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MKS Instruments Inc

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BROADENING OUR HORIZONS

INTEGRATING HIGH-VALUE SUBSYSTEMS

EXPANDING OUR GLOBAL PORTFOLIO

APPLYING PROCESS KNOWLEDGE TO IMPROVE PRODUCTIVITY

mks
Technology for Productivity

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FINANCIAL

MKS INSTRUMENTS, INC. ANNUAL REPORT 2001

MKS products are used in the manufacturing processes required for making semiconductors and other advanced products. Specifically, we bring together the broad range of technologies that **control, analyze, isolate and energize** the processes needed to create the semiconductor devices used in today's sophisticated electronic products. MKS is a preferred supplier to most of the major semiconductor capital equipment manufacturers (SCEMs), who in turn supply semiconductor device manufacturers (SDMs).

MKS has leveraged its process expertise in the semiconductor industry to serve other markets, such as the flat panel display, magnetic and optical data storage, medical imaging, and biopharmaceutical markets.

Our business strategy is to **"surround the process chamber"** through internal product development and acquisition of technologies for advanced materials manufacturing. Our core competencies include pressure measurement and control, materials delivery and analysis, reactive gas and plasma generation, power delivery, and data management. Today we have the most comprehensive product and technology portfolio in the history of MKS. As a result, we can provide unique integrated solutions that help our customers improve process productivity and yields.

(in thousands, except per share data)

SELECTED CONSOLIDATED FINANCIAL DATA

	1997	1998	1999	2000	2001
Net Sales	$236,047	$223,199	$265,292	$466,852	$286,808
Gross Profit	97,884	84,428	102,509	205,396	85,583
Net Income (loss) [Note 1]	14,744	9,065	17,161	60,260	(31,043)

SUPPLEMENTAL CASH EARNINGS INFORMATION [Note 2]

MKS defines cash earnings as net income before amortization of goodwill and acquired intangible assets, and other acquisition and disposition related charges, net of income taxes. MKS incurred special inventory charges in 2001 for excess and obsolete inventory.

The following table presents the cash earnings per share, and cash earnings per share before the special inventory charges, for calendar years 2000 and 2001, with related adjustments in arriving at the supplemental cash earnings information.

	2000 [Note 3]	2001
Net income (loss)	$60,435	$(31,043)
Adjustments:		
Amortization of goodwill and acquired intangible assets	$ 4,955	$ 11,026
Goodwill impairment charge	---	3,720
Merger expenses	---	7,708
Sale of assets and investment	---	2,379
Purchase of in-process technology	310	2,340
Tax effect of adjustments	(1,081)	(5,132)
Cash earnings (loss)	$64,619	$ (9,002)
Cash earnings (loss) per share	$ 1.74	$ (0.24)

Cash earnings (loss)	$ (9,002)
Special inventory charges	16,608
Tax effect of special inventory charges	(6,938)
Cash earnings before special inventory charges	$ 668
Cash earnings per share before special inventory charges	$ 0.02

[Note 1]

Prior to its initial public offering in 1999, MKS was treated as an S corporation for federal income tax purposes. As an S corporation, MKS was not subject to federal and certain state income taxes. For the years 1997-1999 the net income is shown on a pro forma basis. The pro forma net income data reflects the provision for income taxes that would have been recorded had MKS been a C corporation for each period shown. The results include MKS and ASTeX for all periods presented.

[Note 2]

This measurement is not intended to replace operating income (loss), net income (loss) or basic and diluted earnings (loss) per share as an indicator of operating performance, or to replace cash flow as a measure of liquidity, because this measurement is not a concept under generally accepted accounting principles in the United States. This measurement can be calculated differently from one company to the next, and may not be comparable to that reported by other companies.

[Note 3]

ASTeX was acquired by MKS in January 2001. This presentation combines the MKS and ASTeX results for calendar year 2000.

TO OUR SHAREHOLDERS

The year 2001 provided both challenges and opportunities for MKS.

It was a particularly difficult time for the semiconductor industry, our largest market. A slowing U.S. economy compounded the challenges for an industry already dealing with excess capacity. Since 1979, MKS and the industry have achieved a compounded annual growth rate of approximately 17 percent, characterized by periods of contraction and growth. The long-term growth rate is driven by new applications for semiconductors that emerge as device costs decline. The 2001 cyclical downturn – one of the steepest in the history of the semiconductor industry – impacted our financial results.

At the same time, we capitalized on opportunities to create a stronger MKS, around the process chamber and around the world. We responded to our customers, who seek to partner with fewer, broader based suppliers, by making strategic acquisitions to extend our process control technology leadership. We developed and introduced new products that integrate our technologies into subsystems. We enhanced our growth opportunities by expanding our served market and entering new markets. And we worked even closer with our customers on critical high-value process control solutions for the future.

Today MKS is the leading provider of instruments, components and subsystems for advanced manufacturing processes that involve gases and vacuum. We are well positioned, with our breadth of technologies and our depth of process knowledge, to apply our products to improve our customers' productivity. MKS' served market has doubled since the start of 2000, and we are working to position the Company for market share gains in the next cyclical upturn.

FINANCIAL REVIEW

In 2001, major semiconductor device manufacturers postponed their capacity expansion plans while they absorbed excess capacity. Our financial results reflect the severity of the resulting downturn. MKS' net 2001 revenues were $287 million compared to record revenues of $494 million in calendar year 2000, which includes revenues from our acquisition of Applied Science and Technology, Inc., known as ASTeX, completed in January 2001.

As the downturn unfolded in 2001, MKS' sales to the semiconductor industry shifted from 72 percent of total sales in the first quarter to 54 percent in the fourth quarter. However, revenues in other markets – such as medical and pharmaceutical – grew in 2001 compared to 2000 as we continued to penetrate non-semiconductor markets.

In this business environment, we implemented a comprehensive cost containment program that included reduced work hours, management salary reductions and a year-over-year workforce reduction of approximately 30 percent. By reducing our cost structure, we are working to position MKS for higher performance in a more competitive environment as business improves.

Overall, despite a difficult year, we achieved our 32nd consecutive year of profitability on a cash basis,

excluding special charges. Cash earnings are net income excluding acquisition and disposition-related charges. Our 2001 cash earnings, excluding special inventory charges, were $668,000 or $0.02 per share. In addition, we ended the year with a strong balance sheet, with $149 million in cash and short- and long-term investments, $353 million in shareholders' equity, and a low debt-to-equity ratio.

As we go through these cyclical periods, our goal is to maintain our strong balance sheet while we continue to invest in product development, evaluate acquisitions and expand our global infrastructure.

2001 HIGHLIGHTS

Developing integrated products and higher-value process control solutions helps our customers boost their manufacturing productivity and lower their total costs. In 2001 we made significant progress in implementing our core business strategy of "surrounding the process chamber" through product development and prudent acquisitions to provide those solutions.

Key Product Introductions

The scope and breadth of our product line and technologies help to differentiate MKS from other subsystem suppliers. In 2001 we introduced new products across all of our technology areas that surround the process chamber: pressure, flow, gas composition analysis, energy, and information. Among the most significant products were: PICO™, a portable mass spectrometer-based helium leak detector, designed to check for leaks in critical process systems and manufactured products; high-sensitivity infrared gas analyzers for monitoring greenhouse emissions to ensure environmental and safety compliance; ASTRON®e high-flow reactive gas generators for process chamber cleaning which enable next-generation flat panel display and semiconductor substrate processing; additions to MKS' family of digital network control products enabling digital communication on the emerging generation of 300 mm wafer process tools; and the Vision 1000-C™ and Vision 1000-E™ series process monitors for in situ monitoring of chemical vapor deposition and etch processes. We continued to advance our leading Baratron® pressure measurement product range with application-specific versions aimed at critical etch and deposition processes.

We also continued to develop integrated products across our product groups, which represented a high-teens percentage of 2001 total sales. Examples of the many integrated products introduced in 2001 include the Tru-Flo™ in situ mass flow verifier, based on our industry-leading Baratron pressure measurement technology; integrated plasma source subsystems for 300 mm resist removal, and integrated vacuum subsystems for etch, chemical vapor deposition (CVD) and physical vapor deposition (PVD) applications.

We expect to introduce more integrated subsystems in 2002 as we move toward our long-term goal of deriving 30 percent of MKS sales from integrated products.

Acquisitions

By acquiring technologies that help us to surround the process chamber for advanced materials processes, MKS gains a competitive edge in engineering process control solutions for our customers. We believe that no other semiconductor equipment subsystem supplier has our breadth of products and technologies combined with the depth of process knowledge to apply them.

In January 2002, we acquired the ENI division of Emerson Electric Co., a top supplier of power conversion technology in the semiconductor equipment market. ENI has made substantial progress in growing market share with key design wins on next generation 300 mm tools, and we expect to solidify and strengthen ENI's position as part of MKS. In addition, ENI has a particularly strong customer base in Asia and manufacturing operations in China, both of which help position MKS for the next upturn.

The acquisition of ENI also complements our acquisition of ASTeX, which took place in January 2001. ENI's solid-state RF and DC power conversion technology amplifies ASTeX's expertise in reactive gas generation and plasma technology. These strategic acquisitions provide us with synergistic technologies that enable us to develop and deliver gas plasma solutions critical to advanced materials processing technologies.

Another 2001 acquisition, On-Line Technologies, Inc., added advanced process control technologies to MKS' comprehensive product suite, and enabled us to enter the growing market for integrated wafer metrology. The migration to larger and higher-value 300 mm wafers, and the introduction of new materials such as low-k dielectrics into the manufacturing process for silicon devices, increases the demand for advanced measurement and control techniques. Integrated metrology provides a means to measure wafer parameters as the wafer exits the process chamber, which can be the basis for changing process steps in real time to enhance process yield and throughput.

We are investing through the downside of the cycle in order to gain greater market share during the upside. With these acquisitions, we anticipate that we can provide more reliable, efficient and cost effective products

and ultimately, more highly integrated and higher performance subsystems to our customers.

New Markets and Design Wins

Our growth strategy is to participate in growing markets, to continually increase market share in the markets we serve, to add to our broad-based product and technology portfolio, and to continue to develop the integrated subsystems that our customers need to improve the productivity of their manufacturing processes.

MKS' technology portfolio is fundamental to semiconductor manufacturing and related areas of thin film manufacturing. Through close relationships with our semiconductor equipment and end-user customers, we participate in the development of leading edge technologies, well in advance of their use in high volume device fabrication.

Technology purchases continue to be made during periods of over-capacity in the industry, which helps MKS to increase market share as the industry recovers and also provides a buffer in a cyclical industry. As the semiconductor industry transitions from 200 mm to 300 mm wafers, we have been focused on gaining design wins on process tools. By the end of 2001, we had captured hundreds of design wins on 300 mm process tools.

To further offset the cyclicality of the semiconductor industry, we continue to penetrate other markets, such as the medical and pharmaceutical markets. In fact, two of our top ten customers in 2001 were a leading manufacturer of magnetic resonance imaging (MRI) equipment and a leading manufacturer of medical sterilization equipment.

In 2001, our market mix was approximately 64 percent semiconductor and 36 percent non-semiconductor, compared to 80 percent and 20 percent respectively, in calendar year 2000. We will continue to pursue this balanced approach – by leveraging certain semiconductor market technology into other high-growth markets – as the semiconductor industry recovers.

Our goal is to be number one or two in the markets we serve, and we are building market share in key sectors. For example, with the acquisition of ENI, we greatly increased our share of the market for power generation products.

Global Infrastructure

Service is a key competitive advantage in every industry. We currently serve more than 4,000 customers worldwide, including many semiconductor capital equipment suppliers and wafer fabrication facilities around the world.

We have expanded our global infrastructure, which now totals 44 sales and support facilities located around the world and 16 manufacturing facilities located in the U.S., Europe and China. This expansion enables us to identify and respond to our customers' changing needs. It also reflects the fact that more than 30 percent of our total 2001 revenues were from outside North America. We are also pleased that MKS is recognized as a leading practitioner of lean manufacturing techniques, which we are implementing in all of our global operations.

Customer Relationships

MKS is a preferred supplier to most of the major semiconductor equipment manufacturers and major semiconductor device manufacturers. In 2001, our top ten customers represented approximately 39 percent of total revenues, and our largest customer, a leading semiconductor equipment manufacturer, represented approximately 18 percent of total revenues.

With the evolution of the supply chain, we are assuming greater responsibility for helping our customers achieve higher productivity. Through close customer relationships and innovative product development, we are able to partner with our customers and develop technology roadmaps that are consistent with the long-term technology trends of the industry.

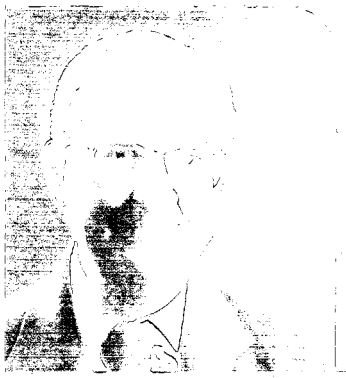
At the same time, as chip technology becomes more complex and as wafers grow in size and value, manufacturing efficiency also becomes increasingly important to our customers. They require tighter control of manufacturing processes in order to lower unit costs and raise productivity. As a result, customers look to us for process control technologies that provide solutions to process problems.

OUTLOOK

Worldwide demand for technology products declined sharply in 2001. The rate of MKS' revenue decline slowed significantly in the fourth quarter of 2001, so we may be nearing the bottom of a very deep cycle. However, as we look ahead, we expect our customers to continue to work through excess inventory for a few more quarters. Therefore we remain cautious about the outlook for revenue growth in 2002, particularly in the first half of the year.

Longer term, we are much more optimistic. Although the semiconductor capital equipment industry is cyclical, it has had a compounded annual growth rate of approximately 17 percent per year over the past 22 years. MKS is a significant player in an industry that is fundamental to the evolution of the information age, and we expect to participate fully in the next growth cycle.

"WE FIRMLY BELIEVE THAT MKS IS POSITIONED TO GROW MORE RAPIDLY THAN THE INDUSTRY BY LEVERAGING OUR BUSINESS STRENGTHS AND BENEFITING FROM THREE POWERFUL MARKET DRIVERS."



John R. Bertucci

Looking ahead, we see three market trends driving long-term growth in the semiconductor equipment industry.

The first is the evolution of the supply chain, which provides more opportunity for companies like MKS to design and integrate high-value products that add value for customers.

The second is the increasing complexity of semiconductor device manufacturing. Greater device complexity requires more advanced process control and tighter integration of processes to improve productivity and manufacturing yields. Our breadth of process technologies and depth of application knowledge provides a distinct competitive advantage.

The third is the infrastructure-driven consolidation of this global industry. Our customers seek fewer, more capable suppliers who are technically, geographically and financially strong.

We firmly believe that MKS is positioned to grow more rapidly than the industry by leveraging our business strengths and benefiting from these three powerful market drivers. By participating in this growth market with a long-term goal to grow faster than the market, we believe we can deliver value to our shareholders as well as our customers.

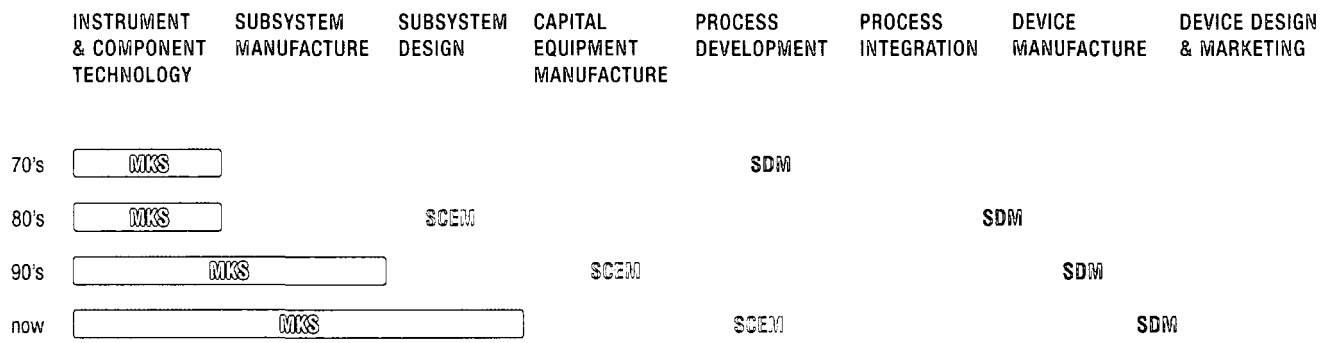
Today MKS is well positioned to benefit from the growth opportunities ahead. We have the strongest product portfolio in our history, and among semiconductor equipment subsystem suppliers. We have a broad spectrum of products and critical process control technologies, and deep process knowledge to apply those technologies for our customers' benefit. We have an extensive global infrastructure to support our customers. And our balance sheet provides a strong financial foundation to support our long-term growth objectives.

Last but not least, we have the dedicated, global MKS team. Their hard work and continuing collaboration will enable MKS to realize the benefits of broader opportunities in 2002. I thank them for their contributions over the past year, and we all thank our customers and shareholders for their ongoing support.

John R. Bertucci
Chairman, Chief Executive Officer and President

INTEGRATING HIGH-VALUE SUBSYSTEMS

market driver #1: EVOLUTION OF THE SUPPLY CHAIN



SDM → SEMICONDUCTOR DEVICE MANUFACTURER
SCEM → SEMICONDUCTOR EQUIPMENT MANUFACTURER

The evolution of the supply chain for semiconductor manufacturing is creating growth opportunities for MKS.

Today semiconductor device manufacturers (SDMs) are looking to semiconductor capital equipment manufacturers (SCEMs) not just for equipment but for manufacturing processes, and increasingly, for sequences of integrated processes. As SCEMs assume responsibility for process integration, they turn to companies like MKS to design fully integrated subsystems in addition to supplying instruments and components.

Integrated subsystems represented a high-teens percentage of MKS' total 2001 revenues. By taking on more responsibility for the engineering of subsystem solutions, we make it easier for SCEMs - and their customers, the SDMs - to manage their processes and improve equipment productivity.

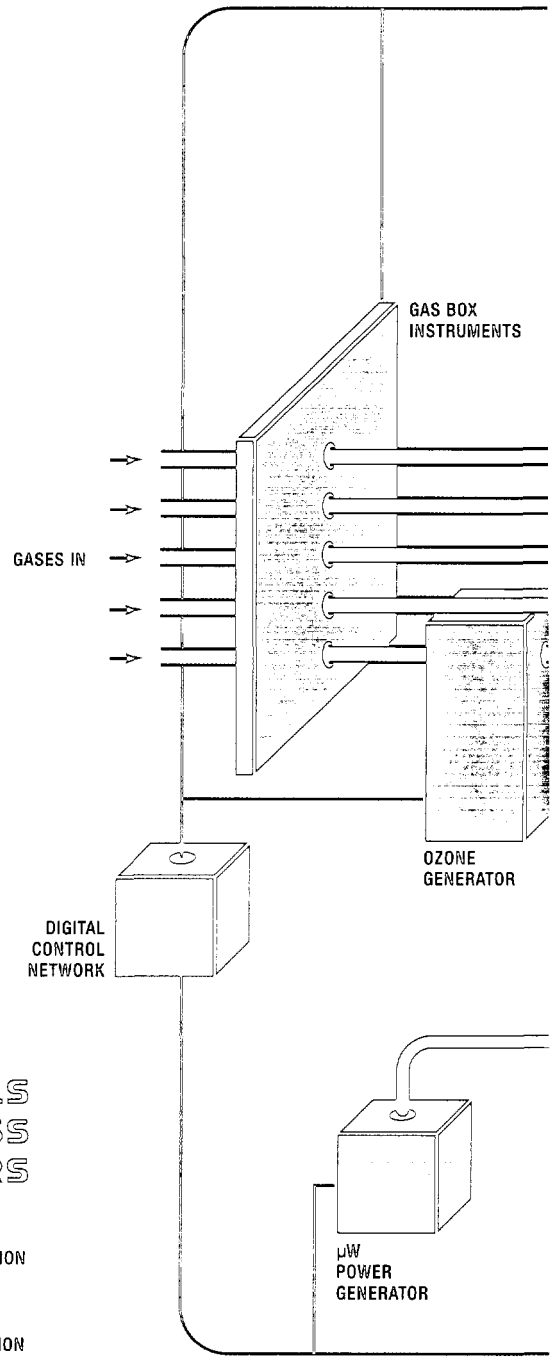
APPLYING PROCESS KNOWLEDGE TO IMPROVE PRODUCTIVITY

market driver #2: GREATER PROCESS COMPLEXITY

A major growth driver for MKS is the increasing technological complexity of semiconductor devices. Smaller and more powerful devices make it possible to continually improve performance in electronic consumer products.

