

Chapter 7

INFORMATION SERVICES

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Chapter 7

INFORMATION SERVICES

7.1 INTRODUCTION

During mid-1968, Informatics embarked on what became its fourth major business group of computer services, known as "information services." This business consisted of systems analysis, design, development, and operation of proprietary software and systems in support of data base input, storage and on-line retrieval; computer aided abstracting, indexing and cataloging; and automated processing, photocomposition and micrographic distribution of specific genre of textual information. In short, information services is dedicated to the collection, description, manipulation, and dissemination of massive amounts of information in its natural form related to a specific topic or related group of subjects. The types of information which Informatics has dealt with cover a comprehensive spectrum ranging from a diversity of topics in space research and aeronautics, medical science and life sciences to anti-trust, product liability and disaster litigation, general library information products, and the administration of environmental and chemical (drug and alcohol) abuse treatment programs.

These services are performed for an individual customer under an information management contract or they can be provided to an entire industry or profession through an on-line computer network on a subscription basis. Some of these subscription services have given users access to proprietary data bases of otherwise unavailable technical information pertaining to a specific field of interest. In other services, referred to as "clearinghouse" services, the information is both published and non-published literature and can consist of books, articles, papers, etc., including computerized abstracts, indexes, and bibliographies which can be distributed electronically through a computer network by micropublishing using microform computer-output or in printed form. In providing these services, Informatics uses its own proprietary software, which it can then opt to make available to the customer or sometimes it creates custom software for the specific application involved.

Information Services was not planned in the company's original objectives (**Prospectus for Corporation D**) and unforeseen as a major business area and technical capability during Informatics early years. In 1965 and 1966 there was an unsuccessful pioneering effort in Western Operations, under Jules Mersel, director of Information Science. But shortly thereafter, in the early 1970's, Information Services became the largest business activity within Informatics, encompassing 400 employees in eight locations. In 1974 it produced \$10 million in annual revenues, over 40 percent of the company's total of \$23.3 million.(1)

The father of this important area is Richard C. Lemons, in 1982 senior vice president, Information Systems and Services. As discussed in Section 2.1.9, he joined Informatics in Washington, DC, in 1966. Like all successful pioneers in new areas, he "had a dream" of a new "information industry," with Informatics leading the way to create it. His theory was that the user does not want computing--he wants information. So, Lemons concluded, he did not want to be in the computing business, he wanted to be in the information business. He points

out how much better off the U.S. railroads would have been if they had realized they were in the transportation business and not had such a blind loyalty to the railroad business. Just as steel rails are an important part of supplying transportation, but are not all of it, so Lemons reasoned, computing is an important part of supplying information, but is far from the whole story.

With the guidance and support of Werner Frank, to whom he reported from 1966 to 1972, Lemons started from the viewpoint of the consumer of information. What he wanted, Lemons would supply. He would know how to collect the raw data, would process it, refine it, and present it to the user as information in the most useful form. With his extensive background in computing, he would know how and when to use computers for this purpose, but would not blindly assume that they were the only tool to use. Based on this philosophy, he led Informatics Information Systems and Services to a business that, in 1982, recorded \$32 million in revenues and \$2 million in pretax profits. But as a result, as discussed in Chapter 6, programming services for the U.S. Government in Washington was de-emphasized, and Informatics former prominent position in that business area declined to negligible proportions, except in the military intelligence area.

All of the information business building was "boot-strapped" with very little risky investment by Informatics. It began in 1968 with a brilliant marketing coup by Werner Frank and Lemons who obtained a large contract with NASA headquarters to operate the NASA Scientific and Technical Information Facility. In the years 1968 through 1982, the company used the skills and advanced technology gained in supplying the information needs of NASA to seek out and acquire commercial customers and applications on a variety of different levels needing the same services. It is through information services that Informatics discovered many new potential areas of proprietary software services. These benefitted not only the stockholders, but also society, since they included the development of systems such as TOXLINE, ENVIRON and many others, discussed in Section 7.4, which aided medical professionals and environmental specialists in improving the quality of life in the United States and many parts of the world.

As might be expected, developing this unprecedented type of service was fraught with uncertainties. Though the broad strategy was always clear, the short-term tactics were often subject to frequent changes. There were many false starts. Many highly touted concepts, optimistically set forth in one year's plan, had often been abandoned a year later. Organizational structure and names of units had short lives. Many promising managers came and went as though in a revolving door. But through it all Lemons kept his eye on his long-range goal. The following sections describe the evolution of the capabilities of Informatics Information Systems and Services.

7.2 TISCO AND NASA SCIENTIFIC AND TECHNICAL INFORMATION FACILITY (STIF)

Informatics entered the information services business in 1968 when, as described in Section 4.4.3, its Eastern Operations Washington, D.C. division, under the marketing initiative of its senior vice president Werner Frank and the leadership of its division vice president Richard Lemons, made a brilliant decision to enter into a joint venture with Information Dynamics Corporation of Boston, Massachusetts, to bid on a competitive procurement to manage and provide

information processing services for NASA's Science and Technical Information Facility (STIF) located in College Park, Maryland. Information Dynamics, a very small company, provided the credentials in information sciences and an excellent rapport with the customer. Informatics provided the computing skills and the management and financial strength to do the work.

Their combined effort succeeded in the award of a one year facilities management contract with NASA having options to renew it for two more years at a contract price of \$4.5 million per year.(2) This award immediately became Informatics largest single contract and revenue producing operation, far exceeding its only other large programming support contract which was then being performed for NASA's Jet Propulsion Laboratory. STIF serves as a massive library for the gathering of published and nonpublished technical information related to space exploration and related subjects. This information is indexed, catalogued and abstracted by personnel and a huge bibliographic data base is built and maintained. The information is then made available to scientists and researchers on a nation-wide basis using automated techniques including a large network of on-line terminals for inquiry and retrieval, micropublishing of abstracts and articles, and publication of computer-generated bibliographies and catalogues of literature related to particular topics or disciplines.

