

"TWO DECADES OF LEADERSHIP...TWENTY YEARS OF RESULTS"

MEASUREX WAS FOUNDED ON JANUARY 18, 1968.

THIS DATE IS NOT JUST SIGNIFICANT BECAUSE

ANOTHER COMPANY CAME INTO EXISTENCE, BUT

ALSO BECAUSE A NEW CONCEPT FOR PROCESS

CONTROL WAS CONCEIVED. MEASUREX'S BEGINNING

SET THE STAGE FOR COMPUTER INTEGRATED

MANUFACTURING. FOR THE FIRST TIME, A DIGITAL

COMPUTER WAS INTEGRATED IN THE HEART OF A

PROCESS CONTROL SYSTEM AND PLACED DIRECTLY

ON THE MANUFACTURING FLOOR. TODAY, AFTER

TWENTY YEARS, MEASUREX IS PROUD TO BE THE

INITIATOR OF THIS CONCEPT.

measurex

THIS BOOKLET WAS DESIGNED TO COMMEMORATE
MEASUREX'S TWENTIETH ANNIVERSARY.

IT IS DEDICATED TO THE MEN AND WOMEN WHO
HAVE WORKED TO CARRY OUT MEASUREX'S
RESULTS PHILOSOPHY AND TO MAKE THE
COMPANY SUCCESSFUL.

FEATURED IN THE BOOKLET ARE SEVEN KEY
INVENTORS WHOSE TALENT AND CREATIVITY
CONTRIBUTED TO THE DEVELOPMENT OF SOME
OF MEASUREX'S MOST IMPORTANT PRODUCTS.

THESE MEN ARE AMONG THOSE WHO
HAVE HELPED THE COMPANY ACHIEVE ITS
WORLDWIDE LEADERSHIP POSITION IN THE
TECHNOLOGY AND APPLICATION OF SENSOR-
BASED COMPUTER PROCESS CONTROL SYSTEMS.

David A. Bossen
President,
Chief Executive Officer



And senior executives
(standing from left):
Fernand Ostiguy
Executive Vice President,
Sales and Service
Robert McAdams Jr.
Senior Vice President,
Finance and Administration
Dr. Doris S. Bossen
Vice President,
Corporate Communications
Glenn R. Wienkoop
President,
Measurex Automation Systems
John C. Gingerich
Executive Vice President,
Operations

Results! That one word has been a driving force behind Measurex since the concept for the Company was sketched out on a napkin by Dave Bossen in **1967**. The "concept" was to put a digital computer directly on the factory floor, something that was virtually unheard of in those days. The computer would be used not only to support



Measurex's original Board of Directors (below, from left): Paul Bancroft III, John W. Larson, Dwight C. Baum, William H. Draper III, David A. Bossen and John W. McKittrick. All except William Draper remain as Directors of the Company today (their current titles are shown in the "Corporate Directory"). Mr. Draper is now Administrator of the United Nations Development Programme.

digital sensors, run sophisticated controls and print out management information, but it would also provide advanced

graphic displays for the operators. Although Bossen's selling technique was a little unusual, his concept-on-a napkin convinced venture capitalists

this new product idea had merit, and they were willing to invest in the new Company. With \$1.3 million in capital, Dave Bossen and 11 employees opened the door for business on January 18, **1968**, and began turning the concept into a reality.

One year and one day after the founding of the Company, the first Measurex Series 1000 System, "Old Number One," was installed at Simpson Paper Company in Ripon, California. The system, shown at right with Dave Bossen (third from left) and officials of Simpson, produced outstanding results for the customer for 14 years and was then replaced with a Measurex System 2002.

The development of Measurex's first product, the Series 1000 System, redefined the papermachine control industry.



It was to be the world's first completely

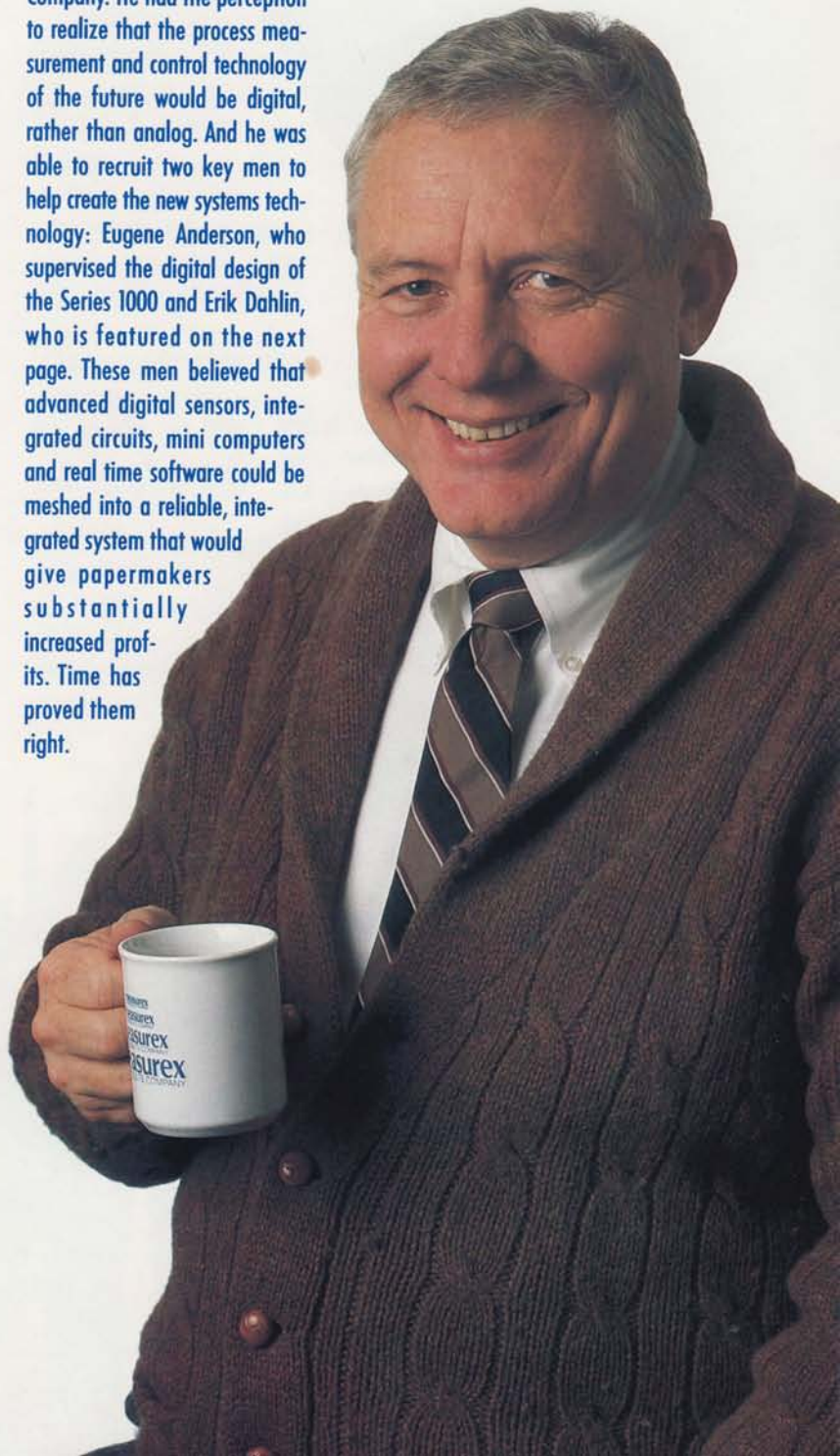
integrated, computer-based digital process control system. The computer, which was the heart of the system, supported two advanced sensors (infrared moisture and beta ray basis weight), eliminating the old analog circuitry. The Series 1000 was made available on a "turnkey" package basis, complete with software and ready to operate. The system was operator, management and pro-

