**John R.. Zinchak**
**24023 South Stoney Lake Drive**
**Sun Lakes, AZ 85248**
**John@Zinchak.com**
**480-883-7213**

## Background

The commercial launch of GE Time-sharing Services started on Monday, October 18, 1965 with the simultaneous openings of time-sharing services in New York and Phoenix. The revenue and success from both centers started a new era for GE in the services business. The 1960's were the golden age of time-sharing. The time-sharing centers success stories to date have mostly focused on the events following the October launch. The period of time that led up to the launch has been less documented. There were only a small number of people who had the vision and believed that time-sharing could be a commercial success. As a member of that small pioneering community, I thought I would like to share my recollections leading up to the launch of GE time-sharing.

In 1964, the Information Processing Business (IPB) was entirely based on a batch processing data center business and was generally viewed as the poor cousins of the Computer Department. With the success of the Dartmouth installation, there was considerable interest in the prospects of a commercial time-sharing business. Larry Hittel in Engineering had a development system, which provided early experimentation and testing.

At the beginning of 1965, I was working in New Market Development for Hank van Dorsten, Manager-Market and Sales Planning. I had completed the Railroad Industry Sales Plan and the Railroad Sales Seminar both of which was based on our work at the Western Pacific and the freight car integration system we had developed for freight car interchange between the Western Pacific, the Denver & Rio Grande and the Great Northern Railroads.

I was contacted by Frank Caruso, who was then working in the Don Knight organization at the IPB at Central Towers, near downtown Phoenix and 13 miles from the main plant. He explained about the time-sharing system installed at Dartmouth, the Larry Hittel development system, and that the IPB was beginning to explore the potential commercial opportunity. Frank Caruso and I were close friends from our days in working for Larry Wolfe in the Manufacturing Applications team under Jay Levinthal. A number of members of Larry's team were ex-Manufacturing Training Program graduates including myself, Frank Caruso, Doug Powell, Ron Grouse and Zigi Quastler who would also join Don Knight in March 1965 as Manager of Operations Engineering and would be eventually responsible for software and deployment to all 35 time-sharing sites.

The time-sharing business was an intriguing concept and, in early 1965, I joined Stan Josephson, who worked for Dan Knight at Central Towers. Stan was managing the business development effort to evaluate the commercial potential for time-sharing. I ended up in a bullpen office with Bill Sanderson and Bill Backer. Bill Sanderson had joined the IPB in November 1964 and in March 1965, Bill teamed with Frank Caruso to publish a three-page Business Opportunity Plan for Time-sharing. This plan was based

on a road trip Bill and Frank made to Dartmouth and to GE internal time-sharing users in Evendale, OH, Schenectady, NY, and Valley Forge, PA. Bill Backer had joined the IBP from Louisville, Kentucky (I believe working for Warren Prince) and had a strong sales and marketing background. Together the three of us worked as a team with the initial time-sharing development users; we performed competitive analysis and made pricing recommendations.

**Time Sharing Development Users**

We allowed both external customers and internal GE users to have access to the Larry Hittel development system. We would then follow up with telephone discussions regarding how they were using time-sharing and attempt to get a handle on the value to them. There was no charge for accessing the system, but the users were required to provide feedback regarding their use of time-sharing and overall suggestions for improvement. Users were encouraged to make their application programs available to others by storing these programs in the System Library. The list of experimental users, both external and internal, grew to about 200 users.

I made a few other trips to leading users to discuss how time-sharing was being utilized by their organizations. One of the most informative trips was to the National Bureau of Standards in Washington. A visit was also made to the NBS facility in Denver and Tulane University. A visit to John Hopkins medical facilities in Baltimore sparked a lot of thought on how time-sharing could be used in the medical field. Other key developmental users included Shell Development, Abbott Labs, Aragon Labs, Hughes Aircraft, and North American Aviation.

**Competitive Analysis**

A small number of companies were already offering time-sharing services. Among the early service providers were Bolt, Beranek and Newman (BBN), which first demonstrated time-sharing in 1962, IBM, CEIR, Keydata, Rand Corporation and Comshare. Most were using early forms of hardware from Digital Equipment that included PDP-1, PDP-2, PDP5 and PDP6. (Scientific Data Systems did not ship the first Tymshare SDS 940 system until April 1966). In early 1965, the most established company and market leader was IBM, which had a strong services market presence through their Service Bureau Corporation (SBC) entity. The IBM time-sharing services offering was marketed as QUICKTRAN and was based on an IBM 7044 scientific computer.

One of the first consulting organizations to perform an overall evaluation of the time-sharing business was Arthur D. Little. I remember going to Boston to interview the ADL author. I can still remember the publication, which had a black cover with silver lettering. The information gained was helpful in finalizing our competitive analysis and formulating our pricing recommendations.

## The Key Event in the Launch of GE Time-sharing

In April 1965, the Spring Joint Computer Conference was held at the Hilton Hotel in New York City. Bill McGuckin was in charge of a large GE booth that was designed to feature the GE-425 system. Initially agreement was reached to install two model 33 teletypes to demonstrate time-sharing. At the last minute, the floor space was expanded to include six teletypes (three back to back) under the banner of, "The Little Red Schoolhouse". The SJCC ran for three days and our plans were to dial into the Larry Hittel development machine in Phoenix. The major concern was that the development machine previously had not run three consecutive days without crashing. Dartmouth graciously agreed to provide their system as backup. In our pockets, we carried dialup cards for accessing the Dartmouth time-sharing system. To our pleasant surprise, the Phoenix system ran all three days flawlessly and we never had to dial into Dartmouth.

The crowd that lined up to take turns on the teletypes overwhelmed us. We were particularly inundated by IBMers and one of our jobs was to intercept them and steer them away from our booth. It was not unusual for three or more people to be lined up at each of the six teletypes waiting for a chance to try out our time-sharing system. We could not use any voice amplification systems to talk to the crowd so we ended up using a megaphone. The New York papers the next day featured a picture of our crowded booth with Bob Widmark, who worked for Bill McGuckin, using a megaphone to talk to the crowd. The newspaper caption was a play on the old singer Rudy Vallee's theme song: "My Time is Your Time."

IBM, which had a much larger booth than GE, featured QUICKTRAN in their booth. The SJCC conference people, seeing the crowd enthusiasm, thought it would be a great idea to feature a fly off between IBM QUICKTRAN and GE Time-sharing. We were willing but IBM backed out and declined the invitation. This was the first time we saw IBM back away from a battle with GE. IBM was concerned about an unfavorable comparison. It provided a great confidence boost to all of us.