A related service is "technology transfer," whereby the information is actively disseminated to other government agencies and industrial companies to enhance the technological leadership of the United States. STIF is literally one of the largest depositories of technical literature in the world for civil (nonmilitary) purposes. Its computerized files contained over 20 million records and 80,000 published articles. It responds to 12,000 requests for information each month and annually distributes microforms counted in the millions. The vast majority of STIF users consisted of NASA personnel, NASA contractors, and university researchers. However, according to Lemons, because of its scientific orientation, the contract initially was not seen by corporate management as a stepping stone to new commercial markets and proprietary information services for Informatics.(3)

The technical information services previously had been provided to NASA by a company known as Documentation, Inc., a subsidiary of Leasco (a computer leasing firm), which employed 387 employees at STIF. Lemons quickly moved to the College Park facility and set up the corporate subsidiary, organizing separate functional departments consisting of plans and programs (marketing), administration and finance, information systems, facility operations, and technology products. The new company hired 240 employees from the previous incumbent and approximately 30 employees of its own and rapidly set up operations within STIF. The initial management staff consisted of Lemons, F.E. Croxton as executive vice president in charge of operations, Pleasant H. McBride as secretary/treasurer and Fred Merkel as controller. This staff at first was headquartered at STIF itself but was moved to private offices located nearby in Riverdale, Maryland, when a year later, Informatics purchased Information Dynamics 49 percent interest in TISCO, renamed it Informatics TISCO, and began to pursue additional business outside of NASA. Internally it was known as NFOD (NASA Facility Operations Division).(4) In May 1975 the facility was moved to another government facility in Glen Burnie, Maryland, adjacent to Baltimore Friendship International Airport. Informatics won periodic recompetitions for this work for many years, and earned many lucrative award fees. Total revenue

amounted to almost \$60 million. In June 1980 a recompetition was finally lost to Planning Research Corporation.

7.2.1 Technology Developed by NFOD

As the new company began fulfilling the terms of its contract, it began designing practical software for library automation. MARK IV was used to develop several management systems. But the most important function was the handling of massive amounts of natural language information and conducting search and on-line retrieval operations according to user specified criteria. Informatics inherited a design of a commercial system for this purpose, called NASA RECON. It had been developed for NASA by Lockheed. (Lockheed subsequently improved it and added it to its own system, known as DIALOG, which is still used in 1982 for commercial subscription access to data bases.) Informatics, on this same software base, built RECON IV, a comprehensive on-line search and retrieval system that is capable of rapidly scanning large computer files for specified individual phrases or index terms or combinations of them. To support RECON IV, a batch program called STIMS was developed for building and updating the files of an on-line data base, generating an automated file thesaurus. The third major system developed was ITS0 IV, which enhanced IBM's TSO so that it could command the operation of STIMS in an on-line, user-friendly fashion. Another system was developed called ATS, which provided publications formatting and report preparation processing of the various information in the data base. The software ran on the facility's computer center operated by Informatics, which grew from an IBM 360/50 to two IBM 4341-2 systems in 1982.

Informatics successfully used this capability in meeting STIF's information needs by responding to information requests from numerous government agencies (including those of the Department of Defense and the Atomic Energy Commission) and 300 research institutions and by the periodic and continuous publication and distribution (in microfiche and paper form) of catalogues and indexes to the on-line technical information kept by STIF. These publications enabled NASA to serve numerous researchers by providing rapid dissemination of new technical advances and information. For instance, SCAN, one of these computer-generated catalogues, indexed over 200 topics and 250 research activities and was regularly distributed to 15,000 users.(5)

NFOD turned out to be extremely beneficial to Informatics, leading eventually to the development of Informatics Information Systems and Services. It brought Informatics into the facilities management of computer services, natural language processing, electronic photocomposition, and information clearinghouse services markets for many other customers. For example, Informatics used RECON IV to develop and operate TOXLINE for the National Library of Medicine, and data bases for alcohol abuse and cancer research for the National Institute of Health. It was applied to litigation information management in support of large-scale lawsuits. These and other outgrowths of NFOD are described in the rest of this chapter.

7.3 THE EXPANSION OF INFORMATION SYSTEMS AND SERVICES

By serving at STIF, Informatics quickly acquired expertise and operations in micrographics and library related services such as acquisition of publications, cataloguing and classification, and abstracting. These coupled with the

combined RECON IV software gave it state-of-the-art techniques in providing automation of large volumes of textual information. With the stabilization of RECON/STIMS software by 1970, Lemons realized that the technology of NFOD could be used to supply information services to other government agencies and most importantly to commercial customers whose business depended upon constant review of new and updated information related to specific subjects. This realization was voiced in the subsidiary's five year plan of 1970:

All corporate activities (whether large or small, government or non-government, profit or non-profit) have rapidly expanding information problems associated with keeping up to date with technology or responding to new areas of interest, managing their own internal data operations, or reporting from complex data bases. Informatics TISCO, Inc. is just beginning the task of relating its resources and opportunities to the breadth of needs in this market place. Thus the current definition of market is divided into three groups which lend themselves to reasonable business planning while still maintaining the necessary responsive management to evolve optimum targeted market areas.

The three markets defined by the plan consisted of 1) continued services to NASA STIF, other NASA departments and locations, and aerospace contractors to NASA; 2) supplying specific services to other Federal government agencies; and 3) venturing outside the Federal government to serve the information systems and processing needs of hospitals, libraries, schools, professional societies, individual corporations, and industry groups which have common bases of information required to conduct business.

The plan recognized that venturing into these new market areas entailed some risk as there were several notable potential competitors in the commercial market (including Xerox Bibliographies, Herner & Company, Becker & Hayes, Inc., Lex, Inc., and Computer Retrieval Systems) and the rapid rate of technological change could obsolete its information processing capabilities and methods. The company, however, asserted its commitment to be a technological leader and to these promising markets:

[New information processing techniques and technological change] dictate the need for tight selectivity of targeted market areas. These must be based on Informatics and Informatics TISCO's ability to be leaders in developing new technology so as not to spread the effort over too broad a number of market trends.

However, Informatics TISCO does not plan to lose sight of the unique data base position it holds now. . . . The company's unique position is that it has the basis for factoring advanced technology into the working atmosphere of data acquisition, cataloguing, indexing, interpretation and distribution so that the results should be an application oriented package well oriented to meeting real customer total information needs.