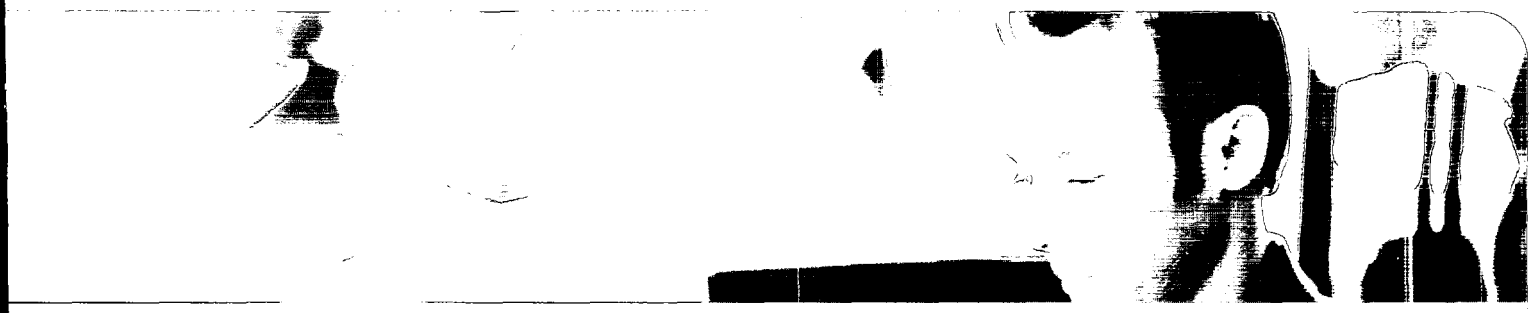
Greater device complexity requires tighter process control and integration of the components that surround the process chamber. Our broad range of products and technologies helps customers control the critical parameters of materials flow, chemical composition, process pressure, process power, and information. By applying our process knowledge to eliminate process bottlenecks, we are helping our customers overcome challenges in their manufacturing processes.

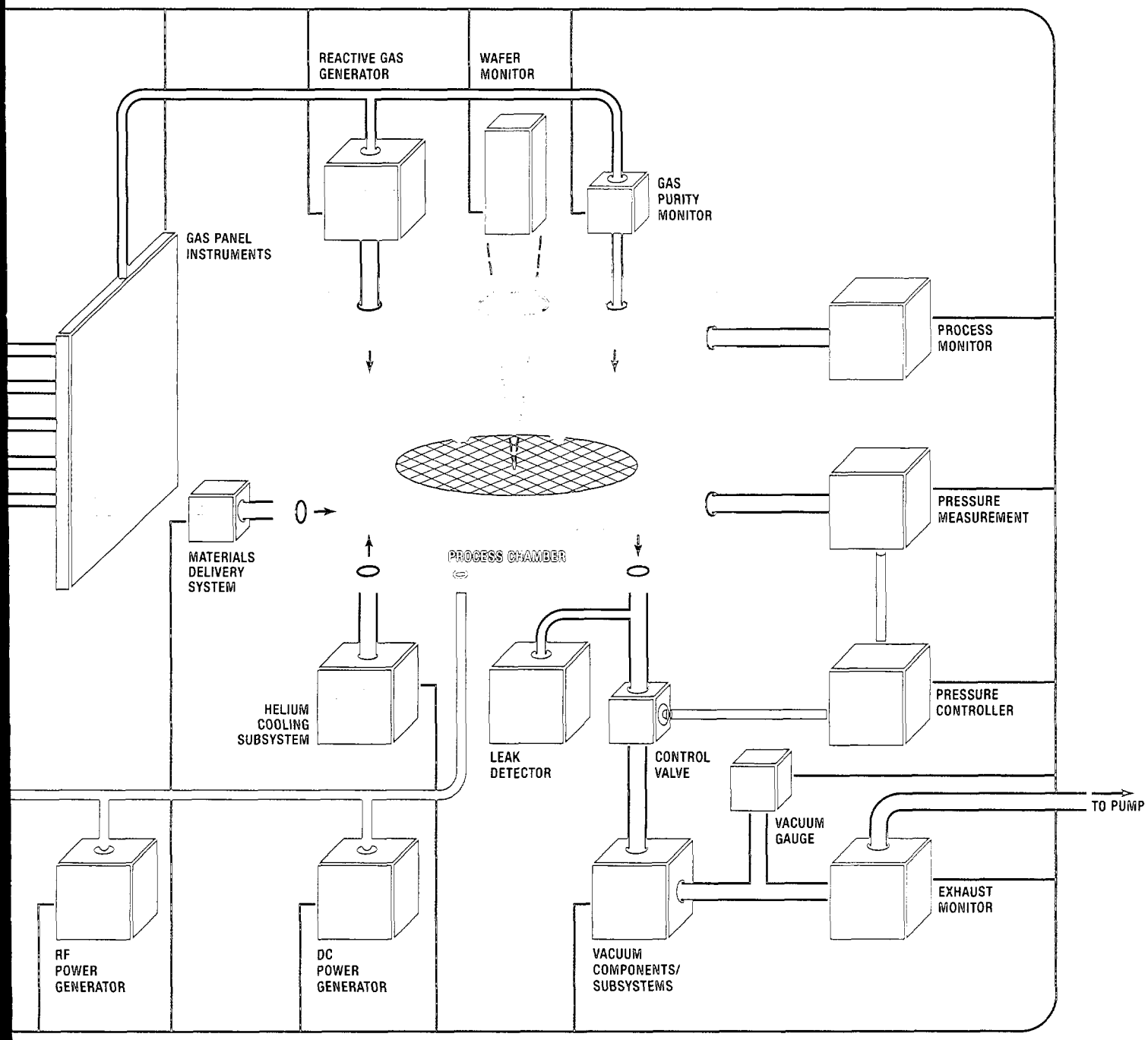
Today MKS combines the broadest portfolio of process control products and technologies with deep application knowledge. Our unique capability to design integrated products that improve productivity in gas and vacuum-based processes is a distinct competitive advantage.

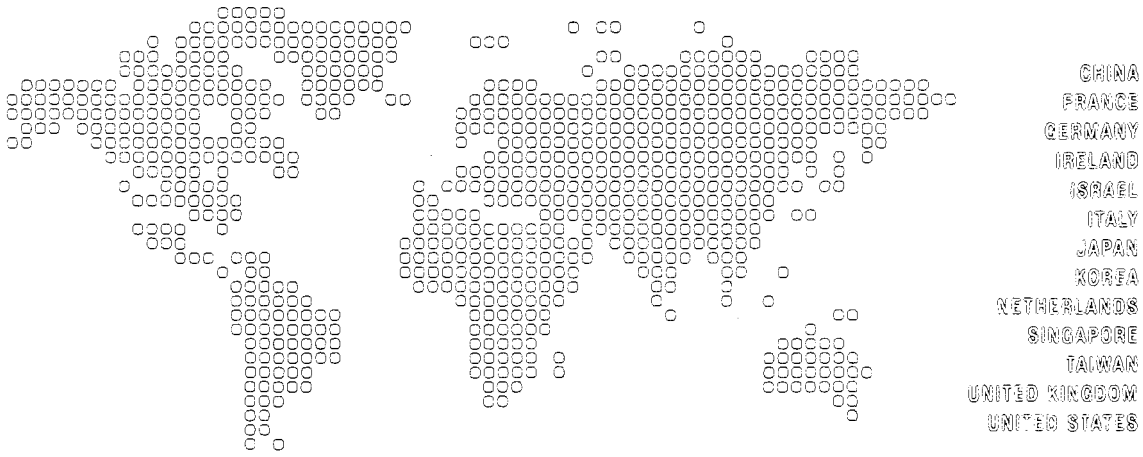


MKS CONTROLS KEY PROCESS PARAMETERS

- → FLOW
- → COMPOSITION
- → PRESSURE
- → ENERGY
- → INFORMATION




REACTIVE GAS GENERATOR
WAFER MONITOR
GAS PURITY MONITOR
GAS PANEL INSTRUMENTS
PROCESS MONITOR
PRESSURE MEASUREMENT
MATERIALS DELIVERY SYSTEM
PROCESS CHAMBER
HELIUM COOLING SUBSYSTEM
LEAK DETECTOR
CONTROL VALVE
PRESSURE CONTROLLER
VACUUM GAUGE
TO PUMP
EXHAUST MONITOR
RF POWER GENERATOR
DC POWER GENERATOR
VACUUM COMPONENTS/ SUBSYSTEMS



PORTFOLIO

market driver #3: INFRASTRUCTURE-DRIVEN CONSOLIDATION

MKS SERVED MARKET DOUBLES

MKS at IPO 1999

PRESSURE
FLOW
VACUUM COMPONENTS
VACUUM GAUGES
RGAs
SUBSYSTEMS

2000 and 2001

LEAK DETECTORS
PROCESS MONITORS
DIGITAL NETWORK
OZONE GENERATORS
REACTIVE GAS GENERATORS
µW POWER
FTIR MONITORS

2002

SOLID-STATE RF POWER
DC POWER
RF MATCHING NETWORKS
V/I SENSORS

Our customers seek fewer, more capable suppliers who are technically, geographically, and financially strong.

Since 2000, MKS has acquired seven companies with complementary technologies and helped them leverage our global infrastructure to meet the growing demands of diverse customers. With these acquisitions, we have doubled our served market. Our strategy for gaining market share is to broaden our technology base and provide a basis for integrated products that combine several technologies for higher functionality. At the same time, we are leveraging our sales, service and manufacturing capabilities to improve operational efficiency across our worldwide organization.

Our leading competitive position is anchored by organizational strength and financial stability, which enables us to realize our goal of "surrounding the process chamber" and extend our technology leadership. By acquiring advanced technologies and developing new products, we can integrate process technologies as never before, and provide higher value products to our customers.

SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 10-K
FOR ANNUAL AND TRANSITION REPORTS TO SECTIONS 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

(MARK ONE)

☒ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 2001

or

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from _____ to _____

Commission File number 0-23621

MKS INSTRUMENTS, INC.

(Exact Name of Registrant as Specified in Its Charter)

Massachusetts *State or other Jurisdiction of Incorporation or Organization)*	04-2277512 *IRS Employer Identification No.)*
Six Shattuck Road, Andover, Massachusetts *(Address of Principal Executive Offices)*	01810 *(Zip Code)*
Registrant's Telephone Number, including area code	(978) 975-2350

Securities registered pursuant to Section 12(b) of the Act: None.
Securities registered pursuant to Section 12(g) of the Act: Common Stock, no par value

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes [X] No [ ].

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of the registrant's knowledge, in definitive proxy or information statement incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. [ ]

Aggregate market value of the voting and non-voting common equity held by nonaffiliates of the registrant as of January 31, 2002: $764,300,367; Number of shares outstanding of the issuer's Common Stock, no par value, as of January 31, 2002: 50,056,447

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive Proxy Statement for MKS' Annual Meeting of Stockholders to be held on May 16, 2002 are incorporated by reference into Part III of this Form 10-K.

PART I

Item 1. Business

MKS Instruments, Inc. is a leading worldwide developer, manufacturer and supplier of instruments, components and integrated subsystems used to measure, control and analyze gases in semiconductor manufacturing and similar industrial manufacturing processes.

MKS Instruments, Inc. completed two acquisitions in fiscal 2001 that further expanded its extensive technology portfolio and product suite. On January 26, 2001, MKS acquired Applied Science and Technology, Inc., ("ASTeX"), a Wilmington, Massachusetts based company with products and technology in reactive gas generation and power delivery. Each outstanding share of ASTeX common stock was exchanged for 0.7669 newly issued shares of common stock of MKS Instruments, Inc., resulting in the issuance of approximately 11.2 million shares of common stock of MKS Instruments, Inc. The acquisition was accounted for under the pooling of interests method of accounting, and accordingly, the consolidated financial statements included in this Form 10-K reflect the combined financial position and results of operations and cash flows of MKS Instruments, Inc. and all of its subsidiaries and ASTeX and all of its subsidiaries (together, the "Company" or "MKS"), for all periods presented. This presentation combines the historical financial statements of MKS Instruments, Inc. for the years ended December 31, 2000 and 1999 with the historical financial statements of ASTeX for the fiscal years ended July 1, 2000 and June 26, 1999, respectively. On April 27, 2001, MKS acquired On-Line Technologies, Inc. ("On-Line"), a privately held company that designs and manufactures products used for gas analysis, wafer metrology and complementary analysis and control software. The purchase price was approximately $23,829,000 and consisted of approximately 660,000 shares of MKS common stock valued at approximately $12,110,000, cash payments of $6,295,000, and the assumption of approximately $4,728,000 of debt. The On-Line acquisition was accounted for under the purchase method of accounting and its results of operations are included in the Company's consolidated statement of income since the date of purchase.

On January 31, 2002, MKS acquired the ENI division of Emerson Electric Co. ENI is a leading supplier of solid-state radio frequency (RF) and direct current (DC) plasma power supplies, matching networks and instrumentation to the semiconductor and thin-film processing industries. ENI's technology complements that of ASTeX by adding critical solid-state power conversion technology to ASTeX's core capability in plasma management. MKS issued 12 million shares of MKS common stock to Emerson in exchange for the businesses and assets of ENI. The purchase price is approximately $265,000,000. The ENI acquisition will be accounted for under the purchase method of accounting and its results of operations will be included in the Company's consolidated statement of income from the date of purchase. See "Management's Discussion and Analysis of Financial Condition and Results of Operations -- Recent Developments" on this Form 10-K. The following discussion of MKS' business, unless otherwise noted, is as of December 31, 2001 and prior to the closing of the acquisition of ENI.

Products

MKS offers a comprehensive line of products that are used to manufacture, among other things:

- semiconductors
- optical filters and fiber optic cables for data and telecommunications
- flat panel displays
- magnetic and optical storage devices and media, including:
  - compact disks
  - hard disk storage devices
  - magnetic devices for reading disk data
  - digital video disks
  - optical storage disks or laser readable disks
- solar panels
- gas lasers
- eyeglasses
- architectural glass
- cutting tools
- freeze-dried pharmaceuticals
- magnetic resonance imaging (MRI) equipment

MKS supplies products in four principal product areas. We also combine products and technologies to provide value-added integrated subsystems. Our product areas include:

- Pressure Measurement and Control Products

- Materials Delivery and Analysis Products
- Vacuum Products
- Reactive Gas Generation and Power Delivery Products

Pressure Measurement and Control Products. MKS designs and manufactures a wide range of gas pressure measurement and control instrumentation. Each product line consists of products that are designed for a variety of pressure ranges and accuracies.

Baratron Pressure Measurement Products. Baratron products are high-precision pressure measurement instruments. MKS has five Baratron product families that range from high accuracy digital output instruments to simple electronic switches. These products are typically used to measure the pressure of the gases being distributed upstream of the process chambers, to measure process chamber pressures and to measure pressures between process chambers, vacuum pumps and exhaust lines. Baratron instruments measure pressures at ranges from two hundred times atmospheric pressure to one billionth of atmospheric pressure. MKS believes it offers the widest range of gas pressure measurement instruments in the semiconductor and advanced thin-film materials processing industries.

A key feature of Baratron instruments is the ability to measure pressure independent of gas composition, which is critical for precise pressure control of semiconductor processes that involve gas mixtures. In these processes, there is a need to control both pressure and gas mixture, but the pressure measurement instrument must measure only the pressure of the sum of the gases in the chamber, independent of gas composition. The Baratron instruments enable users to achieve a highly precise, accurate and repeatable measurement of gas pressure. Pressure measurement, independent of gas composition, is also useful during process steps used to remove atmospheric gases as well as those used to introduce specific amounts of various types of gases. Such processes are used to manufacture fluorescent bulbs and to fabricate gas lasers.

Automatic Pressure and Vacuum Control Products. Automatic pressure control products consist of analog and digital automatic pressure and vacuum control electronic instruments and valves. These products enable precise control of process pressure by electronically actuating valves which control the flow of gases in and out of the process chamber to minimize the difference between desired and actual pressure in the chamber. The electronic controllers vary from simple analog units with precise manual tuning capability to state-of-the-art self-tuning, digital signal processing controllers. The valve products vary from small gas inlet valves to large exhaust valves.

In most cases, Baratron pressure measurement instruments provide the pressure input to the automatic pressure control device. Together, these components create an integrated automatic pressure control system. MKS' pressure control products can also accept inputs from other measurement instruments, enabling the automatic control of gas input or exhaust based on parameters other than pressure.

MKS has a line of integrated pressure controllers to address the need for smaller components that save valuable clean room space. This product line combines the functions of its Baratron pressure measurement instrument, flow measurement instrument, control electronics and valve into a four-inch long instrument. This instrument can be placed directly on a gas line to control pressure downstream of the instrument while indicating the gas flow rate.

Materials Delivery and Analysis Products. MKS designs and manufactures a wide range of flow and composition analysis measurement and control instrumentation. Each product line consists of products that are designed for a variety of flow and composition ranges and accuracies.

Flow Measurement and Control Products. Flow measurement products include gas, vapor and liquid flow measurement products based upon thermal conductivity, pressure and direct liquid injection technologies. The flow control products combine the flow measurement device with valve control elements based upon solenoid, piezo-electric and piston pump technologies. The products measure and automatically control the mass flow rate of gases and vapors into the process chamber. MKS' broad product lines include products that allow the precise, automatic flow control of inert or corrosive gases, the automatic control of low vapor pressure gases and heated liquid source materials, and the automatic control of delicate, advanced technology liquid sources and vaporized solid sources for next generation devices.

MKS' line of thermal-based mass flow controllers, which control gas flow based on the molecular weight of gases, includes all-metal-sealed designs and ultra-clean designs for semiconductor applications, as well as general-purpose controllers for applications where all-metal-sealed construction is not required. MKS has also developed pressure-based mass flow controllers, based on Baratron pressure instrument measurement and control technology, which use flow restrictors in the gas line to transform pressure control into mass flow control.

Certain new materials required for the next generation of semiconductor devices are difficult to control using traditional thermal mass flow technology. To control these new materials, MKS has designed a direct liquid injection subsystem which pumps a precise volume of liquid into a vaporizer, which in turn supplies a controlled flow of vapor into the process chamber. The direct liquid injection subsystem pump and vaporizer are presently used principally for research and development applications for next generation semiconductor device conductors, diffusion barriers and insulators, such as copper, titanium nitride and dielectric materials.

MKS' flow measurement products also include a calibration system which independently measures mass flow and compares this measurement to that of the process chamber mass flow controller. The demand for the MKS calibration system is driven by the increasingly stringent process control needs of the semiconductor industry and the need to reduce costly downtime resulting from stopping operations to address mass flow controller problems.

