
Principles That Guide Measurex

- To provide attractive, tangible economic results for our customers.
- To invest in the marketing and product development required to maintain a leadership role in our markets.
- To offer a working environment that attracts and retains talented personnel and motivates our employees.
- To sustain the highest levels of quality in everything we do.
- To conduct all business—with customers, employees, suppliers and competitors—on an honest and ethical basis.
- To ensure that these ethical standards adhere to both the letter and the spirit of applicable laws of the United States and all countries in which Measurex does business.

Additional Information

Analysts, investors and others seeking additional information about Measurex's Corporate Profile and Investor Fact Book are asked to contact Robert McAdams Jr., Senior Vice President, Finance and Administration; or Fred R. Bierbrauer, Treasurer.

News media representatives and others seeking general information should contact Carol Wilson, Director, Public Relations.

Introduction

When Measurex Corporation was established in 1968, we defined our business as one that provides materials, through-put and quality control systems for the continuous process industries. This definition remains the same today, although it has been broadened to include systems for batch and discrete manufacturing processes worldwide.

Our name stands for "measurement excellence". We believed when we founded the Company, and we believe today, that accurate measurements are the key to process control profitability and Computer Integrated Manufacturing (CIM) profitability for our customers.

We've coined a name for Measurex's product offering; we call it CIMx.™ CIMx means Computer Integrated Manufacturing Excellence. We like that name not only because it reinforces our "Excellence" theme, but also because of the "Mx" on the end, since this is our New York Stock Exchange symbol.

On January 18, 1988, we celebrated our twentieth anniversary. We are proud of our achievements during our first two decades. As we begin our third decade in business, we are optimistic about our ability to continue to provide outstanding results for our customers, investors, employees and suppliers.

As we look at Measurex today, we believe the Company is the leader in providing sensor-based CIM systems to the process industries. Our strategic alliances give us the opportunity to bring these systems to the discrete manufacturing marketplace, as well.

We believe in a very conservative financial management style so that we can take realistic risks in product development in the marketplace. Our long-term financial objectives involve one number: 20. We are targeting for 20 percent growth in system sales, 20 percent pre-tax return on sales, and 20 percent return on beginning equity.

This Corporate Profile and Investor Fact Book is intended primarily for security analysts and other investment professionals who study Measurex Corporation. We hope this data will help you to better understand our Company and the various markets in which we operate. This book will be updated periodically and we sincerely welcome suggestions for ways in which you feel we can make it more useful.



David A. Bossen

David A. Bossen
President and
Chief Executive Officer

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Corporate Profile

Measurex is "The Results Company." It is a leading supplier of sensor-based computerized systems that measure and control continuous and batch manufacturing processes. The Company's Computer Integrated Manufacturing Excellence (CIMx™) product line ensures economic *results* for customers by increasing productivity, reducing raw material usage and energy consumption, and improving product quality and uniformity.

The principal industries served by the Company are: pulp and paper, plastics, metals, rubber, electric utilities, chemicals, glass, pharmaceuticals and food processing. In 1985, Measurex (an abbreviation for "Measurement Excellence") entered the discrete manufacturing marketplace and is developing systems which will provide factory automation for industries such as automotive, aerospace and electronics production.

Since 1969, Measurex has sold more than 3,000 systems having a value in excess of

\$1 billion. Corporate headquarters are located in Cupertino, California, in the heart of Santa Clara County's high technology "Silicon Valley." Measurex and its subsidiaries employ more than 2,500 people who are located in 40 offices in 21 countries around the world. Nearly half of these employees are members of the Company's service organization which contributes significantly to corporate revenues and customer results.

Measurex operates a manufacturing plant in Waterford, Republic of Ireland, and an engineering facility in Cork, Republic of Ireland, in addition to the principal plant in Cupertino.

Measurex's Management Systems Division (MSD), formerly Management Decisions Development Corporation (MDDC) has operations in Fairfield, Ohio, and Pointe Claire, Quebec, Canada.

Measurex Automation Systems (MAS) is 80 percent owned by Measurex Corporation and 20 percent owned by employees of MAS and Measurex. MAS is headquartered in Cupertino, California.

Business

Computer Integrated Manufacturing (CIM): A Key to Success

What exactly is CIM? It is the ability to link all manufacturing applications—from raw material input through shipment of finished goods—into a computer-run communications and information network. A CIM-based network includes: computers, workstations, distributed control systems, application-specific sensors and software, and advanced communications hardware and software.

By implementing such a system, plants have immediate access to vital operating data enabling management to optimize the use of resources, increase productivity and control product quality.

