Congress for IT acquisitions. The Act mandates GSA coordinate and provide for the economic procurement of ADPE. Subsequent to the Act, OFPP was established to develop Government regulations for all acquisitions. The Federal Acquisition Regulation (FAR), which is published and modified by OFPP, is the principal acquisition regulation to follow for all Executive agencies. Part 39 of the FAR governs the acquisition of information resources, and in its thorough four paragraphs it establishes a policy that states:

> ...in acquiring information resources, acquisition personnel shall follow the policies and procedures contained in the FAR except in those areas where the FIRMR (41 CFR Ch. 201) prescribes special policies, procedures, provisions, or clauses. (FAR, 1994)

The FAR basically follows the Brooks Act in maintaining GSA as the governing agency for IT acquisitions, however, the regulatory power is conceded from OFPP to GSA to achieve the intent of Congress. GSA established its own bureaucracy to control the complexity of acquisition and management of all IT resources. The Policy Analysis Division of the Office of Information Resources Management was established to oversee

Government IT resources. This division publishes and maintains the FIRMR (primary Executive Branch IT regulation). The FIRMR is organized into four major segments called Subchapters, and Subchapter D is titled "Acquisition of Federal Information Processing Resources by Contracting." Subchapter D is not extremely long, only 16 pages. For consistency in its relationship to the FAR, this section is further subdivided into 53 subparts consisting of sections and subsections. This structure does not allow for easy assimilation of information for the user attempting to understand the legal necessities required to efficiently and effectively procure information resource technologies. Therefore in addition to the FIRMR, GSA divisions produce and publish over 15 different handbooks to provide aids to help Government employees understand and comply with the FIRMR's 16 pages of acquisition regulations. To enhance these helpful publications, the GSA Information Resources Management Service (IRMS) division publishes a 35 page booklet outlining their directory of client services. This booklet explains how IRMS's eleven different internal divisions can aid the federal manager in applying computing, telecommunications and records management to achieve their mission objectives. All this information and assistance available from GSA is somewhat as overwhelming as the prospect of Government contracting for IT. Going through the maze of laws, regulations, and policies governing IT procurement, it is difficult to remember that the

intent behind the Brooks Act was for the Government to become economic and efficient in procuring IT.

Subsequent legislation has provided additional layers of bureaucracy and blurred this already difficult IT acquisition process. The Paperwork Reduction Act of 1980 and the Paperwork Reauthorization Act of 1986 established the Office of Information and Regulatory Affairs (OIRA) within OMB to be OMB's principal advisor for IT acquisition. It also mandated that all federal agencies establish a senior official within each agency to be responsible for all information resource management (IRM) initiatives for that agency. The Paperwork Reduction Act, the FIRMR, and OMB Circular A-130 combine to require every agency's designated senior official to develop and annually revise a 5-year plan for meeting IT resource needs. GSA reviews all agencies' plans and considers these plans when making decisions on delegating procurement authority for IT resources. The FY 86 Authorization Act amended the Brooks Act to permit GSA to delegate contacting authority to a specific senior official within each federal agency. This delegation of procurement authority (DPA) currently establishes a $2,500,000 threshold for competitive acquisitions of any individual type of IT and $250,000 for non-competitive acquisitions (GSA, 1993). Any agency procurement request (APR) exceeding these limits must be submitted to GSA's IRMS Acquisition Reviews Division for action. Upon review this division will either: 1) approve the

APR, 2) approve the APR with direct GSA participation in the acquisition, or 3) disapprove the APR and GSA conduct the acquisition or 4) deny the total procurement. Any denial of procurement delegation authority (PDA) is subject to review by the Director of OMB, upon appeal by an agency.

The ability of GSA to delegate IT procurement authority allows the agency to concentrate on high dollar or high risk IT procurements to ensure economic and efficient procurements. However, this process adds another layer of review which slows the acquisition process. Agencies contracting for IT resources within their regulatory or specific agency DPA allows them to establish direct control of the procurement with inputs from the requirements generator. However, the contracting official must follow all rules and regulations concerning IT procurement as established in the FAR, FIRMR, OMB directives, and agency specific regulations. The agency specific acquisition procedures and policies may vary as long as they do not conflict with any federal regulations. The DPA allows for some streamlining of the acquisition process without neglecting the intent of Congress to have one agency controlling acquisition of IT resources.

B. PROBLEMS IN GOVERNMENT INFORMATION TECHNOLOGY

The enactment of the Brooks Act did not remove Congressional oversight of the Executive branch's management of computer resources. In the past twenty-eight years the

focus of this oversight seems to have some subtle changes from the original intent of the Act. The Interagency Task Force on Long Range Plans for ADP in the Federal Government reported to Congress in May of 1971 that:

> ...the Government is found to be soundly structured for economical acquisition, management of clock time and disposal of ADPE, with demonstrated proficiency in property management aspects of ADP technology... It is not motivated, equipped, or structured well for development of the most effective use of it, and none of the presently constituted Government-wide ADP entities have demonstrated either the necessary capability or intentions to lead the charge in this area...(Gilchrist,1972)

The Task Force was very critical of Government management of IT resources and focused their attention on the three agencies, GSA, OMB, and NBS, designated as the primary controlling agencies of ADPE by the Brooks Act. They believed that the agencies were narrowly focused on their authority and responsibility for IT, and the agencies seemed to be primarily concerned with property management aspects of IT resources. This narrow management scheme resulted in the lack of innovative leadership and management of IT systems throughout Government.

Leaping forward ten years, a staff paper by Robert Head, titled "Federal Information Systems Management", probed into Governmental IT management. Head believed that Government computer operations must be examined as a unique IT environment. He concluded that although Government computer systems share similarities with commercial computer

operations, the differences were of an entirely different magnitude. Government IT systems' principle characteristics of size, complexity, specialized applications, visibility, managerial constraints, and top management and systems manager discontinuity, all contribute to this uniqueness. Mr. Head noted that another unique problem of Governmental IT management is "micromanagement." The oversight role by Congress, has shifted the balance of power and authority away from agency managers in the direction of close scrutiny by higher levels of authority outside the agency. He states that GSA has an informal practice of clearing APRs with the staff of the House Government Operations Committee before acting on an agency's request. In addition, agencies must justify their IT initiatives to at least three Congressional committees in both the House and the Senate.

This Congressional oversight concern focused on DoD acquisition of IT resources in 1989. The Legislation and National Security Subcommittee of the House Committee on Government Operations report entitled, "DoD Automated Information Systems Experience Runaway Costs and Years of Schedule Delays While Providing Little Capability," discussed a wide range of problems in DoD's efforts to effectively manage IT acquisitions. This subcommittee reported that the lack of cost visibility and control, schedule delays, lack of capability at the time promised, and excessive requirements plague most DoD acquisitions. The subcommittee was concerned

because these problems undermine the ability of both DoD and Congress to effectively allocate scarce financial resources. Some of the problems cited in this report include:

- a shortage of information systems professionals throughout DoD and Government as a whole,

- IT systems' requirements were not controlled or firmly established,

- IT systems acquisitions had weak testing and inadequate quality assurance practices, and

- a lack of pertinent data being reported to upper management levels of DoD. (Sixth Report, 1989)

C. CHANGES AND CHALLENGES IN GOVERNMENT ACQUISITION OF INFORMATION TECHNOLOGY

The increasing Federal deficit has placed pressure on Congress and the President to bring forth changes to decrease wasteful Government spending. Acquisition reform could result in financial savings. In the National Defense Authorization Act for FY 1991, Congress directed the Under Secretary of Defense for Acquisition to appoint an advisory panel of Government and private-sector experts to start the process of streamlining laws affecting DoD procurements. This panel, established in section 800 of the Authorization Act, became known as the Section 800 Panel. The Panel reviewed over 600

laws and almost 300 were recommended for repeal, deletion, or amendment. The Panel's report concentrated on streamlining defense procurements; however, they recognized the need for Government-wide consistency in procurements. They believed that their recommendations should be adopted as a baseline for parallel changes in legislation affecting all Government procurements. Some of the significant Section 800 Panel's recommendations that affect IT acquisition are:

- increase small purchase threshold to $100,000 to be adjusted every five years for inflation,

- change the definition of the term "commercial item" and exempt commercial items acquisition from many statues that impede DoD acquisitions,

- maintain the Truth-in-Negotiations Act (TINA) $500,000 threshold (see Appendix D) and amend the act to facilitate acquisition of commercial items and leading edge technology.

As to a direct recommendation concerning the Brooks Act the Panel identified two options. The choices were: (1) to amend the Warner Amendment to wholly exempt DoD from the Act, and with it GSA oversight, or (2) to significantly increase the blanket delegation of procurement authority for DoD. The Panel agreed that option number two should be adopted. (Executive Summary, 1993) The entire report was presented to the President and Congress for action.