Gas Composition Analysis Instruments. Gas analysis instruments are sold primarily to the semiconductor industry. The product lines for residual gas analysis include a quadrapole mass spectrometer sensor, which is a device that separates gases based on molecular weight. MKS' quadrapole mass spectrometer sensors include built-in electronics to analyze the composition of background and process gases in the process chamber. MKS' Spectra International, LLC ("Spectra") process monitoring system is a sophisticated quadrapole mass spectrometer process analyzer for statistical process monitoring of manufacturing processes operating from very low pressures to atmospheric pressure. These instruments are provided both as portable laboratory systems and as process gas monitoring systems used in the diagnosis of semiconductor manufacturing process systems. The gas monitoring systems can indicate out-of-bounds conditions, such as the presence of undesirable atmospheric gases, water vapor or out-of-tolerance amounts of specific gases in the process chamber, enabling operators to diagnose and repair faulty equipment. MKS' gas sampling systems provide a turnkey solution to withdraw gases from chambers at relatively high pressures for introduction into the low-pressure gas analyzers. Next generation semiconductor manufacturing processes, with smaller circuit patterns and larger wafer sizes, are expected to require sophisticated gas analysis instruments and/or monitoring equipment to ensure tighter process control and earlier diagnosis of equipment malfunction. MKS' acquisition of Compact Instrument Technology, LLC in March 2000 enhances its core capabilities in gas composition analysis and provides additional capabilities to reduce the size and costs of monitors for advanced processes. The first product emerging from the Compact Instrument acquisition is the PICO helium leak detector, which MKS believes is the smallest mass spectrometer-based leak detector currently available. The PICO is applicable in a diverse array of markets from semiconductors to air conditioning, where it is critical to ensure that equipment or products are leak tight.

Optical Monitoring Instruments. MKS' acquisition of Spectra in June 2000, in addition to augmenting the residual gas analysis products mentioned above, added a range of optical monitoring instruments. These are sold primarily to the thin film coating industry in applications such as the manufacture of optical filters. The optical monitors measure the thickness and optical properties of a film being deposited, allowing the user to better control the process.

Gas Analysis, Wafer Metrology and Process Control Products. MKS' acquisition of On-Line in April 2001, added an advanced range of gas analysis and wafer metrology products based on a proprietary FTIR spectrometer, as well as complementary analysis in control software. These products are applicable in three main areas: (1) the measurement of the composition or purity of gases used for processing; (2) the analysis of gases produced by a process, and (3) the analysis of thickness and composition of thin film deposited during semiconductor and optoelectronic fabrication.

Vacuum Products. MKS designs and manufactures a wide variety of vacuum technology products, including vacuum gauges, valves and components.

Vacuum Gauging Products. MKS offers a wide range of vacuum instruments consisting of vacuum measurement sensors and associated power supply and readout units. These vacuum gauges measure phenomena that are related to the level of pressure in the process chamber and downstream of the process chamber between the chamber and the pump. Unlike Baratron pressure measurement instruments, vacuum gauges do not measure pressure directly. These gauges are used to measure vacuum at pressures lower than those measurable with a Baratron pressure measurement instrument or to measure vacuum in the Baratron pressure measurement instrument range where less accuracy is required. MKS' indirect pressure gauges use thermal conductivity and ionization gauge technologies to measure pressure from atmospheric pressure to one trillionth of atmospheric pressure. MKS' Baratron pressure measurement instruments, together with its vacuum gauges, are capable of measuring the full range of pressures used in semiconductor and other thin-film manufacturing processes from two hundred times atmospheric pressure to one trillionth of atmospheric pressure.

MKS also manufactures a wide range of vacuum gauge instruments in which the associated electronics are packaged with the vacuum sensor, reducing panel space and installation cost. MKS offers both analog and digital versions of these vacuum gauge transducers.

Vacuum Valves and Components. MKS' vacuum valves are used on the gas lines between the process chamber and the pump downstream of the process chamber. MKS' vacuum components consist of flanges, fittings, traps and heated lines that are used downstream from the process chamber to provide leak free connections and to prevent condensable materials from depositing particles near or back into the chamber. The manufacture of small circuit patterns cannot tolerate contamination from atmospheric leaks or particles. MKS' vacuum components are designed to minimize such contamination and thus increase yields and uptimes.

Reactive Gas Generation and Power Delivery Products. MKS designs and manufactures a wide variety of reactive gas generation modules and power supplies used in semiconductor device manufacturing and medical equipment markets.

Reactive gases are used in many of the process steps in chip fabrication. Reactive gases are used to etch, strip and deposit films on wafers, to clean wafers during processing, and to clean process chambers to reduce particle contamination. A reactive gas is created when energy is added to a stable gas to break apart its molecules. The resulting dissociated gas produces rapid chemical reactions when it comes into contact with other matter. Reactive gas processes have important advantages relative to other types of chemical processes. These advantages include: greater precision in etch, strip and deposition process steps; lower temperatures that protect materials involved in the process from heat damage; greater efficiency and shorter reaction times to improve manufacturing yields; and lower cost.

MKS' proprietary reactive gas generation modules, delivered to semiconductor equipment manufacturers, create reactive gases used to deposit and etch thin films applied during various steps in the manufacture of semiconductor devices. These modules help manufacturers improve yields, reduce overall production costs and improve time to market. MKS' power delivery products are used in the semiconductor and medical markets. In the semiconductor market, MKS microwave and RF (Radio Frequency) power supplies are used to provide energy to various etching, stripping and deposition processes. In the medical market, MKS' power delivery products are used to provide power for plasma sterilization and for MRI (magnetic resonance imaging) applications.

Markets and Applications

MKS estimates that approximately 64% and 76% of its total sales in 2001 and 2000, respectively, were made to the semiconductor industry. MKS' products are also used in other markets and applications including the manufacture of, among other things:

- optical filters and fiber optic cables for data and telecommunications
- flat panel displays
- magnetic and optical storage, devices and media
- solar panels
- gas lasers
- eyeglasses
- architectural glass
- cutting tools
- magnetic resonance imaging (MRI) medical equipment
- freeze-dried pharmaceuticals

As of December 31, 2001, MKS' products were sold primarily through its direct sales force in 40 offices in France, Germany, Japan, Korea, The Netherlands, Singapore, Taiwan, the United Kingdom and the United States. MKS' direct sales force is supplemented by sales representatives and agents in countries including Canada, China, India, Israel and Italy and in selected U.S. cities. The major markets for MKS' products include:

Semiconductor Manufacturing

MKS' products are sold to semiconductor capital equipment manufacturers and semiconductor device manufacturers. MKS' products are used in the major semiconductor processing steps such as:

- depositing materials onto substrates
- etching circuit patterns
- implanting positively charged atoms into a substrate to alter electrical characteristics

MKS' products are also used for process facility applications such as gas distribution, pressure control and vacuum distribution in clean rooms where semiconductor manufacturing takes place. MKS anticipates that the semiconductor manufacturing market will continue to account for a substantial portion of its sales. While the semiconductor device manufacturing market is global, the major semiconductor capital equipment manufacturers are concentrated in the United States, Japan and Europe.

Optical Filters, Optical Fibers and Other Coating

MKS' products are used in optical filter, optical fiber and other optical thin-film coating processes. MKS' products are sold both to coating equipment manufacturers and to manufacturers of products made using optical thin-film coating processes. Optical filters and fibers used for data transmission are manufactured using processes to deposit chemical vapors which are similar to those used in semiconductor manufacturing. The requirement for greater data transmission is driving the need for tighter control of optical filters and fiber coating processes. Optical thin films for eyeglasses, solar panels and architectural glass are deposited using processes to deposit chemical vapors and gaseous metals similar to those used in semiconductor manufacturing. Optical filter, optical fiber and other optical thin-film processing are concentrated in the United States, Japan and Europe.

Flat Panel Display Manufacturing

MKS' products are used in the manufacture of flat panel displays, which require the same or similar fabrication processes as semiconductor manufacturing. MKS sells its products both to flat panel original equipment manufacturers and to end-users in the flat panel display market. The transition to larger panel size and higher definition is driving the need for tighter process controls to reduce defects. The major manufacturers for flat panel displays and flat panel display equipment are concentrated in Japan, Korea, Taiwan and the United States.

Magnetic and Optical Storage Media

MKS' products are used in the manufacture of:

- magnetic storage media which store and read data magnetically
- optical storage media which store and read data using laser technology
- compact disks
- hard disks
- data storage devices
- digital video or versatile disks

The transition to higher density storage capacity requires manufacturing processes incorporating tighter process controls. While storage media manufacturing is global, the major manufacturers are concentrated in Japan and the Asia Pacific region and storage media capital equipment manufacturers are concentrated in the United States, Japan and Europe.

Other Coating Markets

MKS' products are also used in processes for the application of thin films to harden tool bit surfaces, for the application of diamond thin films to enhance surface hardness and durability and for coatings used for food container packaging, jewelry and ornaments. The major equipment and process providers are concentrated in the United States, Japan and Europe.

Other Markets

MKS' products are used in plasma processes used to sterilize medical instruments, in vacuum freeze drying of pharmaceuticals, foods and beverages, and in vacuum processes involved in light bulb and gas laser manufacturing. MKS'

products are also incorporated into some end-market products such as magnetic resonance imaging (MRI) medical equipment, industrial vehicles, and analytical instruments. MKS' products are also sold to government, university and industrial laboratories for vacuum applications involving research and development in materials science, physical chemistry and electronics materials. The major equipment and process providers and research laboratories are concentrated in the United States, Japan and Europe.

Customers

MKS' largest customers are leading semiconductor capital equipment manufacturers such as Applied Materials, Lam Research, Novellus and Tokyo Electron, semiconductor device manufacturers such as Intel, a major manufacturer of magnetic resonance imaging (MRI) equipment, and a major manufacturer of medical sterilization equipment. Sales to MKS' top ten customers accounted for approximately 39%, 52% and 46% of net sales in 2001, 2000 and 1999, respectively. International sales, which include sales by MKS' foreign subsidiaries, but exclude direct export sales (which were less than 10% of MKS' total net sales) accounted for 31%, 23% and 25% of net sales for 2001, 2000 and 1999, respectively. Sales by MKS' Japan subsidiary comprised 12%, 11% and 12% of net sales in 2001, 2000 and 1999, respectively. During 2001 and 2000, Applied Materials accounted for approximately 18% and 30% of MKS' net sales, respectively. None of MKS' significant customers has entered into an agreement requiring it to purchase any minimum quantity of MKS' products.

Sales, Marketing and Support

MKS' worldwide sales, marketing and support organization is critical to its strategy of maintaining close relationships with semiconductor capital equipment manufacturers and semiconductor device manufacturers. MKS sells its products primarily through its direct sales force. As of December 31, 2001, MKS had 169 sales employees in 40 offices in France, Germany, Japan, Korea, The Netherlands, Singapore, Taiwan, the United Kingdom and the United States. This direct sales force is supplemented by sales representatives and agents in countries including Canada, China, India, Israel and Italy and in selected U.S. cities. MKS maintains a marketing staff to identify customer requirements, assist in product planning and specifications and to focus on future trends in the semiconductor and other markets.

As semiconductor device manufacturers have become increasingly sensitive to the significant costs of system downtime, they have required that suppliers offer comprehensive local repair service and close customer support. Manufacturers require close support to enable them to repair, modify, upgrade and retrofit their equipment to improve yields and adapt new materials or processes. To meet these market requirements, MKS maintains a worldwide sales and support organization with offices in 40 locations as of December 31, 2001. Technical support is provided by applications engineers located at offices in Arizona, California, Colorado, Massachusetts, Oregon and Texas, as well as Canada, France, Germany, India, Israel, Italy, Japan, Korea, The Netherlands, Singapore, Taiwan and the United Kingdom. Repair and calibration services are provided at 17 service depots located worldwide as of December 31, 2001. MKS provides warranties from one to three years, depending upon the type of product. In addition, MKS offers training programs for its customers in a wide range of vacuum and gas processing technologies.

Research and Development

MKS' research and development efforts are directed toward developing and improving MKS process control instruments and components for semiconductor and advanced thin-film processing applications and identifying and developing products for new applications for which gas management plays a critical role. MKS has undertaken an initiative to involve its marketing, engineering, manufacturing and sales personnel in the concurrent development of new products in order to reduce the time to market for new products. MKS employees also work closely with its customers' development personnel. These relationships help MKS identify and define future technical needs on which to focus its research and development efforts. In addition, MKS participates in SEMI (Semiconductor Equipment and Materials International), a trade group representing semiconductor equipment suppliers, to assist in product development and standardization of product technology, and it supports research at academic institutions targeted at advances in materials science and semiconductor process development. Research and development expense was $37,964,000, $37,323,000 and $22,975,000 in 2001, 2000 and 1999, respectively. MKS' research and development efforts include numerous projects which generally have a duration of 18 to 30 months.

Competition

The market for MKS' products is highly competitive. Principal competitive factors include:

- historical customer relationships

- product quality, performance and price
- breadth of product line
- manufacturing capabilities
- customer service and support

Although MKS believes that it competes favorably with respect to these factors, there can be no assurance that it will continue to do so.

MKS encounters substantial competition in each of its product lines from a number of competitors, although no one competitor competes with MKS across all product lines. Certain of MKS' competitors have greater financial and other resources than MKS. In some cases, the competitors are smaller than MKS, but well established in specific product niches. Mykrolis offers products that compete with MKS' pressure and flow products. Advanced Energy, STEC, and Unit Instruments, each offer products that compete with MKS' mass flow control products. Nor-Cal Products and MDC Vacuum Products each offer products that compete with MKS' vacuum components. Inficon offers products that compete with MKS' vacuum measuring and gas analysis products. Helix Technology offers products that compete with MKS' vacuum gauging products. Advanced Energy offers products that compete with MKS' power supply and reactive gas generator products.

In some cases, particularly with respect to mass flow controllers, semiconductor device manufacturers may direct semiconductor capital equipment manufacturers to use a specified supplier's product in their equipment. Accordingly, MKS' success depends in part on its ability to have semiconductor device manufacturers specify that its products be used at their fabrication facilities and MKS may encounter difficulties in changing established relationships of competitors with a large installed base of products at such customers' fabrication facilities. In addition, MKS' competitors can be expected to continue to improve the design and performance of their products. There can be no assurance that competitors will not develop products that offer price or performance features superior to those of MKS' products.

Patents and Other Intellectual Property Rights

MKS relies on a combination of patent, copyright, trademark and trade secret laws and license agreements to establish and protect its proprietary rights. As of December 31, 2001, MKS owned 124 U.S. patents and 79 foreign patents and had 58 pending U.S. patent applications and 128 pending foreign patent applications. Although MKS believes that certain patents may be important for certain aspects of its business, MKS believes that its success depends more upon close customer contact, innovation, technological expertise, responsiveness and worldwide distribution.

MKS requires each of its employees, including its executive officers, to enter into standard agreements pursuant to which the employee agrees to keep confidential all of MKS' proprietary information and to assign to MKS all inventions while they are employed by MKS.

On November 3, 1999, On-Line Technologies, Inc., which was acquired by MKS in April 2001, brought suit in federal district court in Connecticut against Perkin-Elmer, Inc. and certain other defendants for infringement of On-Line's patent related to its FTIR spectrometer product. On November 30, 2000, MKS' ASTeX subsidiary brought suit in federal district court in Delaware against Advanced Energy Industries, Inc. for infringement of ASTeX's patent related to its Astron product. MKS cannot predict the likely outcomes of these suits at this time.

MKS is not involved in any further material disputes with other parties with respect to the ownership or use of its proprietary technology. However, there can be no assurance that other parties will not assert technology infringement claims or other claims against MKS in the future. The litigation of such a claim may involve significant expense and management time. In addition, if any such claim were successful, MKS could be required to pay monetary damages and may also be required to either refrain from distributing the infringing product or obtain a license from the party asserting the claim (which license may not be available on commercially reasonable terms).

Employees

As of December 31, 2001, MKS employed 1,493 persons. Management believes that MKS' ongoing success depends upon its continued ability to attract and retain highly skilled employees. None of MKS' employees is represented by a labor union or is party to a collective bargaining agreement. MKS believes that its employee relations are good.

Factors Affecting Future Operating Results

MKS believes that this document contains "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. These statements are subject to risks and uncertainties and are based on the beliefs and assumptions of management of MKS, based on information currently available to MKS' management. Use of words such as "believes," "expects," "anticipates," "intends," "plans," "estimates," "should," "likely" or similar expressions, indicate a forward-looking statement. Forward-looking statements involve risks, uncertainties and assumptions. Certain of the information contained in this Annual Report on Form 10-K consists of forward-looking statements. Important factors that could cause actual results to differ materially from the forward-looking statements include the following:

MKS' business depends substantially on capital spending in the semiconductor industry which is characterized by periodic fluctuations that may cause a reduction in demand for MKS' products.

MKS estimates that approximately 64% of its sales during 2001 and 76% of its sales in 2000 were to semiconductor capital equipment manufacturers and semiconductor device manufacturers, and it expects that sales to such customers will continue to account for a substantial majority of its sales. MKS' business depends upon the capital expenditures of semiconductor device manufacturers, which in turn depend upon the demand for semiconductors. Periodic reductions in demand for the products manufactured by semiconductor capital equipment manufacturers and semiconductor device manufacturers may adversely affect MKS' business, financial condition and results of operations. Historically, the semiconductor market has been highly cyclical and has experienced periods of overcapacity, resulting in significantly reduced demand for capital equipment. For example, in 1996 and 1998, the semiconductor capital equipment industry experienced significant declines, which caused a number of MKS' customers to reduce their orders. More recently, in 2001, MKS has experienced a significant reduction in demand from OEM customers, lower gross margins due to reduced absorption of manufacturing overhead at the lower revenue levels, and special charges for excess and obsolete inventory of $14.0 million in the fourth quarter of 2001 and $2.6 million in the second quarter of 2001. The charges were significantly higher than normal and were primarily caused by a significant reduction in demand including reduced demand for older technology products. In addition, many semiconductor manufacturers have operations and customers in Asia, a region which in recent years has experienced serious economic problems including currency devaluations, debt defaults, lack of liquidity and recessions. MKS cannot be certain that semiconductor downturns will not recur. A decline in the level of orders as a result of any future downturn or slowdown in the semiconductor capital equipment industry could have a material adverse effect on MKS' business, financial condition and results of operations.

MKS' quarterly operating results have varied, and are likely to continue to vary significantly. This may result in volatility in the market price for MKS' shares.

A substantial portion of MKS' shipments occur shortly after an order is received and therefore MKS operates with a low level of backlog. As a result, a decrease in demand for MKS' products from one or more customers could occur with limited advance notice and could have a material adverse effect on MKS' results of operations in any particular period. A significant percentage of MKS' expenses are relatively fixed and based in part on expectations of future net sales. The inability to adjust spending quickly enough to compensate for any shortfall would magnify the adverse impact of a shortfall in net sales on MKS' results of operations. Factors that could cause fluctuations in MKS' net sales include:

- the timing of the receipt of orders from major customers;
- shipment delays;
- disruption in sources of supply;
- seasonal variations of capital spending by customers;
- production capacity constraints; and
- specific features requested by customers.

For example, MKS was in the process of increasing its production capacity when the semiconductor capital equipment market began to experience a significant downturn in 1996. This downturn had a material adverse effect on MKS' operating results in the second half of 1996 and the first half of 1997. After an increase in business in the latter half of 1997, the market experienced another downturn in 1998, which had a material adverse effect on MKS' 1998 and first quarter 1999 operating results. More recently, the semiconductor capital equipment market has experienced a significant down turn during 2001. As a result, MKS has experienced a reduction in demand from OEM customers in 2001, which has had a material adverse effect on MKS' operating results. During 2001 gross margins were negatively affected by special charges for excess and obsolete

inventory of $14.0 million in the fourth quarter of 2001 and $2.6 million in the second quarter of 2001. The charges were significantly higher than normal and were primarily caused by a significant reduction in demand including reduced demand for older technology products. As a result of the factors discussed above, it is likely that MKS will in the future experience quarterly or annual fluctuations and that, in one or more future quarters, its operating results will fall below the expectations of public market analysts or investors. In any such event, the price of MKS' common stock could decline significantly.

The loss of net sales to any one of MKS' major customers would likely have a material adverse effect on MKS.