With this decision to provide information services to the commercial market, TISCO set an objective of doubling its annual revenues from \$4.9 million in 1971 to \$11 million by 1975 with no further capital investments and of increasing profit from 6.5 to 7.5 percent of revenue. Non-NASA government agencies were expected to provide \$2.7 million of TISCO's increased business by 1975, while the commercial market would provide an additional \$3.2 million in revenue. NASA related services were expected to rise only modestly from \$4.4 million to \$5.1 million in annual sales during the same five year period.(6)

This entry into commercial information services was accompanied by an organizational change. In late 1971, after Werner Frank had left to become the CEO of Equimatics (see Section 4.4.4), Informatics Washington, D.C. custom software services division and Informatics TISCO were consolidated into an enlarged operation dubbed Informatics Systems and Services Company with Lemons as president, reporting directly to the president of the corporation. J.G. Ballenger was vice president of Program Planning, Julien J. Lavoie was vice president of program development, Charles R. Schneider was vice president of Systems Development and Special Projects, and J.E. Denson and later Frank Gaudette was vice president of finance and administration.

In this new entity, the NASA STIF project was but a single division known as the NASA Facility Operations Division (NFOD). The NFOD vice president and general manager was initially A. Gregory Abdjian and later John Sherrod and finally Joseph Kuney. During the entire life of NFOD, Elwood Baker was in charge of operations.

During 1973, Schneider became vice president of operations for Informatics Information Systems and Services supervising separate departments. These were Information Network Services (TOXLINE and ENVIRON), Information Technology (systems development), Facility Support Operations, Information Analysis Services, and the National Cancer Institute cancer information services program.

In addition to these operations, Information Systems and Services began to increase its technical capability during 1973 by acquisitions. Several companies were investigated by Lemons, Wagner and Kaplan, and two were actually acquired.

7.3.1 Acquisitions Which Were Accomplished

The first company acquired, as described in Section 4.2.9, was Source Data Automation (SDA), a data processing company with annual revenues of \$1.2 million. It was headed by Cecil "Tex" Myatt and Ron York. It provided automated computer input of text documents by optical character recognition equipment, and provided data bases with output suitable for electronic photocomposition. It also provided information systems design, implementation and batch processing for U.S. government civilian agencies. Myatt, a very sound businessman, who knew thoroughly the government printing market, was instrumental in laying the foundation for Informatics publishing services business, which is described in detail in Section 7.5. Ron York eventually transferred to PSOW as vice president of commercial professional services.

The second acquisition, as described in Section 4.2.10, was Knowledge Networks International. It was a very small professional services company of about six people who were very skilled in the programming of RECON. They had used the original Lockheed version to develop two computer software packages known as JURIS (Justice Retrieval and Inquiry System) used by the U.S. Department of Justice, and ARBIT (Arbitration Information Tracking System) used to keep track of trade union and corporate data for labor arbitration cases handled by the Federal Mediation and Conciliation Service. This acquisition doubled the company's technical capability in RECON, and gave Informatics some knowledge of legal application needs which later enabled it to identify litigation information management services as a possible area of focus.

7.3.2 Potential Acquisitions Which Were Not Accomplished

Among the companies investigated but not acquired was Stenocomp, which was developing a method of producing transcripts by computer from a tape produced by a Stenotype machine; a company developing a data base for patent searching; and Autocomp. The latter was a company in precarious financial condition that provided computerized electronic photocomposition services as part of its codification and compilation of statutes for state and local governments, using a very sophisticated proprietary program called RECOMP. It is discussed in more detail in Section 7.5.2. Eventually Informatics acquired most of what it wanted from Autocomp without the agony of acquiring a sick company. With these acquisitions, the Informatics Systems and Services Company could supply the entire spectrum of information services from automated input, abstracting and indexing of information to on-line information retrieval, the generation of specialized reports, and the production of published material.(7)

7.3.3 Expansion Beyond Custom Services

By 1972 Informatics interest in proprietary products began to make itself felt in the Systems and Services Company. It refined its business strategy to include developing its own proprietary information products and services. These proprietary products or services, it was believed, would be identified through anticipated government business growth, sophistication and change. It was planned to identify and develop two significant proprietary services or products within the next five years which would add a total of \$12.5 million in revenues and to "address only market segments having greater than 30 percent growth." This refinement of focus and strategy of Systems and Services was explained by the 1972 five year plan as:

First, to protect our ongoing business and promote follow-on in the select business areas. . . . Secondly, to develop new business markets in proprietary products and services.

For the past six months, SSC marketing efforts have been concentrated in the first category (approximately 90 percent). Current planning is concentrated on formulating alternate strategies wherein we can place 90 percent of our resources in the products and services area without near-term degradation in our revenue base.

Some of the factors in the custom [programming] services marketplace which make it a poor market are:

- Multiplicity of contractors competing for the same market
- Intensification of lower rates and profits
- Fixed price procurements (especially software development contracts)
- Rigidity of contract terms and conditions (including pricing).

The market trend shows no relief from the above factors in the foreseeable future. . . .

All future efforts will be oriented toward changing SSC's marketing emphasis from custom services to product services. The largest problem is how to accomplish the shift from 90 percent custom services and 10 percent product/[proprietary] services (90/10) to something like 30/70 within the company's competence and resources. The approach will be to allocate additional marketing/technological resources to the market research and product planning activity for sufficient definition of the market to warrant investment. In the meantime, the stepping stone approach of product development through custom services contracts will be followed.

The Systems and Services Company, expecting revenues from proprietary items, revised its annual revenue projections upward to an expected \$8.5 million (with \$4.5 million from NFOD operations) in sales during 1972, growing to approximately \$16 million (\$4.6 million from NFOD) in sales by 1976. Placing this new strategy into action, Informatics Systems and Services organized around five major functional business areas. These consisted of 1) interactive information systems (later called data base information services and initially directed by A. Weston Ball as vice president from 1975 to 1978) in which Informatics proprietary products are used to establish and implement on-line information data bases; 2) information processing services to support the publishing industry; 3) advanced systems research and development for customer applications, 4) intelligence, command and control systems for Department of Defense agencies (the sole remnant in Washington of programming services not in support of information programs); and 5) information facilities management contracts for NASA, the Environmental Protection Agency, the National Library of Medicine, and other civilian government agencies. Reflecting the focus on developing and selling proprietary software services, Informatics appointed R.L. Stevens as product manager for RECON/STIMS software to direct its technical design, product improvement and marketing. The company also established an information technology department, under the vice presidency of J.G.O. Van Dyke, in 1975 to specifically develop new technologies for utilization in information services applications.(8)