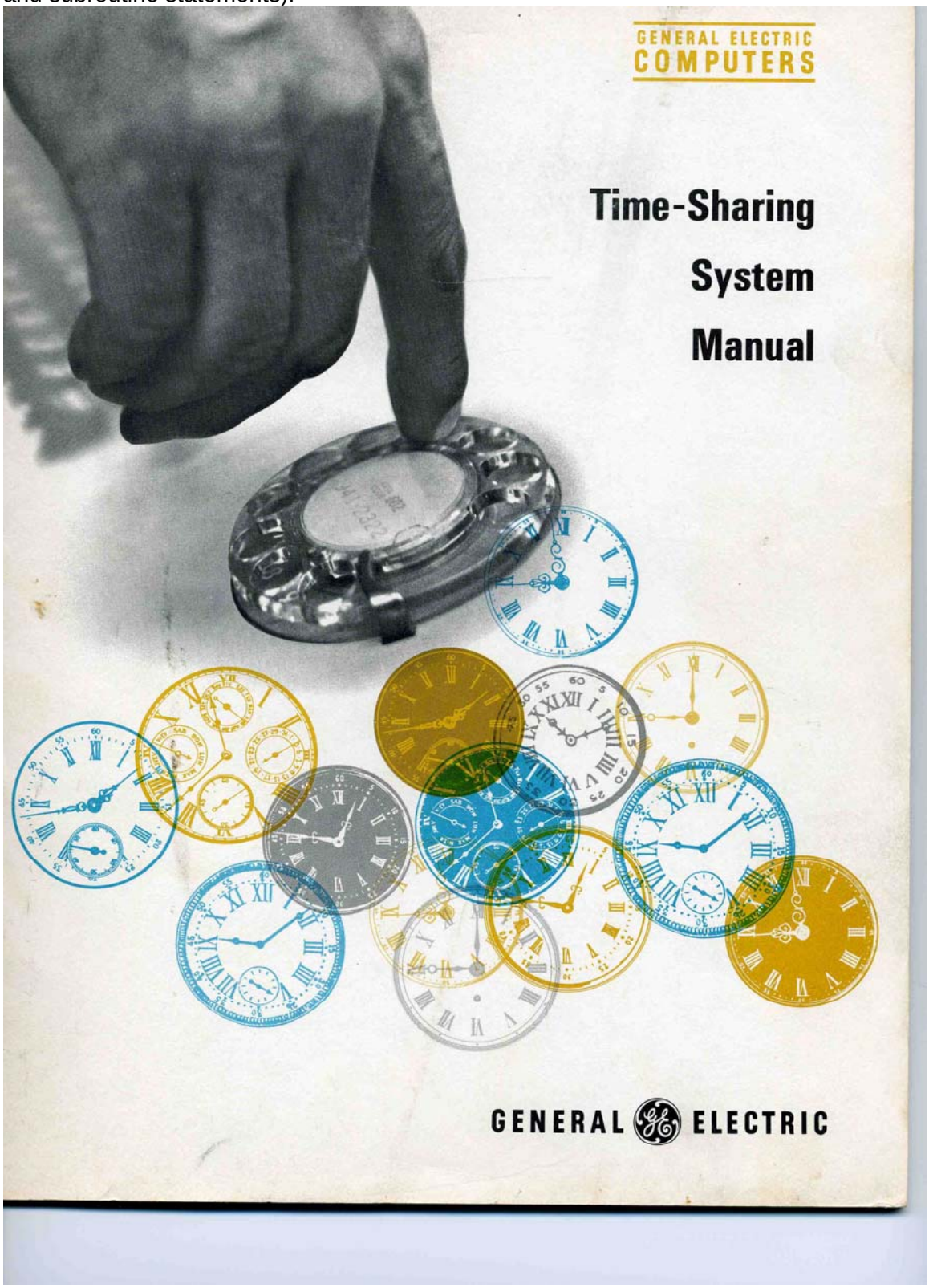
Note: In the following months users from General Motors, Ford, Bell Labs, and GE Engineering Services provided quantitative evaluations that indicated GE's offering is sometimes as much as 10-20 times faster than QUICKTRAN for programming, compilation, and execution.

Because the Spring Joint Computer Conference was held in New York City, we had a large number of GE executives drop by from 570 Lexington Avenue. They all saw the tremendous crowd interest, the press coverage that could translate into commercial business potential. Following the SJCC, we had momentum for the first time to move forward with the launch of time-sharing.

## How Big Is the Time Sharing Market?

The SJCC provided confirmation about the tremendous interest in time-sharing but questions still remained about how big was the market for a BASIC language offering and what price were customers willing to pay. (ALGOL was also available as a programming language but was used by relatively few users). The initial offering would be extremely limited. The BASIC language was new and in its infancy with a limit of 31 system commands and the entire instruction set was limited to 17 possible BASIC

statements, (three arithmetic, three identifier, four input/output, three logic and four loop and subroutine statements).




**Cover to the 35 page System Manual.**
**Note: The same artwork was used for the full-page Wall Street Journal Advertising**

The size of the program and amount of storage were also limiting factors. Because of the simplicity and ease of use, there was a large attraction among users that previously had little or no programming experience. Users were willing to share their use and applications and this would be a great benefit to attracting new users. We were entering competition with other service providers who were already offering applications and programming languages that were more robust than BASIC.

**The Dr. George Feeney 19 Points.**

Dr. George Feeney was headquartered at 570 Lexington Avenue and was Manager, Corporate Strategy. George became one of the early users of time-sharing and the development system in Phoenix. George was very outspoken in his thoughts and recommendations regarding the potential of time-sharing. On June 25, 1965, George came to Phoenix to meet with us in the first floor conference room at Central Towers. We gathered in the conference room for a 10:00 AM meeting. We did not have a formal agenda but one thing we started discussing among ourselves was that we should definitely ask George his thoughts about the size of the time-sharing market. The clock showed 10:05 and no George. Then it was 10:10 and still no George. All of a sudden, the double doors flew open and George strolled into the room with a large pile of papers under one arm. While still walking towards the head of the table George exclaimed, “I hope none of you are so stupid as to ask me how big the time-sharing market is!” With that comment, George commandeered the meeting and presented his agenda, which was the 19 points he thought we needed to address and implement before opening the New York City Time-sharing services business. The 19 points comprised of six operating system enhancements, four points for improvement of input/output, five points that were file generation and modification and four that were classified as miscellaneous.

I published the meeting documentation and the status of the 19 points.