MKS' ten largest customers accounted for approximately 39% of its net sales in 2001, 52% of its net sales in 2000 and 46% of its net sales in 1999. The loss of a major customer or any reduction in orders by these customers, including reductions due to market or competitive conditions, would likely have a material adverse effect on MKS' business, financial condition and results of operations. During 2001 and 2000, one customer, Applied Materials, accounted for approximately 18% and 30%, respectively, of MKS' net sales. None of MKS' significant customers has entered into an agreement requiring it to purchase any minimum quantity of MKS' products. The demand for MKS' products from its semiconductor capital equipment customers depends in part on orders received by them from their semiconductor device manufacturer customers.

Attempts to lessen the adverse effect of any loss or reduction through the rapid addition of new customers could be difficult because prospective customers typically require lengthy qualification periods prior to placing volume orders with a new supplier. MKS' future success will continue to depend upon:

- its ability to maintain relationships with existing key customers;
- its ability to attract new customers; and
- the success of its customers in creating demand for their capital equipment products which incorporate MKS' products.

As part of MKS' business strategy, MKS has entered into and may enter into or seek to enter into business combinations and acquisitions that may be difficult to integrate, disrupt its business, dilute stockholder value or divert management attention.

MKS acquired Compact Instrument in March 2000, Telvac Engineering Limited in May 2000, Spectra in July 2000, D.I.P, Inc. in September 2000, ASTeX in January 2001, On-Line in April 2001, and ENI in January 2002. As a part of its business strategy, MKS may enter into additional business combinations and acquisitions. Acquisitions are typically accompanied by a number of risks, including the difficulty of integrating the operations and personnel of the acquired companies, the potential disruption of MKS' ongoing business and distraction of management, expenses related to the acquisition and potential unknown liabilities associated with acquired businesses.

If MKS is not successful in completing acquisitions that it may pursue in the future, it may be required to reevaluate its growth strategy and MKS may have incurred substantial expenses and devoted significant management time and resources in seeking to complete proposed acquisitions that will not generate benefits for it.

In addition, with future acquisitions, MKS could use substantial portions of its available cash as all or a portion of the purchase price. MKS could also issue additional securities as consideration for these acquisitions, which could cause significant stockholder dilution. MKS' acquisitions of Compact Instrument, Telvac, Spectra, D.I.P., ASTeX, On-Line, and ENI and any future acquisitions may not ultimately help MKS achieve its strategic goals and may pose other risks to MKS.

An inability to convince semiconductor device manufacturers to specify the use of MKS' products to MKS' customers, who are semiconductor capital equipment manufacturers, would weaken MKS' competitive position.

The markets for MKS' products are highly competitive. MKS' competitive success often depends upon factors outside of its control. For example, in some cases, particularly with respect to mass flow controllers, semiconductor device manufacturers may direct semiconductor capital equipment manufacturers to use a specified supplier's product in their equipment. Accordingly, for such products, MKS' success will depend in part on its ability to have semiconductor device manufacturers specify that MKS' products be used at their semiconductor fabrication facilities. In addition, MKS may encounter difficulties in changing established relationships of competitors that already have a large installed base of products within such semiconductor fabrication facilities.

If MKS' products are not designed into successive new generations of its customers' products, MKS will lose significant net sales during the lifespan of those products.

New products designed by semiconductor capital equipment manufacturers typically have a lifespan of five to ten years. MKS' success depends on its products being designed into new generations of equipment for the semiconductor industry. MKS must develop products that are technologically current so that they are positioned to be chosen for use in each successive new generation of semiconductor capital equipment. If MKS' products are not chosen by its customers, MKS' net sales may be reduced during the lifespan of its customers' products. In addition, MKS must make a significant capital investment to develop products for its customers well before its products are introduced and before it can be sure that it will recover its capital investment through sales to the customers in significant volume. MKS is thus also at risk during the development phase that its product may fail to meet its customers' technical or cost requirements and may be replaced by a competitive product or alternative technology solution. If that happens, MKS may be unable to recover MKS' development costs.

The semiconductor industry is subject to rapid demand shifts which are difficult to predict. As a result, MKS' inability to expand its manufacturing capacity in response to these rapid shifts may cause a reduction in its market share.

MKS' ability to increase sales of certain products depends in part upon its ability to expand its manufacturing capacity for such products in a timely manner. If MKS is unable to expand its manufacturing capacity on a timely basis or to manage such expansion effectively, its customers could implement its competitors' products and, as a result, its market share could be reduced. Because the semiconductor industry is subject to rapid demand shifts which are difficult to foresee, MKS may not be able to increase capacity quickly enough to respond to a rapid increase in demand in the semiconductor industry. Additionally, capacity expansion could increase MKS' fixed operating expenses and if sales levels do not increase to offset the additional expense levels associated with any such expansion, its business, financial condition and results of operations could be materially adversely affected.

Sales to foreign markets constitute a substantial portion of MKS' net sales; therefore, MKS' net sales and results of operations could be adversely affected by downturns in economic conditions in countries outside of the United States.

International sales, which include sales by MKS' foreign subsidiaries, located in Japan, Korea, Europe, Singapore and Taiwan, but exclude direct export sales (which were less than 10% of MKS' total net sales), accounted for approximately 31% of net sales in 2001, 23% of net sales in 2000, and 25% of net sales in 1999. Sales by MKS' Japan subsidiary comprised 12%, 11% and 12% of net sales in 2001, 2000 and 1999, respectively. MKS anticipates that international sales will continue to account for a significant portion of MKS' net sales. In addition, certain of MKS' key domestic customers derive a significant portion of their revenues from sales in international markets. Therefore, MKS' sales and results of operations could be adversely affected by economic slowdowns and other risks associated with international sales.

Unfavorable currency exchange rate fluctuations may lead to lower gross margins, or may cause MKS to raise prices which could result in reduced sales.

Currency exchange rate fluctuations could have an adverse effect on MKS' net sales and results of operations and MKS could experience losses with respect to its hedging activities. Unfavorable currency fluctuations could require MKS to increase prices to foreign customers which could result in lower net sales by MKS to such customers. Alternatively, if MKS does not adjust the prices for its products in response to unfavorable currency fluctuations, its results of operations could be adversely affected. In addition, sales made by MKS' foreign subsidiaries are denominated in the currency of the country in which these products are sold and the currency it receives in payment for such sales could be less valuable at the time of receipt as a result of exchange rate fluctuations. MKS enters into forward exchange contracts and local currency purchased options to reduce currency exposure arising from intercompany sales of inventory. However, MKS cannot be certain that its efforts will be adequate to protect it against significant currency fluctuations or that such efforts will not expose it to additional exchange rate risks.

Key personnel may be difficult to attract and retain.

MKS' success depends to a large extent upon the efforts and abilities of a number of key employees and officers, particularly those with expertise in the semiconductor manufacturing and similar industrial manufacturing industries. The loss of key employees or officers could have a material adverse effect on MKS' business, financial condition and results of

operations. MKS believes that its future success will depend in part on its ability to attract and retain highly skilled technical, financial, managerial and marketing personnel. MKS cannot be certain that it will be successful in attracting and retaining such personnel.

MKS' proprietary technology is important to the continued success of its business. MKS' failure to protect this proprietary technology may significantly impair MKS' competitive position.

As of December 31, 2001, MKS owned 124 U.S. patents and 79 foreign patents and had 58 pending U.S. patent applications and 128 pending foreign patent applications. Although MKS seeks to protect its intellectual property rights through patents, copyrights, trade secrets and other measures, it cannot be certain that:

- MKS will be able to protect its technology adequately;
- competitors will not be able to develop similar technology independently;
- any of MKS' pending patent applications will be issued;
- intellectual property laws will protect MKS' intellectual property rights; or
- third parties will not assert that MKS' products infringe patent, copyright or trade secrets of such parties.

Protection of MKS' intellectual property rights may result in costly litigation.

Litigation may be necessary in order to enforce MKS' patents, copyrights or other intellectual property rights, to protect its trade secrets, to determine the validity and scope of the proprietary rights of others or to defend against claims of infringement. For example, on November 30, 2000, MKS' ASTeX subsidiary brought suit in federal district court in Delaware against Advanced Energy Industries, Inc. for infringement of ASTeX's patent related to its Astron product. Such litigation could result in substantial costs and diversion of resources and could have a material adverse effect on MKS' business, financial condition and results of operations.

The market price of MKS' common stock has fluctuated and may continue to fluctuate for reasons over which MKS has no control.

The stock market has from time to time experienced, and is likely to continue to experience, extreme price and volume fluctuations. Recently, prices of securities of technology companies have been especially volatile and have often fluctuated for reasons that are unrelated to the operating performance of the companies. The market price of shares of MKS' common stock has fluctuated greatly since its initial public offering and could continue to fluctuate due to a variety of factors. In the past, companies that have experienced volatility in the market price of their stock have been the objects of securities class action litigation. If MKS were the object of securities class action litigation, it could result in substantial costs and a diversion of MKS' management's attention and resources.

MKS' dependence on sole and limited source suppliers could affect its ability to manufacture products and systems.

MKS relies on sole and limited source suppliers for a few of its components and subassemblies that are critical to the manufacturing of MKS' products. This reliance involves several risks, including the following:

- the potential inability to obtain an adequate supply of required components;
- reduced control over pricing and timing of delivery of components; and
- the potential inability of its suppliers to develop technologically advanced products to support MKS' growth and development of new systems.

MKS believes that in time MKS could obtain and qualify alternative sources for most sole and limited source parts. Seeking alternative sources of the parts could require MKS to redesign its systems, resulting in increased costs and likely shipping delays. MKS may be unable to redesign its systems, which could result in further development costs and shipping delays. These increased costs would decrease MKS' profit margins if it could not pass the costs to its customers. Further, shipping delays could damage MKS' relationships with current and potential customers and have a material adverse effect on MKS' business and results of operations.

MKS is subject to governmental regulations.

MKS is subject to federal, state, local and foreign regulations, including environmental regulations and regulations relating to the design and operation of MKS' power supply products. MKS must ensure that these systems meet certain safety standards, many of which vary across the countries in which MKS' systems are used. For example, the European Union has published directives specifically relating to power supplies. MKS must comply with these directives in order to ship MKS' systems into countries that are members of the European Union. MKS believes it is in compliance with current applicable regulations, directives and standards and has obtained all necessary permits, approvals, and authorizations to conduct MKS' business. However, compliance with future regulations, directives and standards could require it to modify or redesign certain systems, make capital expenditures or incur substantial costs. If MKS does not comply with current or future regulations, directives and standards:

- MKS could be subject to fines;
- MKS' production could be suspended; or
- MKS could be prohibited from offering particular systems in specified markets.

Certain stockholders have a substantial interest in MKS and may be able to exert substantial influence over MKS' actions.

As of January 31, 2002, John R. Bertucci, president, chairman and chief executive officer of MKS, and members of his family, in the aggregate, beneficially owned approximately 29.8% of MKS' outstanding common stock. As a result, these stockholders, acting together, are able to exert substantial influence over the actions of MKS. Pursuant to the acquisition of the ENI Business of Emerson Electric Co. ("Emerson"), MKS issued approximately 24% of its then outstanding shares of common stock to Emerson. Accordingly, these stockholders are able to exert substantial influence over MKS' actions.

Some provisions of MKS' restated articles of organization, MKS' amended and restated by-laws and Massachusetts law could discourage potential acquisition proposals and could delay or prevent a change in control of MKS.

Anti-takeover provisions could diminish the opportunities for stockholders to participate in tender offers, including tender offers at a price above the then current market value of the common stock. Such provisions may also inhibit increases in the market price of the common stock that could result from takeover attempts. For example, while MKS has no present plans to issue any preferred stock, MKS' board of directors, without further stockholder approval, may issue preferred stock that could have the effect of delaying, deterring or preventing a change in control of MKS. The issuance of preferred stock could adversely affect the voting power of the holders of MKS' common stock, including the loss of voting control to others. In addition, MKS' By-Laws provide for a classified board of directors consisting of three classes. The classified board could also have the effect of delaying, deterring or preventing a change in control of MKS.

Item 2. Properties

As of December 31, 2001, the following table provides information concerning MKS' principal and certain other owned and leased facilities:

Location	Sq. Ft.	Activity	Products Manufactured	Lease Expires
Andover, Massachusetts	82,000	Headquarters, Manufacturing, Customer Support and Research & Development	Pressure Measurement and Control Products	(1)
Austin, Texas	8,000	Sales, Customer Support and Service	Not applicable	April 30, 2003
Boulder, Colorado	119,000	Manufacturing, Customer Support, Service and Research & Development	Vacuum Products	(2)
Cheshire, U.K.	13,000	Manufacturing, Sales, Customer Support and Service	Materials Delivery and Analysis Products	(3)

Colorado Springs, Colorado	40,500	Manufacturing, Customer Support, Service and Research & Development	Reactive Gas Generation and Power Delivery Products	(6)
East Hartford, Connecticut	11,000	Manufacturing, Customer Support, Service and Research & Development	Reactive Gas Generation and Power Delivery Products	December 31, 2002
Lawrence, Massachusetts	40,000	Manufacturing	Pressure Measurement and Control Products	(1)
Le Bourget, France	14,000	Sales, Customer Support and Service	Not applicable	(1)
Methuen, Massachusetts	85,000	Manufacturing, Customer Support, Service and Research & Development	Pressure Measurement and Control Products; Materials Delivery and Analysis Products	(1)
Morgan Hill, California	17,000	Manufacturing, Customer Support, Service and Research & Development	Materials Delivery and Analysis Products	June 30, 2007
Munich, Germany	14,000	Manufacturing, Sales, Customer Support, Service and Research & Development	Pressure Measurement and Control Products; Materials Delivery and Analysis Products	(1)
Newton, Massachusetts	3,500	Manufacturing	Reactive Gas Generation and Power Delivery Products	October 31, 2003
Richardson, Texas	15,000	Manufacturing, Sales, Customer Support and Service	Pressure Measurement and Control Products; Materials Delivery and Analysis Products	August 31, 2004
Riverside, California	9,800	Manufacturing, Service	Pressure Measurement and Control Products	April 30, 2003
Santa Clara, California	12,800	Sales, Customer Support and Service	Not applicable	(4)
Santa Clara, California	12,500	Sales, Customer Support and Service	Not Applicable	August 12, 2002
Seoul, Korea	7,000	Sales, Customer Support and Service	Materials Delivery and Analysis Products	May 31, 2003
Shropshire, U.K.	25,000	Manufacturing	Vacuum Products	October 19, 2002
Singapore	4,000	Sales, Customer Support and Service	Not applicable	February 1, 2003
Taiwan	10,600	Sales, Customer Support and Service	Not applicable	December 31, 2003
Tokyo, Japan	13,000	Manufacturing, Sales, Customer Support, Service and Research & Development	Materials Delivery and Analysis Products	(5)
Wilmington, Massachusetts	118,000	Manufacturing, Customer Support, Service and Research & Development	Reactive Gas Generation and Power Delivery Products	(1)

(1) This facility is owned by MKS.

(2) MKS leases two facilities, one has 39,000 square feet of space and a lease term which expires October 31, 2004 and the other has 33,000 square feet with a lease term which expires August 15, 2005. MKS also owns a third and fourth facility with 28,000 and 19,000 square feet of space, respectively.

(3) MKS leases two facilities, one has 2,000 square feet of space and a lease term which expires October 5, 2009 and the second has 11,000 square feet of space and a lease term which expires November 30, 2009.

(4) MKS leases two facilities, one has 4,000 square feet of space and a lease term which expires February 28, 2003 and the second has 3,800 square feet and a lease term which expires April 30, 2002. MKS owns another facility with 5,000 square feet of space.

(5) MKS leases one facility with 4,000 square feet of space on a month-to-month basis, a second facility of 4,000 square feet with a lease term which expires on January 30, 2003. MKS owns a third facility of 5,000 square feet.

(6) MKS leases one facility with 16,500 square feet. The lease expires on February 28, 2005. MKS owns another facility with 24,000 square feet.

In addition to manufacturing and other operations conducted at the foregoing leased or owned facilities, MKS provides worldwide sales, customer support and services from various other leased facilities throughout the world not listed in the table above. See "Business -- Sales, Marketing and Support."

Item 3. Legal Proceedings

On November 3, 1999, On-Line Technologies, Inc., which was acquired by MKS in April 2001, brought suit in federal district court in Connecticut against Perkin-Elmer, Inc. and certain other defendants for infringement of On-Line's patent related to its FTIR spectrometer product. The suit seeks injunctive relief and damages for infringement. Perkin-Elmer, Inc. has filed a counterclaim seeking invalidity of the patent, costs, and attorneys' fees. MKS believes that the counterclaim is without merit.

On November 30, 2000, ASTeX, which was acquired by MKS in January 2001, brought suit in federal district court in Delaware against Advanced Energy Industries, Inc. for infringement of ASTeX's patent related to its Astron product. MKS is seeking injunctive relief and damages for infringement. Advanced Energy Industries, Inc. has filed a counterclaim seeking invalidity of the patent, costs, and attorneys' fees. MKS believes that the counterclaim is without merit.

MKS cannot be certain of the outcome of the foregoing litigation, but does plan to assert its claims against other parties and oppose the counterclaims against it vigorously.

MKS is subject to other legal proceedings and claims, which have arisen in the ordinary course of business.

In the opinion of management, the ultimate disposition of these matters will not have a material adverse effect on MKS' results of operations, financial condition or cash flows.

Item 4. Submission of Matters to a Vote of Security Holders

At the Company's Special Meeting of stockholders held on January 7, 2002, the stockholders voted on the proposal to approve the issuance of 12,000,000 shares of common stock of the Company to Emerson Electric Co. ("Emerson") pursuant to the terms of the Agreement and Plan of Merger, with respect to the acquisition of the ENI Business, dated October 30, 2001, between the Company and Emerson as further specified below:

FOR	AGAINST	ABSTAIN/BROKER NON VOTES
31,649,316	35,393	49,420

PART II

Item 5. Market for the Registrant's Common Equity and Related Stockholder Matters

Price Range of Common Stock

The Common Stock of MKS is traded on the Nasdaq National Market under the symbol MKSI. On February 28, 2002, the closing price of the Company's Common Stock, as reported on the Nasdaq National Market, was $26.86 per share. The following table sets forth for the periods indicated the high and low sales prices per share of the Common Stock as reported by the Nasdaq National Market.

	2001		2000	
Price Range of Common Stock	High	Low	High	Low
First Quarter	$24.63	$15.41	$62.25	$30.50
Second Quarter	31.97	17.13	57.00	31.88
Third Quarter	29.94	15.17	40.75	16.81
Fourth Quarter	27.67	16.16	25.81	14.25

On February 28, 2002, MKS had approximately 245 stockholders of record.

Dividend Policy

On September 19, 2000, MKS made a cash payment in the aggregate amount of $1,594,143, pursuant to its obligations under the Tax Indemnification and S Corporation Distribution Agreement, entered into by and among MKS and the stockholders of MKS prior to MKS' initial public offering. MKS currently intends to retain earnings, if any, to support its growth strategy and does not anticipate paying cash dividends in the foreseeable future. Payment of future dividends, if any, will be at the discretion of the MKS board of directors after taking into account various factors, including MKS' financial condition, operating results, current and anticipated cash needs and plans for expansion.

Item 6. Selected Financial Data

Selected Consolidated Financial Data

(in thousands, except per share data)

	Year Ended December 31				
	2001	2000	1999	1998	1997
Statement of Income (Loss) Data					
Net sales	$286,808	$466,852	$265,292	$223,199	$236,047
Gross profit (1)	85,583	205,396	102,509	84,428	97,884
Income (loss) from operations	(47,360)	91,535	25,037	15,044	25,622
Net income (loss)	$(31,043)	$ 60,260	$ 22,786	$ 11,207	$ 21,228
Historical net income (loss) per share					
Basic	$ (0.83)	$ 1.74	$ 0.76	$ 0.46	$ 0.92
Diluted	$ (0.83)	$ 1.67	$ 0.72	$ 0.44	$ 0.90
Pro Forma Statement of Income (Loss) Data (2)					
Pro forma net income			$ 17,161	$ 9,065	$ 14,744
Pro forma net income per share:					
Basic			$ 0.57	$ 0.37	$ 0.64
Diluted			$ 0.55	$ 0.36	$ 0.63
Balance Sheet Data					
Cash and cash equivalents	$120,869	$123,082	$ 67,489	$ 18,875	$ 5,757
Working capital	216,855	237,321	137,999	59,511	46,674
Total assets	411,189	454,403	253,772	146,972	145,260
Short-term obligations	14,815	19,134	20,828	12,819	15,676
Long-term obligations, less current portion	11,257	12,386	5,662	13,786	21,993
Stockholders' equity	352,871	357,522	185,685	98,074	75,734

(1) Gross profit for the year ended December 31, 2001 includes special charges for excess and obsolete inventory of $14.0 million in the fourth quarter of 2001 and $2.6 million in the second quarter of 2001. These charges were significantly higher than normal and were primarily caused by a significant reduction in demand, including reduced demand for older technology products.