Lemons successfully utilized this strategy during the remainder of the 1970's to identify proprietary information clearinghouse and data base services and software products for specific industries such as the health care, library, publishing, and legal services fields. Major information program contracts were obtained with the National Library of Medicine (NLM) and the Environmental

Protection Agency (EPA). Many of these large government information service contracts were based on the implementation and utilization of data bases utilizing RECON IV. The value of this software was recognized by Bauer and the corporate office as giving Informatics leadership in data base services and a means to increase its share of Federal government business:

"On-line and data base services" represents the fastest growing area in our government business and the fastest growing area in the company as a whole. We have installed the RECON system at numerous organizations within the Federal government and we have recently won two of the choicest data base contracts in the government, the TOXICON system for the National Library of Medicine and the ENVIRON system for the Environmental Protection Agency. We have identified numerous agencies which will need data base service in the future. We believe that no other organization in the Washington area is better qualified to provide these services. We are the leader and we intend to stay there. The data base services business among Federal agencies has shown remarkable growth and we expect we will be making investments in our own proprietary data bases and our own system for interrogating these data bases.(9)

In 1976 when Informatics reorganized into business groups, the Systems and Services Company was renamed the Information Systems and Services Group with Lemons as group vice president. By 1978 the Information Systems and Services Group (not counting the steady business from NASA/STIF) was producing \$12.8 million in annual revenues and \$1.4 million in profits. Approximately \$8.7 million of these revenues were produced from information analysis and processing services with the remaining \$4.1 million resulting from information network services (a new name for data base information services). These two information service areas alone accounted for 13.8 percent of Informatics total annual revenues and 43.8 percent of its total profits of \$3.2 million.(10)

Information services made a major contribution to Informatics growth. By 1982 the initial areas of business had been renamed as follows: Information Resources Management consisted of 1) Information Programs, which had \$5.9 million revenues and \$0.4 million profit; 2) Publishing Services, which had \$5.2 million revenues and \$0.8 million profit; and 3) Library Services, which had \$3.8 million revenues and \$0.1 million profit. The largest growth area was in the Legal Information Services Division, which had \$7.8 million revenues and \$1.2 million profit. It had expanded to an "Operation" by acquiring a second division, Professional Software Services, which had \$9.1 million revenues and a small profit. These areas of business are described in the following sections.

7.4 INFORMATION PROGRAMS, PRIMARILY FOR THE FEDERAL GOVERNMENT

7.4.1 General

At the beginning of the 1970's, several trends became apparent to Lemons: 1) The federal budget was going to shrink in military and scientific areas and grow in socially-oriented areas; 2) it was likely that funding was imminent for many large "programs" (government program activities--not computer programs) in health services and education support; and 3) these programs would need (or

could be persuaded that they needed) to collect, organize, process, analyze, and disseminate vast quantities of information. This fitted neatly into Lemons' strategy. Moreover, the new association of Informatics with The Equitable (which was committed to the health care field) could be exploited to the benefit of both parties.

So, in 1971 the company submitted a joint proposal with The Equitable to provide systems analysis, project management and implementation of a Medicaid Management Information System to the U.S. Department of Health, Education and Welfare. As stated in this proposal:

The implementation of current legislation for federally-aided social programs presents one of the greatest management challenges at all levels of the Government. The task is huge; currently more than \$60 billion a year is being spent on health. Not only is the task huge but the priorities are high. Health must remain high on the scale of social, economic, and political priorities. National policy and human compassion insist that essential individual health needs shall be met.

This proposal was for a nationwide effort involving systems consulting and training on a state government basis as well as with the federal government.

The proposal was not accepted, but beginning in 1971 several other, more computer-oriented proposals in which Informatics bid alone led to contracts. Some of these were renewed for many years and provided many millions of dollars in revenue. Figure 7-1 lists, in abbreviated form, 27 of these projects. It should be used in connection with Figure 7-2, which uses the same line numbers as Figure 7-1, to expand the abbreviations for the names of the projects, customers and areas of business. Note the longest one, ONAC on line 2 which was renewed for 11 years, and the largest one, NCALI on line 25 which produced \$14.5 million in revenues over a period of six years.

The following sections provide descriptions of a sample of these projects, identified by the line numbers in Figures 7-1 and 7-2. Eighteen of them were for organizations in the health field, four in education, four in science, and one in management. This demonstrates the success of Lemons' strategy to penetrate the market for services in the areas of socially significant activities.

7.4.2 TOXICON (TOXLINE)/National Library of Medicine (Figure 7-1, line 3)

In 1972 Informatics Systems and Services Company won a systems design, implementation, and computer facilities management contract from the National Library of Medicine (NLM) to collect, input, and market through a nationwide computer network an extensive on-line data base of toxicological information. This system, known at first as TOXICON and later renamed TOXLINE, was "designed to respond to the information needs of health professionals working in the areas of environmental pollution, industrial or occupational health and safety, pharmacology, toxicology, medicine, agriculture, and other scientific studies, poisons, adverse drug reactions, environmental pollutants, and biochemicals. Using RECON IV, a research scientist could search for this information by specifying key terms and phrases and receive a displayed or hard copy of the