President Clinton campaigned for his office under a banner of change and has accepted many of the proposals suggested by the Panel. Additionally he placed Vice-President Al Gore in charge of the National Performance Review (NPR). The Vice-President organized and led a group of experienced federal employees on a six-month review of the Government. The NPR report presented to the President on September 7, 1993, identified Government Procurement a major area that required the reinvention process and cited six specific actions to be taken:

- Simplify the procurement process by rewriting federal regulations--shifting from rigid rules to guiding principles.

- GSA will significantly increase its delegated authority to federal agencies for the purchase of information technology, including hardware, software, and services.

- GSA will simplify the procurement process by changing regulations to allow agencies to buy where they want and by testing a fully "electronic marketplace."

- Allow agencies to make purchase under $100,000 through simplified purchase procedures.

- Rely more on the commercial marketplace.

- Bring federal procurement laws up to date. (NPR,1993)

DoD was busy during the same time period. The Undersecretary of Defense for Acquisition (USDA) convened the Defense Science Board (DSB) Task Force for acquisition reform and they reported out in July 1993. The board emphasized the need for DoD to immediately start an aggressive acquisition reform process that would enable the integration of the defense industrial base into the commercial industrial base. This would give DoD access to more markets, broaden the industrial base, allow DoD and IT manufacturers to become more efficient, which would foster economic growth and industrial competitiveness.

D. CHANGES AND CHALLENGES IN THE INFORMATION TECHNOLOGY ENVIRONMENT

The computer industry was transformed into an information technology industry by rapid innovations and expanding applications of semiconductor products. Hardware manufacturers like IBM no longer control the flow of technology. The IT industry has expanded to include semiconductors, personal computers, workstations, minicomputers, mainframes, supercomputers, software, networks, network operating software (NOS), and telecommunications equipment. The industry, no longer constrained by hardware manufacturers, is expanding with creative applications driven by emerging software and telecommunications technologies.

By the mid-1980s, the semiconductor part of the IT market was experiencing phenomenal innovations. An example of this rapid growth is that a microprocessor, an IC chip, that sold for under $100 in 1987, had the power of a 1970 mainframe processor that sold for $500,000. (Yoffie, 1993) This rapid technological pace continues; Digital Equipment Corporation has introduced its new Alpha chip. The Alpha chip is a generation ahead of most chips and is described as a 64-bit device offering supercomputer-class performance. Today's standard is a 32-bit design, and its computing capacity is not fully utilized in commercial applications. (Wilke, 1994)

The rapid increase in digital IC chip computing power led to downsizing of computers and the expansion of new industry segments. Mini and Microcomputers now do the work of 1970 era mainframe computers. The computer hardware marketplace has become close to a commodity business. According to *The Wall Street Journal*, "the (hardware) industry is condemned to ceaseless innovation, price cutting, and product cycles that are nasty, brutish and short." Hardware manufacturers faced maturing markets, recessionary economies, rapid technological change, and excess capacity in the early 1990s. Turmoil and uncertain futures have sent hardware manufactures seeking new solutions because a crisis in profitability continues to erode firms' power and options.

The software industry was virtually non-existent in 1970. Through the third generation of computers, software

development was internal to most hardware manufacturers. As the fourth generation expanded into small and personal computers a need arose for new stand-alone software programs to provide applications for various user requirements. One of the most successful software firms was Microsoft Corporation. On June 30, 1991, Microsoft reported their revenues surpassed $1.8 billion with net income reaching $463 million or 25 percent of revenues. (Yoffie, 1993) This corporation was founded in 1975 with three employees and no reported income in that year. In 1991 with 8,226 employees it led the world in sales of software products. This phenomenal growth is not limited to Microsoft; many software manufacturers such as Banyan, Novell, Lotus, and Borland have enjoyed tremendous success. Software is the key in converting the electronic power of hardware to specific applications, this allows IT to enhance Government and business processes.

The telecommunications portion of the IT industry has experienced a radical environmental change with the breakup of American Telephone and Telegraph (AT&T) and the establishment of seven different Bell Systems plus AT&T. With expanding competition driven by new entrants into this segment of the IT market, a comprehensive review of this segment of the IT industry is not available. Telecommunications influence on IT is an area of research that is beyond the scope of this paper.

The overall trend in the total IT market is extreme competition driven by technological advances and environmental

changes. The IT market was once dominated by IBM and now market pressures are causing problems for IBM. Louis Gerstner, IBM's CEO, announced that IBM would produce a profit in 1994, which will be IBM's first profitable year since 1990. (Wiseman, 1994). IBM has been the IT industrial leader since the mid-1950s and its top-down management scheme has had difficulty in keeping pace with IT industry trends. However, to produce a profit, Mr. Gerstner had to bring about radical changes during his first year (1993-1994) as CEO. Some of his significant changes were refining IBM's mission, streamlining the organization, improving finances, cutting payroll, and updating technology plans. IBM is looking to lead the market in open distributed computing, transform the company's research practices to produce a return on investment, dominate new markets for multimedia networks, retool products and the sales force to penetrate specific vertical industries, capture the growing computer market in China and Latin America, and use IBM's resources to cut costs and boost sales. (Winkler, 1994) In short, IBM is reinventing itself to become more competitive in today's IT environment and to lay the groundwork to remain competitive during the next century.

E. SUMMARY

This chapter started with a comprehensive introduction to the complex requirements and guidelines governing IT acquisitions. Then the focus shifted to the problems

involving Government IT, Government acquisition of IT, and environmental changes in the IT industry itself. The chapter provided expanded information on the IT environment since the passage of the Act and introduced some of the significant new IT industry trends.

IV. NEW DIRECTIONS FOR INFORMATION TECHNOLOGY

A. THE IMPORTANCE OF INFORMATION TECHNOLOGY IN GOVERNMENT TODAY AND TOMORROW

President Clinton has pledged to radically change the way Government does business and to achieve a more efficient and economical entrepreneurial bureaucracy. The NPR report acknowledged that the transformation of the Government is a massive undertaking and stated that "information technology can be a powerful tool for reinvention." (NPR, 1993) IT acts as an enabler to allow organizations to do work in radically different ways, to break old rules and create new ways of working (Hammer & Champy, 1993). The Clinton administration's budget for fiscal year 1994 has the Government spending $24.8 billion on IT and the President believes that technology holds the key to better Government (Corbin, 1994).

Even though the NPR and the new administration sound like they have found a new application for IT, Government has long supported the innovative use of computers and related technologies. Between 1988 and 1991 the Government IT budget grew 32 percent and from 1991 through 1994 it grew by 12 percent. A significant change is that from 1989 the civilian agencies, instead of DoD, began spending more than one half of the Government's IT budget and their share has been growing

every year (Corbin,1994). Unlike most politically driven trends the growth of IT is necessary for the survival of Government.

> Information systems technology has become so embedded in the management structure of the Federal establishment that vital administrative, scientific, and military functions are now almost totally dependent on the smooth functioning of computer hardware and software. (Head,1982)

The sixth edition of the Government-wide Five-Year ADP and Telecommunications Plan issued by OMB predicted the following trends for IT in the year 2000:

> First, the amount of computing power used by the government and therefore its dependence on that technology will continue to grow. It is difficult to conceive of running large governmental systems-like Social Security, military logistics, weather forecasting, tax collection, or air traffic control-without modern information technology. The public demand for these services, and improved responsiveness can be expected to continue to grow. Second, the nature of governmental programs, not just the tools used to operate them, will change. Technology offers the potential not just to make our systems marginally more efficient and responsive, but to change the way we do business. (OMB, 1988)

Government reliance on IT resources will not diminish under the current administration and as technology increasingly interacts with our everyday life, IT will increase in importance. The Government could not effectively reinvent large federal programs without the aid of automation and in the era of renewed demands for increased efficiency with less resources, IT is a tool capable of enabling success.