(2) Data is computed on the same basis as Note 2 of Notes to MKS' consolidated financial statements for the year ended December 31, 2001, which are included in this Annual Report on Form 10-K . The historical net income per share data does not include provisions for federal income taxes prior to its initial public offering in 1999, because MKS was treated as an S corporation for federal income tax purposes. The pro forma statement of income data presents net income and net income per share data as if MKS had been subject to federal income taxes as a C corporation during the periods presented. No pro forma presentation is necessary for the fiscal years ended December 31, 2001 and 2000 because MKS was subject to income taxes as a C corporation for these periods.

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

Management's Discussion and Analysis of Financial Condition and Results of Operations

MKS believes that this Annual Report on Form 10-K contains "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. When used herein, including this Management's Discussion and Analysis, the words "believes," "anticipates," "plans," "expects" and similar expressions are intended to identify forward-looking statements. These forward-looking statements reflect management's current opinions and are subject to certain risks and uncertainties that could cause actual results to differ materially from those stated or implied. MKS Instruments, Inc. assumes no obligation to update this information. Risks and uncertainties include, but are not limited to, those discussed in the section entitled "Factors Affecting Future Operating Results."

Overview

MKS Instruments, Inc. was founded in 1961. MKS Instruments, Inc. develops, manufactures and supplies instruments, components and integrated subsystems used to measure, control and analyze gases in semiconductor manufacturing and similar industrial manufacturing processes. On January 26, 2001, MKS Instruments, Inc. completed its acquisition of Applied Science and Technology, Inc. ("ASTeX") in a transaction accounted for under the pooling of interets method of accounting and, accordingly, the consolidated financial statements reflect the combined financial position and results of operations and cash flows of MKS Instruments, Inc. and ASTeX (together, the "Company" or "MKS"), for all periods presented. This presentation combines the historical financial statements of MKS Instruments, Inc. for the years ended December 31, 2000 and 1999 with the historical financial statements of ASTeX for the fiscal years ended July 1, 2000 and June 26, 1999, respectively.

The Company's customers include semiconductor capital equipment manufacturers, semiconductor device manufacturers, industrial manufacturing companies and university, government and industrial research laboratories. During 2001 and 2000, MKS estimates that approximately 64% and 76% of its net sales, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers. MKS expects that sales to such customers will continue to account for a substantial majority of its sales. In 2001, 2000 and 1999, sales to MKS' top ten customers accounted for approximately 39%, 52% and 46%, respectively, of MKS' net sales. During 2001 and 2000, Applied Materials, Inc. accounted for approximately 18% and 30% of MKS' net sales, respectively.

A significant portion of MKS' sales are to operations in international markets. International sales, which include sales by MKS' foreign subsidiaries, but exclude direct export sales (which were less than 10% of MKS' total net sales), accounted for approximately 31% of net sales in 2001, 23% of net sales in 2000, and 25% of net sales in 1999. Sales by MKS' Japan subsidiary comprised 12%, 11% and 12% of net sales in 2001, 2000 and 1999, respectively.

On April 27, 2001, MKS completed its acquisition of On-Line Technologies, Inc. ("On-Line"), a supplier of measurement and control products used for gas analysis, wafer metrology and process control. The acquisition has been accounted for under the purchase method of accounting. The purchase price was approximately $23,829,000 and consisted of approximately 660,000 shares of MKS common stock valued at approximately $12,110,000, cash payments of $6,295,000, assumption of On-Line debt of approximately $4,728,000 and transaction expenses of approximately $696,000. The results of operations are included in the Company's consolidated statement of income since the date of the purchase.

MKS completed several acquisitions in fiscal 2000, all of which have been accounted for under the purchase method of accounting. Accordingly, the results of operations for each acquired company have been included in the MKS consolidated results of operations from the date of purchase. On March 10, 2000, MKS acquired Compact Instrument Technology, LLC ("Compact Instrument"), a start-up company with proprietary technology in process monitoring for semiconductor manufacturing and other manufacturing processes. The purchase price was $8,700,000 and consisted of $8,400,000 in MKS common stock and $300,000 in assumed net liabilities. On May 5, 2000, MKS acquired Telvac Engineering, Ltd., or Telvac, a UK-based, privately held manufacturer of vacuum subsystems. The purchase price was $1,600,000 and consisted of $750,000 in cash; $750,000 in debt; and $100,000 in acquisition expenses. On July 21, 2000, MKS acquired Spectra International, LLC, or Spectra, a privately held company with products and technology in process monitoring. The purchase price was $19,000,000 and consisted of $9,700,000 in cash; 183,293 shares of MKS common stock valued at $6,500,000; *fully vested* options to purchase 83,675 shares of MKS common stock valued at $2,400,000; and $400,000 in acquisition costs. On September 6, 2000, MKS acquired D.I.P., Inc., or D.I.P., a privately held company with products and technology in digital process control. The purchase price was $14,000,000 and consisted of $6,900,000 in cash; 231,392 shares of MKS common stock valued at $6,800,000; and $300,000 in acquisition costs.

MKS was treated as an S corporation for federal income tax purposes prior to its initial public offering in 1999. MKS' S corporation status terminated upon the closing of the offering, at which time MKS became subject to federal, and certain state, income taxation as a C corporation. The pro forma net income reflects a pro forma effective tax rate of 37.3% in 1999 to reflect federal and state income taxes which would have been payable had MKS been taxed as a C corporation in 1999.

Critical Accounting Policies and Estimates

Management's Discussion and Analysis of Financial Condition and Results of Operations discusses MKS' consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. On an on-going basis, management evaluates its estimates and judgments, including those related to revenue recognition, in-process research and development, merger expenses, intangible assets and goodwill, inventories and investments. Management bases its estimates and judgments on historical experience and on various other factors that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

Management believes the following critical accounting policies affect its more significant judgments and estimates used in the preparation of its consolidated financial statements:

Revenue recognition The Company recognizes revenue from product sales generally upon shipment provided that persuasive evidence of an arrangement exists, the sales price is fixed or determinable, collectibility is reasonably assured and title and risk of loss have passed to the customer. The Company has no obligations to customers after the date products are shipped other than pursuant to warranty obligations. The Company provides for the estimated costs to fulfill customer warranty obligations upon the recognition of the related revenue. Shipping and handling fees, if any, billed to customers are recognized as revenue. The related shipping and handling costs are recognized in cost of sales. The Company monitors and tracks the amount of product returns and reduces revenue at the time of shipment for the estimated amount of such future returns, based on historical experience. While product returns and warranty costs have historically been within our expectations and the provisions established, there is no assurance that we will continue to experience the same return rates and warranty repair costs that we have in the past. Any significant increase in product return rates or a significant increase in the cost to repair our products could have a material adverse impact on our operating results for the period or periods in which such returns or increased costs materialize. The Company makes estimates evaluating its allowance for doubtful accounts. The Company continuously monitors collections and payments from its customers and maintains a provision for estimated credit losses based upon our historical experience and any specific customer collection issues that we have identified. While such credit losses have historically been within our expectations and the provisions established, there is no assurance that we will continue to experience the same credit loss rates that we have in the past. A significant change in the liquidity or financial position of our customers could have a material adverse impact on the collectability of our accounts receivable and our future operating results.

In-process research and development The Company values tangible and intangible assets acquired through our business acquisitions at fair value including in-process research and development ("IPR&D"). The Company determines IPR&D through established valuation techniques for various projects for the development of new products and technologies and expenses IPR&D when technical feasibility is not reached. During 2001, the Company expensed approximately $2.3 million in IPR&D charges in connection with the On-Line acquisition because the technological feasibility of certain products under development had not been established and no future alternative uses existed. If the Company acquires other companies with IPR&D in the future, we will value the IPR&D through established valuation techniques and incur future IPR&D charges if those products under development have not reached technical feasibility.

Merger expenses The Company expenses fees and costs related to mergers accounted for under the pooling of interests method. In connection with the acquisition of ASTeX in January 2001, the Company expensed approximately $7.7 million of merger related expenses, consisting of $6.9 million of investment banking, legal, accounting, printing and other professional fees, and $0.8 million of regulatory and other costs in the first quarter of 2001. In July 2001, the Financial Accounting Standards Board ("FASB") issued Statement of Financial Accounting Standards No. 141 ("SFAS 141"), "Business Combinations." SFAS 141 requires the purchase method of accounting for business combinations initiated after June 30, 2001 and eliminates the pooling of interests method. Merger expenses associated with any future purchase business combination will be accounted for under the purchase method of accounting and included as part of the purchase price.

Valuation of long-lived and intangible assets and goodwill The Company assesses the impairment of identifiable intangibles, long-lived assets and goodwill whenever events or changes in circumstances indicate that the carrying value may not be recoverable. Factors we consider important which could trigger an impairment review include the following:

- significant under-performance relative to expected historical or projected future operating results;
- significant changes in the manner of the Company's use of the acquired assets or the strategy for the Company's overall business; and
- significant negative industry or economic trends.

When the Company determines that the carrying value of intangibles, long-lived assets and related goodwill may not be recoverable based upon the existence of one or more of the above indicators of impairment, we measure any impairment based on a projected discounted cash flow method using a discount rate determined by the Company's management to be commensurate with the risk inherent in the Company's business model. While we believe that our estimates of future cash flows are reasonable, different assumptions regarding such cash flows could materially affect our evaluations.

Effective with the January 1, 2002 adoption of Statement of Financial Accounting Standards No. 142 ("SFAS 142"), "Goodwill and Other Intangible Assets," the Company will cease to amortize approximately $40,271,000 of goodwill. In lieu of amortization, the Company is required to perform an initial impairment review of our goodwill in 2002 and an annual impairment review thereafter. The Company is currently assessing the impact of SFAS 142 on our financial position, cash flows and results of operations and expects to complete this review by the second quarter of 2002.

Inventory The Company values its inventory at the lower of cost (first-in, first-out method) or market . The Company regularly reviews inventory quantities on hand and records a provision to write down excess and obsolete inventory to its estimated net realizable value, if less than cost, based primarily on its estimated forecast of product demand for the next 18 to 24 months. As demonstrated during 2001, demand for the Company's products can fluctuate significantly. The Company recorded special charges for excess and obsolete inventory of $14.0 million in the fourth quarter of 2001 and $2.6 million in the second quarter of 2001. The charges were significantly higher than normal and were primarily caused by a significant reduction in demand including reduced demand for older technology products. A significant increase in the demand for the Company's product could result in a short-term increase or decrease in the cost of inventory purchases while a significant decrease in demand could result in an increase in the charges for excess inventory quantities on hand. In addition, the Company's industry is subject to technological change, new product development, and product technological obsolescence that could result in an increase in the amount of obsolete inventory quantities on hand. Therefore, any significant unanticipated changes in demand or technological developments could have a significant impact on the value of the Company's inventory and its reported operating results.

Investments The Company holds investments in companies having operations or technology in areas within or adjacent to its strategic focus, which are in non-publicly traded companies whose value is difficult to determine. These investments are accounted for under the cost and equity method of accounting. Under the equity method of accounting, which generally applies to investments that represent a 20 to 50 percent ownership of the equity securities of the investee, the Company's proportionate share of the earnings or losses of the investee is include in other income and expense. The Company records an investment impairment charge when it believes an investment has experienced a decline in value. Future adverse changes in market conditions or poor operating results of underlying investments could result in losses or an inability to recover the carrying value of the investments that may not be reflected in an investment's current carrying value, thereby possibly requiring an impairment charge in the future.

Results of Operations

The following table sets forth for the periods indicated the percentage of total net sales of certain line items included in MKS' consolidated statement of income data:

	Year Ended December 31		
	2001	2000	1999
Net sales	100.0%	100.0%	100.0%
Cost of sales	70.2	56.0	61.4
Gross profit	29.8	44.0	38.6
Research and development	13.2	8.0	8.7
Selling, general and administrative	24.5	15.2	19.4
Amortization of goodwill and acquired intangible assets	3.8	1.1	0.3
Goodwill impairment	1.3	---	---
Restructuring charge	---	---	0.8
Merger expenses	2.7	---	---
Purchase of in-process technology	0.8	0.1	---
Income (loss) from operations	(16.5)	19.6	9.4
Interest income (expense), net	1.3	1.0	0.5
Other income (expense), net	(0.9)	---	0.4
Income (loss) before income taxes	(16.1)	20.6	10.3
Provision (benefit) for income taxes	(5.3)	7.7	1.7
Net income (loss)	(10.8)%	12.9%	8.6%
Pro forma data:			
Historical income before income taxes			10.3%
Pro forma provision for income taxes			3.8
Pro forma net income			6.5%

Year Ended 2001 Compared to 2000

Net Sales Net sales decreased 38.6% to $286.8 million for the year ended December 31, 2001 from $466.9 million for the year ended December 31, 2000. International net sales were approximately $90.0 million for the year ended December 31, 2001 or 31.4% of net sales and $108.1 million for the year ended December 31, 2000 or 23.1% of net sales. The decrease in net sales is due to a worldwide slowdown in demand for semiconductors during 2001 which resulted in a decline in demand for the Company's products from the Company's semiconductor capital equipment manufacturers and semiconductor device manufacturer customers, offset by an increase in net sales of approximately $15.4 million from the companies acquired in 2001 and 2000.

Gross Profit Gross profit as a percentage of net sales decreased to 29.8% for the year ended December 31, 2001 from 44.0% for the year ended December 31, 2000. Gross margin was negatively effected by special charges for excess and obsolete inventory of $14.0 million in the fourth quarter of 2001 and $2.6 million in the second quarter of 2001. These charges were significantly higher than normal and were primarily caused by a significant reduction in demand, including reduced demand for older technology products. Additionally, gross margin was negatively effected due to lower absorption of manufacturing overhead costs.

Research and Development MKS' research and development efforts are directed toward developing and improving MKS process control instruments and components for semiconductor and advanced thin-film processing applications and identifying and developing products for new applications for which gas management plays a critical role. Research and development expense increased 1.7% to $38.0 million or 13.2% of net sales for the year ended December 31, 2001 from $37.3 million or 8.0% of net sales for the year ended December 31, 2000. The increase was primarily due to increased compensation expense resulting from the companies acquired in 2001 and 2000. The Company's research and development efforts include numerous projects which generally have a duration of 18 to 30 months.

Selling, General and Administrative Selling, general and administrative expenses decreased 1.4% to $70.2 million or 24.5% of net sales for the year ended December 31, 2001 from $71.2 million or 15.2% of net sales for the year ended December 31, 2000. The decrease was primarily due to decreased salaries and wages and incentive compensation expense of $5.7 million, offset by increased professional fees of $4.3 million primarily related to costs associated with defending certain of the Company's patents.

Amortization of Goodwill and Acquired Intangible Assets Amortization of goodwill and acquired intangible assets of $11.0 million for the year ended December 31, 2001, represents the amortization of goodwill and other intangibles resulting from the acquisitions completed by the Company, of which $5.2 million relates to acquired intangibles and $5.8 million relates to goodwill. Effective with the January 1, 2002 adoption of SFAS 142, the Company will cease to amortize approximately $40,271,000 of goodwill.

Goodwill Impairment Charge When the Company acquired the Shamrock product line, it was expected that sales of the existing system design and development of new system designs would generate future revenues. Since the acquisition, the Company has provided potential customers with purchase quotations for Shamrock systems, including a significant quotation to a potential customer in January 2001 for the sale of several systems. The customer did not purchase the systems, and the quotation expired in March 2001. The Company has been unsuccessful in selling any systems of the product line since the acquisition and, with the expiration of the significant quote in March 2001, the Company evaluated the recoverability of the long-lived assets, primarily goodwill. As a result, based on a discounted cash flow analysis, the Company recorded an impairment charge for the carrying value of the related goodwill of approximately $3,720,000 in the quarter ended March 31, 2001.

Merger Costs On January 26, 2001 MKS completed its acquisition of ASTeX in a transaction accounted for under the pooling of interests method of accounting. Under the pooling of interests method of accounting, fees and expenses related to the merger are expensed in the period of the merger. During the year ended December 31, 2001, MKS expensed approximately $7.7 million of merger related expenses, consisting of $6.9 million of investment banking, legal, accounting, printing and other professional fees, and $0.8 million of regulatory and other costs.

Purchase of In-process Technology In April 2001, the Company acquired On-Line in a transaction accounted for as a purchase. The purchase price was allocated to the assets acquired, including intangible assets, based on their estimated fair values. The intangible assets include approximately $2.3 million for acquired in-process technology for various projects, generally expected to have durations of 24 to 48 months, that did not have future alternative uses. The value of the purchased in-process technology was determined using the income approach, which discounts expected future cash flows from projects under development to their net present value. Each project was analyzed to determine the technological innovations included; the utilization of core technology; the complexity, cost and time to complete development; any alternative future use or current technological feasibility; and the stage of completion. The cash flows derived from the in-process technology projects were discounted at a rate of 25%. The Company believes this rate was appropriate given the risks associated with the technologies for which commercial feasibility had not been established. The percentage of completion for each in-process project was determined by identifying the elapsed time invested in the project as a ratio of the total time required to bring the project to technical and commercial feasibility. The percentage of completion for in-process projects acquired ranged from 55% to 65%, based on management's estimates of tasks completed and the tasks to be completed to bring the projects to technological and commercial feasibility. At the date of the acquisition, the development of these projects had not yet reached technological feasibility, and the technology in progress had no alternative future uses. Accordingly, these costs were expensed in the second quarter of 2001.

Interest Income (Expense), Net During the years ended December 31, 2001 and 2000, the Company generated net interest income of $3.7 million and $4.8 million, respectively, primarily from the invested net proceeds of its common stock offerings, offset by interest expense on outstanding debt. Interest income decreased by $1.0 million for the year ended December 31, 2001 from $6.2 million for the year ended December 31, 2000. The decrease was due to lower interest rate yields on investments during 2001.

Other Income (Expense), Net Other expense of $2.4 million for the year ended December 31, 2001 represents a loss on sale of assets of $1.2 million and a loss on the sale of an investment in a company of $1.1 million. Other expense of $0.2 million in the year ended December 31, 2000 represents expenses related to the preparation of the registration statement for the Company's follow-on public stock offering. The Company decided not to proceed with the follow-on offering, and converted the registration statement to a shelf registration statement.

Provision for Income Taxes The effective tax rates for the years ended December 31, 2001 and 2000 were 32.6% and 37.3%, respectively, resulting in an income tax benefit of $15.0 million and provision for income taxes of $35.9 million, respectively. The reduction in the effective tax rate and the resulting income tax benefit for the year ended December 31, 2001 as compared to the effective tax rate for the year ended December 31, 2000 was primarily due to non-deductible charges associated with acquisitions made in 2001.

Year Ended 2000 Compared to 1999

Net Sales Net sales increased 76.0% to $466.9 million for the year ended December 31, 2000 from $265.3 million in the same period of 1999. International net sales were approximately $108.1 million for the year ended December 31, 2000 or 23.1% of net sales and $65.1 million for the year ended December 31, 1999 or 24.5% of net sales. The increase in net sales was due to increased worldwide sales volume of the Company's existing products which resulted primarily from increased sales to the Company's semiconductor capital equipment manufacturer and semiconductor device manufacturer customers, and an increase of approximately $11.3 million from the companies acquired in 2000.