Project Name(1)	Customer(1)	Area(1)	Period	Revenues (\$000)	Description
1 Family Planning	HEW	H	1971-1981	\$ 6,953	National reporting system for visits to Family Planning Services facilities
2 ONAC	EPA	H	1971-1982	2,466	Information support for Office of Noise Abatement & Control
3 TOXICON	NLM	H	1971-1974	995	On-line search & retrieval of variety of toxicology related data bases
4 ARPA	DOD	S	1972-1977	1,628	Acquisition, abstracting & translation of foreign technical literature
5 GRAS	FDA	H	1972-1978	589	Search & acquisition of literature concerning substances generally regarded as safe
6 ENVIROB	EPA	H	1972-1975	1,530	Mgmt & operation of environmental data bases in on-line search/retrieval
7 ICRDB	NCI	H	1973-1974	851	Design & support activities for International Cancer Research Data Bank
8 BEGGS	OE	E	1973-1978	1,252	Programming & processing for education opportunity grants reporting system
9 NAPIS	NIAAA	H	1973-1983	4,095	Data collection & processing support for evaluation of alcoholism programs
10 POPINFORM	AID	H	1973-1980	653	Development of on-line access to data base of family planning & population data
11 FEWA(2)	FEWA	H	1973-1979	345	Analyze documents containing biochemistry/toxicity of selected compounds
12 Crises Mgmt	NSF	M	1975-1976	120	Develop experimental design of information system for crises management
13 Nursing Homes	NCHS	H	1975-1979	1,215	Collect & analyze data on all nursing homes in nation
14 ICRDB/IP	NCI	H	1975-1979	325	Acquisition, analysis & dissemination of immunotherapy clinical protocol data
15 NFRS	NEPCA	S	1976,80-82	257	Conducted surveys, developed design report, prepared abstracts on fire prevention
16 Community Ed	OE	E	1976-1981	687	Design, establish & operate federal community education clearinghouse
17 Smoke & Health	OSH	H	1976-1985	3,870	Clearinghouse of scientific literature for smoking and health
18 SWIRS	EPA	H	1976-1979	720	Acquisition, analysis, retrieval, dissemination of publications on solid waste
19 Adult Ed	OE	E	1977-1979	296	Establishment & operation of clearinghouse for adult education & lifelong learning
20 Head Start	OE	E	1977-1982	641	Design & conduct surveys, process & analyze data on handicapped children
21 Chem In Comm	EPA	H	1977-1982	6,749	Design & maintain data bases in support of Toxic Substances Control Act
22 EPRI(2)	EPRI	S	1977-1980	1,215	Abstracting & indexing of research reports related to the electric power industry
23 Spec Report	NIAAA	H	1979-1982	1,091	Produced Fourth Special Report to the U.S. Congress on Alcohol and Health
24 SMCST(2)	NSF	S	1979-1980	1,212	Install computer and software for scientific & technical center for Saudi Arabia
25 NACLI	NIAAA	H	1979-1984	14,511	Operation of National Clearinghouse on Alcohol Information
26 ICRDB/CP	NCI	H	1979-1984	1,009	Collection, analysis, & dissemination of info on all clinical research protocols
27 ICRDB/TS	NCI	H	1981-1984	873	Provide variety of technical information support activities to cancer research

- (1) See Figure 7-2
(2) Not Federal Government

**INFORMATION SERVICES PROGRAMS
PRIMARYLY FOR THE FEDERAL GOVERNMENT**

FIGURE 7-1

Project Name	Customer	Area
1 National Family Planning	Health, Education and Welfare	Health
2 Office of Noise Abatement and Control	Environmental Protection Agency	Health
3 Toxicological Information Data Bank	National Library of Medicine	Health
4 Advanced Research Project Agency	Department of Defense	Scientific
5 Substances Generally Regarded As Safe	Food and Drug Administration	Health
6 Environmental Information Retrieval On-Line	Environmental Protection Agency	Health
7 International Cancer Research Data Bank	National Cancer Institute	Health
8 Basic Education Opportunity Grants	Office of Education	Education
9 National Alcoholism Program Information System	National Institute on Alcohol Abuse and Alcoholism	Health
10 Population Information Program	Agency for International Development	Health
11 Flavor and Extract Manufacturers Association	Flavor and Extract Manufacturers Association	Health
12 Crises Management	National Science Foundation	Management
13 Nursing Homes Survey	National Center for Health Statistics	Health
14 International Cancer Research Data Bank- Immunotherapy Protocols	National Cancer Institute	Health
15 National Fire Reference Service	National Fire Prevention and Control Administration	Scientific
16 Community Education Clearinghouse	Office of Education and Mott Foundation	Education
17 Smoking and Health	Office of Smoking and Health	Health
18 Solid Waste Information Retrieval System	Environmental Protection Agency	Health
19 Adult Education Clearinghouse	Office of Education	Education
20 Head Start	Office of Education	Education
21 Chemicals in Commerce Information System	Environmental Protection Agency	Health
22 Electric Power Research Institute	Electric Power Research Institute	Scientific
23 Technical and Special Reports	National Institute on Alcohol Abuse and Alcoholism	Health
24 Saudi Arabia National Center for Science and Technology	National Science Foundation (agent for Saudi Arabia)	Scientific
25 National Clearinghouse for Alcohol Information	National Institute on Alcohol Abuse and Alcoholism	Health
26 International Cancer Research Data Bank- Clinical Protocols	National Cancer Institute	Health
27 International Cancer Research Data Bank- Technical Support	National Cancer Institute	Health

INFORMATION SERVICES PROGRAMS

PROJECT NAMES AND CUSTOMERS

FIGURE 7-2

required report or abstract within minutes. The system was thus invaluable to health care professionals who needed up-to-date and rapid information on poisons and other toxic substances, and it was one of the earliest government computer data bases offered for sale to the general public. During its first year of operating the system for NLM, Informatics sold it to over 50 major users including 9 universities, 6 chemical firms and 8 pharmaceutical houses.(11)

Designing, building, and maintaining the data base and operating the computers provided \$1 million in annual revenues from NLM. Informatics marketed the system to subscribers through a timesharing network with major entry points in California, Connecticut, Massachusetts, Michigan, Missouri, New Jersey, New York, Oregon, Pennsylvania, and Texas. Subscribers paid Informatics an initial initiation service fee of \$350 which included installation and \$45 per hour for actual use of the system. Informatics also provided training at \$100 per person. These services to the public provided relatively little revenue, so NLM had to continue to pay all of the costs of the system. The company offered the system for three years until 1975 when NLM assumed management and marketing of the system by itself as a part of their subsidized MEDLARS system which charged only \$5 per hour for access, thus destroying any possibilities for commercial exploitation by Informatics. TOXLINE served as a model for other information services developed and offered by Informatics under government sponsorship.(12)

7.4.3 ENVIRON and ONAC/Environmental Protection Agency (Figure 7-1, lines 2 and 6)

In June 1972 the company obtained a contract from the Environmental Protection Agency (EPA) to provide what would become Informatics second information network service, ENVIRON. Like TOXLINE, ENVIRON was a large government-owned data base built, maintained, and accessed through a timesharing computer network using RECON IV. Users had direct access to an on-line full text storage and retrieval system that contained environmental data files related to EPA research projects, water quality monitoring, oil and hazardous materials, and other pollutants. The system contained 225 categories of topical information about dangerous substances, from which users could retrieve information, including trade names, chemical formulas, common uses, melting points, lower/upper flammability limits, odor thresholds, taste thresholds, human ingestion factors, animal toxicity, disposal methods, and effects of prolonged human contact. Under the ONAC project (Figure 7-1, line 2) Informatics provided the NOISE data base concerning the measurement of noise pollution, its effects on man, noise standards practices and experience, and legal enforcement thereof.(13)