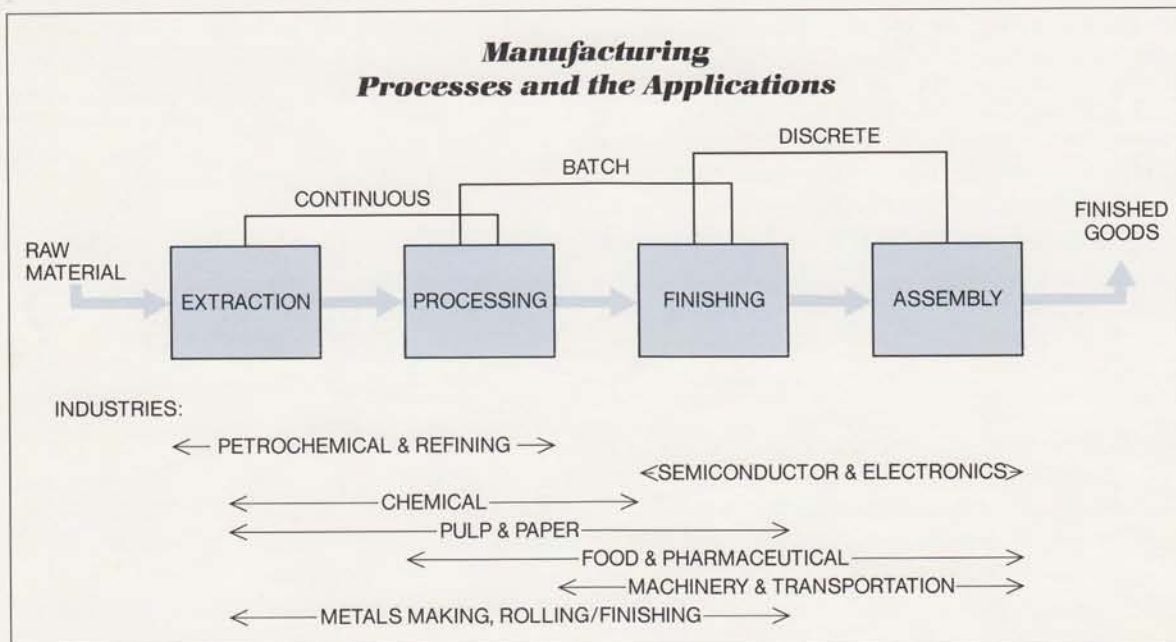
The Marketplace Today: An Introduction to Computer Integrated Manufacturing (CIM)

Today, Computer Integrated Manufacturing (CIM) requirements overlap the traditional industry boundaries. Most manufacturing plants have manufacturing processes that are not wholly continuous, batch or discrete. They are "hybrid" in nature.

Examples of the different types of processes are:

- **Continuous**—a manufacturing operation that produces a continuous flow of product by blending, cooking and mixing ingredients such as paper, gasoline or chemicals in a continuously moving status.
- **Batch**—a manufacturing operation that produces a product by mixing, cooking, fermenting, etc., ingredients such as pharmaceuticals, soap or food in one or more vessels.
- **Discrete**—a manufacturing operation that produces individual parts, subassemblies or assemblies that are then assembled into a final product. Automobiles, television sets, tires, and boxes of tissue are examples of products manufactured or converted in this way.

Users are looking for broad solutions since they want to integrate material flow across all applications in a plant. Shown below is a graphic representation of the integrated material flow as developed by Harbor Research Corporation:



As shown in the illustration on Page 4 (in blue), the raw material input goes through a variety of applications, starting with extraction, before it comes out as a finished product. Each application involves one or a combination of manufacturing processes, whether it be continuous, batch or discrete. As a result, many companies require controls for continuous, batch and discrete manufacturing processes all at the same plant, integrated into a plantwide information system.

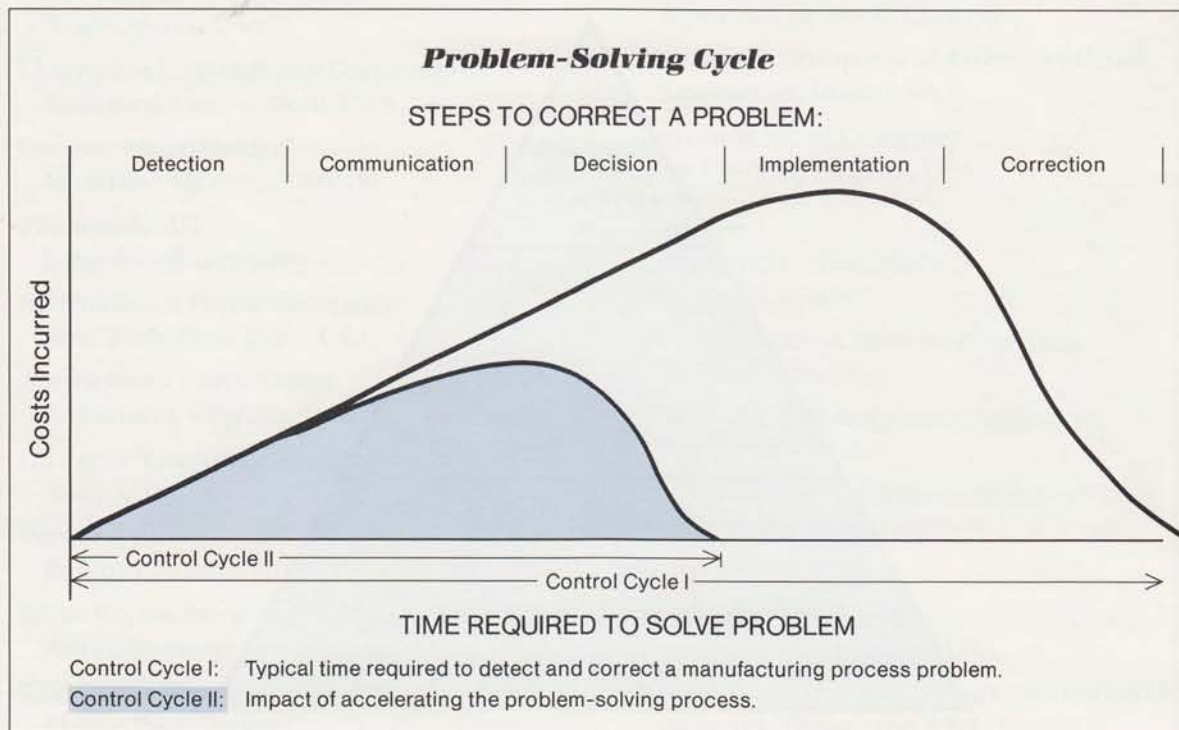
The illustration also identifies the various industries, and which application and manufacturing processes are predominantly used by each. Measurex believes that the companies that are able to provide integrated systems for measurement, control and communication for all three process types will dominate the market. This is the Company's goal.