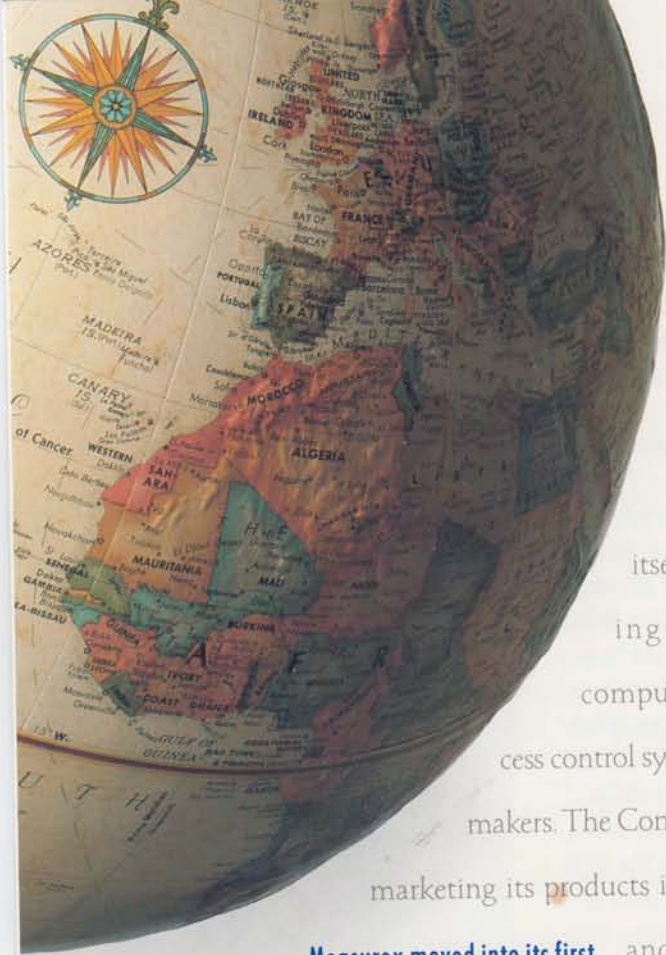


duction oriented to achieve maximum dollar savings. For example, the system typically afforded a 3 percent savings in raw

materials and a 5 percent increase in throughput. With raw material cost at more than 50 percent of a papermaker's product selling price, the results achieved with the Series 1000 translated to from \$300 to \$3,500 more profit a day, depending on the level of the mill's production.

The first of the Company's "seven key inventors" is the man who made all other Measurex achievements possible. It was Dave Bossen's vision that provided the impetus for starting the new Company. He had the perception to realize that the process measurement and control technology of the future would be digital, rather than analog. And he was able to recruit two key men to help create the new systems technology: Eugene Anderson, who supervised the digital design of the Series 1000 and Erik Dahlin, who is featured on the next page. These men believed that advanced digital sensors, integrated circuits, mini computers and real time software could be meshed into a reliable, integrated system that would give papermakers substantially increased profits. Time has proved them right.





Measurex moved into its first headquarters on Mathew Street in Santa Clara, California, in February 1968. In July 1971, groundbreaking ceremonies were held (below) for the Company's new headquarters on a 22-acre site which was to become "Results Way" in Cupertino, California. The "Mathew Street Gang" moved into the 52,000 square-foot building the next year.

By the early 1970s, Measurex had established itself as the leading supplier of computer-based process control systems to paper-makers. The Company was also marketing its products internationally,

and in **1970** the first two paper control systems were sold in Europe. During this period, Measurex began developing

new applications and in **1972** recorded many "firsts" within the paper industry. These included: the successful instal-



lation of Measurex's first system to control the pulp bleaching process for the chemical side of the pulp and paper industry; the first installation of a digital computer process control system on a machine producing tissue paper; and the development of many software packages for advanced control strategies, including BLOC™ software, an interpretive on-line development language. In addition, the

Company began expanding its sensor line—developing x-ray, caliper, infrared and opacity sensors. These high-

The initial public offering of 600,000 shares of Measurex Corporation common stock (right) was completed on March 28, 1972, by an underwriting group led by Eastman Dillon, Union Securities & Co. The Measurex stock was traded over the counter under the symbol "MSRX." The following year, Measurex revenues were \$27.1 million, up 66 percent from \$16.3 million in 1972.

accuracy sensors, or measuring devices, measure product variables on-line.