7.4.4 ICRDB/National Cancer Institute (Figure 7-1, lines 7, 14, 26 and 27)

Contracts with the U.S. Food and Drug Administration (GRAS, Figure 7-1, line 5--to process data to determine cancer causing effects and perform bibliographical research on 100 food additives), and with the Flavor and Extract Manufacturers Association (FEMA--Figure 7-1, line 11--to perform information analyses of data pertaining to 250 food flavors and extracts and to write monographs thereon) helped Informatics Systems and Services to obtain four contracts, beginning in 1973, from the National Cancer Institute to "collect, catalogue, store, and disseminate results of cancer research to scientists

throughout the world." This was the most extensive study ever performed on cancer research data and information available on an international scale. Informatics developed custom programs, created a comprehensive data base used to generate directories, surveys, progress reports and catalogs published by the National Cancer Institute for use by medical researchers around the globe. The system also was used to provide an on-line directory of organizations and individuals offering cancer research treatment and an international registry of tumor immunotherapy.(14)

7.4.5 NAPIS, NACALI/National Institute on Alcohol Abuse and Alcoholism
(Figure 7-1, lines 9, 23 and 25)

In the spring of 1973 the U.S. Department of Health, Education and Welfare awarded Informatics a contract to perform systems design, programming, and processing of statistical data and information for a management reporting system pertaining to the administrative and treatment efforts of 41 alcoholism treatment centers operated by the National Institute on Alcohol Abuse and Alcoholism (NIAAA).(15)

Subsequent contracts with NIAAA resulted in Informatics producing the Fourth Special Report to the U.S. Congress on Alcohol and Health, and in 1979 receiving a contract to operate the National Clearinghouse for Alcohol Information (NACALI) with a staff of almost 100 employees.

In developing a system for building and maintaining this programmatic data base, Informatics focused on the following strategies: Use of retrospective techniques for searching data bases and other information resources; establishment of a network for formal and informal linkages with public and private organizations, including other clearinghouses; and systematic interchange with users and sources, and, as necessary, survey techniques for information collection.

Approximately 125,000 requests for information on alcohol topics were received each year at NACALI from sources such as health professionals, scientists or researchers, educators, counselors, social workers, law enforcement professionals, labor leaders, business executives, alcoholics and their families, writers and editors, and others affected by or interested in alcohol-related matters. Most could be responded to routinely. But requests which required individualized responses were referred to the Reference Service staff. This staff annually answered about 10,000 requests for help with personal or family alcohol problems by providing referrals to appropriate local organizations and agencies. In addition, some technical questions required preparation of individual responses, involving searches of the NACALI and other data bases. More than 5,000 individualized searches were completed each year.

NACALI publications specialists developed new materials and publications based on user needs, NIAAA priorities, information gaps in the field, and other factors. Materials such as fact sheets, flyers, and pamphlets were researched, written, and designed with distribution plans developed and implemented to meet these needs. Two of the publications most useful to society produced by Informatics are the renowned pamphlets, "Should I Drink" and "Alcohol and Your Unborn Baby" distributed to millions of expectant mothers.

7.4.6 Excerpta Medica

During the second quarter of 1974, Informatics was encouraged enough by its several different health care oriented information service contracts for various government agencies that it attempted to develop a proprietary information service of its own for general offering to medical professionals. Systems and Services Company identified a potential market in on-line general medical reference works and bibliographical citations, and specifically targeted the world-famous hard copy Excerpta Medica reference work as a potential on-line data base and service. The company successfully negotiated with the owners of Excerpta Medica, the most prestigious international medical reference work, published in the Netherlands, for rights to automate its bibliographical citations and abstracts for the development of a computer network reference service. By the fourth quarter of 1975 Informatics produced an on-line version of Excerpta Medica using RECON IV, and sold several subscriptions including one to the U.S. Veterans Administration involving 200 potential users. However, the expected market for this service failed to appear quickly. There was an unknown market factor, in the case of both TOXLINE and Excerpta Medica--how many users were satisfied with the delayed, but lower cost, information available in hard copy? Some reference librarians felt that such services for the public welfare should be supplied free by the government. The crowning blow came when the National Library of Medicine offered their Index Medicus, a competitive service, to public users at a very low price. Informatics discontinued Excerpta Medica by the end of 1976 after losing several hundred thousand dollars.(16)

7.5 PUBLISHING SERVICES

7.5.1 Origins

The Publishing Services Division, which in 1982 was a substantial profit contributor to Information Systems and Services, had its origin in 1973 when Informatics began investigating the acquisition of two companies in the Washington area. One of these, Source Data Automation (SDA) was acquired, as described in Section 4.2.9, in 1973. The other, Autocomp, was never acquired, but its principal assets, including the RECOMP system, were acquired.

7.5.2 Autocomp

Autocomp was a company that conducted a dual business. One part of it was the codifying of statutes and ordinances for states and cities. In many cases the printed copy of these laws was in disarray due to continual legislative revision. Autocomp would obtain a contract to go through everything that had ever been printed, the original statutes and all of their revisions, and restructure the whole into a consistent document. For this purpose they hired part time legal students. The other part of the business was producing "camera-ready" pages to print the resulting document. To accomplish this they developed RECOMP, which was then the most sophisticated IBM 360 computer system for photocomposition. It produced a tape for input to a very advanced electronic photocomposition machine, a Harris Fototronic. This machine read the tape and converted the characters and the instructions about the layout of the page into electronic signals which were sent to a high-speed cathode ray tube (CRT). The image of the page on the face of the CRT was then photographed, developed, and

delivered to the printer. The Fototronic was owned by PRINT (Printing Research Institute for New Technology) which leased it to Autocomp in return for Autocomp providing space, operators, and photographic developing equipment.