STATUS OF DR. FEENEY'S 19 POINTS

| Recommendation | Status | Requirement | Comment | Available W of New York |
|---|---|---|---|---|
| A. Operating System | | | | |
| * 1. Library procedure and date at compile time. | Not available | Modify compilers | This is feasible, know approach for doing this, some of the capability now within the compilers. | No |
| 2. Improved diagnostics (including program length). | "LENGTH" now available Diagnostics - N/A | Rewrite compiler | This is required primarily for ALGOL, not for BASIC. | No--with ex |
| 3. Self-instruction commands. | Available--limited | Notify users through TTY of new additions, describe, how to use. | This is being done to a limited degree now through notification during "HELLO" sequence and "INFORM". | Yes (as qua |
| 4. "Public Files" | Not available | Extend library functions with merge capability. | Merge capability is now available. | No |
| 5. Technical documentation. | Not available | Personnel assignment. | This can be done and should be combined with item 3. | Yes (as qua |
| 6. User communication medium. | Limited availability through "INFORM". | Personnel assignment. | We should provide for user communication, possible user meetings similar to GET. | Yes (as qua |
| B. Input/Output | | | | |
| * 1. Reflexive capability | Available | | | Yes |
| * 2. Format control | Not available | Modify compilers | | No |
| * 3. Alpha data | Not available | Modify compilers | | No |

**Dr. Feeney 19 Points, Page 1**

Dr. Feeney's 19 Points
Page 2

| Recommendation | Status | Requirement | Comment | Available W of New York |
|---|---|---|---|---|
| * 4. Pseudo tape | Not available | Modify compiler--(put in verbs, generate object codes so codes can interface) depending on resulting modifications, may have to modify executive. | Work has been done on the executive to provide way of doing this so we are no longer blocked out from having this capability. | No |
| C. File Generation and Modification | | | | |
| 1. Resequenching | Available | | | Yes |
| 2. Merging | Available | | | Yes |
| 3. Block deletion | Available | | In addition, "EXTRACT" is now available which is the corollary to DELETE | Yes |
| 4. Input mode (automatic sequence number generation) | Not available | Provide program switches in DN-30. | | No |
| * 5. Protection levels | Not available | Password routine | Protection will improve with completion of line monitoring software for checking valid remotes and user numbers. | File protect Valid user |
| D. Miscellaneous | | | | |
| 1. Logical procedures | Not available | Modify compiler | ALGOL only. | No |
| 2. String manipulation | Not available | Modify compiler | | No |

**Dr. Feeney 19 Points, Page 2**

Dr. Feeney's 19 Points
Page 3

| Recommendation | Status | Requirement | Comment | Available W of New York |
|---|---|---|---|---|
| 3. Recursive capability | Not available | Modify compiler | Would require a large amount of memory to be able to build long lists which may make this impractical. | No |
| 4. Labels in procedure arguments. | Not available | Modify compiler | | No |

*Six major points emphasized by Dr. Feeney.

John R. Zinchak
June 25, 1965

**Dr. Feeney 19 Points, Page 3**

Although many of the points were very valid, the complexity of some of them would take considerable time and investment. On October 18, 1965, .New York and Phoenix started up, having met, with qualifications, seven of the 19 points.

Unknown to us at the time of our meeting was the fact that Borge M. Christensen, New York City IPC Manager, had accompanied George Feeney to Phoenix in March to meet with the time-sharing Engineering people. George had made similar recommendations regarding what needed to be incorporated before going commercial.

## Pricing

Following the SJCC, there was now considerable pressure to finalize the recommendations for commercial pricing. Competitive analysis was completed with the IBM QUICKTRAN being considered the predominant leader. QUICKTRAN was based on an IBM 7044 scientific computer with about the same number of simultaneous users (40). There was also precedence by several time-sharing vendors that pricing was directly related to the resources being consumed, (1) time physically connected, (2) CPU resources consumed, and (3) storage required. This appeared to be the logical methodology for our pricing as well. The big question now was determining our sales price for each of these resource values. The pricing recommendations were drafted and submitted to Dr. Louis Rader's office in Charlottesville, VA for approval. Airplane tickets were delivered in anticipation of an August launch. The pricing approval cycle took approximately three months and was not received until September. An October launch date was then initiated.

## New York and Phoenix Information Processing Centers

A decision was made that Bill Backer and I would go to New York to work with Borge M. Christensen. Bill Sanderson would remain in Phoenix to help support Ken McDonald for the October 18, 1965 launch. We took the list of experimental users, which numbered about 200, and divided the list by geography. Everyone east of the Mississippi was assigned to New York and west of the Mississippi to Phoenix. Our role was to help convert these experimental users to a commercial basis by explaining the pricing methodology and providing signup information. As it turned out, almost everyone who was an experimental user wanted to be converted to a commercial user. A full-page Wall Street Journal ad was published to promote the announcement.

I was returning to Phoenix after the first full month of revenue and I had a list of customers by name and the billing revenue for each one. The total exceeded $100,000. By coincidence on the American Airlines flight from New York to Phoenix was Harrison Van Aken. About midway during the flight, I thought I would go visit him in First Class and show him the monthly revenue. He was utterly shocked and said, "Do you mean to tell me it could be more profitable to give you the equipment rather than sell it ourselves?"

The third time-sharing system was installed in Schenectady, NY. The commercial success of time-sharing was proven and soon George Snively would be working on one of the largest appropriations in Phoenix history that would include the opening of six more centers (Los Angeles, Chicago, Detroit, Washington DC (Bethesda), Cleveland and. Teaneck NJ. The Don Knight-George Snively business plan, which Helmut Sassenfeld approved, was the largest Appropriation Request in the history of GE to that time. The six GE 265 systems were each valued at $1,200,000 for a total equipment price of $7,200,000. The Appropriation also included $600,000 for facilities renovation over half of which would go to 570 Lexington Avenue to move the NYC time-sharing center from the basement to the first floor. The total appropriation came to $7,800,000.

For comparative purposes, the Appropriation Request for the Black Canyon/Thunderbird Road plant was $4,500,000 including factory equipment, engineering test equipment, furniture, etc.

## A Vision of the Future

In April 1966, Dr. Dan Scott, Time-sharing Engineering, and I attended the first Symposium on Computer Graphics hosted by UCLA. Examples of early user successes of graphics included Lockheed-Marietta, Georgia for numerical controlled machine tools, Boeing Huntsville, Alabama for data reduction and General Motors Computer Aided Design, which utilized an IBM 7094, the largest mainframe made by IBM to drive one graphics terminal. One hour of console time required six minutes of CPU time. The early graphical consoles were the Stromberg Carlson 2040, the IBM 2250 and the Rand Tablet which used a 10” by 10” copper wired, “pad of paper.” The cost was out of sight but a vision began forming that user graphics interface would be the way of the future and replace the keyboard and text input for computer applications. The benefits for computer-aided design would help drive the technology and the link to Computer Aided Manufacturing (CAD/CAM) would follow. My recommendations to the IPB were that graphics would become the key to future success.

Symposium on Computer Graphics

Date: April 4,5,6, 1966

Place: University of California
Los Angeles, California

Attendees: D. Scott, J. Zinchak

Summary: Computer Graphics and its potential impact on the IPB

Prediction: Within two to three years, the IPB will be augmenting its product offering with graphic services. Our experience to date with Computer Time-Sharing Service has clearly proven the benefits to be gained by a computer system that provides man-machine interaction; that is, combining what a man can do best, such as utilizing his experience and judgement with what a computer can do best, such as providing speed, power, and low cost/calculation. Graphics extends the man-machine interaction by utilizing skills that are most efficiently done by man, that of pattern recognition and visual comparisons.

What is Computer Graphics?