B. THE ORIGINAL INTENT OF THE BROOKS ACT

Sifting through the numerous pages of the historical record behind the Act, it is apparent that the primary concern of Congress was in saving money. The testimony focused on GAO reports and studies that demonstrated how separate agencies did not achieve the most efficient and economical use of IT resources. The preamble of The Act states the original intent:

> ...to provide for the economic and efficient purchase, lease, maintenance, operation, and utilization of automatic data processing equipment. (U.S. Code, 1966)

Congress was and should always be concerned with guarding the taxpayers interest and ensuring proper handling of Government funds. Since Congress relies on the executive branch to carry out their will, they must rely on their oversight role to protect the taxpayer's interest. In addition to this basic duty, Congress was attempting to build a state of the art management system for the executive branch to implement. This system would call upon separate agencies within the executive branch to fulfill management and allocation of IT resources duties. Of course, Congress counted on its oversight role as a key to ensuring success of this effort. This secondary intent was highlighted in the legislative history when, in discussions, it stated that the Act:

> ...is not primarily concerned with determining policies, by providing the means with which adequate information can be obtained, joint effort sufficiently applied, and new management techniques devised, this

> legislation makes it possible to determine effective policies and achieve fiscal control. (U.S. Code, 1966)

This passage shows that Congress did not want to hamper the executive branch by laying out specific policies to be followed. They instead set up the three tier management structure within the executive branch to establish policies, set standards, and administer the policies and standards. Congress displayed their desire to avoid establishing policies by not defining ADPE in the original Act. This solicitude was explained in the legislative history by the following passage:

> Although the ADP to be included under this management program could be more closely defined at this time, the committee is concerned that rapidly shifting developments in the interrelated fields of defense, space, communications, and ADP could make any presently acceptable distinctions obsolete. And, as this legislation involves the internal operations of the Government, there is no pressing need for strict statutory definitions. As in keeping with the general concept of H. R. 4845, the specific definition of general-purpose ADP equipment is left to BOB and GSA and the issuance of appropriate regulations.(U.S. Code, 1966)

Throughout the historical record and subsequent legislation, Congress displayed the need to maintain tight oversight over all IT issues. However, they remained committed to the primary intent behind the Act, which is to provide fiscal control and establish executive branch management systems to enhance Government's acquisition and utilization of IT resources.

C. SYNTHESIS OF MAJOR PROBLEMS IN GOVERNMENT'S ACQUISITION AND MANAGEMENT OF INFORMATION TECHNOLOGY RESOURCES

In 1965, some of the major problem areas in ADP acquisition and management were:

- no Government-wide management of ADP acquisitions or operations,
- IBM had an effective monopoly of ADPE market,
- no established standards for ADPE,
- widespread waste of computer time on expensive mainframe computers, and
- with the ever-increasing complexities of business and government, greater exploitation of IT potential was required. (U.S. Code, 1966)

In 1982, some of the major problems areas in IT acquisitions and management were:

- Congressional oversight had become micromanagement of GSA and reduced the federal manager's ability for unrestricted work,
- centralized management and excessive regulations reduce effectiveness or IT procurements,
- federal agencies lagged behind private industry in taking advantage of up-to-date computer technology and they lack

the ability to attract high quality IT personnel. (Head, 1982)

Some of the major problem areas in Government IT acquisition and management today are:

- procurement reform is required to allow for federal access to all the modern technology available,

- management reform is required to empower federal employees to work effectively,

- reduction of excessive laws and regulations is mandatory to reinvent Government, and

- innovative leadership is required to effectively integrate new technologies to provide the effective, efficient and responsive Government demanded by the American people. (NPR, 1993)

The themes behind these items indicate that the Congressional intent behind the original Brooks Act is as relevant today as it was in 1965: the economic and efficient purchase, lease, maintenance, operation, and utilization of IT resources is still required. The significant difference is that the centralized management systems of the 1960's are not flexible enough to quickly respond in this technologically advanced decade. The Government should study the reinvention process that IBM has undertaken. IBM, which may have had the world's largest corporate bureaucracy, started its reinvention process by reducing overhead and employees in order to achieve

flexibility. (Winkler, 1994) IBM's CEO, Louis Gestner recognizes the need for his large corporation to react quickly to market stimuli. He stated that:

> The failure to capitalize on this sea of change in our industry is the most important mistake that IBM has made in the last decade. (Information Week, 4/11/94)

The management structure that controls the acquisition and operation of IT resources is even more complex today than those designed in the original Act. The three tiered management of placing OMB in charge of policy, GSA in charge of procurement and operations, and National Institute of Standards and Technology (NIST), formerly NBS, in charge of standards is slightly more complex. In the past twenty-eight years Government has added layers of new offices that interact in the information technology arena. Two of the major offices are:

- OFPP - responsible for formulating Government acquisition policy, with input from all major agencies.

- OIRA - responsible to ensure that automatic data processing, telecommunications, and other information technologies are acquired and used by the Federal Government in a manner which improves service delivery and program management, increases productivity, improves the quality of decision-making, reduces waste and fraud, and wherever practicable and appropriate, reduces the information processing burden for the Federal Government and for persons who provide information to and for the Federal Government. (GSA, 1993)

These new offices within OMB are tasked with control over Government IT. These taskings are very similar to the duties and responsibilities assigned to GSA by the Brooks Act.

The management of the Federal acquisition process is highly regulated and IT related procurements are subject to the following laws and regulations:

- Brooks Act (P.L. 89-306)
- Warner Amendment (P.L. 99-500)
- Paperwork Reduction Act (P.L. 96-511)
- Paperwork Reduction Reauthorization Act of 1986 (P.L. 99-500)
- Competition in Contracting Act (P.L. 98-369)
- Computer Security Act of 1987 (P.L. 100-235)
- Privacy Act of 1974 (P.L. 93-579)
- Federal Acquisition Regulation (FAR)
- Federal Information Resources Management Regulation (FIRMR)

- Federal Property Management Regulation (FPMR)

- OMB Circular A-130, Management of Federal Information Resources

- OMB Circular A-76, Policies for Acquiring Commercial or Industrial Products and Services Needed by the Government

- OMB Circular A-109, Major Systems Acquisitions

- Plus any agency specific guidance regarding acquisition and operation of IT resources.

These rules were built by a large Federal bureaucracy that has increased since the passage of the original Act. The regulatory structure above establishes the need for internal reviews within the executive branch. Inspector General offices within each agency act as a extension of the legislative and judicial branches in ensuring adherence to the letter and spirit of the law. This oversight can stifle employee innovation and build an atmosphere of distrust.

The synthesis of the major problems in Government IT is that the problem may be the size of Government. The bureaucratic morass that has accumulated over Government acquisitions and management of IT resources has stifled the innovative ability of the executive branch manager. Over the last twenty-eight years the legislative and administrative branches have just superimposed new rules and regulations over

the existing framework of the Brooks Act. This has created an increase in the complexity and frustration of federal managers' practices in working with IT. The NPR summed up the Federal management scheme as:

> ...Washington is filled with organizations designed for an environment that no longer exists, bureaucracies so big and wasteful that they can no longer serve the American people. From the 1930s through the 1960s, we built large, top-down, centralized bureaucracies to do the publics business. They were patterned after the corporate structures of the age: hierarchical bureaucracies in which tasks were broken into simple parts, each was the responsibility of a different layer of employees, each was defined by specific rules and regulations. A rigid preoccupation with standard operating procedure, their vertical chains of command, and their standardized services, these bureaucracies were steady-but slow and cumbersome. In today's world of rapid change, lighting-quick information technologies, tough global competition, and demanding customers, large, top-down bureaucracies-public and private-don't work very well. (NPR,1993)

D. THE IMPACT OF INNOVATION IN INFORMATION TECHNOLOGY

The rapid technological surge in the IT industry during the last twenty-eight years has been truly amazing. The combination of IBM's decision to "unbundle" their product line with the introduction of the micro-chip brought forth a rapid expansion of technology at the start of the fourth generation of computer equipment. This entrepreneurial explosion saw the emergence of some fourteen thousand new software firms. These companies acted as catalysts, combining with new hardware and micro-chip manufacturers, to create an upsurge of growth in the 1980s. The U.S. IT Industry's lead in world-wide sales of computers and peripherals rose some 40 percent, from $35

billion in 1979 to $49 billion in 1989, while the U.S. lead in software revenues rose by a factor of 2.5. These numbers have not been adjusted for inflation, but because prices in the computer industry dropped throughout this period, the unadjusted statistics understate the actual U.S. IT industrial growth. (Henderson, 1993)