In addition to using the Fototronic for their own legal codification work, Autocomp provided photocomposition services to members of PRINT and to anyone else who needed them, one of whom was SDA. As mentioned earlier, Informatics was very interested in acquiring Autocomp as a complementary firm to SDA but finally decided against it because of its weakness, both financially and in top management. Later, when Autocomp went out of business, Informatics was able to acquire, for very little cost, all that it wanted of Autocomp: 1) The Fototronic installation and the deal with PRINT; 2) their best member of middle management, Lloyd Kendall; and 3) the RECOMP System under the terms of a perpetual, exclusive license, along with Christopher Reisinger, the programmer who had developed it.

7.5.3 Source Data Automation (SDA)

SDA was a small company specializing, as the name implies, in the conversion of source data to machine readable form. It was founded by Cecil "Tex" Myatt, an outstanding example of a small businessman, who managed the company very tightly in a no-frills, plain pipe-rack fashion. Actually, the company consisted of two parts. One was a program development and data services organization under Ron York, which developed information systems for federal agencies, and collected and processed data; for example, the BEOGS project (Figure 7-1, line 8). Sometimes they conducted surveys of information for agencies of the government, for example of nursing homes (Figure 7-1, line 13).

The other part of the business, data input, which was its bread-and-butter, was a unique operation, conceived and developed by Myatt. A former government employee, he knew inside and out the segment of the federal government agencies with which he did business. These were organizations which had huge quantities of data necessary for input to computers, and which were being overwhelmed by the difficulty of keypunching it onto IBM cards. Myatt decided to exploit the then state-of-the-art technology of optical character reading and data base management. An indispensable part of his concept was that there were far more trained typists than keypunchers, and that many of these were young mothers who did not want to work full time and, in some cases, preferred to work at home. Myatt's business depended on recruiting and organizing a large number of these typists. They would use typewriters with a special font for optical character reading. Some would do their typing at home, coming into the office only to pick up new work and deliver their completed typing. For others, he set up facilities near their homes where they could come in and work part time, even on evening shifts. This may have been the first use of "cottage workers" in the information industry.

SDA acquired the best then available optical character reading machines, manufactured by Control Data Corporation. The typed pages were read by these machines onto computer tape. Normally everything was typed twice by a different typist. The tapes were then read into a computer, the two inputs compared, and a printout made of errors to be corrected. A guarantee could be given of a very low error rate. If the customer did not wish to pay premium prices for quality service, a single typing and a printout would be provided at a lower price.

Usually the tapes were delivered or electronically transmitted to the customer. Sometimes, for material which was to be printed, SDA also supplied an electronic photocomposition service, which produced pages of graphic quality, in "camera ready" form, to be photographed and turned into plates for offset printing. Occasionally SDA would even supply the finished printed product. Note that for these services SDA had a minimum of capital investment--only the typewriters and the optical character reading equipment. All the rest was subcontracted at low competitive rates--the computing to various local service bureaus, the plate making and printing to various printing organizations, and the electronic photocomposition to Autocomp.

7.5.4 The Development of Publishing Services

SDA, renamed the Information Processing Services Division, thrived under Myatt's aggressive leadership. He began to really build the photocomposition business. The RECOMP system was enhanced and renamed Composition System IV (CS IV). Myatt moved the Fototronic to his facility in Riverdale, Maryland. He aggressively developed business with U.S. Government printing organizations and with commercial printers, in particular with Port City Press, who eventually inherited the Fototronic from PRINT and sold it to Informatics in 1979.

Lloyd Kendall, who came from Autocomp, was in charge of this part of the business. However, Myatt did not neglect his basic marketplace, the federal agencies with large data input and printing requirements, and expanded his work there to include photocomposition, adding to CS IV output capabilities suitable for other photocomposition devices, especially those owned by the U.S. Government Printing Office.

Eventually, newer technologies caught up with the data input business. The growth of key-to-tape and eventually key-to-disk machines began to be very competitive with Myatt's optical character technology. The trend toward full time working mothers began to erode his base of typists. But worst of all, competition from offshore data input in Hong Kong and the Caribbean Islands pushed prices down to the point where it became unattractive to compete. So the pure data input business slowly declined and was gone by 1980. In 1979 to the mutual regret of Informatics and Myatt, he decided that it was best for him to return to the government in order to complete the number of years of federal employment necessary for him to receive a federal pension.

Lloyd Kendall was appointed vice president and general manager of the division, which was renamed the Publishing Services Division (PSD). Under his direction, as described in Section 11.8.3, CS IV was marketed as a software product. A version of it named CS V was developed for the Wang VS minicomputer and successfully marketed. Based on the possession of the Wang computer, the data input business was revived with a \$1 million per year contract from the National Library of Medicine to maintain the data base of information which it publishes as Index Medicus (the service which killed the Excerpta Medica service). Under Kendall, ongoing contracts were obtained from a number of publishers of loose-leaf reference services to maintain a data base of their product and photocompose its periodic revisions. Thus PSD continued to grow and in 1982 recorded \$5.2 million of revenues and produced \$0.75 million of profit, with about 75 percent of it from the commercial market.

7.6 LIBRARY SERVICES

In 1977 Informatics identified library management services as a potential market sector in which to expand its offering of information services. With over 26,000 public and private libraries existing in the United States, this application area appeared as a viable and growing market. Indeed library enthusiasts optimistically saw the market for automated cataloging services alone for libraries as being a hefty \$800-960 million in annual sales. The company had previously performed several systems design and data base implementation contracts for several Federal government libraries (most notably the Library of Congress, the U.S. Army Pentagon Library, Army Corps of Engineers, National Library of Medicine, and NASA's Goddard Space Flight Research Center). In 1975 it had recorded a modest \$557,000 in revenues from library information services. This figure was estimated to increase from \$666,000 in revenues with small profits in 1976 to over \$1.3 million in annual revenues and \$110,000 in profits by 1981. In 1982 Library Services actually recorded \$3.8 million of revenues, but only produced a very small profit.