Four main developments have occurred in the architecture of computer systems, enabling them to provide tremendously enhanced capabilities. These developments include: improvements in sensor technol-

ogy, advances in digital control, rapid reductions in computing costs and evolving data communications standards.

Additionally, heightened worldwide competition in nearly every industry has prompted decision-makers in factories around the world to look for ways to operate more efficiently. As more companies utilize just-in-time (JIT) inventory techniques, their factories need real time information. Shown below is an example of a typical control cycle and the savings that can be realized when companies are able to solve their problems faster.

As the chart below illustrates, the longer it takes to detect and correct a manufacturing process problem, the higher the costs in terms of scrap, quality and rework. Through the use of Measurex CIMx product offerings, information on the manufacturing process is available to the factory floor decision makers on a real time basis. This substantially reduces the time required to detect, communicate, decide and implement the necessary corrective action.



The CIM Marketplace

Three Control Levels

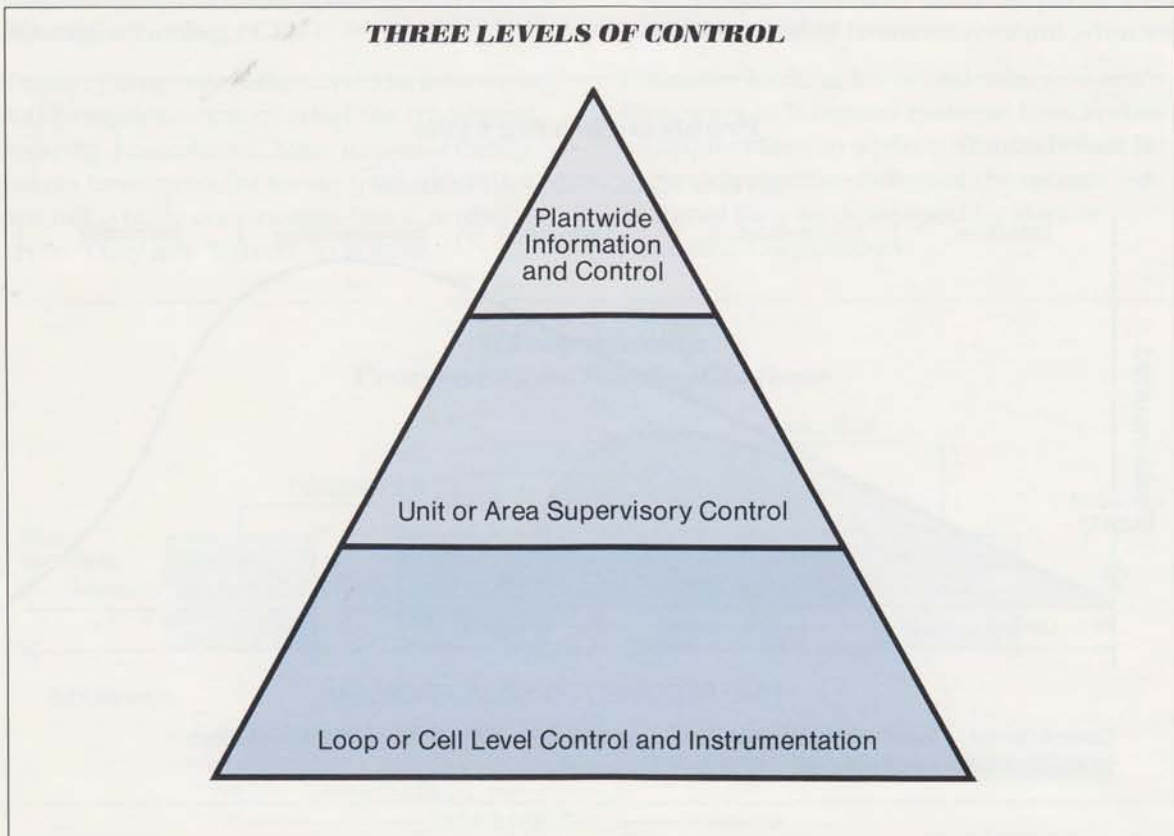
As shown below, the CIM market is generally divided into three levels of control: 1) loop, or cell, level control and instrumentation; 2) unit or area supervisory control; and 3) plantwide information and control. For additional information on the background and history of these levels of control see page 13.

Each individual level of control is different in terms of system objectives and how the system cost is justified. Measurex has traditionally competed in the unit and area supervisory control and product sensors segment where the systems are purchased based on the payback customers realize. A manufacturing process can be run without supervisory systems, relying on only the loop level controls. Measurex systems provide end-product measurement and control to ensure better quality, lower costs

and a higher return on investment. The Company sells its products by convincing operating management they will get value-added results from Measurex systems.

The loop level, or cell, control segment's primary objective is to operate the manufacturing process. Purchase decisions are typically made by instrument or industrial engineers to whom purchase price is the main issue. This segment is very competitive, with many distributed control and programmable logic control (PLC) companies, such as Honeywell, Allen-Bradley and Foxboro, competing.