The personal computer (PC) market is one of the most competitive segments of the IT industry. The rapid introduction of a new generation of PCs is being driven by rapid increases in IC chip innovation. Intel, a leading manufacturer of IC microprocessors has produced seven innovative generations of IC chips since the introduction of its i80286 (286-chip) in 1982. (Yoffie, 1993) Intel chips are the heart of several major PC manufacturers' products. Rapid introduction of these new chips has forced PC prices into a free fall and increased competition in a cut-throat market. Government acquisition procedures are simply inadequate when adjusting to this type of market force because of the time consuming bureaucratic process. The U.S. Air Force, using a PDA granted by GSA, just completed the Desktop IV contract. This contract was awarded <u>two years</u> after beginning the acquisition process. This contract is an indefinite delivery, indefinite quantity (IDIQ) type contract that enables all Government agencies to procure PCs and related equipment under an umbrella contract. This contract is a direct descendent of the type of contracts envisioned by the Brooks Act. It is a

large Government-wide contract that enables the Government to use the promise of huge purchases to lock in low prices. However, the benefits of an IDIQ can be lost by the rapid advance of new technology. Federal trade magazines regularly run advertisements touting PCs that are three times as powerful and half as expensive as machines available through this IDIQ contract.(Corbin, 1993) This is because a new generation of PCs based on Intel's Pentium chip and IBM's new "PowerPC" chip are being sold as the best models available, whereas the PCs available under Desktop IV are 486-chip machines. Government's ability to modify existing contracts for new product developments is limited due to the legal complexities of rigid acquisition laws and regulations. The most troublesome aspect of this Air Force scenario is that the Desktop IV contract is being studied by Government procurement specialists and computer company executives, because it was the first major procurement to be attempted under the "fast-track" procedure. On average, 15 months elapse between approval of a DPA and the award of a contract.(Corbin, 1993) Of course this time does not include the time spent by requirements generators to conceive, budget, plan, and process a computer project through their own agency hierarchy. This internal agency process combined with the normal 15 month "fast-track" procedure has resulted in the Air Force contracting for old IT technology at higher than market prices. This contract is a good example of why the

streamlining of the Government acquisition process is required, and indicates the difficulty of using outdated management techniques in a new rapidly changing business environment.

Where are the IT technological advances leading the world? The answer is in every different direction. Information technology is integrated into almost every aspect of modern American society. IC chips are in almost all home appliances, cars, PCs, toys, telephones, fax machines, photocopiers, answering machines, and computer printers. Applications requiring the use of IC chips are rapidly increasing. The newest marriage of technology coming to most homes is the interactive cable television service, where cable television, computers, and telephones will allow high speed graphics and textual interactive telecommunications between places with access to a cable system. Of course, satellite communication with portable equipment is available, too. The challenge in the IT industry is to develop open systems, in that new generations of software will permit total integration of any hardware, software, and telecommunications medium for any application the user requires.

The problem is that Government is trapped in a rigid, inflexible, set of laws and regulations, and will not have access to the latest technological advances because of stifling bureaucracy. This will slow Government's ability to achieve the NPR goals to provide the most economical and

efficient service to the taxpayer. Information technology is an important tool that public and private concerns use to conduct business, and as new IT applications become available Government employees must be empowered to use the technology in innovative ways.

E. THE BROOKS PROPHECY VERSUS REALITY

In the legislative history of the original Act, a few predictions of the future of Government IT were discussed. Some of the predictions were:

- the future is in large time-sharing computer systems dedicated to specific functions,

- fewer units of Government will have sufficient requirements for the new and expensive large capacity computers, and

- most computer systems will consist of huge new machines linked to numerous small satellite machines serving dozens of users simultaneously. (U.S.Code, 1966)

These predictions were relatively correct. The main flaw is that Congress, and most other experts, foresaw a future of computer systems built around even larger more expensive mainframe computers. These beliefs were based upon the new computer systems being introduced during the third generation of computers. The Congressional argument was that the Governmental management systems must be capable of procuring

and operating the new third generation type machines for many users and achieve economies of scale.

The reality of the current IT environment is different than the 1965 prediction and the differences highlight the possibility that the Act may not have had all the answers to fix Government's IT problems. The combination of inexpensive small powerful computers with stand-alone software programs has eliminated the emphasis on large time-share computers. The expansive growth of Government since 1965 has increased the need for IT systems, and they have become an integral part of today's office environment. Market competition and technological innovations have given rise to more and different types of IT applications available than expected in 1965. The future of IT is even more uncertain now, therefore, it is necessary to build a Government management and acquisition system for IT with the flexibility to adapt to future innovations. The system should follow General George S. Patton's advice in that one should "Never tell people how to do thin . Tell them what you want to achieve, and they will surprise you with their ingenuity." (NPR, 1993)

F. SUMMARY

This chapter has presented an analysis of the information and data presented in the previous chapters. The chapter began by describing how Government relies on IT to provide services, and emphasized the increasing importance of IT in

improving Government. Then the Congressional intent of the Act was derived before addressing the major problems in Governmental acquisition and management of IT resources. The chapter then revealed how innovation impacted the IT Industry and finished by showing how those innovations were different than predicted in the legislative history of the Act.

V. CONCLUSIONS AND RECOMMENDATIONS

A. OVERVIEW

The Brooks Act was enacted in the decade that started the explosive growth of increased Government action to lead the country into the next century. President John F. Kennedy started the period by challenging the nation to put a man on the moon by the end of the decade. President Lyndon B. Johnson followed by building a huge Government bureaucracy to administer "The Great Society." The Act was an attempt by Congress to put into place a "state-of-the-art" management structure to enable the Government to harness the productivity of the computer. However, this law is just like a Government program, what started out as a small and lean program, is now encumbered with layers of bureaucracy which are costing the Government excessive expenditures of time, money, and manpower.

B. CONCLUSIONS

1. Conclusion 1

The Brooks Act should be repealed. The Government can use one of the central reasons for establishing the Brooks Act as justification to repeal the Act. Congress was putting into place a state-of-the-art centralized management system to enable the Executive branch to provide innovative management

over automatic data processing equipment. Today IBM is reengineering itself from a centralized management system to a streamlined vertical management system, so they can remain competitive and keep pace with a rapidly changing market. The Government, needs to mirror IBM and remove overbearing bureaucracies and empower its employees by streamlining its management structure and eliminating unnecessary regulations. By repealing the Brooks Act, the Government can peel away a layer of bureaucracy. This will allow federal employees the necessary freedom to provide innovative management.

The Act can be repealed because most of its primary functions have been duplicated by other agencies. OFPP can and should control all Government acquisition regulations in the FAR. OIRA can take over all executive agency responsibilities for establishing IT acquisition policies. GSA can promulgate policy over Government property management. NIST's responsibility for establishing standards is covered under other legislation (see Computer Security Act of 1987 in Appendix D), as is OMB's overall policy establishment role for the President.

Now is a good time to propose and work for the repeal of the Act because NPR initiatives are politically acceptable. If the repeal is proposed as an innovative reshaping of Government that will increase Government efficiency, most elected members of Congress would be hard pressed to vote against such initiatives.

2. Conclusion 2

The Congressional intent of the original Act has been duplicated in subsequent legislation. While the stated intent of efficient and economical purchase, lease, maintenance, operation, and utilization of IT resources is an ongoing concern, the competitive market environment has evolved to allow for this to occur. The IT industry is no longer controlled by IBM's effective monopoly. Market competition is keen and allows for Government to achieve efficiency and economy under established acquisition regulations. If the NPR acquisition initiatives were totally adopted, GSA's role would be less apparent. The increase of small purchase authority to $100,000, the new definition of commercial items with its special acquisition rules, and the increasing of PDA would reduce the scope of GSA's authority. The combined effect of subsequent legislation, acquisition streamlining, Government reinvention under NPR initiatives, and IT industry changes will achieve most of the reasons the Act was created.

3. Conclusion 3.

The size and complexity of the Government makes automation and information processing a vital necessity in all aspects of Government. Services required and demanded to maintain the standard of living in today's society could not be possible without information technology innovations. This reliance will increase and the Government will have to be able

to tap into technological advances to provide economical, efficient, and innovative services promised to the American public by the current administration. Government regulations must be reduced to allow federal agencies and employees the ability to adjust and adapt to rapid technological advances.

Rules and regulations must be reduced to permit streamlining of the acquisition process and provide an atmosphere conducive to innovation.

C. RECOMMENDATIONS

1. Recommendation 1.

Repeal the Brooks Act.(see Conclusion 1)

2. Recommendation 2.

In lieu of repeal, the following administrative actions can be taken to reduce the restrictive impact of the Act while maintaining the intent of Congress:

- incorporate the FIRMR into the FAR and ensure that only OFPP establishes acquisition regulations with inputs from GSA concerning IT acquisitions,

- GSA should increase DPA to $250 million for all agencies,

- GSA should encourage innovative procurement techniques by reducing restrictive regulations,

- Congress should refrain from micromanaging GSA's procurement approval process,

- OMB should ensure periodic audits are conducted on all agencies receiving DPA to ensure the economic and efficient purchase, lease, maintenance, operation and utilization of IT resources and report to Congress in an attempt to reduce Congressional oversight and micromanagement, and

- remove the definition of ADPE from the Act and allow ADPE to be defined in the FAR, because it is easier to change definitions in regulations than to amend a law. Additionally this would empower OIRA to advice OMB on new developments in ADPE.