Based on its contract with NASA/Goddard, Informatics Information Systems and Services Group developed a set of IBM 370 software products called BIBPRO IV and a hardware/software product known as MINI MARC. These are described in Sections 11.6.4 and 11.6.3. However, the product part of the business did not grow beyond \$1 million per year and about broke even, so it was discontinued in 1982.(17)

7.7 LEGAL INFORMATION SYSTEMS

7.7.1 Legal Information Services

The most profitable information market into which Informatics has ventured is litigation information management services in lawsuits involving millions of pages of documentation. This particular service consists of aiding clients involved in major and complex litigation by performing systems design, software support, source data capture, microfilming, abstracting, and indexing services in support of documentary evidence gathering during the discovery phases of legal proceedings. The majority of litigation services are performed for cases involving anti-trust, product liability, disaster, and large contract disputes. These information management projects are often massive multi-million dollar efforts involving, for each case, temporary employment of several hundred project personnel (consisting of both clericals and specialists used for abstracting, indexing, microfilming and duplicating of documents) and lasting from several months to several years.

Informatics first identified the legal industry as a potential market through its acquisition of Knowledge Networks, and its investigations of Stenocomp and Autocomp. The company made its first attempt to enter this particular business in 1974 when it submitted a proposal to the Federal Trade Commission to manage legal documents associated with antitrust cases. The company failed to get its proposal adopted, having been underbid by Control Data Corporation. Undaunted, Informatics "revamped" its proposal and offered the same service to law firms. After a slow start, the Informatics Information Network Services, under Weston Ball, obtained a contract with the Washington,

D.C. based Petroleum Research Group formed by five major oil companies. This contract was performed for a fixed price, initially \$350,000. From this and other similar contracts, Informatics recorded total revenues of \$846,000 and losses of \$180,000 during the first year. Revenues for the following year totaled \$1,400,000 with \$125,000 in profit. These were projected to increase to \$7,140,000 in annual sales and \$715,000 in profit by 1981. It was also recognized that experience in providing litigation information management services would give Informatics the opportunity to identify other software applications and services which could be offered to law firms such as case-tracking systems, legislative-tracking systems, law office library management systems, law office accounting systems and mathematical modeling programs for estate planning and tax decision analysis.(18)

Within two years after entering the litigation information management services business, Walter Bauer could cautiously but optimistically report to the Informatics Board of Directors on the importance of this market to the company:

Needless to say, we are watching these contracts carefully in case they might be terminated rapidly or unexpectedly (by settlement of the suit). On the other, it should be said that **litigation management services is an ongoing and important part of Informatics business and we expect good revenue and profit input from this new area of our business in future periods.** There are quite a number of other contracts, at present small, which conceivably can grow and there are many other prospects and opportunities for sizeable contracts in this area of business.

Since Bauer's statement to the board of directors, Informatics litigation information management services has been provided to over 100 law firms. It has grown to become the largest supplier of these services in the country, recording \$12 million in annual revenues during 1981 with profit rates exceeding 15 percent. The catalyst for this growth appeared in 1976 when Informatics hired John Rome to serve as first director (reporting to Weston Ball) and then as vice president of a new Legal Information Services Division (LISD) which became a separate division of the Information Systems and Services Group in 1978, reporting to Lemons. Rome, an attorney as well as a business entrepreneur, had for several years directed his own company known as Man-Machine Interface Corporation (acquired by the Grumman Corporation in 1973) which supplied computerized services specifically tailored to the needs of lawyers. Rome was thus familiar with how to market legal information services to individual law firms and corporate clients. Using an informal personal approach to marketing, Rome obtained a number of contracts. Most importantly he established the policy that the company would not perform litigation management services for government agencies. This had the effect of enabling Informatics to win the trust of potential corporate clients and to gain higher profit margins from contracts performed for the private sector than would be available through federal procurement. LISD had obtained enough experience by 1978 that it was also able to develop a standardized methodology and system to provide its services at lower cost to its clients, and thus earn a strong reputation and market leadership based on the recommendations of its past clients.

Sometimes LISD works for the legal department of the customer, and sometimes for the outside law firm involved. In most cases Informatics is bound to secrecy about its services, so it cannot discuss its customers until long after the project is over. But it is safe to say that LISD has supported one side or the other in nearly every significant lawsuit of this type since 1976. A sampling of Informatics clients of LISD who can be mentioned are Westinghouse Corporation, Burlington Northern Railway, Trans America, Standard Oil of California, Sunkist Growers, Southern California Edison, and McDonnell Douglas Aircraft Corporation. In 1982 LISD recorded revenues of \$7.8 million and profits of \$1.2 million.

7.7.1 Professional Software Systems

Capitalizing on its leadership and experience in providing litigation information management services, the Legal Information Services Division was elevated in 1981 to the status of an "operation," with John Rome as operations vice president of the new Legal Information Systems Operation (LISO). It included the old LISD, reporting to Jeff Emerson, vice president and general manager. LISO soon acquired a second division, Professional Software Systems Division (PSSD), in May 1981, as described in Section 4.2.19. PSSD sells to law offices hardware/software products for law office automation systems, which are described in Section 11.8.5.(19)

7.8 RECENT VENTURES

From 1974 until recently, Information Systems and Services did not expand by acquisition or joint ventures. However, in the 1980's, two efforts were made, neither of which was successful. In 1980, as described in Section 4.4.6, a joint venture company called Infodynamics was established with Mangement Analyses Company, a high-level consulting firm in La Jolla, California, to try to exploit the information management needs of the nuclear power industry. However, the timing was bad, as the building of nuclear power plants in the United States slowed up greatly, and the joint venture was terminated without loss to Informatics in July 1981.

Another venture was the acquisition in 1981, described in Section 4.2.20, of a small company in New York called Automated Systems Design (ASD). This company attempted to supply a product for the information needs for large corporations. It was a small micrographics retrieval system, similar to RECON IV, which ran on a minicomputer called Ultimate, a modified version of a Honeywell Level 6 computer. ASD attempted to sell a hardware/software system to large companies but without much success. In 1982 it had revenues of only \$0.1 million and lost \$0.6 million. Shortly thereafter the product rights were sold to Visual Information System Corporation (VISCO).

7.9 THE INFORMATION PROCESSING CENTER

Nearly all of the information services described above require substantial computer support. Such support was initially provided primarily by Informatics Data Services Group from its computer center in Fairfield, New Jersey. However, as described in Section 12.5.2, in 1979 Information Systems and Services established an Information Processing Center in Riverdale, Maryland, which by 1982 provided all such support, under the direction of Robert Johnson, vice

president and general manager of the Information Technology and Processing Division.

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