Gross Profit Gross profit as a percentage of sales increased to 44.0% for the year ended December 31, 2000 from 38.6% for the same period of 1999. The increase was primarily due to fuller utilization of existing manufacturing capacity as a result of increased sales, other manufacturing efficiencies, and a lower fixed cost structure from restructurings in 1999. Gross margins in fiscal 1999 were adversely impacted by a $1.1 million inventory writedown.

Research and Development Research and development expense increased 62.5% to $37.3 million or 8.0% of net sales for the year ended December 31, 2000 from $23.0 million or 8.7% of net sales for the same period of 1999. The increase was due to increased compensation of $4.2 million, increased spending for development materials related to projects in process of $3.7 million, development of new products and increased spending on other costs related to development work.

Selling, General and Administrative Selling, general and administrative expenses increased 38.3% to $71.2 million or 15.2% of net sales for the year ended December 31, 2000 from $51.5 million or 19.4% of net sales for the same period of 1999. The increase was due primarily to increased compensation expense of $9.1 million, earnout payments of $1.2 million related to the acquisition of Spectra International, LLC, increased professional fees and other selling, general and administrative expenses.

Amortization of Goodwill and Acquired Intangible Assets Amortization of goodwill and acquired intangible assets increased $4.2 million to $5.0 million for the year ended December 31, 2000 from $0.8 million for the same period of 1999. The increase is due to the amortization of goodwill and other intangibles resulting from the acquisitions completed by the Company during 2000.

Purchase of In-Process Technology In July 2000, the Company acquired Spectra International, LLC in a transaction accounted for as a purchase. The purchase price was allocated to the assets acquired, including intangible assets, based on their estimated fair values. The intangible assets include approximately $0.3 million for acquired in-process technology for projects that did not have future alternative uses. This allocation represents the estimated fair value based on risk-adjusted cash flows related to the in-process technology projects. At the date of the acquisition, the development of these projects had not yet reached technological feasibility, and the technology in progress had no alternative future uses. Accordingly, these costs were expensed in the three months ended September 30, 2000.

Interest Income (Expense), Net During the years ended December 31, 2000 and 1999, the Company generated net interest income of $4.8 million and $1.4 million, respectively, primarily from the invested net proceeds of its common stock offerings, offset by interest expense on outstanding debt.

Provision for Income Taxes Prior to the closing of its initial public offering in April 1999, MKS was treated as an S corporation for tax purposes. As an S corporation, MKS was not subject to federal and certain state income taxes. Upon the closing of its initial public offering on April 5, 1999, MKS' status as an S Corporation was terminated and it became subject to taxes as a C corporation. The Company's pro forma provision for income taxes in 1999 reflects the estimated tax expense the Company would have incurred had it been subject to federal and state income taxes as a C corporation. The pro forma provision differs from the federal statutory rate due primarily to the effects of state and foreign taxes and certain tax credits. The 2000 provision for income taxes of 37.3% is approximately the same as the pro forma provision in 1999.

Liquidity and Capital Resources

MKS has financed its operations and capital requirements through a combination of cash provided by operations, long-term real estate financing, capital lease financing and short-term lines of credit.

On April 5, 1999, the Company completed the initial public offering of its Common Stock. In connection with this offering and the exercise of an over-allotment option by the underwriters, the Company sold 6,375,000 shares of Common Stock at a price of $14.00 per share. The net proceeds to the Company were approximately $82.0 million and were received in the second quarter of 1999. Underwriting discounts and commissions were approximately $6.2 million, and other offering

costs were approximately $1.0 million. On April 5, 1999 MKS distributed $40.0 million, which was the estimated amount of its undistributed S Corporation earnings as of the day prior to the closing of the offering.

On March 30, 2000, ASTeX completed the registration and sale of 1,917,250 shares of common stock at $40.42 per share. The net proceeds from the offering were approximately $73.2 million.

On March 5, 1999, ASTeX completed the registration and sale of 1,533,800 shares of common stock at $14.34 per share. On April 6, 1999, the underwriters exercised their over-allotment option to purchase an additional 230,070 shares of common stock. The net proceeds from the offering were approximately $23.8 million.

Operations provided cash of $20.1 million for 2001 and $40.0 million for 2000. The cash flow from operations in 2001 was impacted by the net loss of $31.0 million, decreases in accounts payable and accrued expenses of $14.3 million and of $12.2 million, respectively, and offset by depreciation of $26.7 million and decreases in accounts receivable and inventory of $58.9 million and $16.2 million, respectively. The cash flow from operations in 2000 was impacted by the net income of $60.3 million, depreciation of $14.9 million, increases in accounts payable and accrued expenses of $7.5 million and $10.3 million, respectively, and offset by increases in accounts receivable and inventory of $37.6 million and $24.9 million, respectively. Investing activities utilized cash of $18.1 million for 2001 and $64.8 million for 2000. Cash utilized in investing activities decreased by $46.7 million in 2001 compared with 2000 primarily from fewer purchases of property, plant and equipment and fewer acquisitions made in 2001. Financing activities utilized cash of $1.1 million in 2001 and provided cash of $81.0 million in 2000. Net cash provided from financing activities in 2000 was primarily from the sale of 1,917,250 shares of common stock for $73.2 million.

Working capital was $216.9 million as of December 31, 2001, a decrease of $20.5 million from December 31, 2000. MKS has a combined $40.0 million line of credit with two banks, expiring July 31, 2002. The line of credit is collateralized by the Company's domestic accounts receivable and domestic inventory for borrowings exceeding $5,000,000. There were no borrowings under this line of credit as of December 31, 2001. The terms of the line of credit and certain term loan agreements, as amended, contain, among other provisions, requirements for maintaining certain levels of tangible net worth and other financial ratios. The agreements also contain restrictions with respect to acquisitions. Under the most restrictive covenant, the Company's consolidated cash, short term investments, accounts receivable and long term fixed income investments to consolidated current liabilities shall not be less than 2.25 to 1.0 at anytime. In the event of default of these covenants or restrictions, any obligation then outstanding under the loan agreement shall become payable upon demand by the bank. The Company was in compliance with all debt covenants as of December 31, 2001.

Future payments due under debt and lease obligations as of December 31, 2001 (in thousands) are as follows:

	Payment Due by Period				
	Total	Less than 1 Year	1-3 Years	4-5 Years	After 5 Years
Debt	$25,228	$14,312	$6,721	$3,550	$645
Capital Leases	919	523	396	---	---
Operating Leases	11,558	3,803	4,812	1,965	978
	$37,705	$18,638	$11,929	$5,515	$1,623

MKS believes that its working capital, together with the cash anticipated to be generated from operations and funds available from existing credit facilities, will be sufficient to satisfy its estimated working capital and planned capital expenditure requirements through at least the next 12 months.

Prior to its initial public offering, the Company entered into a Tax Indemnification and S Corporation Distribution Agreement with its then existing stockholders (the "Pre-IPO stockholders"). The agreement includes provisions for the payment, with interest, by the Pre-IPO stockholders or MKS, as the case may be, for the difference between the $40.0 million distributed as an estimate of the amount of the accumulated adjustments account as of April 4, 1999, which is the date the Company's S Corporation status was terminated, and the actual amount of the accumulated adjustments account on that day. The actual amount of the accumulated adjustments account was $41.4 million. Accordingly, the Company made an additional distribution of $1.4 million, plus interest of $0.2 million, to the Pre-IPO stockholders during the three months ended September 30, 2000. The amount of the additional distribution payable had been estimated to be $3.3 million. This estimated amount was charged directly to retained earnings during 1999 and had no impact on net income or earnings per share. The difference of $1.9 million between the actual additional distribution and the estimated additional distribution was credited directly to retained earnings during the three months ended September 30, 2000 and had no impact on net income or earnings per share. The amount of the accumulated adjustments account can be affected by future income tax audits of MKS.

If any audit increases or decreases the accumulated adjustments account, MKS or the Pre-IPO stockholders, as the case may be, will also be required to make a payment, with interest, of such difference to the other party. No shareholders, other than the Pre-IPO stockholders, are parties to the Tax Indemnification and S Corporation Distribution Agreement.

Derivatives

The Company conducts its operations globally. Consequently the results of our operations are exposed to movements in foreign currency exchange rates. The Company hedges a portion of its forecasted foreign currency denominated intercompany sales of inventory, over a maximum period of fifteen months, using forward exchange contracts and currency options primarily related to Japanese and European currencies. These derivatives are designated as cash-flow hedges, and changes in their fair value are carried in accumulated other comprehensive income until the hedged transaction affects earnings. When the hedged transaction affects earnings, the appropriate gain or loss from the derivative designated as a hedge of the transaction is reclassified from accumulated other comprehensive income to cost of sales. As of December 31, 2001 the amount that will be reclassified from accumulated other comprehensive income to earnings over the next twelve months is an unrealized gain of $787,000, net of taxes. The ineffective portion of the derivatives is primarily related to option premiums, is recorded in cost of sales, and was immaterial in 2001.

Realized and unrealized gains and losses on forward exchange contracts and local currency purchased option contracts that do not qualify for hedge accounting are recognized immediately in earnings. The cash flows resulting from forward exchange contracts and local currency purchased options that qualify for hedge accounting are classified in the statement of cash flows as part of cash flows from operating activities. Cash flows resulting from forward exchange contracts and local currency purchased options that do not qualify for hedge accounting are classified in the statement of cash flows as investing activities. The Company does not hold or issue derivative financial instruments for trading purposes.

There were no forward exchange contracts outstanding at December 31, 2001. Forward exchange contracts with notional amounts totaling $1,500,000 and $4,000,000 to exchange foreign currencies for U.S. dollars were outstanding at December 31, 2000 and 1999, respectively. Of such forward exchange contracts $1,500,000 and $4,000,000 to exchange Japanese yen for U.S. dollars were outstanding at December 31, 2000 and 1999, respectively. Local currency purchased options with notional amounts totaling $11,349,000, $25,390,000 and $11,800,000 to exchange foreign currencies for U.S. dollars were outstanding at December 31, 2001, 2000 and 1999, respectively.

There were no foreign exchange gains or losses on forward exchange contracts which did not qualify for hedge accounting in 2001. Foreign exchange gains of $37,000 and $415,000 on forward exchange contracts which did not qualify for hedge accounting were recognized in earnings during 2000 and 1999, respectively, and are classified in other income, net. Gains and losses on forward exchange contracts and local currency purchased options that qualify for hedge accounting are classified in cost of goods sold and totaled a gain of $175,000 and $6,000 and a loss of $104,000 for the years ended December 31, 2001, 2000 and 1999, respectively.

The fair values of forward exchange contracts at December 31, 2000, determined by applying period end currency exchange rates to the notional contract amounts, amounted to an unrealized gain of $164,000. The fair values of local currency purchased options at December 31, 2001 and 2000, which were obtained through dealer quotes were immaterial.

The Company hedges certain intercompany payables with currency options. Since these derivatives hedge existing amounts that are denominated in foreign currencies, the options do not qualify for hedge accounting. The foreign exchange gain on these currency options was not material in 2001, 2000 and 1999.

Interest Rate Risk Management

The Company utilizes an interest rate swap to fix the interest rate on certain variable rate term loans in order to minimize the effect of changes in interest rates on earnings. In 1998, the Company entered into a four-year interest rate swap agreement, with a major bank, on a declining notional amount basis which matches with the scheduled variable term loan principal payments. At December 31, 2001, the remaining notional amount of the interest rate swap, and the remaining principal amount of the bank term loan, was $917,000. Under the agreement, the Company pays a fixed rate of 5.85% on the notional amount and receives LIBOR. The interest differential payable or accruable on the swap agreement is recognized on an accrual basis as an adjustment to interest expense. The criteria used to apply hedge accounting for this interest rate swap is based upon management designating the swap as a hedge against the variable rate debt combined with the terms of the swap matching the underlying debt including the notional amount, the timing of the interest reset dates, the indices used and the paydates. At December 31, 2001, the fair value of this interest rate swap, which represents the amount the Company would

receive or pay to terminate the agreement, was not material, based on dealer quotes. The variable rate received on the swap at December 31, 2001 was 2.14%.

Recently Issued Accounting Pronouncements

In July 2001, the Financial Accounting Standards Board ("FASB") issued Statement of Financial Accounting Standards No. 141 ("SFAS 141"), "Business Combinations." SFAS 141 requires the purchase method of accounting for business combinations initiated after June 30, 2001 and eliminates the pooling of interests method.

In July 2001, the FASB issued Statement of Financial Accounting Standards No. 142, "Goodwill and Other Intangible Assets" ("SFAS 142"), which is effective for fiscal years beginning after December 15, 2001. SFAS 142 requires, among other things, the discontinuance of goodwill amortization. In addition, the standard includes provisions upon adoption for the reclassification of certain existing recognized intangibles as goodwill, reassessment of the useful lives of existing recognized intangibles, reclassification of certain intangibles out of previously reported goodwill and the testing for impairment of existing goodwill and other intangibles. Upon adoption of SFAS 142 the Company will cease to amortize approximately $40,271,000 of goodwill. The impairment review will involve a two-step process as follows:

Step 1 — The Company will compare the fair value of our reporting units to the carrying value, including goodwill of each of those units. For each reporting unit where the carrying value, including goodwill, exceeds the unit's fair value, the Company will move on to step 2. If a unit's fair value exceeds the carrying value, no further work is performed and no impairment charge is necessary.

Step 2 — The Company will perform an allocation of the fair value of the reporting unit to its identifiable tangible and non-goodwill intangible assets and liabilities. This will derive an implied fair value for the reporting unit's goodwill. The Company will then compare the implied fair value of the reporting unit's goodwill with the carrying amount of the reporting unit's goodwill. If the carrying amount of the reporting unit's goodwill is greater than the implied fair value of its goodwill, an impairment loss must be recognized for the excess.

The Company is currently assessing the impact of SFAS 142 on our financial position, cash flows and results of operations and expects to complete this review by the second quarter of 2002.

In August 2001, the FASB issued Statement of Financial Accounting Standards No. 143, "Accounting for Obligations Associated with the Retirement of Long-Lived Assets" ("SFAS 143"). The objective of SFAS 143 is to provide accounting guidance for legal obligations associated with the retirement of long-lived assets. The retirement obligations included within the scope of this pronouncement are those that an entity cannot avoid as a result of either the acquisition, construction or normal operation of a long-lived asset. Components of larger systems also fall under this pronouncement, as well as tangible long-lived assets with indeterminable lives. The provisions of SFAS 143 are effective for financial statements issued for fiscal years beginning after June 15, 2002. The Company is currently evaluating the expected impact of the adoption of SFAS 143 on the Company's financial condition, cash flows and results of operations. The Company will adopt the standard in the first quarter of fiscal 2003.

In October 2001, the FASB issued Statement of Financial Accounting Standards No. 144, "Accounting for the Impairment or Disposal of Long-Lived Assets" ("SFAS 144"). SFAS 144 addresses significant issues relating to the implementation of SFAS No. 121, "Accounting for the Impairment of Long-Lived Assets and for Long-Lived Assets to Be Disposed Of," and develops a single accounting method under which long-lived assets that are to be disposed of by sale are measured at the lower of book value or fair value less cost to sell. Additionally, SFAS 144 expands the scope of discontinued operations to include all components of an entity with operations that (1) can be distinguished from the rest of the entity and (2) will be eliminated from the ongoing operations of the entity in a disposal transaction. SFAS 144 is effective for financial statements issued for fiscal years beginning after December 15, 2001 and its provisions are to be applied prospectively. The Company does not expect that the implementation of SFAS 144 will have a significant impact on its financial statements.

Recent Developments

On January 31, 2002, the Company completed its acquisition of the ENI Business of Emerson Electric Co. ("Emerson"), pursuant to an Agreement and Plan of Merger with respect to the acquisition of the ENI Business dated October 30, 2001 between the Company and Emerson. The Company issued an aggregate of 12.0 million shares of its common stock to Emerson, in exchange for the businesses and assets of ENI. The acquisition will be accounted for under the purchase method of accounting.

Item 7A. Quantitative and Qualitative Disclosures about Market Risk

Market Risk and Sensitivity Analysis

Foreign Exchange Rate Risk

MKS enters into local currency purchased options and forward exchange contracts to reduce currency exposure arising from intercompany sales of inventory. The potential fair value loss for a hypothetical 10% adverse change in currency exchange rates on MKS' local currency purchased options at December 31, 2001 would be approximately $628,000. The value of the local currency purchased options at December 31, 2000 was immaterial. The potential loss in 2001 was estimated by calculating the fair value of the local currency purchased options at December 31, 2001 and comparing that with those calculated using the hypothetical currency exchange rates.

There were no forward exchange contracts outstanding at December 31, 2001. The potential fair value loss for a hypothetical 10% adverse change in the forward currency exchange rate on MKS' forward exchange contracts at December 31, 2000 would be $146,000. The potential loss in 2000 was estimated by calculating the fair value of the forward exchange contracts at December 31, 2000 and comparing that with those calculated using the hypothetical forward currency exchange rates.

At December 31, 2001, MKS had $9,238,000 related to short-term borrowings denominated in Japanese yen. The carrying value of these short-term borrowings approximates fair value due to their short period to maturity. Assuming a hypothetical 10% adverse change in the Japanese yen to U.S. dollar year end exchange rate, the fair value of these short-term borrowings would increase by $1,026,000. The potential increase in fair value was estimated by calculating the fair value of the short-term borrowings at December 31, 2001 and comparing that with the fair value using the hypothetical year end exchange rate.

At December 31, 2000, MKS had $15,719,000 related to short-term borrowings denominated in Japanese yen. The carrying value of these short-term borrowings approximated fair value due to their short period to maturity. Assuming a hypothetical 10% adverse change in the Japanese yen to U.S. dollar year end exchange rate, the fair value of these short-term borrowings would have increased by $1,746,000. The potential increase in fair value was estimated by calculating the fair value of the short-term borrowings at December 31, 2000 and comparing that with the fair value using the hypothetical year end exchange rate.

Interest Rate Risk

MKS is exposed to fluctuations in interest rates in connection with its variable rate term loans. In order to minimize the effect of changes in interest rates on earnings, MKS entered into an interest rate swap that fixed the interest rate on its variable rate term loans. Under the swap agreement, MKS pays a fixed rate of 5.85% on the notional amount and receives LIBOR. At December 31, 2001 and 2000, the notional amount of the interest rate swap was equal to the principal amount of the variable rate term loans. The potential increase in the fair value of term loans resulting from a hypothetical 10% decrease in interest rates, after adjusting for the interest rate swap, was not material.

Due to its short-term duration, the fair value of the Company's cash and investment portfolio at December 31, 2001 and 2000 approximated its carrying value. Interest rate risk was estimated as the potential decrease in fair value resulting from a hypothetical 10% increase in interest rates for securities contained in the investment portfolio. The resulting hypothetical fair value was not materially different from the year-end carrying values.

Item 8. Financial Statements

Report of Independent Accountants

To the Board of Directors and
Stockholders of MKS Instruments, Inc.:

In our opinion, based on our audits and the report of other auditors, the consolidated financial statements listed in the index appearing under Item 14(a)(1) present fairly, in all material respects, the financial position of MKS Instruments, Inc. and its subsidiaries at December 31, 2001 and 2000 and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2001 in conformity with accounting principles generally accepted in the United States of America. In addition, in our opinion, based on our audits and the report of other auditors, the financial statement schedule listed in the index appearing under Item 14(a)(2) presents fairly, in all material respects, the information set forth therein when read in conjunction with the related consolidated financial statements. These financial statements and financial statement schedule are the responsibility of the Company's management; our responsibility is to express an opinion on these financial statements and financial statement schedule based on our audits. The consolidated financial statements give retroactive effect to the merger of Applied Science and Technology, Inc. on January 26, 2001 in a transaction accounted for as a pooling of interests, as described in Note 2 to the consolidated financial statements. We did not audit the financial statements and financial statement schedule of Applied Science and Technology, Inc., which statements reflect total assets of 41 percent of the related consolidated totals as of December 31, 2000 and total revenues of 30 percent and 29 percent of the related consolidated totals for the year ended December 31, 2000 and 1999, respectively. Those statements and schedule were audited by other auditors whose report thereon has been furnished to us, and our opinion expressed herein, insofar as it relates to the amounts included for Applied Science and Technology, Inc., is based solely on the report of the other auditors. We conducted our audits of these statements in accordance with auditing standards generally accepted in the United States of America, which require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits and the report of other auditors provide a reasonable basis for our opinion.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts
January 31, 2002

INDEPENDENT AUDITORS' REPORT

The Board of Directors and Stockholders
Applied Science and Technology, Inc.:

We have audited the consolidated balance sheet of Applied Science and Technology, Inc. and subsidiaries as of July 1, 2000, and the related consolidated statements of operations, stockholders' equity, and cash flows for each of the years in the two-year period ended July 1, 2000. These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits.