D. REVIEW OF RESEARCH QUESTIONS

1. Primary Research Question.

What was the Congressional intent behind the Brooks Act and to what extent is it relevant today? The original intent behind the Act was to establish a management system in the executive branch which provided fiscal control and enhanced the Government's acquisition and utilization of information technology resources. This intent is relevant today but it is accomplished by subsequent legislation, regulation, and environmental change over the past two decades.

2. Subsidiary Research Question 1.

What was the state of the IT industry and the procurement regulatory environment when the Brooks Act was passed and how has it evolved? The IT industry had just entered the third generation of computer equipment. This generation was highlighted by the introduction of large

mainframe computers which were expensive to operate and maintain, and required economies-of-scale operations to enhance efficiency. Today, the IT industry is in the fifth generation of computer equipment, and competitive markets are flooded with small, inexpensive, extremely powerful computers. Rapid innovation of microprocessor, IC chip technology, and software innovations has enabled IT manufacturers to provide diverse applications of computer technology.

3. **Subsidiary Research Question 2.**

Is the Brooks Act's definition of ADP and ADPE adequate or should it be altered? The terms ADP and ADPE as defined in the modified version of the Brooks Act is very broad in scope. The most significant issue within the definition is that, as defined, almost all modern office equipment, computer software, and telecommunications equipment can be interpreted as being ADPE. This would mean all office equipment would fall under the domain of the Act and this was not Congress' original intent. Congress originally left the terms undefined so that OMB and GSA could define these terms and administratively issue appropriate controlling regulations. By removing the definition from the Act, Executive agencies could administratively change the regulations to allow for flexibility in responding to the rapid technological changes in the IT industry.

4. Subsidiary Research Question 3.

What has been the effect of the Brooks Act on IT acquisitions? The Act established a highly centralized management structure within the Executive Branch which created a plethora of rules, regulations, and instructions to control Government IT. Agencies cannot possibly master this maze of bureaucracy and this over-regulation has stifled creativity. This environment does not allow Government executives the ability to concentrate on integrating IT effectively within their organizations because Congressional oversight and micromanagement emphasize the necessity of following regulations.

5. Subsidiary Research Question 4.

What were the Section 800 Panel's recommendations concerning the Brooks Act and what do they signify? The Section 800 Panel was convened and tasked with studying ways to streamline the DoD acquisition process. The Panel recommended either wholly exempting DoD from the Act or significantly increasing DoD's DPA. Their recommendations did not address all of the issues surrounding Governmental IT because their charter was limited to the review of acquisition laws pertinent only to DoD. This recommendation was significant because it signals the need to reduce Government-wide IT acquisition controls and allow individual agencies the flexibility to control their IT environment.

6. Subsidiary Research Question 5.

Given a different IT industry and procurement regulatory environment, to what extent is the Brooks Act necessary today? The intent behind the Act is relevant today but the Act itself is not necessary. Competition in IT markets is sufficient to ensure Government contracting officers can achieve the best value available without massive quantity procurements. All Federal agencies are acutely aware of the need to achieve the most efficient IT resources possible for their scarce funding.

7. Subsidiary Research Question 6.

What administrative actions can be taken to improve IT acquisitions today? Recommendation number 2 represents the most significant administrative actions to be taken. In addition, GSA can change regulations and allow for increased procurements from multiple award schedules. OMB should also direct Executive agencies to review all agency-specific IT acquisition rules and regulations, to remove any restrictive covenants that do not add value to the procurement process.

APPENDIX A: THE ORIGINAL BROOKS ACT

PUBLIC LAW 89-306; 79 STAT. 1126

<H.R. 4858>

An Act to provide for the economic and efficient purchase, lease, maintenance, operation, and utilization of automatic data processing equipment by Federal departments and agencies.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That:

Title I of the Federal Property and Administrative Services Act of 1949 (63 Stat. 377), as amended, is hereby amended by adding a new section to read as follows:

"AUTOMATIC DATA PROCESSING EQUIPMENT

"Sec. 111. (a) The Administrator is authorized and directed to coordinate and provide for the economic and efficient purchase, lease, and maintenance of automatic data processing equipment by Federal agencies.

"(b) (1) Automatic data processing equipment suitable for efficient and effective use by Federal agencies shall be provided by the Administrator through the purchase, lease, transfer of equipment from other Federal agencies, or otherwise, and the Administrator is authorized and directed to provide by contract or otherwise for the maintenance and repair of such equipment. In carrying out his responsibilities under this section the Administrator is authorized to transfer automatic data processing equipment between Federal agencies, to provide for joint utilization of such equipment by two or more Federal agencies, and to establish and operate equipment pools and data processing centers for the use of two or more such agencies when necessary for its most efficient and effective utilization.

"(2) The Administrator may delegate to one or more Federal agencies authority to operate automatic data processing equipment pools and automatic data processing centers, and to lease, purchase, or maintain individual automatic data processing systems or specific units of equipment, including such equipment used in automatic data processing pools and automatic data processing centers, when such action is determined by the Administrator to be necessary for the economy and efficiency of operations, or when such action is essential to national defense or national security. The Administrator may delegate to one or more Federal Agencies

authority to lease, purchase, or maintain automatic data processing equipment to the extent to which he determines such action to be necessary and desirable to allow for the orderly implementation of a program for the utilization of such equipment.

"(c) There is hereby authorized to be established on the books of the Treasury an automatic data processing fund, which shall be available without fiscal year limitation for expenses, including personal services, other cost, and the procurement by lease, purchase, transfer, or otherwise of equipment, maintenance, and repair of such equipment by contract or otherwise, necessary for the efficient coordination, operation, utilization of [illegible] equipment by and for Federal agencies: *Provided*, That [illegible]rt of equipment inventory, utilization, and acquisitions, together with an account of receipts, disbursements, and transfers to miscellaneous receipts, under this authorization shall be made annually in connection with the budget estimates to the Director of the Bureau of Budget and to the Congress, and the inclusion in appropriation acts of provisions regulating the operation of the automatic data processing fund, or limiting the expenditures therefrom, is hereby authorized.

"(d) There are authorized to be appropriated to said fund such sums as may be required which, together with the value, as determined by the Administrator, of supplies and equipment from time to time transferred to the Administrator, shall constitute the capital of the fund: *Provided*, That said fund shall be credited with (1) advances and reimbursements from available appropriations and funds of any agency (including the General Services Administration), organization, or contractor utilizing such equipment and services rendered them, at rates determined by the Administrator to approximate the costs thereof met by the fund (including depreciation of equipment, provision for accrued leave, and for amortization of installation costs, but excluding, in the determination of rates prior to the fiscal year 1967, such direct operating expenses as may be directly appropriated for, which expenses may be charged to the fund and covered by advances or reimbursements from such direct appropriations) and (2) refunds or recoveries resulting from operations of the fund, including the net proceeds of disposal of excess or surplus personal property and receipts from carriers and others for loss of or damage to property: *Provide further*, That following the close of each fiscal year any net income, after making provisions for prior year losses, if any, shall be transferred to the Treasury of the United States as miscellaneous receipts.

"(e) The proviso following paragraph (4) in section 201 (a) of this Act and the provisions of section 602 (d) of this Act shall have no application in the administration of this section. No other provision of this Act or any other Act

which is inconsistent with the provisions of this section shall be applicable in the administration of this section.

"(f) The Secretary of Commerce is authorized (1) to provide agencies, and the Administrator of General Services in the exercise of the authority delegated in this section, with scientific and technological advisory services relating to automatic data processing and related systems, and (2) to make appropriate recommendations to the President relating to the establishment of uniform Federal automatic data processing standards. The Secretary of Commerce is authorized to undertake the necessary research in the sciences and technologies of automatic data processing computer and related systems, as may be required under the provisions of this subsection.

"(g) The authority conferred upon the Administrator and the Secretary of Commerce by this section shall be exercised subject to direction by the President and to fiscal and policy control exercised by the Bureau of Budget. Authority so conferred upon the Administrator shall not be so construed as to impair or interfere with the determination by agencies of their individual automatic data processing equipment requirements, including the development of specifications for and the selection of the types and configurations of equipment needed. The Administrator shall not interfere with, or attempt to control in any way, the use made of automatic data processing equipment or components thereof by any agency. The Administrator shall provide adequate notice to all agencies and other users concerned with respect to each proposed determination specifically affecting them or the automatic data processing equipment or components used by them. In the absence of mutual agreement between the Administrator and the agency or other user concerned, such proposed determinations shall be subject to review and decision by the Bureau of Budget unless the President otherwise directs."

Approved October 30, 1965.