A computer system that has the capability to accept and/or display information that may consist of (1) text, (2) line art, and (3) pictorial content together with providing extensive computation of such information. In brief, graphic devices (consoles/terminals) are used as an input/output tool where computing is required rather than merely for a display of static data. Graphic applications to date have been generally classified as either (1) active or (2) passive graphics.

**Report on Symposium for Computer Graphics, April 1966, Page 1**

In the interim, P&AD personnel should be cognizant of:

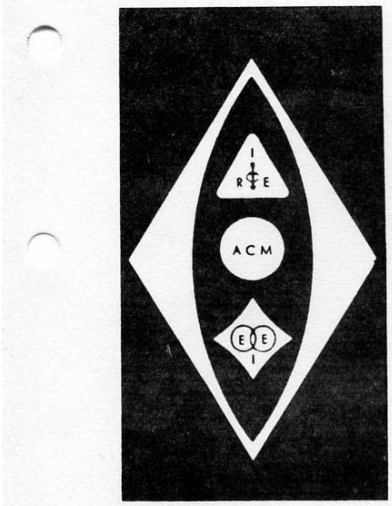
1. The future implications that graphics has for our business
2. Industry applications
3. Applications now being done by our time sharing users that could be done better with graphics
4. Work being done by S&PO, also provide documentation and available machine time so that, such consoles will properly interface with our product offerings, such as the Dartmouth system.
5. Development resources for possible experimentation within P&AD.

J.R. Zinchak

**Report on Symposium for Computer Graphics, April 1966, Page 6**
**Recommendations**

## Applications, the Next Wave

The BASIC language proved to be very successful. The pressure now was to add FORTRAN and applications. Some of the competition was successfully offering FORTRAN and COBOL and some were offering applications, such as COGO for design work. I decided that rather than supporting the roll out to new time-sharing locations, I would prefer to work on making recommendations for time –sharing applications.
Having had a vision of the potential future for CAD/CAM, I thought I would use my manufacturing background to implement a service for creating programs for numerically controlled machine tools. The NC market was growing rapidly with a large push from the aerospace industries and help from the US Air Force. GE was becoming a major controls supplier to the industry with the shipment of the GE Mark series controllers and the Mark Century controller, successfully competing with Allen-Bradley, and Bendix controllers.
The benefits of utilizing NC technology were not being realized due to the time and difficulty in creating machining part programs. My first exposure to NC was while working with Manufacturing Engineering Services in Schenectady. My primary responsibility in 1961 was the support of a Tabular Systems-Oriented Language (TABSOL) for the GE jet engine gear shop at Evendale, Ohio. There are over 600 different gears that are required in a jet engine and by using decision structure tables we could quickly generate operations planning and machine tool information including machine tool speed and feeds and numerical control parts programming.




TABSOL

A FUNDAMENTAL CONCEPT FOR

SYSTEMS-ORIENTED LANGUAGES

T. F. Kavanagh
Manufacturing Services
General Electric Company

Presented at the

Eastern Joint Computer Conference
December 14, 1960
Hotel New Yorker
New York, New York

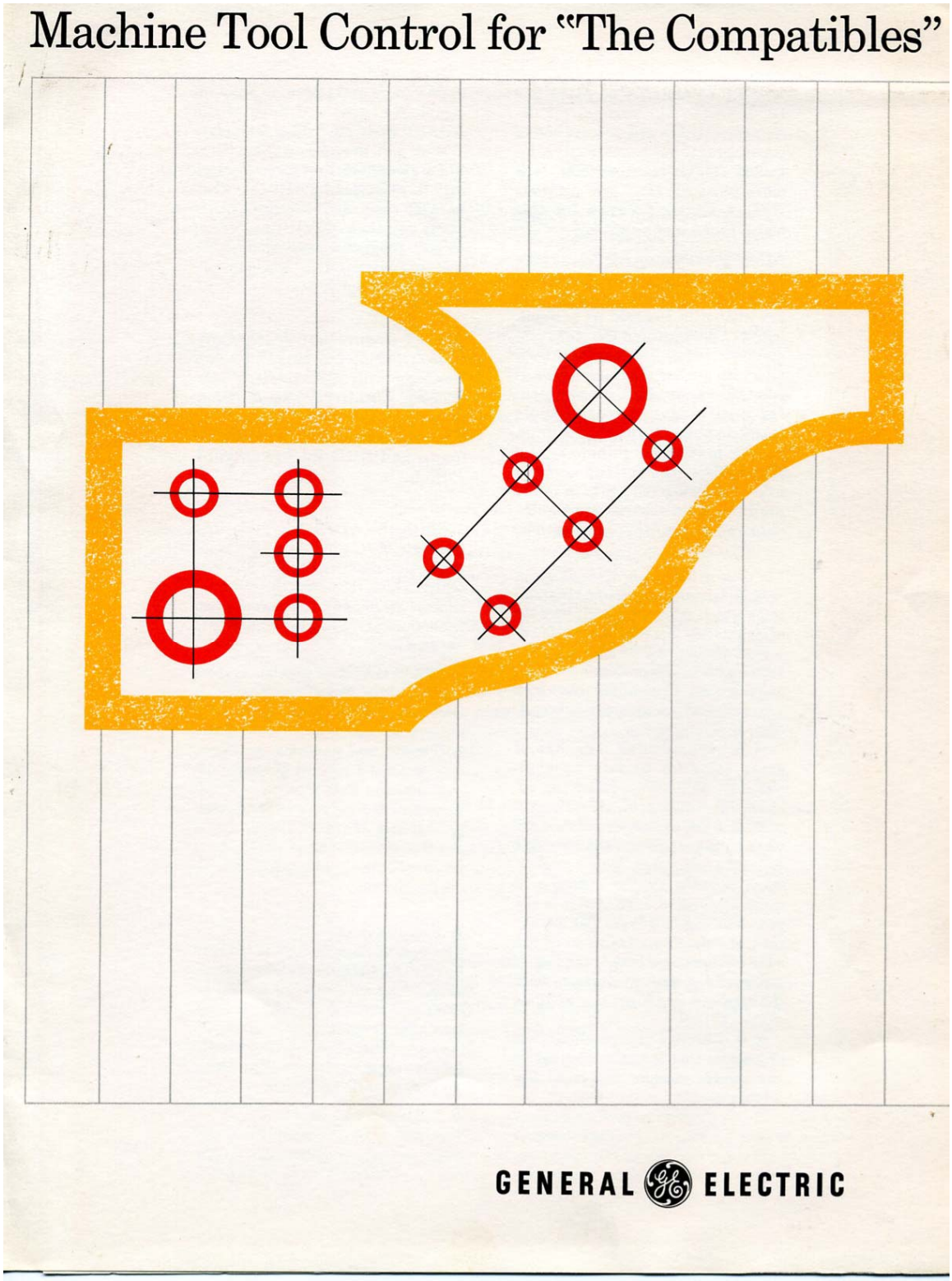
MANUFACTURING SERVICES

GENERAL ELECTRIC

NEW YORK, N. Y.