We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of Applied Science and Technology, Inc. and subsidiaries as of July 1, 2000, and the results of their operations and their cash flows for each of the years in the two-year period ended July 1, 2000, in conformity with accounting principles generally accepted in the United States of America.

/s/ KPMG LLP

Boston, Massachusetts
July 31, 2000

Consolidated Balance Sheets

(in thousands, except share data)	December 31 2001	2000
Assets		
Current assets:		
Cash and cash equivalents	$ 120,869	$ 123,082
Short-term investments	16,625	17,904
Trade accounts receivable, net of allowance for doubtful accounts of $3,282 and $1,954 at December 31, 2001 and 2000, respectively	35,778	95,076
Inventories	56,954	69,165
Deferred tax asset	16,426	9,976
Other current assets	16,353	4,433
Total current assets	263,005	319,636
Property, plant and equipment, net	69,634	64,133
Long-term investments	11,029	17,100
Goodwill and acquired intangible assets	52,285	45,325
Other assets	15,236	8,209
Total assets	$411,189	$454,403
Liabilities and Stockholders' Equity		
Current liabilities:		
Short-term borrowings	$ 9,238	$ 15,741
Current portion of long-term debt	5,074	2,783
Current portion of capital lease obligations	503	610
Accounts payable	9,668	23,653
Accrued compensation	6,116	17,003
Other accrued expenses	15,551	14,588
Income taxes payable	---	7,937
Total current liabilities	46,150	82,315
Long-term debt	10,916	11,439
Long-term portion of capital lease obligations	341	947
Deferred tax liability	---	1,663
Other liabilities	911	517
Commitments and contingencies (Note 7)		
Stockholders' equity:		
Preferred Stock, $0.01 par value, 2,000,000 shares authorized; none issued and outstanding	---	---
Common Stock, no par value, 75,000,000 shares authorized; 37,998,699 and 36,645,665 shares issued and outstanding at December 31, 2001 and 2000	113	113
Additional paid-in capital	285,252	263,723
Retained earnings	68,160	93,235
Accumulated other comprehensive income (loss)	(654)	451
Total stockholders' equity	352,871	357,522
Total liabilities and stockholders' equity	$411,189	$454,403

The accompanying notes are an integral part of the consolidated financial statements.

Consolidated Statements of Income

(in thousands, except per share data)	Year Ended December 31		
	2001	2000	1999
Net sales	$286,808	$466,852	$265,292
Cost of sales	201,225	261,456	162,783
Gross profit	85,583	205,396	102,509
Research and development	37,964	37,323	22,975
Selling, general and administrative	70,185	71,205	51,474
Amortization of goodwill and acquired intangible assets	11,026	5,023	763
Goodwill impairment charge	3,720	---	---
Restructuring charge	---	---	2,260
Merger expenses	7,708	---	---
Purchase of in-process technology	2,340	310	---
Income (loss) from operations	(47,360)	91,535	25,037
Interest expense	1,513	1,390	1,378
Interest income	5,196	6,208	2,803
Other income (expense), net	(2,379)	(243)	905
Income (loss) before income taxes	(46,056)	96,110	27,367
Provision (benefit) for income taxes (Note 9)	(15,013)	35,850	4,581
Net income (loss)	$ (31,043)	$ 60,260	$ 22,786
Historical net income (loss) per share:			
Basic	$(0.83)	$ 1.74	$ 0.76
Diluted	$(0.83)	$ 1.67	$ 0.72
Historical weighted average common shares outstanding:			
Basic	37,493	34,596	29,991
Diluted	37,493	36,170	31,439
Pro forma data (unaudited):			
Historical income before income taxes			$ 27,367
Pro forma provision for income taxes assuming C corporation tax			10,206
Pro forma net income			$ 17,161
Pro forma net income per share:			
Basic			$ 0.57
Diluted			$ 0.55
Pro forma weighted average common shares outstanding:			
Basic			29,991
Diluted			31,271

The accompanying notes are an integral part of the consolidated financial statements.

Consolidated Statements of Stockholders' Equity

For the years ended December 31, 2001, 2000 and 1999
(in thousands, except share data)

	Common Stock											
	Class A		Class B		Common Stock		Additional Paid-In Capital	Retained Earnings	Shareholder Receivable	Accumulated Other Comprehensive Income (loss)	Comprehensive Income (loss)	Total Stockholders' Equity
	Shares	Amount	Shares	Amount	Shares	Amount						
Balance at December 31, 1998	7,766,910	$40	10,286,257	$73	6,600,296	---	$ 44,085	$52,232	$(148)	$1,792		$ 98,074
Distributions to stockholders								(40,000)				(40,000)
Distributions payable to stockholders								(3,350)				(3,350)
Conversion to Common Stock	(7,766,910)	(40)	(10,286,257)	(73)	18,053,167	113						
Issuance of common stock from Initial Public Offering					6,375,000		82,062					82,062
Common stock issued in ASTeX stock offering, net of issuance costs					1,763,870		23,805					23,805
Issuance of common stock from exercise of stock options and warrants and Employee Stock Purchase Plan					374,961		2,219					2,219
Tax benefit from exercise of stock options							1,556					1,556
Retirement of common stock					(16,825)		(195)					(195)
Stock option compensation							261					261
Stock issued in pooling of interest acquisition					238,202		837	(626)				211
Shareholder receivable									(856)			(856)
Comprehensive income:												
Net income								22,786			22,786	22,786
Other comprehensive income, net of taxes:												
Non-recurring deferred tax charge to comprehensive income (Note 9)										(497)	(497)	(497)
Impact of adopting SFAS No. 133										(16)	(16)	(16)
Changes in value of financial instruments designated as cash flow hedges and unrealized gain (loss) on investment										(212)	(212)	(212)
Foreign currency translation adjustment										(163)	(163)	(163)
Comprehensive income											$21,898	
Balance at December 31, 1999	---	---	---	---	33,388,671	113	154,630	31,042	(1,004)	904		185,685
Adjustment to Distributions payable to stockholders								1,933				1,933
Issuance of common stock					1,917,250		73,207					73,207
Issuance of common stock from exercise of stock options and Employee Stock Purchase Plan					787,929		6,477					6,477
Tax benefit from exercise of stock options							5,273					5,273
Stock and stock options issued in acquisition of Businesses					551,815		24,136					24,136
Shareholder receivable									1,004			1,004
Comprehensive income:												
Net income								60,260			60,260	60,260
Other comprehensive income, net of taxes:												
Changes in value of financial instruments designated as cash flow hedges and unrealized gain (loss) on investment										603	603	603
Foreign currency translation adjustment										(1,056)	(1,056)	(1,056)
Comprehensive income											$59,807	
Balance at December 31, 2000	---	---	---	---	36,645,665	113	263,723	93,235	---	451		357,522
Issuance of common stock from exercise of stock options and Employee Stock Purchase Plan					693,089		6,391					6,391
Tax benefit from exercise of stock options							2,342					2,342
Issuance of common stock for acquisition of business					659,945		12,110					12,110
Stock option compensation and other							686					686
Comprehensive loss:												
Net loss								(31,043)			(31,043)	(31,043)
Other comprehensive income, net of taxes:												
Changes in value of financial instruments designated as cash flow hedges and unrealized gain (loss) on investment										104	104	104
Foreign currency translation adjustment										(1,209)	(1,209)	(1,209)
Comprehensive loss											$(32,148)	
Adjustment to conform ASTeX's year end								5,968				5,968
Balance at December 31, 2001	---	$---	---	$---	37,998,699	$113	$285,252	$68,160	$---	$(654)		$352,871

The accompanying notes are an integral part of the consolidated financial statements.

Consolidated Statements of Cash Flows

(in thousands)	Year Ended December 31 2001	2000	1999
Cash flows from operating activities:			
Net income (loss)	$ (31,043)	$ 60,260	$ 22,786
Adjustments to reconcile net income (loss) to net cash provided by operating activities:			
Depreciation and amortization	26,705	14,875	9,490
Deferred taxes	(11,452)	(2,828)	(1,260)
Other	4,836	844	(2,592)
Changes in operating assets and liabilities, net of effects of businesses acquired:			
Trade accounts receivable	58,911	(37,593)	(20,250)
Inventories	16,218	(24,932)	(1,272)
Other current assets	(9,637)	450	(1,569)
Accrued expenses	(12,170)	10,323	7,783
Accounts payable	(14,293)	7,503	5,970
Income taxes payable	(7,967)	11,106	1,307
Net cash provided by operating activities	20,108	40,008	20,393
Cash flows from investing activities:			
Purchases of short-term and long-term investments	(22,545)	(46,598)	(45,999)
Maturities and sales of short-term and long-term investments	21,066	39,044	18,654
Purchases of property, plant and equipment	(14,638)	(32,168)	(7,344)
Proceeds from sale of assets and investment	4,726	---	---
Business combinations, net of cash acquired	(7,121)	(23,921)	(23)
Increase in other assets	383	(1,171)	(1,598)
Net cash used in investing activities	(18,129)	(64,814)	(36,310)
Cash flows from financing activities:			
Proceeds from short-term borrowings	32,117	42,272	11,250
Payments on short-term borrowings	(36,944)	(37,226)	(9,825)
Proceeds from long-term borrowings	833	9,639	---
Payments on long-term debt	(2,810)	(10,800)	(3,110)
Proceeds from issuance of common stock, net of issuance costs	---	73,207	105,542
Proceeds from exercise of stock options and Employee Stock Purchase Plan	6,391	6,477	2,219
Cash distributions to stockholders	---	(1,417)	(40,000)
Principal payments under capital lease obligations	(706)	(1,064)	(1,050)
Net cash provided by (used in) financing activities	(1,119)	81,088	65,026
Effect of exchange rate changes on cash and cash equivalents	69	(689)	(495)
Increase in cash and cash equivalents	929	55,593	48,614
Cash and cash equivalents at beginning of period	123,082	67,489	18,875
Effect of excluded results of ASTeX (Note 2)	(3,142)	---	---
Cash and cash equivalents at end of period	$ 120,869	$ 123,082	$ 67,489
Supplemental disclosure of cash flow information:			
Cash paid during the period for:			
Interest	$ 1,074	$ 1,416	$ 1,409
Income taxes	$ 16,032	$ 24,995	$ 10,294
Supplemental schedule of noncash investing and financing activities:			
Capital lease obligations incurred for the purchase of new equipment	$ ---	$ ---	$ 762
Note receivable from sale of assets	$ 3,928	$ ---	$ ---

The accompanying notes are an integral part of the consolidated financial statements.

Notes to Consolidated Financial Statements
(Tables in thousands, except per share data)

1) Description of Business
MKS Instruments, Inc. was founded in 1961. MKS Instruments, Inc. develops, manufactures and supplies instruments, components and integrated subsystems used to measure, control and analyze gases in semiconductor manufacturing and similar industrial manufacturing processes.

2) Summary of Significant Accounting Policies
Basis of Presentation
All significant intercompany accounts and transactions have been eliminated in consolidation. On January 26, 2001, MKS Instruments, Inc. completed its acquisition of Applied Science and Technology, Inc. ("ASTeX") in a transaction accounted for under the pooling of interests method of accounting and, accordingly, the consolidated financial statements reflect the combined financial position, results of operations and cash flows of MKS Instruments, Inc., ASTeX and their subsidiaries (together, the "Company" or "MKS"), for all periods presented. These consolidated financial statements combine the historical consolidated financial statements of the Company for all periods presented and the ASTeX share information has been converted to the MKS share equivalent.

Since the fiscal years of MKS and ASTeX differed, the historical periods combined giving effect to the merger are as follows:

MKS	ASTeX
Fiscal year ended December 31, 1999	Fiscal year ended June 26, 1999
Fiscal year ended December 31, 2000	Fiscal year ended July 1, 2000

As a result of conforming dissimilar fiscal year-ends, the ASTeX results of operations for the six month period ended December 31, 2000 are excluded from these consolidated financial statements. The following is information related to the ASTeX financial results for the six-month period ended December 31, 2000:

Net sales	$89,193
Net income	5,968
Decrease in cash and cash equivalents	(3,142)

The excluded net income and excluded decrease in cash and cash equivalents of $5,968,000 and $3,142,000 have been recorded as adjustments to retained earnings and statement of cash flows for the year ended December 31, 2001, respectively.

The following table shows the separate historical results of MKS and ASTeX for the periods prior to the consummation of the merger of the two entities.

	Fiscal Year Ended	
	2000	1999
Net sales:		
MKS	$326,955	$187,083
ASTeX	139,897	78,209
	$466,852	$265,292
Net income (loss):		
MKS	$ 46,234	$ 24,037
ASTeX	14,026	(1,251)
	$ 60,260	$ 22,786

All fees and expenses related to the merger and the integration of the combined companies are expenses as required under the pooling of interests accounting method. For the year ended December 31, 2001, the Company expensed approximately $7.7 million of merger related expenses, consisting of $6.9 million of investment banking, legal, accounting, printing and other professional fees, and $0.8 million of regulatory and other costs.

Historical and Pro Forma (Unaudited) Net Income Per Share
The Company computes basic and diluted earnings per share in accordance with Statement of Financial Accounting Standards No. 128 ("SFAS 128") "Earnings per Share." SFAS 128 requires both basic earnings per share, which is based on

the weighted average number of common shares outstanding, and diluted earnings per share, which is based on the weighted average number of common shares outstanding and all dilutive potential common equivalent shares outstanding. The dilutive effect of options is determined under the treasury stock method using the average market price for the period. Common equivalent shares are included in the per share calculations when the effect of their inclusion would be dilutive.

Historical net income per share in 1999 is not meaningful because of the Company's conversion from an S corporation to a C corporation upon the closing of its initial public offering in 1999. Historical net income has been adjusted for the pro forma provision for income taxes calculated assuming the Company was subject to income taxation as a C corporation, at a pro forma tax rate of 37.3% in 1999.

The following is a reconciliation of basic to diluted pro forma and historical net income per share:

	For the Year Ended December 31,			
	2001	2000	1999	
	Historical	Historical	Pro forma	Historical
Net income (loss)	$(31,043)	$60,260	$ 17,161	$ 22,786
Shares used in net income (loss) per common shares – basic	37,493	34,596	29,991	29,991
Effect of dilutive securities:				
Employee and director stock options	---	1,574	1,280	1,448
Shares used in net income (loss) per common share – diluted	37,493	36,170	31,271	31,439
Net income (loss) per common share – basic	$ (0.83)	$ 1.74	$ 0.57	$ 0.76
Net income (loss) per common share – diluted	$ (0.83)	$ 1.67	$ 0.55	$ 0.72

For purposes of computing diluted earnings per share, weighted average common share equivalents do not include stock options with an exercise price greater than the average market price of the common shares during the period. Options to purchase 474,000 and 374,000 shares of common stock were outstanding during 2000 and 1999, respectively, but were not included in the calculation of diluted net income per common share because the option price was greater than the average market price of the common shares during the period. All options outstanding during the year ended December 31, 2001 are excluded from the calculation of diluted net loss per common share because their inclusion would be anti-dilutive. There were options to purchase 5,958,735 of the Company's common stock outstanding at December 31, 2001.

Foreign Exchange

The functional currency of the Company's foreign subsidiaries is the applicable local currency. For those subsidiaries, assets and liabilities are translated to U.S. dollars at year-end exchange rates. Income and expense accounts are translated at the average exchange rates prevailing for the year. The resulting translation adjustments are included in accumulated other comprehensive income in consolidated stockholders' equity. Foreign exchange transaction gains and losses were not material in 2001, 2000 and 1999.

Revenue Recognition

Revenue from product sales is generally recognized upon shipment provided that persuasive evidence of an arrangement exists, the sales price is fixed or determinable, collectibility is reasonably assured and title and risk of loss have passed to the customer. The Company has no obligations to customers after the date products are shipped other than pursuant to warranty obligations. The Company provides for the estimated costs to fulfill customer warranty obligations upon the recognition of the related revenue. Shipping and handling fees, if any, billed to customers are recognized as revenue. The related shipping and handling costs are recognized in cost of sales. The Company monitors and tracks the amount of product returns and reduces revenue at the time of shipment for the estimated amount of such future returns, based on historical experience. The Company makes estimates evaluating its allowance for doubtful accounts. The Company continuously monitors collections and payments from its customers and maintains a provision for estimated credit losses based upon its historical experience and any specific customer collection issues that it has identified.

Cash and Cash Equivalents and Investments

All highly liquid investments with an original maturity of three months or less at the date of purchase are considered to be cash equivalents.

Cash equivalents consist of the following:

	December 31,	
	2001	2000
Cash and Money Market Instruments	$ 101,045	$ 36,687
Commercial Paper	8,094	74,895
Federal Government and Government Agency Obligations	11,730	1,000
State and Municipal Government Obligations	---	2,000
Corporate Obligations	---	8,500
	$ 120,869	$123,082

Short-term available-for-sale investments maturing within one year consist of the following:

	December 31,	
	2001	2000
Federal Government and Government Agency Obligations	$ 5,442	$10,101
State and Municipal Government Obligations	3,100	---
Corporate Obligations	---	1,000
Commercial Paper	8,083	6,803
	$ 16,625	$17,904

Long-term available-for-sale investments with maturities of 1 to 5 years consist of the following:

	December 31,	
	2001	2000
Federal Government and Government Agency Obligations	$ 1,008	$ 4,000
State and Municipal Government Obligations	7,021	13,100
Corporate Obligations	3,000	---
	$ 11,029	$ 17,100

The appropriate classification of investments in securities is determined at the time of purchase. Debt securities that the Company does not have the intent and ability to hold to maturity are classified as "available-for-sale" and are carried at fair value. Unrealized gains and losses on securities classified as available-for-sale are included in accumulated other comprehensive income in consolidated stockholders' equity. The cost of securities sold is based on the specific identification method.

The Company holds investments in companies having operations or technology in areas within or adjacent to its strategic focus, which are in non-publicly traded companies whose value is difficult to determine. These investments are accounted for under the cost and equity method of accounting. Under the equity method of accounting, which generally applies to investments that represent a 20 to 50 percent ownership of the equity securities of the investee, the Company's proportionate share of the earnings or losses of the investee is included in other income and expense. The Company records an investment impairment charge when it believes an investment has experienced a decline in value.

Inventories

The Company values its inventory at the lower of cost (first-in, first-out method) or market. The Company regularly reviews inventory quantities on hand and records a provision to write down excess and obsolete inventory to its estimated net realizable value, if less than cost, based primarily on its estimated forecast of product demand for the next 18 to 24 months.

Property, Plant and Equipment

Property, plant and equipment are stated at cost. Equipment acquired under capital leases is recorded at the present value of the minimum lease payments required during the lease period. Expenditures for major renewals and betterments that extend the useful lives of property, plant and equipment are capitalized. Expenditures for maintenance and repairs are charged to expense as incurred. When assets are sold or otherwise disposed of, the cost and related accumulated depreciation are eliminated from the accounts and any resulting gain or loss is recognized in earnings.

Depreciation is provided on the straight-line method over the estimated useful lives of twenty to thirty-one and one-half years for buildings and three to seven years for machinery and equipment. Leasehold improvements are amortized over the shorter of the lease term or the estimated useful life of the leased asset.