In **1973**, the first systems were shipped to control a single-

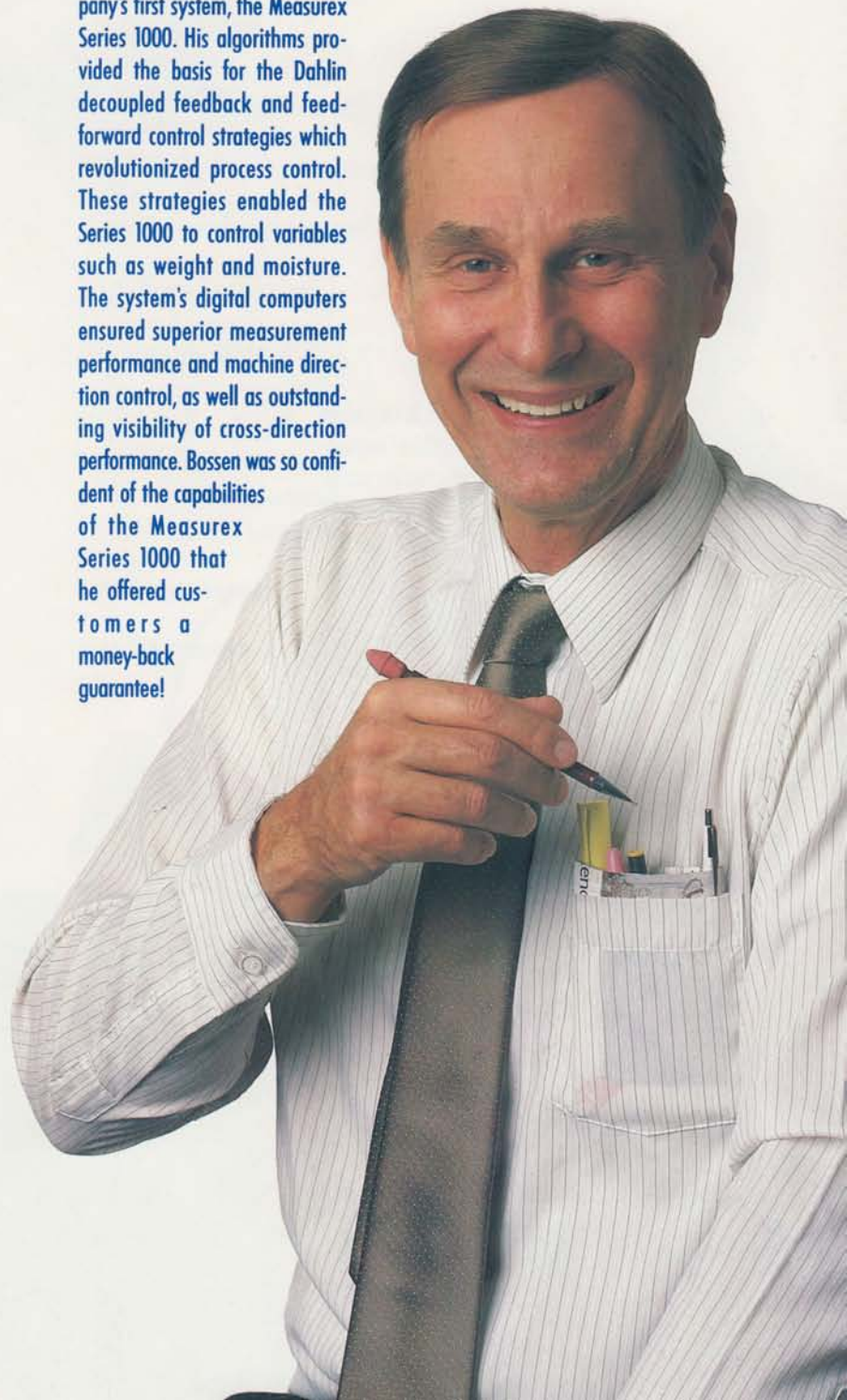
stand rolling mill producing aluminum foil and the calendering operation by which rubber is applied to tire fabric. Early in the year, Measurex began looking for a site to establish a manufacturing facility to serve the European Common Market countries. After investigating several locations, Waterford, Republic of Ireland, was selected and a 20,000 square-foot plant was opened in June 1973.



Corporate headquarters was also expanded that year when 41,000 square feet of manufacturing and engineering space was added at

the Cupertino location. Authorization was received from the Japanese government to form a wholly-owned subsidiary, and Measurex commenced marketing activities in that country. In late 1973, the Company began marketing internationally to industries other than paper

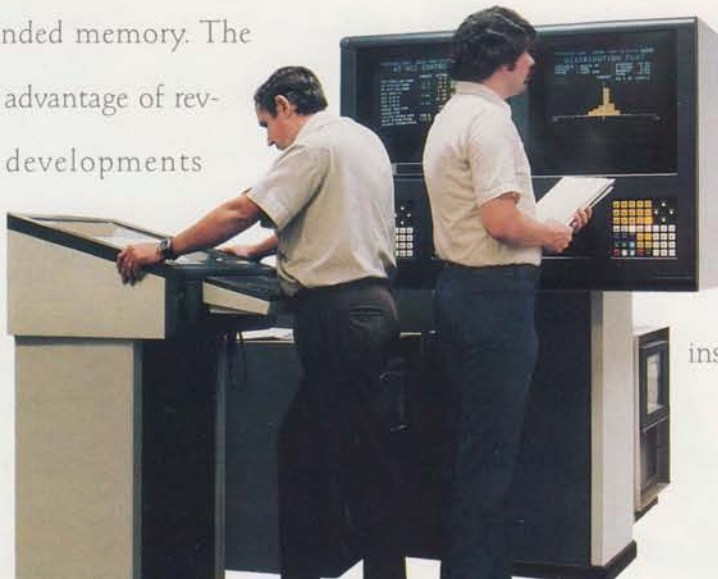
Dr. Erik B. Dahlin, whose 12 patents cover a broad spectrum of inventions, is one of the men who shared Dave Bossen's vision in late 1967. He became heavily involved in the design of the Company's first system, the Measurex Series 1000. His algorithms provided the basis for the Dahlin decoupled feedback and feed-forward control strategies which revolutionized process control. These strategies enabled the Series 1000 to control variables such as weight and moisture. The system's digital computers ensured superior measurement performance and machine direction control, as well as outstanding visibility of cross-direction performance. Bossen was so confident of the capabilities of the Measurex Series 1000 that he offered customers a money-back guarantee!



In January **1974**, Measurex continued to expand its technological leadership by introducing the System 2000. Developed over a three-year period, it incorporated the latest in computer software technology. The System 2000 offered many important advances,

The Measurex System 2000 (below) made it possible for the Company to enter many new market areas. The versatile system was designed for adaptation to a wide variety of process control applications. New applications were implemented by equipping the System 2000 with suitable measurement sensors, selecting computer program modules and changing pushbutton labels.

including improved communications between system elements and the first interactive color video operator station. A key feature of the 2000 was its expanded memory. The System took advantage of revolutionary developments within the electronics industry,



particularly the development of microprocessors and semiconductor memory. This new extended memory system provided the ability to expand so that customers could upgrade their equipment, adding new features, without replacing the system. Measurex

recognized the need for new control systems to optimize energy usage. The Company's first Energy Control System—for

control of recovery and power boilers,

Control of Kamyrdigesters (right) was made possible with Measurex's sensor-based Kamyrdigester System. The System increased profitability by using the Effective Alkali Sensor to control digester cooking. Tangible savings were obtained through reductions in wood, chemical and steam usage, improving process control 15 percent over conventional computer control.

steam distribution and turbine generator monitoring—was

installed in **1975**.