The plantwide segment addresses the management information and control area where a high level of technology is required. Vendors, such as DEC and IBM, sell the computer hardware and operating system software to the Management Information System (MIS) Director who then develops his own custom application software.



Measurex's CIMx Strategy

Today, Measurex offers CIMx—Computer Integrated Manufacturing Excellence—to integrate manufacturing processes so that customers can achieve complete millwide or plantwide information. The Company's marketing strategy is to build on its success in the supervisory control market segment and, utilizing this strong worldwide industry base, expand into both the loop level and plantwide market segments.

Measurex currently serves nearly a dozen major industries and has a customer roster that includes many of the largest companies in the world. The following is a list of a few representative customers, by industry:

Pulp and Paper

- Abitibi-Price Incorporated
Toronto, Ontario, Canada
- Beghin-Say
Paris, France
- Boise Cascade Corporation
Boise, Idaho, USA
- Champion International Corporation
Stamford, Connecticut, USA
- Domtar Incorporated
Montreal, Quebec, Canada
- Feldmuhle AG
Dusseldorf, Germany
- International Paper Company
New York, New York, USA
- James River Corporation
Richmond, Virginia, USA
- Oji Paper Company Limited
Tokyo, Japan
- Parengo BV
Renkum, Netherlands
- Stora Kopparberg
Falun, Sweden
- Taio Paper Manufacturing Company Limited
Ehime Pref., Japan
- Wiggins Teape Group Limited
Hampshire, England

Yhtyneet Paperitehtaat OY
Valkeakoski, Finland

Chemicals and Plastics

- American Cyanamid Company
Westego, Louisiana, USA
- Borden Incorporated
New York, New York, USA
- Ciba Giegy
Basel, Switzerland
- E.I. duPont de Nemours and Company
Wilmington, Delaware, USA
- Eli Lilly and Company
Indianapolis, Indiana, USA
- Rhone Poulenc
Paris, France
- 3 M Company
St. Paul, Minnesota, USA

Metals

- Alcan Aluminum Limited
Montreal, Quebec, Canada
- Aluminum Company of America (Alcoa)
Davenport, Iowa, USA
- Reynolds Metal Company
Richmond, Virginia, USA

Rubber

- Continental – Uniroyal
Liege, Belgium
- Firestone Tire & Rubber Company
Akron, Ohio, USA
- Goodyear Tire & Rubber Company
Akron, Ohio, USA
- Uniroyal Goodrich Tire Company
Akron, Ohio, USA

Energy and Other

- Eli Lilly and Company
Indianapolis, Indiana, USA
- Nissan Motor Manufacturing Corporation USA
Smyrna, Tennessee, USA
- Owens-Corning Fiberglas Corporation
Toledo, Ohio, USA

The Company is focusing its engineering, sales and marketing investments, with the goal to become the leading supplier of plantwide CIM systems to its current industry base from which it will leverage into new markets. Measurex has the largest number of installed sheet process supervisory control systems in the world today. By building on this strength, the Company plans to penetrate and gain a large share of the other CIM market segments.

Measurex's CIMx Offering

Key to this strategy is the Company's ability to offer a CIMx product line that can serve these diverse market segments. Measurex's CIMx product offering includes:

- The VISION 2002® Network which provides loop level supervisory optimization and plantwide control for all continuous and batch manufacturing customers;
- The VISION 2002 ET™ product series which provides loop level, continuous sheet process supervisory optimization and plantwide control for both paper-machines and industrial systems such as plastics, rubber and metals;
- Measurex 2002 Systems which provide sheet process supervisory optimization;
- Profile (cross-direction) controls which, through their actuators and software, allow precise control of end product characteristics across the entire width of the product;
- Measurex 4000M papermill management computer systems for order entry, production planning, product finishing, roll wrapping, inventory management and shipping;
- More than 70 proprietary sensors for on-line, real time measurement of the physical characteristics of the products being processed; and
- The DataFreeway™, a local area network which connects Measurex and other vendor systems.

Product Information

VISION 2002 Network

The VISION 2002 Network can control any level of flow process within a plant or mill—from single process loops, or discrete logic, to area supervision and plantwide management—in one integrated package.

The Network has a single, integrated architecture allowing plants to automate in a modular fashion. Plants can begin their plantwide automation scheme with entry-level computer systems and increase capabilities as their needs grow by adding hardware and software to the existing Network. The hardware independence of the Network software allows customers to take advantage of the latest computer technology, thereby protecting the customer's investment and providing for long-term growth.

In April 1988, Measurex introduced a new 32-bit process control computer, based on Intel 80386/80387 chips, with on-board cache memory. This new computer, called SuperVISION, runs the same VISION 2002 Network software four times faster. The Network's open architecture also enables a variety of hardware and software—from both Measurex and from other leading vendors—to be integrated into one working environment.

Key features of the VISION 2002 Network are its Global Data Base and Global Data Manager. These patented features represent unique proprietary technology and allow information residing anywhere on the network to be accessed as if it were a part of a single data base.

The system is built around extensive proprietary software that provides users with powerful tools for building control strategies, graphic displays and reports, all tailored to the users' process management requirements. Users operate the VISION 2002 Network by means of a simple user-to-system dialogue on a special touch-activated screen. The software makes complex underlying computer and communications tasks transparent to the user.

VISION 2002 ET Product Series

The VISION 2002 ET™ product series builds upon the proven design of the Measurex 2002 supervisory system plus incorporates the instrumentation and millwide information capability of the VISION 2002 Network. The new 32-bit SuperVISION process computer is also available on the VISION 2002 ET product series. This "Enhanced Technology" has a number of features which help customers increase product quality and improve process efficiency.