APPENDIX B: THE AMENDED BROOKS ACT

Public Law 89-306
89th Congress, H.R. 4845
October 30, 1965

An Act

As Amended

79 STAT. 1127

To provide for the economic and efficient purchase, lease, maintenance, operation, and utilization of automatic data processing equipment by Federal departments and agencies.

Be it enacted by the Senate and the House of Representatives of the United States of America in Congress assembled, That Title I of the Federal Property and Administrative Services Act of 1949 (63 Stat. 377), as amended, is hereby amended by adding a new section to read as follows:

AUTOMATIC DATA PROCESSING EQUIPMENT

SEC. 111. (a) *(1)* The Administrator is authorized and directed to coordinate and provide for the economic and efficient purchase, lease, and maintenance of automatic data processing equipment by Federal agencies.

(2) (A) For the purposes of this section, the term 'automatic data processing equipment' means any equipment or interconnected system or subsystems of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information-

(i) by a Federal agency, or

(ii) under a contract with a Federal agency which-

(I) requires the use of such equipment, or

(II) requires the performance of a service or the furnishing of a product which is performed or produced making significant use of such equipment.

(B) Such term includes-

(i) computers:

(ii) ancillary equipment:

(iii) software, firmware, and similar procedures:

(iv) services, including support services; and

(v) related resources as defined by regulations issued by the Administrator for General Services.

(3) This section does not apply to-

(A) automatic data processing equipment acquired by a Federal contractor which is incidental to the performance of a Federal contract;

(B) radar, sonar, radio, or television equipment;

(C) the procurement by the Department of Defense of automatic data processing equipment or services if the function, operation, or use of which-

(i) involves intelligence activities;

(ii) involves cryptologic activities related to national security;

(iii) involves the command and control of military forces;

(iv) involves equipment which is an integral part of a weapon or weapons system; or

(v) is critical to the direct fulfillment of military or intelligence missions, provided that this exclusion shall not include automatic data processing equipment used for routine administrative and business applications such as payroll, finance, logistics, and personnel management; or

(D) the procurement of automatic data processing equipment or services by the Central Intelligence Agency.

(b) (1) Automatic data processing equipment suitable for efficient and effective use by Federal agencies shall be provided by the Administrator through the purchase, lease, transfer of equipment from other Federal agencies, or otherwise, and the Administrator is authorized and directed to provide by contract or otherwise for the maintenance and repair of such equipment. In carrying out his responsibilities under this section the Administrator is authorized to transfer automatic data processing equipment between Federal agencies, to provide for joint utilization of such equipment by two or more Federal agencies, and to establish and operate equipment pools and data processing centers for the use of two or more such agencies when necessary for its most efficient and effective utilization.

(2) The Administrator may delegate to one or more Federal agencies authority to operate automatic data processing equipment pools and automatic data processing centers, and to lease, purchase, or maintain individual automatic data processing systems or specific units of equipment, including such equipment used in automatic data processing pools and automatic data processing centers, when such action is determined by the Administrator to be necessary for the economy and efficiency of operations, or when such action is essential to national defense or national security. The Administrator may delegate to one or more Federal Agencies authority to lease, purchase, or maintain automatic data

processing equipment to the extent to which he determines such action to be necessary and desirable to allow for the orderly implementation of a program for the utilization of such equipment.

(3) If the Administrator finds that a senior official of an agency designated pursuant to section 3506 (b) of Title 44, United States Code, is sufficiently independent of program responsibility and has sufficient experience, resources, and ability to carry out fairly and effectively procurements under this section, the Administrator may delegate to such official the authority to lease, purchase, or maintain automatic data processing equipment pursuant to paragraph (2) of this subsection, except that any such delegation shall not relieve the Administrator of the responsibilities assigned to the Administrator under this section. A delegation by the Administrator under this subsection shall not preclude the Administrator from reviewing individual procurement requests if the Administrator determines that circumstances warrant such a review. The Administrator shall retain authority to revoke such delegations, both in general and with regard to any specific matter. In acting for the Administrator, any official to whom approval authority has been delegated under this subsection shall comply fully with the rules and regulations promulgated by the Administrator.

(c) The proviso following paragraph (4) in section 201 (a) of this Act and the provisions of section 602 (d) of this Act shall have no application in the administration of this section. No other provision of this Act or any other Act which is inconsistent with the provisions of this section shall be applicable in the administration of this section.

(d) The Secretary of Commerce is authorized (1) to provide agencies, and the Administrator of General Services in the exercise of the authority delegated in this section, with scientific and technological advisory services relating to automatic data processing and related systems, and (2) to make appropriate recommendations to the President relating to the establishment of uniform Federal automatic data processing standards. The Secretary of Commerce is authorized to undertake the necessary research in the sciences and technologies of automatic data processing computer and related systems, as may be required under the provisions of this subsection.

(e) The authority conferred upon the Administrator and the Secretary of Commerce by this section shall be exercised subject to direction by the President and to fiscal and policy control exercised by the Bureau of Budget. Authority so conferred upon the Administrator shall not be so construed as to impair or interfere with the determination by agencies of their individual automatic data processing equipment requirements, including the development of specifications for and the selection of the types and configurations of equipment

needed. The Administrator shall not interfere with, or attempt to control in any way, the use made of automatic data processing equipment or components thereof by any agency. The Administrator shall provide adequate notice to all agencies and other users concerned with respect to each proposed determination ***whether or not the automatic data processing equipment will be provided by the Administrator or whether or not the authority to lease, purchase, or maintain the equipment will be delegated. If the Administrator denies an agency procurement request such denial shall be subject to review and decision by the Director of the Office of Management and Budget, unless the President otherwise directs. Such review and decision shall be made only on the basis of a written appeal, and such appeal, together with any written communications to the Administrator or any officer or employee of the Office of Management and Budget concerning such denial shall be made available to the public.***

(f) Automatic data processing dispute resolution

(1) Upon request of an interested party ***in connection with any procurement which is subject to this section*** (including procurements ***subject to delegation*** of procurement authority), the board of contract appeals of the General Services Administration (hereafter in this subsection referred to as "board"), shall review any decision by a contracting officer alleged to violate a statute or regulation. Such review shall be conducted under the standard applicable to review of contracting officer final decisions by boards of contract appeals. ***The authority of the board to conduct such a review shall include the authority to determine whether any procurement is subject to this section and the authority to review regulations to determine their consistency with applicable statutes.***

A proceeding, decision, or order of the board pursuant to this subsection shall not be subject to interlocutory appeal or review.

An interested party who has filed a protest under subchapter V of chapter 36 of Title 31 with respect to a procurement or proposed procurement may not file a protest with respect to that procurement or proposed procurement under this subsection.

(2) (A) When a protest under this subsection is filed before the award of a contract in a protested procurement, the board, at the request of an interested party and within 10 days of the filing of the protest, shall hold a hearing to determine whether the board should suspend the procurement authority of the Administrator or the Administrator's delegation of procurement authority for the protested procurement on an interim basis until the board can decide the protest.

(B) The board shall suspend the procurement authority of the Administrator or the Administrator's delegation of

procurement authority unless the Federal agency concerned establishes that-

(i) absent action by the board, contract award is likely to occur within 30 days of the hearings; and

(ii) urgent and compelling circumstances which significantly affect interests of the United States will not permit waiting for the decision of the board.

(3) (A) If the board receives notice of a protest under this subsection after the contract has been awarded but within 10 days after the contract award, the board shall, at the request of an interested party and within 10 days after the date of the filing of the protest, hold a hearing to determine whether the board should suspend the procurement authority of the Administrator or the Administrator's delegation of procurement authority for the challenged procurement on an interim basis until the board can decide the protest.

(B) The board shall suspend the procurement authority of the Administrator or the Administrator's delegation of procurement authority to acquire any goods or services under the contract which are not previously delivered and accepted unless the Federal agency concern establishes that urgent and compelling circumstances which significantly affect the interest of the United States will not permit waiting for the decision of the board.

(4) (A) The board shall conduct such proceedings and allow such discovery as may be required for the expeditious, fair, and reasonable resolution of the protest.

(B) Subject to any deadlines imposed by section 9(a) of the Contract Disputes Act of 1978 (41 U.S.C. 608 (a)), the board shall give priority to protest filed under this subsection. The board shall issue its final decision within 45 working days after the date of the filing of the protest, unless the board's chairman determines that the specific and unique circumstances of the protest require a longer period, in which case the board shall issue such decision within the longer period determined by the chairman.

(C) The board may dismiss a protest the board determines is frivolous or which, on its face, does not state a valid basis for protest.