I was introduced to the Manufacturing Services developed program called PRONTO which was a computer assisted programming tool for NC positioning machine tools such as drills and punch presses. When I got to Phoenix and started working for Larry Wolfe in Manufacturing Applications, one of the first assignments Larry gave me was to see how we could capitalize on the NC programming work being developed by GE Huntsville. One of the Air Force projects given to Huntsville was to develop a subset of the Automatically Programmed Tool (APT) language that could run on a GE-225. Up to that time, APT was being run on an IBM-7094 primarily for complex 5-axis contouring machining applications. A large number of machine tools was being sold with 2-3 axis controls and would be a good fit for ADAPT and the GE-225. I developed the following

sales brochure while working for Larry Wolfe that covered both GE ADAPT and the PRONTO capabilities.




**General Electric Computer Department Sales Brochure for Numerical Control 1964**

Since most of the NC controllers were operating with paper tape input, there was a logical fit with our teletype terminals. Based on this background, I made my recommendations to implement ADAPT as one of the initial time-sharing applications.

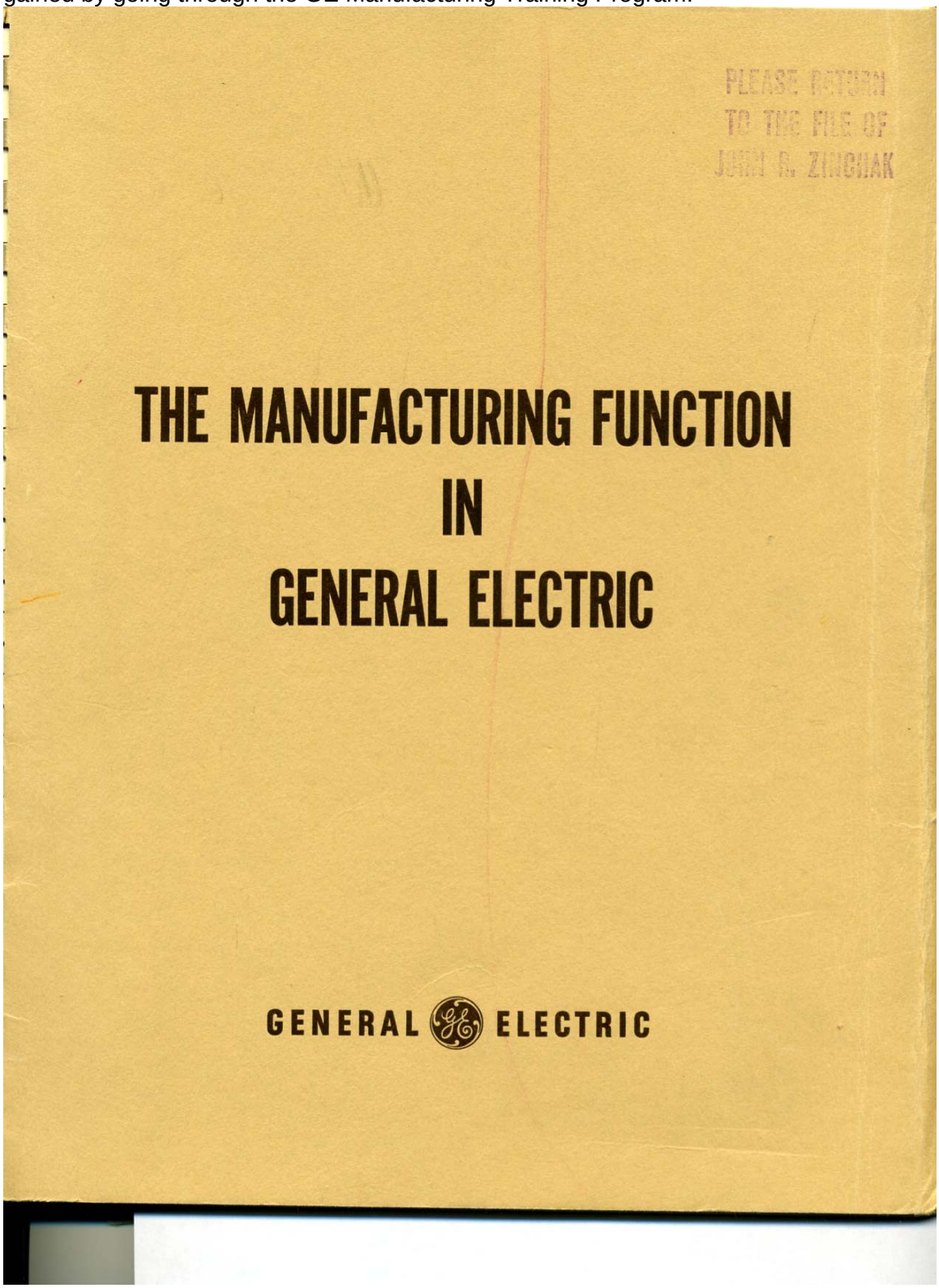
**GE Sales Training**

Word started to leak out that the time-sharing headquarters operation was going to be moved from Phoenix to Bethesda, MD. One of the rumored justifications given for the move was that many poor decisions were made in Phoenix and it was due to the excessive heat. I had worked one summer in the Washington D.C. area and was not interested in returning to that part of the world. As luck would have it, I was introduced to Ted Sable, Manager of Sales Training, who was one floor above me at Central Towers. Ted was interested in developing industry sales training and thought I would be a good fit for developing the first course, which was aimed at how to sell computers to the manufacturing industries. I worked with Susan Brewer, who was in Nancy Tafel's organization and together we offered the first two-week course in industry sales.

**<u>Front Row</u>: Hal Greenberg, Dave Falkenstein (Denver). Dick Rice (Houston)**
**<u>Middle Row</u>: Jim Floyd (Houston), Jack Stone (Seattle), Chuck Williams, Jim Butler (Charlotte)**
**<u>Top Row</u>: Ted Sable, Bill Maloney (Minneapolis), Art Waggoner (Dallas), Paul Darby (Tampa), John Zinchak, Manufacturing Sales Training Instructor**


**John Zinchak, Manufacturing Sales Training Instructor, makes a point to Hal Greenburg, Paul Darby and Jim Floyd**

The course was very well received and featured an introduction to the manufacturing functions and organization, which was based on my experiences and documentation gained by going through the GE Manufacturing Training Program.




**The First Course in the three-year Manufacturing Training Program**

The last part of the two-week training class consisted of making a sales pitch to a typical manufacturing company. I had great success at getting GE manufacturing people from Black Canyon plant to come down to Central Towers and role-play their experiences for the IMA Manufacturing Company.