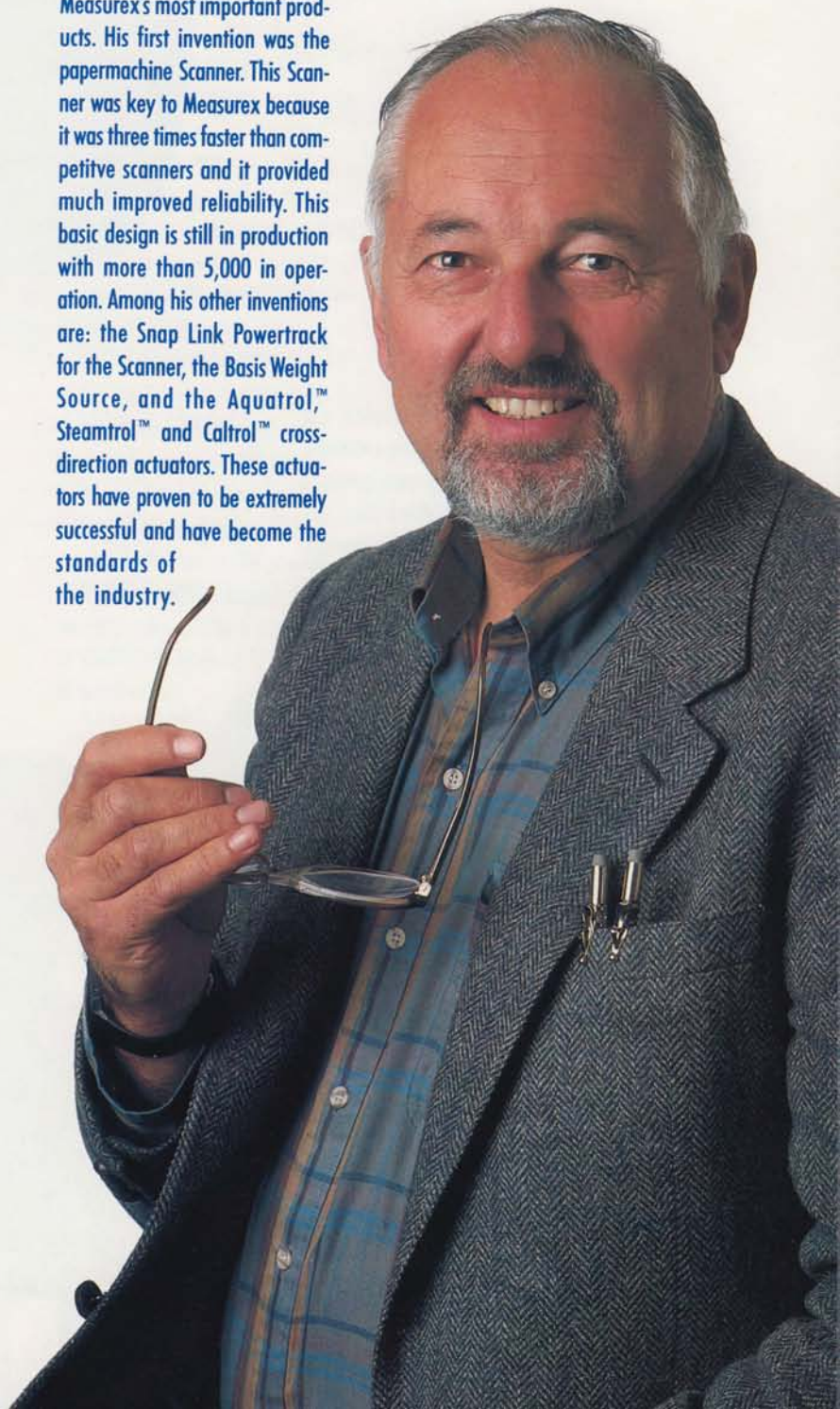
At a typical plant, this system reduced the cost of energy from 3 to 10 percent. During 1975, international business continued to increase and manufacturing space at the Waterford plant was expanded to 66,000 square feet. In July **1976**, another major new system was introduced: The Measurex 2000/25 for the plastic film and sheet extrusion market. The system incorporated new micro-



computers and an intelligent data terminal, providing the plastics industry low-cost, advanced process control dedicated to a

single extruder. In 1976 Measurex introduced its first cross-direction controls for moisture and caliper (thickness). The result of these refinements were reductions of 50 percent in caliper spread variations across the sheet with a consequent dramatic decrease in roll rejects.

Mat Boissevain, who is Employee Number Five, is Manager of the Mechanical Group in the Sensor Department. He has been awarded 10 U.S. patents and among them are some of Measurex's most important products. His first invention was the papermachine Scanner. This Scanner was key to Measurex because it was three times faster than competitive scanners and it provided much improved reliability. This basic design is still in production with more than 5,000 in operation. Among his other inventions are: the Snap Link Powertrack for the Scanner, the Basis Weight Source, and the Aquatrol™, Steamtrol™ and Caltrol™ cross-direction actuators. These actuators have proven to be extremely successful and have become the standards of the industry.



As it approached the end of its first decade in business, Measurex had already established a proven track record of achieving results for customers. The late 1970s were a time of rapid sales growth and market acceptance of the Company's products. In September

The Measurex 2001 (below in a system commissioning ceremony for a customer in Japan) provided customers with added reliability, maintainability and diagnostics. It had important new capabilities that expanded the use of the computer systems to control such key areas as cross-machine caliper and moisture variations, advanced stock blending and refiner control.

was introduced. This evolutionary System, which was fully compatible with the Measurex 2000, provided many



new control capabilities. During this year, Measurex began its architectural planning for Computer Integrated Manufacturing Excellence (CIMx). In **1978**, the Company increased its manufacturing capability by expanding facilities both in the United States and

1977, the first process control family of elements with fully distributed intelligence—the Measurex 2001—

building was added at Measurex's Cupertino headquarters, providing additional manufacturing and engineering space. In

In 1977, Measurex was listed on the New York (right) and Pacific Stock Exchanges, trading under the symbol MX. The Board of Directors declared an initial dividend of \$257,000, or \$.01 per share, and announced it would declare dividends on a quarterly basis if future business conditions so warranted. Dividends have been distributed in all but one year since then.

the Republic of Ireland, the Waterford plant was expanded to 80,000 square feet and construction was begun on a 47,000 square-foot facility in Cork. By the