A Measurex supervisory system includes sensors, digital computers, displays and terminals, and proprietary software. Measurex's strategy is to provide a fully integrated system, assembled in accordance with customer specifications, from standard hardware and software modules developed by the Company.

Measurex personnel supervise the installation of the Company's systems and work with the customer to optimize results from the systems.

Measurex 2002 Systems

Measurex 2002 Systems feature consolidated electronics, advanced operator stations designed for ease of use with a broad range of graphic displays, fiber optic communications and proprietary software. A number of proprietary sensors are offered with these systems to meet the needs of the industry served.

Profile (Cross-Direction) Control

Measurex is a leader in the complex technology of profile control. Profile control, as used for example in the Pulp and Paper Industry, allows precise control of paper characteristics in small segments over the entire width of a reel of paper. In addition, it controls the average taken along the paper's direction of travel. This control strategy significantly enhances a customer's ability to achieve optimum quality levels, thus reducing raw material and energy usage and lowering scrappage rates. Measurex provides the sophisticated central software, operator displays and actuators needed for these demanding applications.

Profile control can be ordered with new systems or can be easily integrated into existing installed Measurex 2002 series systems due to the expandable, modular architecture of such systems. The Company also provides cross-direction control systems for the plastics and aluminum industries.

Measurex 4000M Systems

Measurex's Management System Division, formerly Management Decisions Development Corporation, provides transaction computing expertise in the areas of order entry, production planning, inventory management and shipping. The Measurex 4000M System gives the Company the ability to provide a single-vendor offering, from an order entry function to manufacturing and shipping the product.

Proprietary Sensors

Measurex is a leader in sensor technology for the process industries, currently offering more than 70 sensors. Its sensors include those that monitor the basis weight, moisture, ash content, coating, smoothness, gloss, formation, opacity, strength and color of processed paper, as well as the physical properties of other processed products such as the wire spacing faults on steel-belted tires. These sensors use a variety of proprietary technologies, including microwave, infrared, visible light, ultraviolet, beta, x-ray and gamma radiation.

DataFreeway

The DataFreeway™ local area network provides high-speed, computer-to-computer communications. Its modified Ethernet*-based protocol, using Carrier Sense Multiple Access and Collision Detection (CSMA/CD), is efficient and dependable. Each node is controlled by a dedicated DataFreeway controller with its own microcomputer. The DataFreeway accommodates multiple vendors and mixed technologies within a network, and allows them to communicate via microprocessor-based translators.

*Trademark of Xerox Corporation.

Competition

The CIM market for batch and continuous process applications has a large number of competitors. The loop level control and instrumentation market segment competition includes Honeywell, Fisher, Foxboro and Seimens. The area supervisory control and product sensor market segment competition includes Combustion Engineering and Sentrol, a subsidiary of Valmet of Finland. Measurex has the leading market share of the area supervisory control segment.

Competition for discrete process applications is very fragmented. No other vendor is currently supplying the total solutions Measurex is developing using standard software modules. For those companies that have installed systems, much of the overall CIM design has been done by system integrators and internal specialists who buy products from many suppliers and develop their own custom software. Honeywell has announced plans to enter this market. Allen-Bradley, a subsidiary of Rockwell, is involved in certain aspects of factory automation through its programmable logic controllers (PLC's).

Facilities, Manufacturing and Sales

Measurex Corporation occupies a 320,000 square-foot manufacturing and administrative facility in Cupertino, California, approximately 50 miles south of San Francisco.

Measurex produces the software, sensors, scanners, digital logic circuits, peripheral devices and various terminals used in all of its systems. Certain components—such as integrated circuits, video monitors, disk drives, and printers—are purchased from other manufacturers and integrated into the systems.

The systems are assembled, integrated and tested at Measurex's facilities in Cupertino, California; Waterford, Republic of Ireland; and Fairfield, Ohio.

Measurex sells and services most of its products through its own worldwide marketing service organization. The Company has sales and service offices located in 21 countries. Measurex's worldwide service organization is composed of more than 1,150 technical representatives. This worldwide service network is an important element of Measurex expansion plans.

Strategic Alliances

Ford Motor Company

In October 1985, Measurex and Ford Motor Company signed a multiyear cooperative development program to develop an integrated CIM applications solution for Ford's Body and Assembly operations. Under the agreement, Measurex and Ford were to each contribute \$7.2 million, with Ford additionally funding technology pilots. The program is designed to provide generic integrated application products which will run in a distributed plant floor architecture.

Products

Production Manufacturing Information System (PMIS)

The first product developed under the program is a Production Manufacturing Information System. PMIS is an on-line, integrated system that automatically gathers data from production equipment and provides timely, accurate manufacturing information such as production counts, labor utilization, equipment status and line status. Information is used to identify machines that are not producing parts, prone to breakdown, having maintenance problems and running slower than standard. The system also improves dispatching of personnel to correct maintenance problems. The first PMIS system was installed in the spring of 1987 and is being integrated as part of Ford's long-term strategic solution.

Statistical Quality Control (SQC) and Line Cycle Analysis (LCA)

The second system being developed for Ford is in the design and test stages. It consists of two modules designed to provide information that will help improve line efficiency and produce parts of uniform quality.

The first module—Statistical Quality Control—gathers production and quality data and provides the statistical tools necessary to maintain parts quality.

The second module—Line Cycle Analysis—gathers line and equipment data and assists the production personnel in analyzing machine inefficiency and pinpointing problems such as bottlenecks, capacity limits and efficiency degradation. This will help Ford to improve the performance and productivity of a line or piece of manufacturing equipment.