(5) (A) in making decisions on the merits of protests brought under this section, the board shall accord due weight to the policies of this section and the goals of economic and efficient procurement set forth in this section. ***The board may consider any decision, determination, opinion, or statement made by the Director of the Office of Management and Budget or any officer of any other Federal agency regarding applicability of this section to a particular procurement, and may request the advice of the Director or such officer with the regard to such applicability, but shall not be bound by any such decision, determination, opinion, or statement when determining whether a procurement is subject to this section.***

(B) If the board determines that a challenged agency action violates a statute or regulation or the conditions of any delegation of procurement authority issued pursuant to this section, the board may suspend, revoke, or revise the procurement authority of the Administrator or the Administrator's delegation of procurement authority applicable to the challenged procurement.

(c) Whenever the board makes such a determination, it may, in accordance with section 1304 of Title 31, further declare an appropriate interested party be entitled to the costs of-

(i) filing and pursuing the protest, including reasonable attorney's fees, and

(ii) bid and proposal preparation.

(6) (A) The final decision of the board may be appealed by the head of the Federal agency concerned and by an interested party, including interested parties who intervene in any protest filed under this subsection, as set forth in the Contract Disputes Act of 1978 (41 U.S.C. 601 et seq.).

(B) If the board revokes, suspends, or revises the procurement authority of the Administrator or the Administrator's delegation of procurement authority after the contract award, the affected contract shall be presumed valid as to all goods and services delivered and accepted under the contract before the suspension, revocation, or revision of such procurement authority or delegation.

(C) Nothing contained in this subsection shall affect the board's power to order any additional relief which it is authorized to provide under any statute or regulation. However, the procedures set forth in this subsection shall only apply to procurements conducted under the authority in this section. In addition, nothing contained in this subsection shall affect the right of any interested party to file a protest with the contracting agency or to file an action in a district court of the United States or the United States Claims Court.

(7) Not later than January 15, 1985, the board shall adopt and issue such rules and procedures as may be necessary to the expeditious disposition of protests filed under the authority of this subsection.

(8) For the purposes of this subsection-

(A) the term "protest" means a written objection by an interested party to a solicitation by a Federal agency for bids or proposals for a proposed contract for the procurement of property or services or a written objection to a proposed award or the award of such a contract; and

(B) the term "interested party" means, with respect to a contract or proposed contract described in subparagraph (A), an actual or prospective bidder or offeror whose direct economic interest would be affected by the award of the contract or by failure to award the contract.

(g) The justifications and approvals required by section 303(f)(1) of this Act shall apply in the case of any procurements under this section for which the minimum needs are so restrictive that only one manufacturer is capable of satisfying such needs. Such procurement includes either a sole source procurement or a procurement by specific make and model. Such justification and approval shall be required notwithstanding that more than one bid or offer is made or that the procurement obtains price competition and such procurement shall be treated as a procurement using procedures other than competitive procedures for the purposes of section 19(b) of the Office of Federal Procurement Policy Act (41 U.S.C. 417(b)).

Notes:

(1) Basic Brooks Act is in plain text.

(2) Amendments per Deficit Reduction Act of 1984 are in underlined plain text.

(3) Amendments per Paperwork Reduction Reauthorization Act of 1986 are in ***bold italic*** text.

(4) Amendments per FY 86 Authorization Act of 1986 is in *underlined bold italic* text.

APPENDIX C: GLOSSARY OF TERMS

Acquisition: The acquiring by contract with appropriated funds of supplies and services by and for the use of the Federal Government through purchase or lease, whether the supplies or services are already in existence, or must be created, developed, demonstrated, and evaluated. Acquisition begins at the point when agency needs are established and includes the description of requirements to satisfy agency needs, solicitation and selection of sources, award of contracts. contract financing, contract performance, contract administration, and those technical and management functions directly related to the process of fulfilling agency needs. (GSA, 1993)

Agency Procurement Request (APR): A request to GSA by an agency for contracting authority above their regulatory or specific agency authority. (GSA, 1993)

Automatic Data Processing (ADP): the automatic processing of data by electronic digital computers. (Stern, 1983)

Automatic Data Processing Equipment (ADPE): automatic data processing equipment (ADPE) as defined in Public Law 99-500 (40 U.S.C. 759(a)(2)), and set out in paragraphs (a) and (b) of this definition. (a) Any equipment or interconnected system or subsystem of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception, of data or information - (1) by a Federal agency, or (2) under a contract with a Federal agency which - (i) requires the use of such equipment, or (ii) requires the performance of a service or the furnishing of a product which is performed or produced making significant use of such equipment. (b) such term includes - (1) computers;(2) ancillary equipment; (3) software, firmware, and similar procedures; (4) services, including support services; and (5) related resources as defined by regulations issued by the Administrator for General Services. (GSA, 1993)

Business Process Reengineering: The fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed. (Hammer & Champy, 1993)

Computer: A device that operates on data at high speeds, can store data, and needs to be programmed. The term "computer" is most frequently used to denote an electronic digital device. (Stern, 1983)

Delegation of Procurement Authority (DPA): Authority provided by GSA, to other Executive agencies, to contract for FIP resources. (GSA, 1993)

Embedded FIP Equipment: FIP equipment that is an integral part of a product, where the principle function of the product is not the automatic acquisition, storage manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information. (GSA, 1993)

Federal Acquisition Regulation (FAR): The regulation that codifies uniform acquisition policies and procedures for Executive agencies Government-wide. (GSA, 1993)

Federal Information Processing (FIP) Resources: Same as Automatic data processing equipment (ADPE).

Federal Information Resources Management Regulation (FIRMR): The regulation that sets forth uniform policies and procedures for acquiring, managing, and using FIP resources and Federal records. Federal agencies use it in conjunction with the FAR. (GSA, 1993)

Federal Property Management Regulation (FPMR): Regulations that govern the management of all Federally-owned property. (GSA, 1993)

Firmware: Pre-wired hardware that has been preprogrammed to perform specific functions. (Stern, 1983)

Government Information: information created, collected, processed, transmitted, disseminated, used, stored, or disposed of by the Federal Government. (Federal Register, 1985)

Hardware: The physical devices that constitute a computer system. Contrast with software. (Stern, 1983)

Information: any communication or reception of knowledge such as facts, data, or opinions, including numerical, graphic, or narrative forms, whether oral or maintained in any medium, including computerized data bases, paper, microfilm, or magnetic tape. (Federal Register, 1985)

Information Resources Management (IRM): Planning, budgeting, organizing, directing, training, promoting, controlling, and management activities associated with the burden, collection, creation, use, and dissemination of management information and related resources, such as FIP resources. (GSA,1993)

Information System: the organized collection, processing, transmission, and dissemination of information in accordance with defined procedures, whether automatic or manual. (Federal Register, 1985)

Information Technology: the hardware and software used in connection with Government information, regardless of the technology involved, whether computers, telecommunications, micrographics, or others. (Federal Register, 1985)

Mainframe: A term used to describe a central processing unit (CPU) and connotes a device that controls the actual operations of the computer system; these include input, data transfer, arithmetic, logic, and output operations which are part of each user program. (Stern, 1983)

Management Information System (MIS): A systems approach that treats business departments as integrated parts of one total system rather than as separate entities. This approach aims at facilitating the flow of information and at providing management with greater decision-making power. (Stern, 1983)

Microcomputer: A small computer, that can be acquired for as little as several hundred dollars in its basic form. (Stern, 1983)

Minicomputer: A small computer, that cost about $4000 to $150,000, with most of the same features as a standard-sized computer; frequently used as a front-end processor in a data communications network. (Stern, 1983)

Program: A series of instructions that reads input data, processes it, and converts it to output. (Stern, 1983)

Supercomputer: a category of computer that has the capability to perform at least 20 million arithmetic operations per second and solve problems involving a data base of a million or more words. (Stern, 1983)

Small Purchase: An acquisition of resources or material in the amount of $25,000 or less. (GSA,1993)

Software: Programming support that enables the computer system to operate effectively; including the supervisor and user programs. (Stern, 1983)

APPENDIX D: KEY LEGISLATIVE AND ADMINISTRATIVE ACTIONS INFLUENCING GOVERNMENT ACQUISITIONS

1792 First law dealing with Government procurement was passed. The Departments of War and Treasury were given the responsibility to make purchases and contracts in the name of the United States.

1795 The purveyor of public supplies was established in the Department of Treasury to act as the Government's purchasing manager.

1808 The first law dealing with procurement abuses was passed and it required the phrase "Officials Not to Benefit" to be inserted as a clause in all Government contracts.

1809 The Procurement Act of 1809 was passed requiring the use of competitive bids for all Government contracts.

1933 The Buy American Act of 1933 was passed to foster and protect American industry, American workers, and invested American capital.

1934 The Copeland "Anti-Kickback" Act was passed to prohibit kickbacks from employees on public works.

1947 The Armed Forces Procurement Act was passed and established two objectives. First it provided workable procurement policies for periods of national emergency and second, it recognized that negotiated procurement is a required method of purchase in peacetime as well as wartime.