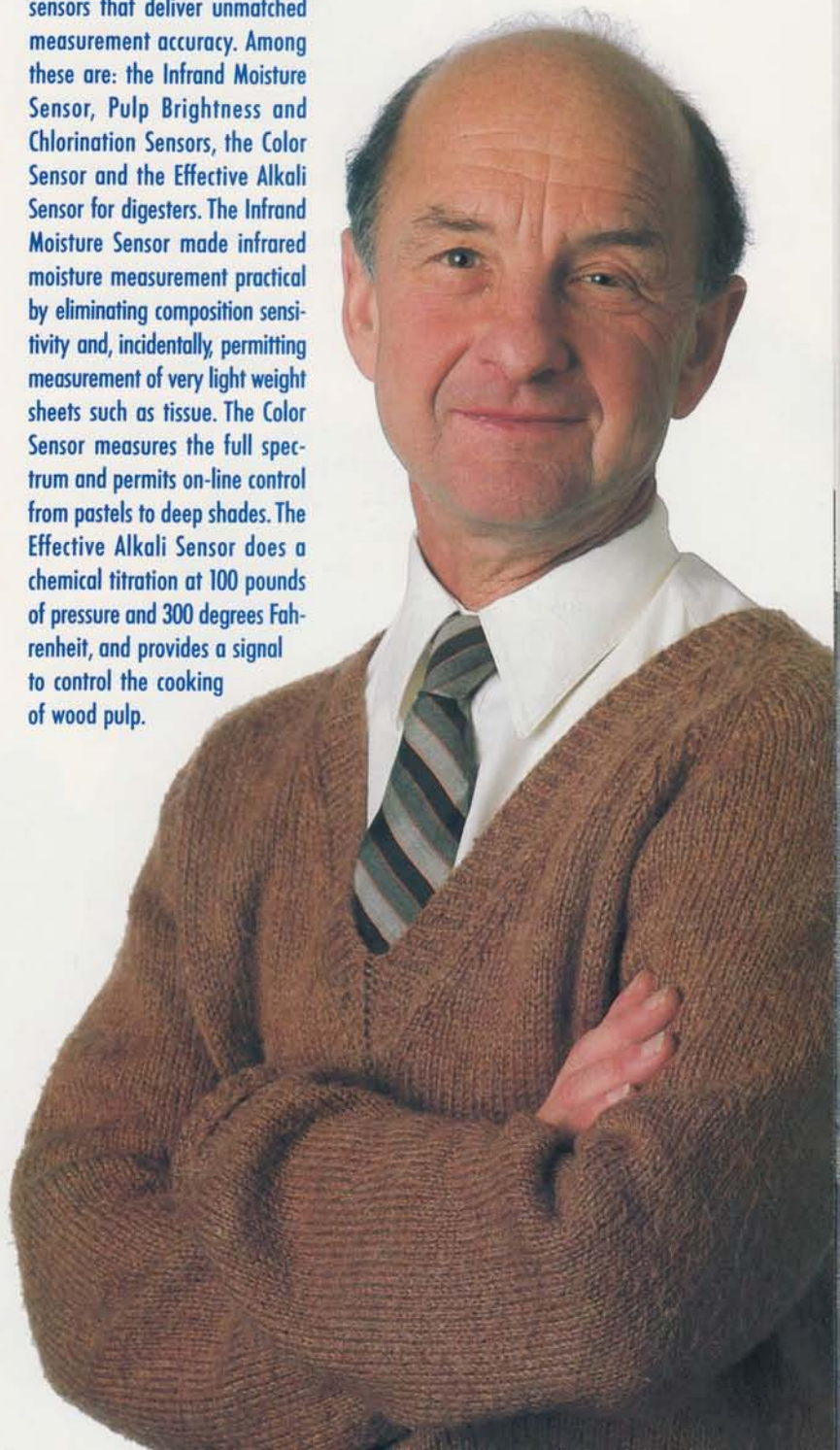
end of the year, nearly 1,000 systems had been ordered, systems were installed in 25 countries and the Company had more than 1,800 employees. In **1979**, Measurex continued to offer new capabilities to the plastics industry, including a system for the control of extruded foam insulation and new sensors to control the production of biaxially oriented film, adhesive tape, vinyl and




linoleum flooring, and ultrathin flexible packaging. For the first time, Measurex's revenues broke the \$100-million mark

in 1979, for a record \$119.5 million. This was up 35 percent from the previous year. The Company also reported record earnings that year, and it continued to increase its market share of the worldwide rubber, plastics and metals industries.

John Howarth is Measurex's Principal Physicist. He joined the Company in 1970, when the organization was located at Mathew Street. Howarth has been awarded 10 U.S. patents for a variety of sensors that deliver unmatched measurement accuracy. Among these are: the Infrand Moisture Sensor, Pulp Brightness and Chlorination Sensors, the Color Sensor and the Effective Alkali Sensor for digesters. The Infrand Moisture Sensor made infrared moisture measurement practical by eliminating composition sensitivity and, incidentally, permitting measurement of very light weight sheets such as tissue. The Color Sensor measures the full spectrum and permits on-line control from pastels to deep shades. The Effective Alkali Sensor does a chemical titration at 100 pounds of pressure and 300 degrees Fahrenheit, and provides a signal to control the cooking of wood pulp.





Measurex's DataFreeway millwide communications network (above) allows control systems within a plant to be easily connected by a single high-speed coaxial cable. It provides a superior method to collect and exchange information required for effective management of equipment, materials, energy and resources. This results in a plantwide network of unrivaled versatility.

a close, Measurex announced the next generation of the 2000 series: the System 2002. The System 2002 pro-

By **1980**, Measurex had supplied over 1,150 computer control systems to the paper industry, more than all other suppliers combined. In addition, nearly 325 orders had been received from customers outside the paper industry. As the year came to



vided dozens of features and benefits never before available for measurement and control. Among these features were: fast, reliable, expandable hardware; modular, easy-to-use software; plasma displays to enhance operator control; powerful interactive displays; new sensors; MeasureTest™ total diagnostics; advanced management reports and millwide management control via the DataFreeway™

communications. The DataFreeway was a key to Measurex's future CIMx offerings since exist-

ing and

future Measurex, as well

as most non-Measurex, computers and instrument buses could be connected

After 14 years, Simpson Paper Company ordered a new Measurex System 2002 (right) to replace "Old Number One." Simpson's System 2002 was the two-thousandth system order received by Measurex. The introduction of the Thermatrol weight profile control package (below) and the Steamtrol moisture control system completed the Company's "Total Profile Control" offering.

to the Network. During **1981**, the Company adapted the System 2002 family for applications in other industry markets and announced: the 2002 MetalsMaster™ System for metals, the System 2002 for plastics and the 2002 Pulp System. Also in 1981, further additions were made to Measurex's line of cross-direction controls with the introduction of the Thermatrol™ basis weight actuator and