Production Tracking

Production Tracking is an application package that complements PMIS with factory floor tracking of work in process on a real time basis. It functionally integrates with the master build schedule, distributes data to cell controllers, and integrates real time inputs (bar code readers, PLC's, etc.) with actual product location, statistical and sequence information. Production Tracking provides the ability to define, identify and locate specific product and product components, as well as to attach process, quality or any general type of information to the tracked product as it proceeds through production. This system is in final design and is scheduled for installation in 1989.

IBM Corporation

In January 1986, Measurex reported another important strategic move. The Company signed an agreement with IBM Corporation to analyze software requirements, architecture and technologies to implement Computer Integrated Manufacturing software on IBM computers.

Measurex Automation Systems (MAS)

To ensure the success of the Ford and IBM partnerships, and maintain an entrepreneurial focus, Measurex formed a subsidiary company, Measurex Automation Systems (MAS). Capitalizing on the CIM expertise and technology already established by Measurex, MAS's objective is to expand developed CIM software in order to provide standard CIM solutions for discrete manufacturing applications.

Beloit Corporation

In February 1987, Measurex entered a third strategic alliance to serve the worldwide Pulp and Paper Industry. The alliance was formed with Beloit Corporation, a subsidiary of Harnischfeger Industries.

Under the agreement, Beloit will offer Measurex's VISION 2002 product line, which will be integrated with its pulp and paper-making equipment. Measurex will market a number of Beloit's cross-direction actuators and sensors.

History

Evolution of CIM Technology for Continuous and Batch Process Applications

First Stage

Tying together all applications in a manufacturing facility is by no means a small task. Continuous and batch processes generally divide into three levels of control: loop level, supervisory and plantwide.

The loop level, which is the most elementary level of control, began in the 1930s with simple pneumatic (or compressed air) analog controllers. These devices controlled the operation of a single loop within a manufacturing plant, such as the temperature of a specific tank. The process cannot be operated without this loop level instrumentation and control.

With advancements in technology, the pneumatic controllers were replaced with electronic analog controllers, which have, in turn, been improved with more complex and sophisticated digital controllers and advanced application-specific sensors.

Today the proliferation of these control and sensor devices poses a much more complex management situation. One resolution has been the grouping of devices in units with hierarchical factory-floor computers providing the management functions.

Second Stage

The second stage in evolution for continuous and batch processes came in the late 1960s with the introduction of supervisory computer systems. These supervisory computer systems control and optimize the operation of the lower-level controllers and

sensors (supervisory controls are generally not required to run the process). Supervisory systems enable plant decision-makers to "fine-tune" the operation of manufacturing applications and are justified by an economic payback as they permit optimization of product qualities.

Measurex Corporation led the way in the development of packaged computer-based supervisory systems with the introduction, in 1969, of its Series 1000 System. It was the first supervisory system to enable information from scanning sensors to be analyzed, controlled, adjusted and optimized by a computer dedicated to a process unit.

Since that time, Measurex has built a reputation as the leading supplier of digital computer-based supervisory systems for all process industries, including pulp and paper, plastics and metals. Part of this leadership reputation is based on Measurex's state of the art, application-specific sensors.

Third Stage

The third stage in automation was introduced in the mid-1970s with the widespread use of microprocessors. Previously, the computing functions had been performed in central computers. Distributed systems took the power of the central computer and distributed it to the various functions on the plant floor via microprocessor-based controllers.

Finally, CIM systems were introduced. These systems were designed to integrate all three levels of automation (loop level, supervisory and plantwide)—each with its own system requirements and software—into a single, integrated system.

Significant Events

- Measurex was founded January 18, 1968, with \$1.3 million in first-round venture capital. During its first year of business, Measurex developed the first turnkey, integrated digital papermachine control system.
- One year and one day after the Company was founded, its first Series 1000 supervisory system was installed at Simpson Paper Company in Ripon, California.
- In 1970, the first two paper control systems were sold in Europe, as Measurex began to market its products internationally.
- In July 1971, groundbreaking ceremonies were held for the Company's initial 52,000 square-foot headquarters building in Cupertino, California. The building was occupied the following year.
- Measurex became a publicly owned company on March 28, 1972, with an offering of 600,000 shares of common stock. The stock offering realized about \$11 million for Measurex.
- Also in 1972, the Company introduced supervisory control systems for the chemical side of the Pulp and Paper Industry, specifically for pulping and bleaching operations.
- A 20,000 square-foot manufacturing plant was opened in Waterford, Republic of Ireland, in June 1973.
- In 1974, the Company introduced the Measurex 2000 System. It was the first system with extended memory, interactive color video displays, distributed intelligence and serial communications.
- In 1976, Measurex introduced the first cross-direction control systems for moisture and caliper. Subsequently (in 1979) weight profile control was added to provide a full line of cross-direction controls which today represent the Company's "Total Profile Control" offering.
- Also in 1976, the Company introduced the Measurex 2000/25 system for the plastic film and sheet extrusion market.
- In 1977, the Measurex 2001 System was introduced. It was the first family of systems with fully distributed intelligence, greater reliability and configuration flexibility and microprocessor-based diagnostics.
- Also in 1977, the Company was simultaneously listed on the New York and Pacific Stock Exchanges.
- In 1978, construction was begun on a 47,000 square-foot engineering facility in Cork, Republic of Ireland.
- In 1979, new capabilities were offered 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 linoleum flooring, and ultrathin flexible packaging.
- In 1980, the Measurex 2002 System was introduced with electronic consolidation plus new high-speed computers and a new operator station design.
- The DataFreeway™ system, also introduced in 1980, provided computer-to-computer communications enabling plantwide information sharing.