1962 The Truth-in-Negotiations Act (TINA) was designed and enacted to place the Government buyer in a more equal bargaining position with contractors. Contractors are required to provide current, accurate, and complete cost and pricing data for negotiations of contracts in excess of $100,000.

1965 The Brooks Act was passed establishing the framework, requirements, and responsibilities for procurement of automatic data processing equipment (ADPE).

1972 The Office of Federal Procurement Policy (OFPP) Act was passed establishing OFPP, under cognizance of the

Office of Management and Budget (OMB), to be responsible for developing a uniform procurement system throughout the Government.

1976 OMB Circular A-109 was published to establish policies to be followed by executive branch agencies in the acquisitions of major systems.

1980 The Paperwork Reduction Act of 1980 was enacted to ensure that ADP and telecommunications technologies were acquired and used in a manner that improved service delivery and program management, increased productivity, reduced waste and fraud, and - wherever practical and appropriate - reduced the information processing burden for the Federal Government and for persons who provide information to the Government. OMB's Office of Information and Regulatory Affairs was assigned overall authority for implementation of the Act and defined paperwork reduction requirements in OMB Circular (A-130).

1983 OMB Circular A-76 was published to establish Federal policy regarding the performance of commercial activities. The Supplement to the Circular sets forth procedures for determining whether commercial activities should be performed under contract with commercial sources or in-house using Government facilities and personnel.

1984 OMB Circular A-123 was published to prescribe policies and standards to be followed by executive departments and agencies in establishing, maintaining, evaluating, improving, and reporting on internal controls in their program and administrative activities.

1984 The Competition in Contracting Act (CICA) was passed requiring the use of full and open competition for all Government procurement of supplies and services.

1986 The Paperwork Reduction Reauthorization Act was passed to establish an information management framework for the Government with primary responsibilities centered in the Office of Information and Regulatory Affairs (OIRA) within the OMB.

1986 OMB Circular A-130 was published to provide a general policy framework for the management of Federal information resources. Among other requirements, this Circular required agencies to designate a senior official to carry out responsibilities under the

Paperwork Reduction Act for information resources management.

1987 The Computer Security Act was passed to provide for computer standards within the National Bureau of Standards (NBS) and establish security requirements for Government computer systems.

1988 The Procurement Integrity Act (PIA) was designed and enacted to control disclosure of source selection information and to restrict revolving door employment, including certifications, reporting and penalties for violations. The PIA was suspended in 1989 and reinstated in 1990.

1991 The Defense Acquisition Workforce Improvement Act (DAWIA) was passed to address some principle weaknesses within DoD's acquisition management system. It established action to be taken to improve the DoD acquisition workforce.

APPENDIX E: HISTORICAL SYNOPSIS OF INFORMATION TECHNOLOGY ADVANCES

1833 Charles Babbage started work on the Analytic Engine; the basic architecture of this machine was similar to the modern computer.

1890 The Tabulating Machine Company, owned by Herman Hollerith, was awarded a contract with the Federal Government's Census Bureau to develop equipment to code information on punched cards and process it with sorters and printers for the 1890 census.

1911 The Computing-Tabulating-Recording (CTR) Company was established by combining the Tabulating Machine Company with two other companies.

1924 CTR's name changed to International Business Machines (IBM).

1942 IBM dedicated the Automatic Sequence Controlled Calculator (ASCC), also known as the Harvard Mark I. The Mark I was made of electrically powered mechanical moving parts and had a speed similar to that of the machine envisioned by Babbage.

1943 The Army awarded a contract to the Moore School for the development of an electronic numerical integrator and computer (ENIAC).

1945 ENIAC was delivered to Army Ordinance, ENIAC is generally recognized as the first electronic computer.

1947 The transistor was invented at Bell Telephone Laboratories.

1948 IBM dedicated the Selective Sequence Electronic Calculator (SSEC), the world's first operational stored-program computer.

1950 The beginning of the first generation of electronic computers with the introduction of commercial components manufactured and sold in quantity. The Eckert-Mauchly Computer Company under contract to deliver an electronic computer to the Census Bureau merged with Remington Rand and became the Univac Division of Remington Rand.

1951 Univac I was completed and delivered to the Census Bureau. Univac delivered five other machines to Government agencies before making its first sale to a private company.

1953 IBM delivered its first computer, the 701, to compete in the same large scale market as the Univac I. These units were designed for a limited scientific market.

1954 IBM brought out the small scale 650 computer, for appeal to IBM's large base of punched card accounting machine customers.

1955 IBM delivered the 702 computer; these systems employ the ferrite core buffer memories.

1956 IBM, Sperry Rand, Burroughs, RCA, and NCR are competing in the computer market with a total value of installed computers of over $269 million.

1956 IBM computer models 702, 704, and 705, with ferrite core memories are shipped to customers.

1958 Univac is the first manufacturer to introduce a transistorized computer, Univac's Solid State 80.

1959 IBM vacuum tube model 709 is reintroduced as model 7090; the 7090 is completely solid state, and became the standard large scale computing system for the second generation of computers.

1959 The second generation of electronic computers started with the introduction of transistorized circuits and lasted from approximately 1959 to 1965. This generation of computers expanded the market from just over one billion dollars worth of equipment installed in 1959 to more than six billion dollars worth in 1965.

1960 Control Data Corporation (CDC) introduced a transistorized, 12-bit machine called the CDC-160. The CDC-160 was intended primarily as an input-output (I/O) controller for a larger 48-bit computer but it could be used for computing as a stand alone unit, and as such was one of the first machines to fit the definition of minicomputer.

1963 Honeywell announces its H-200 computer with Liberator software designed to translate IBM 1401 programs into H-200 machine language.

1964 The term supercomputer was brought into common use with the introduction of CDC's model 6600, designed by Seymour Cray.

1965 The third generation of electronic computers introduced computers built with integrated circuits, originally developed by Texas Instruments and Fairchild Semiconductor for military applications.

1970 The manufacturing cost of tested cores made by IBM is 0.03 cents each, one thousand times less than the price charged by General Ceramics in 1953.

1971 IBM introduces the world's first commercial computer with an all-semiconductor main memory, the IBM System/370 Model 145.

1971 The fourth generation of computers appears to emerge with the change from integrated circuits to large scale integration. Large scale integration is the packing of a number of complete circuits on a single silicon chip.

1975 Bill Gates and Paul Allen start Microsoft Corporation to capitalize upon their development of BASIC software language.

1976 Cray Research introduced the CRAY-1, a supercomputer ten times faster than the CDC-6600. Sophisticated emitter-coupled logic (ECL) chips were densely packed into modules and cooled by freon to produce a fast and deceptively small size computer.

1976 The Apple Computer Company designed and manufactured the Apple I. This provided Apple the start into a fast emerging personal computer market.

1977 The Tandy TRS-80 model I and Apple II computers were introduced. These units came with individual monitors, keyboards, and used ordinary letters and words to communicate with the users.

1980 Microsoft introduces MS-DOS (Microsoft Disk Operating System) language in reply to IBM's request for a software to run its line of personal computers.

1980 IBM introduces its new PC, based on Intel 8086 microprocessor.

1982 The Commodore 64 was introduced and became the most popular home computer in history. The Commodore 64

was inexpensive and had very good color graphics which allowed it to act as a game machine.

1982 Intel introduces i80286 chip in February, Osborne is introduced as the first luggable computer.

1984 Apple introduces the Macintosh (Mac) line of PCs which provided user friendly, mouse driven, graphical user interface (GUI) programming that made Apple a leader in the PC industry.

1985 Intel introduces the i80386 chip in October.

1985 Microsoft introduces "Windows", a graphics-based operating environment that ran on MS-DOS and allowed users to run several programs at the same time.

1986 Commodore Amiga, Burroughs and Sperry merge to form Unisys; Apple Macintosh generates increasing interest in desktop publishing.

1987 IBM introduces new generation of personnel computers the PS/2.

1988 Microsoft number one in world-wide software sales.

1989 Intel introduces the i80486 chip in April.

1991 Apple, IBM, and Motorola sign joint venture to develop a new generation of computers the "PowerPC." NCR, Tandy, and Apple market "clipboard" (pen) computers that allow input of handwritten printed characters. Apple calls their version "Powerbook Notebook" computers.

1992 Apple introduces PDAs (personal digital assistants) called Newton; PDAs combine the features of a notepad, calendar, and fax machine.

1993 Intel introduces the Pentium chip in March.

Note: The majority of information in this appendix was taken from the "Encyclopedia of Computer Science, Third Edition."

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