**Special Systems Department**

Shortly after John Haanstra left IBM to join GE, he formed the Special Systems Department. Jack Katz was the newly appointed Department Manager. John Scandalios, from Honeywell, became the Manager of Marketing and I joined John as one of his early managers. The Special Systems Department was going to evaluate the commercial potential for the work done for JC Penny, (TRADAR) in retail and the Direct Data Entry System developed for the Internal Revenue System. I was assigned to do market development for data entry. I visited our IRS installation in Austin to see first hand how 640 GE CRT terminals could replace the data entry work previously being done by IBM 026 and 029 keypunches and 056 and 059 key verifiers. The GE solution was based on a Datanet 30 and GEPAC 4020 processors. There was a tremendous market for a scaled-down system that would be about in the 30 CRT range. Bill Combs joined the direct data entry project after completing his assignment in Australia. On a business trip with Bill he started to tell me about a tremendous business opportunity that was about to be launched. Bill along with Chuck Ettinger, Walt Mitchell, Eugene Dubbs and Ed Aiello had put together a business plan and raised millions of investment capital to start a new time-sharing company called Dialog Computing. I had seen a number of people who had left GE to start time-sharing ventures, and, at least on paper, become millionaires. In some cases, without knowing their intentions, I had provided them with a wealth of information before they made their decision to leave GE. I felt the time-sharing market had passed me by and this represented perhaps the last opportunity to grab the golden ring and make a bundle of money.

**Dialog Computing**

I moved to Fairfield Connecticut, Dialog's new corporate headquarters as the Director, Products and Services.


**Photo: John Zinchak, Director of Applications Development and Chuck Ettinger, President and CEO, Dialog Computing, Fairfield, Connecticut.**

I hired three people from GE time-sharing as part of my team. The first was Frank Caruso, who I worked with on Larry Wolfe's team and who later introduced me to the IPB and time-sharing. I also hired Bob Edwards who worked in Ken McDonald's Phoenix IPC organization and had a strong background in Engineering Applications. Bill Kienstra also came on board and I knew Bill from his work in the IPB on various business applications. Dialog had made a decision to be IBM based and installed two IBM 360/50 computers. The most promising time-sharing operating system appeared to be the one developed by the University of Pittsburgh, which unfortunately turned out to have a number of flaws.

After about 8 months, when it became painfully obvious that Dialog was not going to succeed. I contacted Stan Josephson, formerly of the IPB who now was working for University Computing in Dallas, Texas. Stan mentioned he was heading to Zurich Switzerland for a two-week planning effort and thought there might be a possible position for me in Zurich. After Stan returned to the States, he called to let me know the job in Zurich was about two years away but Bob Jacobs, who was also on the same trip, knew me and would like to bring me to Dallas. I knew Bob from Central Towers days when he was in sales management.

**University Computing Company**

Sam and Charles Wyly founded University Computing Company (UCC) in Dallas, Texas in 1963. Sam was a contemporary of Ross Perot and both were ex-IBMers who made their quotas by February and started to look around at other things to do. Sam got his start by selling available time at the Southern Methodist University computing center, hence the name UCC.

UCC

UNIVERSITY COMPUTING COMPANY

**COMPUTER UTILITY NETWORK**

World Headquarters
1949 North Stemmons Freeway
Dallas, Texas 75207
(214) 741-5781

**AREA BUSINESS OFFICES**

DALLAS
1949 North Stemmons Freeway
Dallas, Texas 75207
(214) 741-5781

HOUSTON
400 Fannin Bank Building
Houston, Texas 77025
(713) RI 8-3820

KANSAS CITY
2000 Johnson Drive
Shawnee Mission, Kansas 66205
(913) 831-1771

LOS ANGELES
888 North Sepulveda Boulevard
El Segundo, California 90245
(213) 322-3093

NEW ORLEANS
234 Loyola
New Orleans, Louisiana 70112
(504) 522-9971

NEW JERSEY
13 Kennedy Boulevard
East Brunswick, New Jersey 08816
(201) 828-3900

SAN FRANCISCO
260 Sheridan Avenue
Palo Alto, California 94306
(415) 328-2050

NEW YORK
299 Park Avenue
New York, New York 10017
(212) 421-8850

ST. LOUIS
500 Northwest Plaza
St. Louis, Missouri 63141
(314) 542-4975

TULSA
823 South Detroit
Tulsa, Oklahoma 74120
(918) LU 2-0975

DENVER
Continental Terrace Building
Suite 348
2785 N. Speer Boulevard
Denver, Colorado 80211
(303) 477-3822

CHICAGO
O'Hare Aerospace Center
Suite 101
9950 W. Lawrence Avenue
Schiller Park, Illinois 60176
(312) 678-4871

BOSTON
Central Plaza Building
675 Massachusetts Avenue
Cambridge, Massachusetts 02139

**UTILITY CONSULTING SERVICES**
888 North Sepulveda Boulevard
El Segundo, California 90245
(213) 322-9217

***OTHER UCC DIVISIONS***

**DATA LINK DIVISION**

- HAYES STATISTICAL SERVICES, INC.
- MORTGAGE SYSTEMS COMPANY
- AMERICAN DATA PROCESSING COMPANY

**PROFESSIONAL SERVICES DIVISION**

- D. R. McCORD & ASSOCIATES, INC.
- KEYSTONE COMPUTER ASSOCIATES, INC.
- INSTITUTE FOR PROFESSIONAL EDUCATION

**MICROWAVE TRANSMISSION CORPORATION**

- FEDERAL SYSTEMS DIVISION

**UCC INTERNATIONAL**

- UNIVERSITY COMPUTING COMPANY (GREAT BRITAIN)
- COMPUTER SERVICES (BIRMINGHAM), LTD.
- COMPUTER BUREAU (SHANNON), LTD.
- UNIVERSITY COMPUTING COMPANY (NETHERLANDS) N.V.

**COMPUTER INDUSTRIES, INC.**

- GRAPHIC SYSTEMS DIVISION
- DATA COMMUNICATION SYSTEMS DIVISION
- COMPUTER INSTRUMENTATION, LTD.
- DATA CENTRE

**COMPUTER LEASING COMPANY**

- STANDARD COMPUTERS DIVISION
- BELL EQUIPMENT CORPORATION


# UNIVERSITY COMPUTING COMPANY

***CORPORATE OFFICE: 1300 Frito-Lay Tower Dallas, Texas 75235 (214) 357-0246***

**UCC Divisions and Major Locations**

The Company became very successful and the stock had gone up as high as $167 per share. A number of ex-GE people were now in place. Stan Josephson and Paul Rosenthal, both ex-IPB, were in the banking and software side, which were primarily based on Honeywell systems. A number of former GE salesreps were also hired which included Billy Bacum and Leo Mott, who was head of the Computer Utility Network Division, which featured large scale UNIVAC 1108s. (The Dallas center also had Control Data 6000 series and Cray computers). Bob Jacobs worked for Leo as the Marketing Manager and I was hired by Bob in September 1969 to do the market development work for the UCC time-sharing front end to the UNIVAC 1108s. The Utility Network engineering team had ex-GEers including John Couleur and Gene Scott. Dr. Dan Scott came from Phoenix with a talented team of GE time-sharing engineers that included Pat and George Friend, Alex Zaxson, and Verlan (Zip) Zapotocky. Dan conceived and designed FASBAC as the conversational front end and FASBAC was promoted as being “beyond time-sharing”. The name, FASBAC, was a play on a popular marketing brand name at that time such as Fastback cars and razors. FASBAC was implemented on the Digital Equipment Corporation PDP-8 and PDP-9 computers. The Computer Utility Network primarily targeted large-scale engineering and scientific applications and had an applications software library of over 25 widely used packages. FORTRAN and COBOL were also available. UCC already had a significant number of customers running the APT language for numerical control applications. UCC marketed a high-speed terminal called the COPE.45, which featured a card reader, cardpunch and printer.