- In 1981, Measurex introduced the 2002 MetalsMaster™ System for metals, the System 2002 for plastics and the 2002 Pulp System.
- In 1983, Measurex introduced its CIM system, the VISION 2002 Network, to provide loop level control as well as plant-wide management capabilities.
- In 1984, Measurex acquired Management Decisions Development Corporation (MDDC), now the Measurex Management Systems Division.
- In 1985, Measurex announced plans to address discrete manufacturing through a joint development and pilot program with Ford Motor Company and formed a subsidiary company—Measurex Automation Systems—to develop and manufacture CIM systems for discrete manufacturing industries.
- Also in 1985, the Industrial Systems Group introduced the 2002 wire calender measurement and control system.
- In 1986, on January 22, the Company announced an agreement with IBM Corporation to analyze software requirements, architecture and technologies to implement CIM software on IBM computers.
- In March 1986, Measurex introduced the Pulp and Paper Industry's first on-line, nondestructive, scanning Digital Strength Sensor.
- In May 1986, the Company introduced its "Enhanced Technology" VISION 2002 ET™ product series.
- In February 1987, Measurex formed a strategic alliance with Beloit Corporation, a subsidiary of Harnischfeger Industries.
- In January 1988, the MassForm and SpectraForm formation sensors were introduced.
- In April 1988, the Company introduced a new 32-bit process control computer, called SuperVISION, that runs the VISION 2002 Network and "Enhanced Technology" software four times faster than the existing computer.

Twelve-Year Summary of

(Dollar amount in millions except per share data)	Year Ended			
	Nov. 29 1987	1986	1985	1984
Total operating revenues	\$227.4	\$192.7	\$176.6	\$160.3
Income before extraordinary item	\$26.8	\$21.1	\$17.7	\$12.8
Net income	\$26.8	\$21.1	\$17.7	\$14.4
Income per share before extraordinary item	\$1.39	\$1.12	\$0.97	\$0.73
Net income per share	\$1.39	\$1.12	\$0.97	\$0.83
Gross margin (%)	43.3	44.9	44.1	43.0
Operating margin (%)	12.8	12.7	13.1	11.2
Income margin before extraordinary item (%)	11.8	10.9	10.0	8.0
Effective tax rate (%)	28.6	31.7	41.0	44.4
Return on assets (%)	17.7	10.9	10.3	10.1
Return on equity (%)	17.7	16.4	16.0	15.7
Total debt/total capitalization (%)	3.5	4.2	5.0	5.9
Pretax interest coverage (X)	33.9	30.7	39.7	20.6
System orders	\$187.0	\$135.0	\$112.0	\$123.0
System backlog—Ending	\$102.0	\$69.0	\$60.0	\$65.0
System revenues	\$153.3	\$125.3	\$114.6	\$102.2
System gross margin (%)	49.1	52.4	51.1	51.2
Service and other revenues	\$74.1	\$67.4	\$62.0	\$58.1
Service and other gross margin (%)	31.3	30.8	31.2	28.7
Cash flow from operations	\$37.9	\$33.0	\$27.6	\$19.6
Depreciation and amortization (PP&E)	\$5.7	\$4.6	\$3.7	\$2.9
Capital expenditures	\$6.9	\$7.3	\$7.8	\$6.3
Capital expenditures/cash flow (%)	18.3	22.2	28.3	32.2
Current ratio	3.2	3.5	3.4	2.7
Total assets	\$258.7	\$224.9	\$193.1	\$172.6
Stock price—high	\$34.50	\$20.25	\$13.19	\$11.00
Stock price—low	\$17.50	\$12.63	\$7.75	\$6.38
Stock price—ending	\$26.00	\$17.69	\$13.13	\$8.19
Price/earnings ratio	17.9	15.5	13.3	11.3
Book value per share—ending	\$9.24	\$8.20	\$7.15	\$6.25
Market value/book value—ending (%)	281.4	215.7	183.6	130.9
Common shares—ending (millions)	18.416	18.516	18.002	17.663
Dividends paid per share	\$0.225	\$0.165	\$0.120	\$0.100
Dividends/income before extraordinary item (%)	15.7	14.3	12.1	13.1
Annual dividend yield (%)	0.9	1.6	1.2	1.0

QUARTERLY INFORMATION

	First	Second	Third	Fourth		First	Second	Third	Fourth
Total Revenues					Income per Share before Extraordinary Item				
1988	\$61.9				1988	\$0.41			
1987	\$51.1	\$57.6	\$57.7	\$60.9	1987	\$0.34	\$0.31	\$0.34	\$0.40
1986	\$44.7	\$47.4	\$49.8	\$50.9	1986	\$0.27	\$0.27	\$0.28	\$0.30
1985	\$44.0	\$44.2	\$45.5	\$42.9	1985	\$0.22	\$0.24	\$0.24	\$0.26
1984	\$36.1	\$37.5	\$43.1	\$43.7	1984	\$0.14	\$0.17	\$0.20	\$0.23
1983	\$28.6	\$30.5	\$31.2	\$32.4	1983	\$0.05	\$0.08	\$0.10	\$0.11
1982	\$30.3	\$32.0	\$28.3	\$27.6	1982	\$0.01	\$0.06	(\$0.15)	(\$0.02)