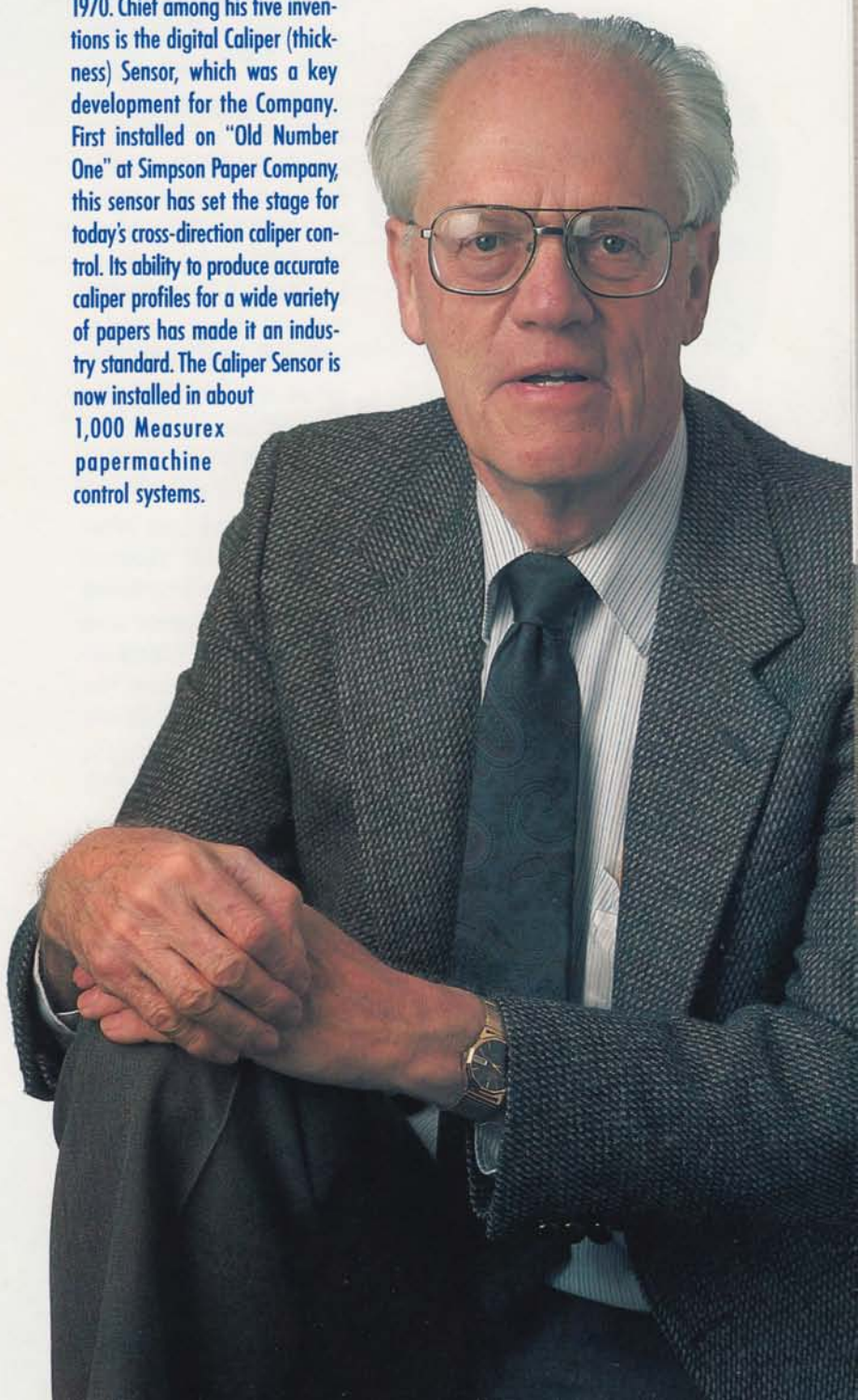


the Steamtrol™ moisture control unit. (Thermatrol profile controls use Equilex™ slice rods designed by Chleq Frote et Cie

and exclusively licensed to Measurex.)

A milestone of another sort occurred in **1982**, when for the first time since becoming a public Company, Measurex reported a loss. The loss, in the third quarter, was due to a worldwide recession in all of the Company's principal markets.

Gunnar Wennerberg is Senior Staff Scientist for the Industrial Systems Group's Engineering Department. Like John Howarth, he was a part of the "Mathew Street Gang," joining Measurex in 1970. Chief among his five inventions is the digital Caliper (thickness) Sensor, which was a key development for the Company. First installed on "Old Number One" at Simpson Paper Company, this sensor has set the stage for today's cross-direction caliper control. Its ability to produce accurate caliper profiles for a wide variety of papers has made it an industry standard. The Caliper Sensor is now installed in about 1,000 Measurex papermachine control systems.



On March 2, **1983**, after six years and \$25 million in development, the VISION 2002* Network was announced. With this single network for millwide visibility and control, Measufex took a major step in the evolution of process control technology.

A key to the success of the VISION 2002 Network (below) is its Global Data Base which integrates software that is distributed among a number of computers. It gives users the ability to be at any VISION 2002 console at any time and have direct, dynamic access to all information, from any computer in the Network, as if it were a part of a single data base.

The Company's entry into the distributed digital instrumentation and plantwide control market represented a substantial increase in Measurex's worldwide business potential. The VISION 2002 Network provided the Company with a cohesive family of system products, from

basic instrumentation through to unit process and millwide control. The VISION 2002 Network gave Measurex the ability to

offer true CIMx to customers. In **1984**, Measurex acquired the Management Decisions Development Corpora-

tion (MDDC) companies (now the Measurex Management Systems Division), further expanding the Company's CIMx capabilities. This acquisition

Measufex 4000M equipment uses noncontacting, computer-controlled ultrasound technology to give precise, accurate and reliable measurement of roll width and diameter and of roll diameter build-up at a machine winder (right). The state-of-the-art equipment uses laser scanners to read roll numbers to ensure all paper rolls are wrapped and labeled to a client's exact specifications.