## FASBAC
in summary

### Principal advantages include:

- SPEED AND CONVENIENCE—Swift job turnaround is provided via dial-up service from your office.
- ECONOMY — The hierarchy of computers in the FASBAC system provides the most efficient and least costly service for the job at hand. Low-cost small and medium scale equipment handles communications and "conversational" requirements. The large scale system is reserved for users as the computational muscle of the service.
- FLEXIBILITY—The remote user has the capability to enter, store, retrieve, and manipulate text (program or data) from his keyboard terminal, eliminating the need to work directly with awkward card decks or coding sheets.
- CONTROL—The user can funnel his output to best meet his needs—to a bulk storage unit, magnetic tape, remote high-speed terminal, the central site computer or his own keyboard terminal.
- SOFTWARE—Files can be created in COBOL, FORTRAN IV and V, ALGOL, BASIC or in the special CASH language. Numerous special application packages are also available through the FASBAC service (see list). The FASBAC edit language can be used to work with these special packages.

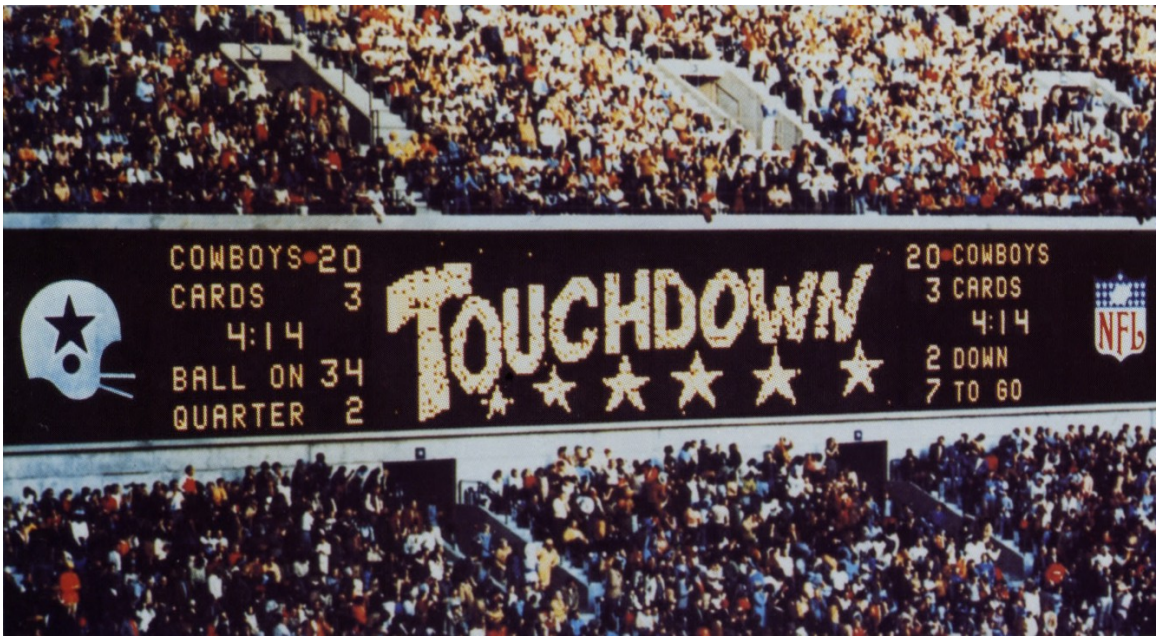
### special software application "packages" available with the FASBAC service include:

APT — Automatically Programmed Tools
SCEPTRE — Electronic Circuit Design Program
FASNET — UCC Critical Path Method
LOAD FLOW — Analysis for Electric Utilities
MACRO/8 — PDP-8 Assembler
MIMIC — Differential Equations
SIMSCRIPT — Mathematical Modeling and Simulation
FRAN — Framed Structure Analysis
PIFA — Piping Flexibility Analysis
FMPS — Functional Mathematical Programming System
THAN — Transient Heat Flow Analysis
PERT — Program Evaluation Review
HOUSEM — Full Moment Resisting Space Frame
PROSIM — Critical Path Method (CPM)
BMD — Bio-Medical Routine
GPSS-II — General Purpose System Simulator
GOALS — Geometric Optical Analysis of Lens Systems
ACCOS — Automatic Correction of Centered Optical Systems
IBM 1130 — UNIVAC 1108 — Communications Package
GASPIP — Gas Pipeline Network Simulation
GE 400 — UNIVAC 1108 — Communications Package