DEFINITIONS OF SELECTED FINANCIAL TERMS

Gross Margin = Total operating revenues less cost of system sales, service and other, as a % of total operating revenues

Operating Margin = Total operating revenues less cost of system sales/service/other, less product development/selling/administration expenses as a % of total operating revenues

Income Margin before Extr. Item = Income (loss) before extr. item, as a % of total operating revenues

Return on Assets = Income (loss) before extr. item, as a % of beginning total assets

Return on Equity = Income (loss) before extr. item, as a % of beginning stockholders' equity

Prepared: May 17, 1988

Selected Financial Data

1983	1982	1981	1980	1979	1978	1977	1976
\$122.7	\$118.1	\$119.7	\$122.0	\$119.5	\$88.5	\$64.1	\$52.2
\$4.8	(\$1.4)	\$2.1	\$7.3	\$9.9	\$8.8	\$5.4	\$3.0
\$4.8	(\$0.4)	\$2.1	\$7.3	\$9.9	\$8.8	\$5.4	\$3.0
\$3.3	(\$1.0)	\$0.15	\$5.2	\$7.0	\$6.5	\$4.1	\$2.3
\$3.3	(\$0.2)	\$1.15	\$5.2	\$7.0	\$6.5	\$4.1	\$2.3
36.9	32.4	37.0	40.0	44.1	45.2	43.1	40.8
6.3	0.8	5.2	11.9	15.6	15.2	13.1	10.9
3.9	-1.2	1.8	6.0	8.3	9.9	8.4	5.7
46.0	-42.0	42.0	32.0	31.6	29.7	27.6	25.0
4.0	-1.1	1.6	5.4	9.2	7.7	4.6	2.4
6.4	-1.8	2.8	10.7	17.3	17.9	12.2	7.3
11.6	13.8	19.1	23.3	33.2	27.3	48.9	55.5
6.3	0.8	1.8	3.1	4.0	4.5	2.4	1.6
\$83.0	\$68.0	\$87.0	\$84.0	\$102.0	\$73.8	\$63.8	\$42.5
\$40.0	\$27.0	\$35.0	\$30.0	\$38.0	\$31.7	\$26.0	\$12.6
\$68.0	\$69.9	\$78.3	\$88.0	\$93.9	\$66.6	\$48.6	\$42.0
44.1	40.6	49.0	54.3	56.6	56.3	55.9	53.2
\$54.7	\$48.2	\$41.4	\$34.1	\$25.6	\$22.0	\$15.5	\$10.3
28.0	20.4	14.5	3.2	(1.9)	11.7	3.1	(10.1)
\$12.7	\$2.7	\$5.8	\$12.5	\$14.8	\$6.5	\$7.1	\$1.1
\$3.0	\$2.8	\$2.5	\$2.4	\$2.2	\$1.6	\$1.5	\$1.1
\$3.6	\$3.3	\$3.4	\$5.6	\$10.4	\$6.2	\$3.7	\$1.6
29.2	122.6	59.3	45.1	70.3	95.4	51.5	144.1
2.3	2.2	2.6	2.7	2.7	1.8	2.1	2.1
\$126.0	\$118.7	\$129.3	\$131.7	\$136.2	\$108.1	\$113.6	\$115.9
\$9.07	\$4.63	\$6.91	\$9.81	\$12.13	\$9.97	\$4.85	\$4.32
\$3.57	\$3.25	\$3.41	\$5.19	\$7.32	\$4.19	\$2.63	\$2.10
\$8.75	\$3.60	\$3.78	\$7.19	\$8.30	\$7.91	\$4.47	\$2.55
26.9	N/M	25.2	13.8	11.8	12.2	10.8	11.1
\$5.63	\$5.29	\$5.42	\$5.42	\$5.00	\$4.40	\$3.82	\$3.42
\$155.6	68.0	69.7	132.8	166.2	179.9	117.0	74.6
14.474	14.244	14.132	13.952	13.646	13.038	12.830	12.820
—	\$0.095	\$0.125	\$0.125	\$0.125	\$0.090	\$0.020	—
—	N/M	83.6	23.5	16.7	13.3	4.8	—
—	1.1	1.5	1.4	1.4	1.1	0.4	—

	First	Second	Third	Fourth		First	Second	Third	Fourth
Dividends per Share					Income Margin before Extraordinary Item (%)				
1988	\$0.060				1988	12.5			
1987	\$0.045	\$0.060	\$0.060	\$0.060	1987	12.6	10.5	11.5	12.7
1986	\$0.030	\$0.045	\$0.045	\$0.045	1986	11.1	10.7	10.7	11.2
1985	\$0.030	\$0.030	\$0.030	\$0.030	1985	9.2	9.9	9.7	11.4
1984	\$0.025	\$0.025	\$0.025	\$0.025	1984	6.2	7.8	8.3	9.3
1983	—	—	—	—	1983	2.5	3.6	4.4	5.0
1982	\$0.03125	\$0.03125	\$0.03125	—	1982	0.6	2.6	(7.3)	(1.1)

Total Debt/Total Capitalization = Total interest-bearing debt as a % of total interest-bearing debt plus ending stockholders' equity

Pretax Interest Coverage = Gross interest charges plus income before extr. item and income taxes, divided by gross interest charges

Cash Flow from Operations = Net income (loss) plus noncash charges to income plus extraordinary item

Price/Earnings Ratio = Ending stock price divided by EPS before extraordinary item for the latest four quarters

Notes: Data adjusted to reflect a two-for-one stock split in January 1984 and a two-for-one stock split in February 1987.

N/A: not available. N/M: not meaningful.

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