brought expertise in the order



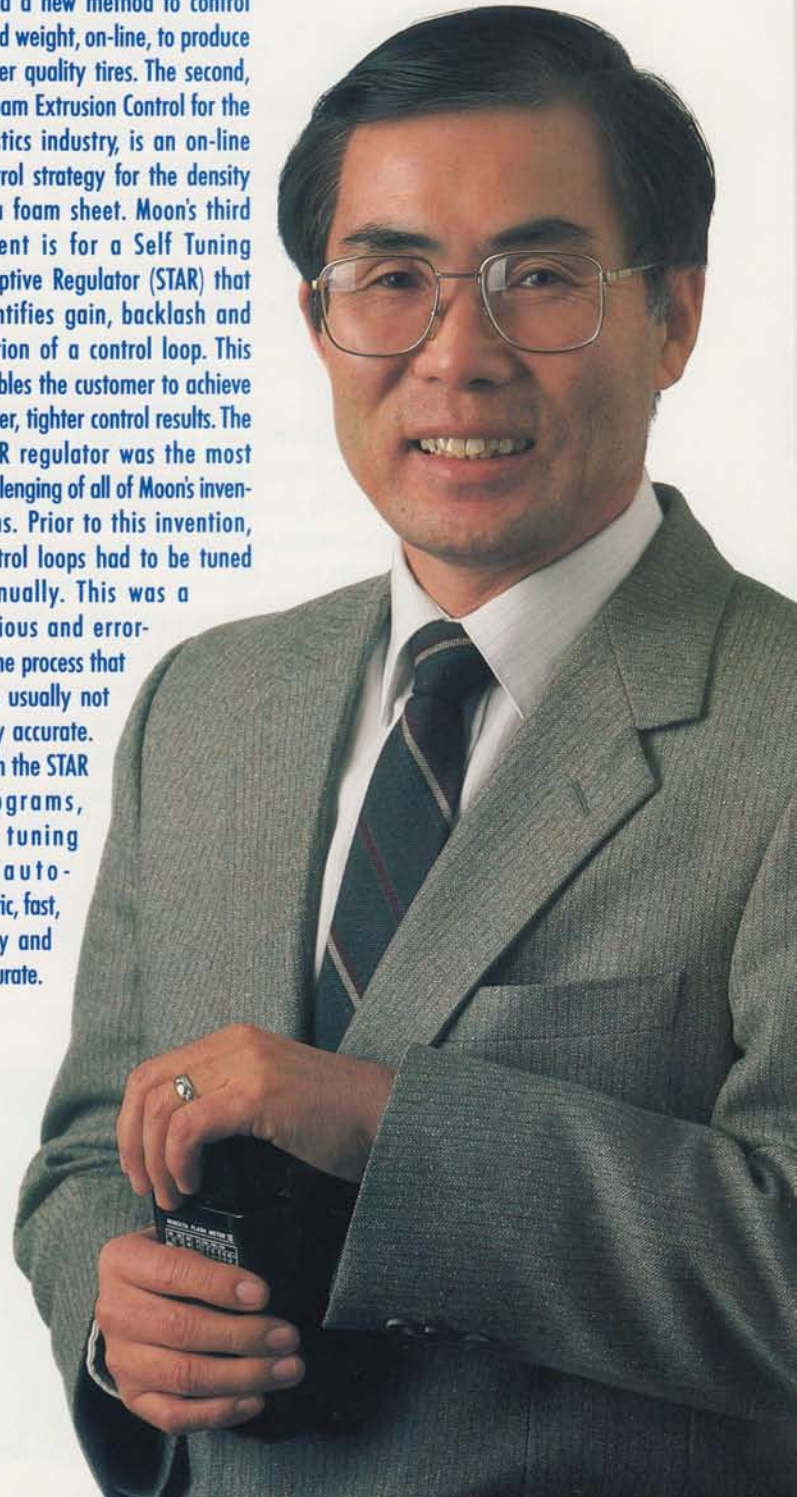
entry, production planning, inventory management and shipping areas of transaction computing. Also in 1984, a groundbreaking ceremony was held to launch construction of a 35,500 square-foot Customer/Employee Center at Measurex's headquarters. **1985** marked the beginning of a new business course for Measurex. The Company signed a co-development program with Ford



Motor Company and then formed a subsidiary company, Measurex Automation Systems (MAS), moving Measurex into

the discrete manufacturing marketplace. The Ford/Measurex program focused on development of production monitoring, production control and diagnostic support, and decision support systems for Ford's Body and Assembly Operations.

Dr. Sang Moon, Principal Control Engineer for the Pulp and Paper Group, joined Measurex in 1974. He has been awarded three patents. The first, a Tread Extruder Control system for tires, provided a new method to control tread weight, on-line, to produce better quality tires. The second, a Foam Extrusion Control for the plastics industry, is an on-line control strategy for the density of a foam sheet. Moon's third patent is for a Self Tuning Adaptive Regulator (STAR) that identifies gain, backlash and stiction of a control loop. This enables the customer to achieve better, tighter control results. The STAR regulator was the most challenging of all of Moon's inventions. Prior to this invention, control loops had to be tuned manually. This was a tedious and error-prone process that was usually not very accurate. With the STAR programs, all tuning is automatic, fast, easy and accurate.



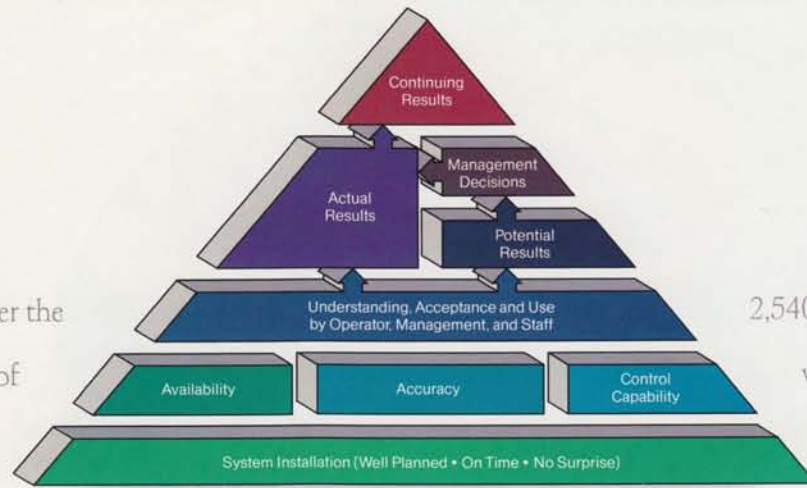
Shortly after the formation of MAS, on January 22,

1986, the Company signed an agreement with IBM Corporation to analyze software requirements, architecture and technologies to implement Computer Integrated Manufacturing software on IBM computers. That spring, the Com-

The VISION 2002 ET (below) links all levels of control—throughout all areas of a mill—in one fully integrated, single-system architecture. Among the many new “Enhanced Technology” features are: ZOOM™ plus, providing up to six times greater streak resolution across a full sheet, and QuadraView™, allowing four related process areas to be viewed simultaneously.

pany introduced “Enhanced Technology.” The VISION 2002 ET™ product series provides integrated papermachine control and a clear path to CIMx from Measurex. **1987**: Today, as the Company has completed its twentieth

year in business, Measurex employs



2,540 employees who are located in 40

offices in 21 countries. The Company serves a wide range of process industries and has shipped more than 3,000 hierarchical process control systems that are located in 45 countries throughout the world. These systems help papermakers

produce a variety of superior products, including: fine paper, newsprint, tissue, linerboard, wrapping and specialty kraft, and

coated paper; and building products such as particleboard and ceiling tile.