**FASBAC Summary of Advantages and Key Application Packages**

## DPA Management Systems

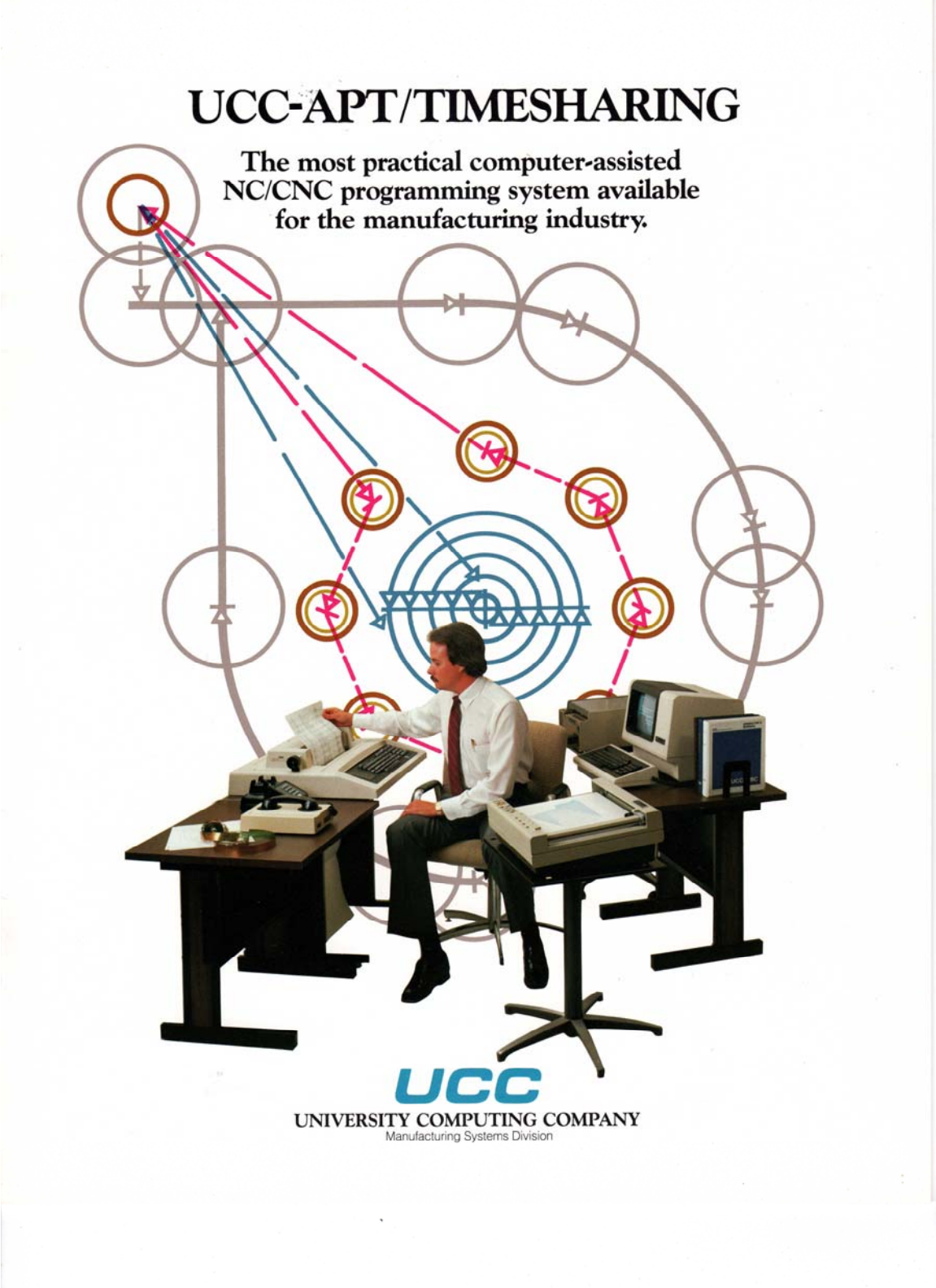
For the next nine years, I served as the Executive Vice President for DPA Management Systems, a computer services and facilities management company. Outsourcing services was provided for a number of companies including Motorola, Centennial Homes, a Weyerhaeuser Division and Varo Semiconductor. We were also the successful bidder for the Dallas Cowboys and Texas Stadium Scoreboard system that was IBM based. I was the scoreboard operator working with a team of 11 people from our company.




**Texas Stadium Scoreboard Operations, November 1972**

## UCC becomes UCCEL

In 1981, I rejoined UCC as the Marketing Manager for the Manufacturing Systems Division, which was providing remote APT language numerical control services. Three years later, I became the Vice President and General Manager for the Division.




**UCC-APT was also sold as turnkey solutions on Digital PDP-11, VAX and HP3000**

I expanded our markets from the US by hiring country managers for both the UK and Australia. One day I heard a rumor that UCC was going to hire a new CEO and it was going to be someone who was currently heading up GE Information Services by the name of Greg Liemandt. I called my old friend Bill Backer who had made the transition from the IPB in Phoenix to Bethesda to find out a little information. Bill was unaware of the rumor and felt that Greg would never leave GE, as Greg was close friends with Jack Welch. (In1972 Jack hired Greg from Booz Allen & Hamilton to join him in Pittsfield as his strategy planner). Bill mentioned their families would take vacations together and Bill thought it would take a million dollars to lure Greg away.
It turned out that the signing bonus and relocation allowance alone exceeded a million dollars. With the stock options that were provided it is estimated that Greg eventually earned something in excess of $44 million dollars. After coming on board, Greg not only fired the head of Utility Network Division that I reported to but also the UCC President. For the next eight months, I worked directly for Greg and attended the weekly meetings. In 1984 Greg and I were going out for lunch the week that Fortune Magazine did a feature story about Jack Welch being “The Toughest Boss In America”. It was about the time that term “Neutron Jack” was coined. I asked Greg what he thought would be Jack’s reaction to the story. He said Jack would hate the article and would not see himself at all as the magazine presented him.

**UCCEL**

Greg Liemandt renamed the company as UCCEL and later would end up selling the business to Computer Associates International in 1987 for $830 million making CA the world’s largest independent software company. Prior to the sale Greg wanted to sell off those divisions, which did not have a fit with the CA business.
Greg told me my Division was not a fit and I was asked to find a buyer for my Division, which by that time, was known as the Computer Integration Manufacturing Company (CIMCO).

# UCC-APT

## Industry's Most Powerful, Versatile NC/CNC Part Programming System

**FEATURES:**

- **Full multi-axis capabilities.**
- **Lathe module to simplify lathe programming.**
- **Extensive geometric definition facilities.**
- **Complete control over cutter motion.**
- **Both general and custom postprocessors.**
- **Two configurations — Intermediate and Advanced.**
- **Complete documentation and training.**
- **Single- and multi-user systems.**
- **Support available from Regional and National Customer Support Representatives.**
- **Software warranty of one year includes program updates and enhancements.**
- **Extended warranty available.**
- **Utilities to punch tapes and plot cutter paths.**

**OVERVIEW:**

UCC-APT has, for many years, been recognized as the standard against which all other NC/CNC programming systems have been measured. Whether you are doing highly complex multi-axis contouring work or are concerned just with 2-axis positioning, UCC-APT can provide you the tools to do the job more effectively.

Now UCC-APT is available in two configurations, totally upward compatible. The Intermediate Level serves as the foundation of our parts programming product line and provides the capabilities to program cutter motions relative to two-dimensional geometry in any non-vertical plane.

It also contains a series of enhancements and programming aids to simplify the logical requirements of more elaborate part configurations. Included as part of the geometry facilities is a 2-D TABCYL definition.

ADVANCED UCC-APT is the top of the line. It contains all the features of the intermediate level, plus a full complement of multi-axis support capabilities.

An optional LATHE MODULE can be added to either level of UCC-APT. It simplifies programming for lathe parts by using short-cut, shop-type terminology to reduce the coding effort. Roughing, threading and finishing routines are provided.

Verification of cutter paths is easily accomplished with our NC PLOT II option. You no longer have to waste valuable machine time finding errors.

CIMCO

Computer Integrated Manufacturing Company

**CIMCO Data Sheet for UCC-APT**

Negotiations were held with several potential buyers, including IBM, General Electric and Control Data Corporation, but CIMCO was acquired by a small Austin based organization.

**Digital Equipment (DEC)/Compaq/HP**

At the time of the acquisition, I decided not to move to Austin but joined Digital Equipment Corporation in Dallas initially focusing on manufacturing based customers. Later assignments included Electronic Commerce, Electronic Data Interchange, (EDI) and Supply Chain Management. DEC was later acquired by Compaq, which in turn was acquired by Hewlett Packard. In 2002, I elected to take early retirement from HP.