For industrial customers, Measurex

Measurex’s “Results Pyramid” (above) was first introduced in 1969. It demonstrates that the Company’s ultimate goal is to achieve continuing results for customers. Measurex’s headquarters complex (right) has been expanded over the years and today there are 320,140 square feet of manufacturing, engineering and office space on the 22-acre site in Cupertino.

systems measure and control a broad



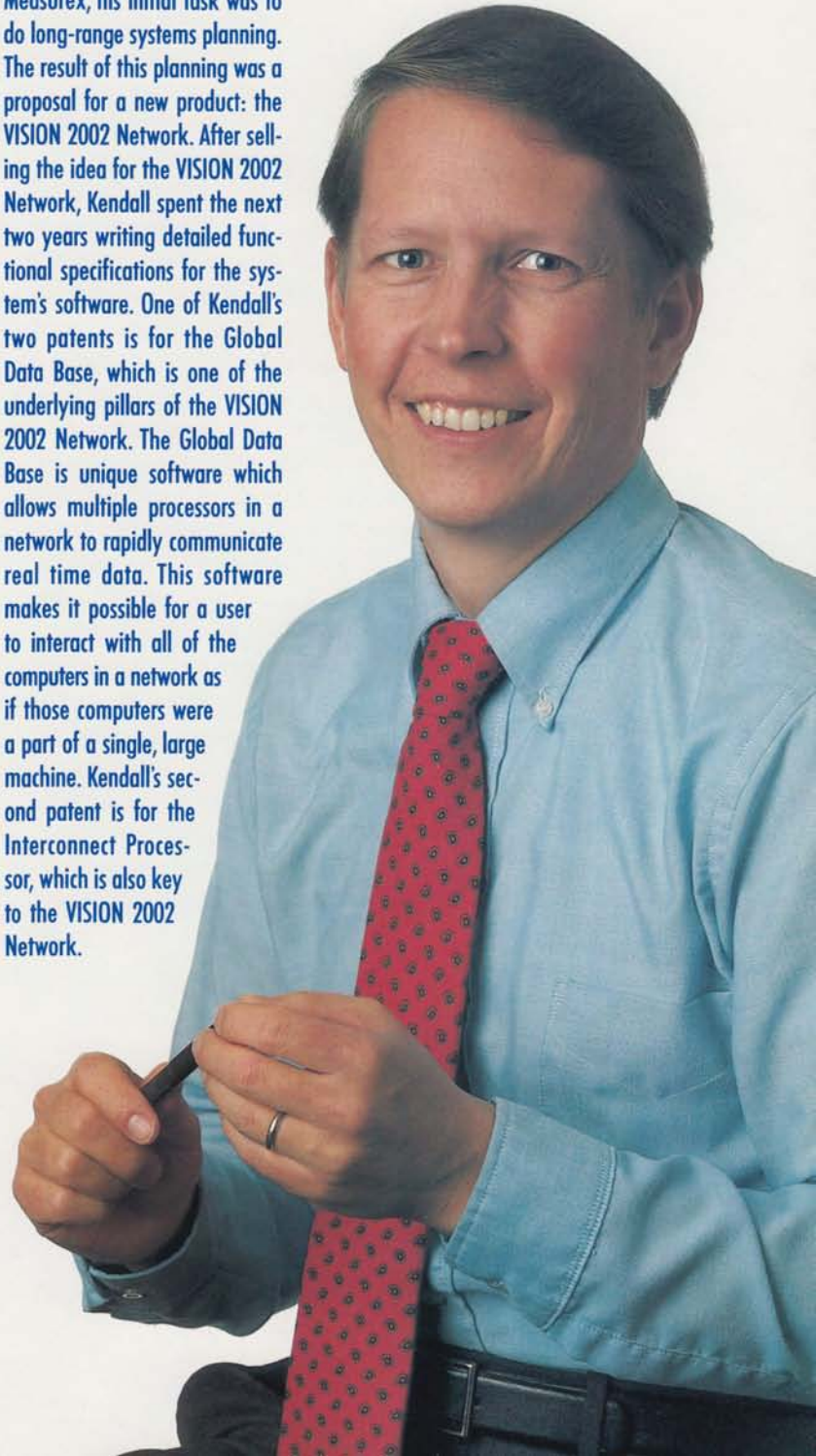
spectrum of specialized manufacturing processes, including: flat die, foam, tread and coating extrusion; slot die and blade coating; ceramics; vinyl and rubber calendering; aluminum rolling; energy systems and chemical processing. Some of the materials produced on these lines include: disposable diaper liners, plastic bags, automobile and truck tires, magnetic tape and floppy disks, aluminum



cans, vinyl floorings and food packaging. The Company's results approach to automation remains the same today as

it did 20 years ago when the first Series 1000 was being developed. The specific objectives may vary from process to process, depending upon the application, but the basic goal of the Company is unchanged: to provide ongoing results for customers.

Dr. Burt Kendall, who is Chief Software Architect and Principal Scientist for Measurex, is a relative newcomer. He'll celebrate his tenth year with the Company in June 1988. When he joined Measurex, his initial task was to do long-range systems planning. The result of this planning was a proposal for a new product: the VISION 2002 Network. After selling the idea for the VISION 2002 Network, Kendall spent the next two years writing detailed functional specifications for the system's software. One of Kendall's two patents is for the Global Data Base, which is one of the underlying pillars of the VISION 2002 Network. The Global Data Base is unique software which allows multiple processors in a network to rapidly communicate real time data. This software makes it possible for a user to interact with all of the computers in a network as if those computers were a part of a single, large machine. Kendall's second patent is for the Interconnect Processor, which is also key to the VISION 2002 Network.



One of the key factors contributing to Measurex's success during the past two decades is the Company's dedication to quality and results. Measurex not only designs and engineers its products—hardware, software and systems—but it also works with customers to ensure high-level ongoing results after the products are sold. A worldwide service organization provides a variety of on-site and on-call services to make sure each system installed operates to its full capacity. Of the 2,540 employees working for Measurex, 1,130 are members of the field service team. This team provides quality installations, control engineering, applications engineering and continuing support. Service is an integral part of the total results package Measurex offers to customers.



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