Intangible Assets

Intangible assets resulting from the acquisitions of entities accounted for using the purchase method of accounting are estimated by management based on the fair value of assets received. These include acquired customer lists, workforce, technology, patents, trade name, covenants not to compete and goodwill. Intangible assets are amortized from three to ten years on a straight-line basis which represents the estimated periods of benefit.

Impairment of Long-Lived Assets

The Company evaluates the recoverability of its long-lived assets in accordance with Statement of Financial Accounting Standards No. 121, "Accounting for the Impairment of Long-Lived Assets and for Long-Lived Assets to be Disposed Of" ("SFAS 121"). SFAS 121 requires recognition of impairment of long-lived assets in the event the net book value of such assets exceeds the future undiscounted cash flows attributable to such assets.

Research and Development

Research and development costs are expensed as incurred. The Company's research and development efforts include numerous projects which generally have a duration of 18 to 30 months.

In-process Research and Development

The Company values tangible and intangible assets acquired through its business acquisitions at fair value including in-process research and development ("IPR&D"). The Company determines IPR&D through established valuation techniques for various projects for the development of new products and technologies and expenses IPR&D when technical feasibility is not reached.

Patents

Patent costs are amortized over their estimated useful life of five years.

Merger Expenses

The Company expenses fees and costs related to mergers accounted for under the pooling of interests method. In July 2001, the Financial Accounting Standards Board ("FASB") issued Statement of Financial Accounting Standards No. 141 ("SFAS 141"), "Business Combinations." SFAS 141 requires the purchase method of accounting for business combinations initiated after June 30, 2001 and eliminates the pooling of interests method.

New Accounting Pronouncements

In July 2001, the Financial Accounting Standards Board ("FASB") issued Statement of Financial Accounting Standards No. 141 ("SFAS 141"), "Business Combinations." SFAS 141 requires the purchase method of accounting for business combinations initiated after June 30, 2001 and eliminates the pooling of interests method.

In July 2001, the FASB issued Statement of Financial Accounting Standards No. 142, "Goodwill and Other Intangible Assets" ("SFAS 142"), which is effective for fiscal years beginning after December 15, 2001. SFAS 142 requires, among other things, the discontinuance of goodwill amortization. In addition, the standard includes provisions upon adoption for the reclassification of certain existing recognized intangibles as goodwill, reassessment of the useful lives of existing recognized intangibles, reclassification of certain intangibles out of previously reported goodwill and the testing for impairment of existing goodwill and other intangibles. Upon adoption of SFAS 142 the Company will cease to amortize approximately $40,271,000 of goodwill. The impairment review will involve a two-step process as follows:

> Step 1 — The Company will compare the fair value of our reporting units to the carrying value, including goodwill of each of those units. For each reporting unit where the carrying value, including goodwill, exceeds the unit's fair value, the Company will move on to step 2. If a unit's fair value exceeds the carrying value, no further work is performed and no impairment charge is necessary.
>
> Step 2 — The Company will perform an allocation of the fair value of the reporting unit to its identifiable tangible and non-goodwill intangible assets and liabilities. This will derive an implied fair value for the reporting unit's goodwill. The Company will then compare the implied fair value of the reporting unit's goodwill with the carrying amount of the reporting unit's goodwill. If the carrying amount of the reporting unit's goodwill is greater than the implied fair value of its goodwill, an impairment loss must be recognized for the excess.

The Company is currently assessing the impact of SFAS 142 on its financial position, cash flows and results of operations and expects to complete this review by the second quarter of 2002.

In August 2001, the FASB issued Statement of Financial Accounting Standards No. 143, "Accounting for Obligations Associated with the Retirement of Long-Lived Assets" ("SFAS 143"). The objective of SFAS 143 is to provide accounting guidance for legal obligations associated with the retirement of long-lived assets. The retirement obligations included within the scope of this pronouncement are those that an entity cannot avoid as a result of either the acquisition, construction or normal operation of a long-lived asset. Components of larger systems also fall under this pronouncement, as well as tangible long-lived assets with indeterminable lives. The provisions of SFAS 143 are effective for financial statements issued for fiscal years beginning after June 15, 2002. The Company is currently evaluating the expected impact of the adoption of SFAS 143 on the Company's financial condition, cash flows and results of operations. The Company will adopt the standard in the first quarter of fiscal 2003.

In October 2001, the FASB issued Statement of Financial Accounting Standards No. 144, "Accounting for the Impairment or Disposal of Long-Lived Assets" ("SFAS 144"). SFAS 144 addresses significant issues relating to the implementation of SFAS No. 121, "Accounting for the Impairment of Long-Lived Assets and for Long-Lived Assets to Be Disposed Of," and develops a single accounting method under which long-lived assets that are to be disposed of by sale are measured at the lower of book value or fair value less cost to sell. Additionally, SFAS 144 expands the scope of discontinued operations to include all components of an entity with operations that (1) can be distinguished from the rest of the entity and (2) will be eliminated from the ongoing operations of the entity in a disposal transaction. SFAS 144 is effective for financial statements issued for fiscal years beginning after December 15, 2001 and its provisions are to be applied prospectively. The Company does not expect that the implementation of SFAS 144 will have a significant impact on its financial statements.

Use of Estimates

The consolidated financial statements have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. On an on-going basis, management evaluates its estimates and judgments, including those related to revenue recognition, in-process research and development, merger expenses, intangible assets and goodwill, inventories and investments. Management bases its estimates and judgments on historical experience and on various other factors that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

3) Financial Instruments and Risk Management

Foreign Exchange Risk Management

The Company adopted the provisions of SFAS No. 133 effective April 1, 1999. The impact of adopting SFAS No. 133 was the recording of an unrealized loss of $16,000, net of taxes, in other comprehensive income. The Company hedges a portion of its forecasted foreign currency denominated intercompany sales of inventory, over a maximum period of fifteen months, using forward exchange contracts and currency options primarily related to Japanese and European currencies. These derivatives are designated as cash-flow hedges, and changes in their fair value are carried in accumulated other comprehensive income until the hedged transaction affects earnings. When the hedged transaction affects earnings, the appropriate gain or loss from the derivative designated as a hedge of the transaction is reclassified from accumulated other comprehensive income to cost of sales. As of December 31, 2001 the amount that will be reclassified from accumulated other comprehensive income to earnings over the next twelve months is an unrealized gain of $787,000, net of taxes. The ineffective portion of the derivatives is primarily related to option premiums, is recorded in cost of sales, and was immaterial in 2001.

Realized and unrealized gains and losses on forward exchange contracts and local currency purchased option contracts that do not qualify for hedge accounting are recognized immediately in earnings. The cash flows resulting from forward exchange contracts and local currency purchased options that qualify for hedge accounting are classified in the statement of cash flows as part of cash flows from operating activities. Cash flows resulting from forward exchange contracts and local currency purchased options that do not qualify for hedge accounting are classified in the statement of cash flows as investing activities. The Company does not hold or issue derivative financial instruments for trading purposes.

There were no forward exchange contracts outstanding at December 31, 2001. Forward exchange contracts with notional amounts totaling $1,500,000 and $4,000,000 to exchange foreign currencies for U.S. dollars were outstanding at December 31, 2000 and 1999, respectively. Of such forward exchange contracts, $1,500,000 and $4,000,000 to exchange Japanese yen for U.S. dollars, were outstanding at December 31, 2000 and 1999, respectively. Local currency purchased options with notional amounts totaling $11,349,000, $25,390,000 and $11,800,000 to exchange foreign currencies for U.S. dollars were outstanding at December 31, 2001, 2000 and 1999, respectively.

There were no foreign exchange gains or losses on forward exchange contracts which did not qualify for hedge accounting in 2001. Foreign exchange gains of $37,000 and $415,000 on forward exchange contracts which did not qualify for hedge accounting were recognized in earnings during 2000 and 1999, respectively, and are classified in Other income, net. Gains and losses on forward exchange contracts and local currency purchased options that qualify for hedge accounting are classified in cost of goods sold and totaled a gain of $175,000 and $6,000 and a loss of $104,000 for the years ended December 31, 2001, 2000 and 1999, respectively.

The fair values of forward exchange contracts at December 31, 2000, determined by applying period end currency exchange rates to the notional contract amounts, amounted to an unrealized gain of $164,000. The fair values of local currency purchased options at December 31, 2001 and 2000, which were obtained through dealer quotes were immaterial.

The Company hedges certain intercompany payables with currency options. Since these derivatives hedge existing amounts that are denominated in foreign currencies, the options do not qualify for hedge accounting under SFAS No. 133. The foreign exchange gain on these currency options was not material in 2001, 2000 and 1999.

Interest Rate Risk Management

The Company utilizes an interest rate swap to fix the interest rate on certain variable rate term loans in order to minimize the effect of changes in interest rates on earnings. In 1998, the Company entered into a four-year interest rate swap agreement on a declining notional amount basis which matches with the scheduled principal payments with a major bank. At December 31, 2001, the remaining notional amount of the interest rate swap, and the remaining principal amount of the bank term loan, was $917,000. Under the agreement, the Company pays a fixed rate of 5.85% on the notional amount and receives LIBOR. The interest differential payable or accruable on the swap agreement is recognized on an accrual basis as an adjustment to interest expense. The criteria used to apply hedge accounting for this interest rate swap is based upon management designating the swap as a hedge against the variable rate debt combined with the terms of the swap matching the underlying debt including the notional amount, the timing of the interest reset dates, the indices used and the paydates. At December 31, 2001, the fair value of this interest rate swap, which represents the amount the Company would receive or pay to terminate the agreement, was not material, based on dealer quotes. The variable rate received on the swap at December 31, 2001 was 2.14%.

The market risk exposure from the interest rate swap is assessed in light of the underlying interest rate exposures. Credit risk exposure from the swap is minimized as the agreement is with a major financial institution. The Company monitors the credit worthiness of this financial institution and full performance is anticipated.

Concentrations of Credit Risk

The Company's significant concentrations of credit risk consist principally of cash and cash equivalents, investments, forward exchange contracts, and trade accounts receivable. The Company maintains cash and cash equivalents with financial institutions including the bank it has borrowings with. The Company maintains investments primarily in U.S. Treasury and government agency securities and corporate debt securities, rated AA or higher. The Company places forward currency contracts with high credit-quality financial institutions in order to minimize credit risk exposure. Concentrations of credit risk with respect to accounts receivable are limited due to the large number of diverse and geographically dispersed customers. Credit is extended for all customers based on financial condition and collateral is not required.

Fair Value of Financial Instruments

The fair value of the term loans, including the current portion, approximates its carrying value given its variable rate interest provisions. The fair value of marketable securities is based on quoted market prices. The fair value of mortgage notes is based on borrowing rates for similar instruments and approximates its carrying value. For all other balance sheet financial instruments, the carrying amount approximates fair value because of the short period to maturity of these instruments.

4) Inventories

Inventories consist of the following:

	December 31,	
	2001	2000
Raw material	$21,019	$23,765
Work in process	15,362	20,856
Finished goods	20,573	24,544
	$56,954	$69,165

5) Goodwill Impairment Charge

When the Company acquired the Shamrock product line, it was expected that sales of the existing system design and development of new system designs would generate future revenues. Since the acquisition, the Company has provided potential customers with purchase quotations for Shamrock systems, including a significant quotation to a potential customer in January 2001 for the sale of several systems. The customer did not purchase the systems, and the quotation expired in March 2001. The Company has been unsuccessful in selling any systems of the product line since the acquisition and, with the expiration of the significant quote in March 2001, the Company evaluated the recoverability of the long-lived assets, primarily goodwill. As a result, based on discounted cash flow analysis, the Company recorded an impairment charge for the carrying value of the related goodwill of approximately $3,720,000 in the quarter ended March 31, 2001.

6) Property, Plant and Equipment

Property, plant and equipment consist of the following:

	December 31,	
	2001	2000
Land	$ 10,499	$10,936
Buildings	46,107	35,892
Machinery and equipment	53,216	46,402
Furniture and fixtures	18,984	16,789
Leasehold improvements	3,170	3,775
Construction in progress	4,626	5,956
	136,602	119,750
Less: accumulated depreciation and amortization	66,968	55,617
	$69,634	$64,133

Depreciation and amortization of property, plant and equipment totaled $11,905,000, $9,785,000 and $8,727,000 for the years ended December 31, 2001, 2000 and 1999, respectively.

7) Debt

Credit Agreements and Short-Term Borrowings

Effective January 1, 2000, the Company entered into a loan agreement with two banks, which provides access to a revolving credit facility. The revolving credit facility provides for borrowings up to $40,000,000, and expires July 31, 2002. The credit facility is collateralized by the Company's domestic accounts receivable and domestic inventory for borrowings exceeding $5,000,000. Interest on borrowings is payable quarterly at either the banks' base rate, or the LIBOR Rate, as defined in the agreement. At December 31, 2001 there were no borrowings outstanding under this agreement. The credit facility was amended in January 2002 to reduce the minimum tangible net worth requirement.

Additionally, certain of the Company's foreign subsidiaries have lines of credit and short-term borrowing arrangements with various financial institutions which provide for aggregate borrowings as of December 31, 2001 of up to $18,388,000, which generally expire and are renewed at six month intervals. At December 31, 2001 and 2000, total borrowings outstanding under these arrangements were $9,238,000 and $15,719,000, respectively, at interest rates ranging from 0.84% to 1.88% and 1.35% to 1.88%, respectively.

Long-Term Debt

Long-term debt consists of the following:

	December 31,	
	2001	2000
Term loans	$ 7,042	$ 2,620
Mortgage notes	8,948	11,602
Total long-term debt	15,990	14,222
Less: current portion	5,074	2,783
Long-term debt less current portion	$ 10,916	$ 11,439

On November 1, 1993, the Company entered into a term loan agreement with a bank, which provided for borrowings of $10,000,000. The loan was collateralized by certain land, buildings, and equipment. Interest was payable monthly at either the bank's base rate, at a rate based on the long-term funds rate, or at the LIBOR Rate, as defined in the agreement, at the Company's option. The final principal amount on this term loan was paid in November 2000.

On October 31, 1995, the Company also entered into a term loan agreement with the same bank, which provided additional uncollateralized borrowings of $7,000,000. Principal payments are payable in equal monthly installments of $83,000 through June 1, 2002, with the remaining principal payment due on June 30, 2002. Interest is payable monthly at either the bank's base rate or at the LIBOR Rate, as defined in the agreement, at the Company's option. The remaining principal as of December 31, 2001 was $917,000. The term loan agreement was amended in January 2002 to reduce the minimum tangible net worth requirement.

In connection with the purchase of On-Line Technologies, Inc., the Company assumed term loans of $4,728,000. The principal and interest accrued are due in two equal installments, the first installment on April 27, 2002, and the second installment on April 27, 2003.

In connection with the purchase of Telvac Engineering, Ltd., the Company issued term loans of $752,000. Principal payments of $51,000 are due on an annual basis through December 1, 2004 with the remaining principal due on May 1, 2005. Interest is payable semi-annually at the UK base rate. Remaining principal as of December 31, 2001 was $634,000.

The Company also has an outstanding term loan from a foreign bank, with principal due on April 2, 2004. The interest rate in effect for this term loan at December 31, 2001 was 1.19%. The remaining principal balance at December 31, 2001 was $763,000.

At December 31, 2001 and 2000, the interest rates in effect for the outstanding term loan borrowings ranged from 1.19% to 6.0% and from 6.0% to 9.59%, respectively.

On March 6, 2000, the Company entered into a mortgage note payable with a bank to borrow $10,000,000 to finance the purchase of land and a building. Principal and interest of $119,000 is being paid in monthly installments with final payments due in March 2007. The remaining principal as of December 31, 2001 was $7,500,000.

The terms of the revolving credit facility and certain term loan agreements, as amended, contain, among other provisions, requirements for maintaining certain levels of tangible net worth and other financial ratios. The agreements also contain restrictions with respect to acquisitions. Under the most restrictive covenant, the Company's consolidated cash, short term investments, accounts receivable and long term fixed income investments to consolidated current liabilities shall not be less than 2.25 to 1.0 at anytime. In the event of default of these covenants or restrictions, any obligation then outstanding under the loan agreement shall become payable upon demand by the bank. The Company was in compliance with all debt covenants as of December 31, 2001.

The Company has loans outstanding from various foreign banks in the form of mortgage notes at interest rates ranging from 1.88% to 6.10%. Principal and interest are payable in monthly installments through 2010. The loans are collateralized by mortgages on certain of the Company's foreign properties. The remaining principal as of December 31, 2001 was $1,448,000.

Aggregate maturities of long-term debt over the next five years are as follows:

Year ending December 31,	Aggregate Maturities
2002	$5,074
2003	4,159
2004	2,562
2005	2,061
2006	1,489
Thereafter	645
	$15,990

8) Commitments and Contingencies

On November 3, 1999, On-Line Technologies, Inc., which was acquired by the Company in April 2001, brought suit in federal district court in Connecticut against Perkin-Elmer, Inc. and certain other defendants for infringement of On-Line's patent related to its FTIR spectrometer product. The suit seeks injunctive relief and damages for infringement. Perkin-Elmer, Inc. has filed a counterclaim seeking invalidity of the patent, costs, and attorneys' fees. The Company believes that the counterclaim is without merit.

On November 30, 2000, ASTeX, which was acquired by the Company in January 2001, brought suit in federal district court in Delaware against Advanced Energy Industries, Inc. for infringement of ASTeX's patent related to its Astron product. The

Company is seeking injunctive relief and damages for infringement. Advanced Energy Industries, Inc. has filed a counterclaim seeking invalidity of the patent, costs, and attorneys' fees. The Company believes that the counterclaim is without merit.

The Company cannot be certain of the outcome of the foregoing litigation, but does plan to assert its claims against other parties and oppose the counterclaims against it vigorously.

The Company is subject to other legal proceedings and claims, which have arisen in the ordinary course of business.

In the opinion of management, the ultimate disposition of these matters will not have a material adverse effect on the Company's results of operations, financial condition or cash flows.

The Company leases certain of its facilities and machinery and equipment under capital and operating leases expiring in various years through 2002 and thereafter. Generally, the facility leases require the Company to pay maintenance, insurance and real estate taxes. Rental expense under operating leases totaled $5,122,000, $4,623,000, and $4,289,000 for the years ended December 31, 2001, 2000 and 1999, respectively.

Minimum lease payments under operating and capital leases are as follows:

Year ending December 31,	Operating Leases	Capital Leases
2002	$3,803	$ 523
2003	2,697	290
2004	2,115	106
2005	1,273	---
2006	692	---
Thereafter	978	---
Total minimum lease payments	$11,558	$919
Less: amounts representing interest		75
Present value of minimum lease payments		844
Less: current portion		503
Long-term portion		$ 341

Prior to its initial public offering, the Company entered into a Tax Indemnification and S Corporation Distribution Agreement with its then existing stockholders (the "Pre-IPO stockholders"). The agreement includes provisions for the payment, with interest, by the Pre-IPO stockholders or MKS, as the case may be, for the difference between the $40,000,000 distributed as an estimate of the amount of the accumulated adjustments account as of April 4, 1999, which is the date the Company's S Corporation status was terminated, and the actual amount of the accumulated adjustments account on that day. The actual amount of the accumulated adjustments account was $41,416,619. Accordingly, the Company made an additional distribution of $1,416,619, plus interest of $177,524, to the Pre-IPO stockholders during the three months ended September 30, 2000. The amount of the additional distribution payable had been estimated to be $3,350,000. This estimated amount was charged directly to retained earnings during 1999 and had no impact on net income or earnings per share. The difference of $1,933,000 between the actual additional distribution and the estimated additional distribution was credited directly to retained earnings during the three months ended September 30, 2000 and had no impact on net income or earnings per share. The amount of the accumulated adjustments account can be affected by future income tax audits of MKS. If any audit increases or decreases the accumulated adjustments account, MKS or the Pre-IPO stockholders, as the case may be, will also be required to make a payment, with interest, of such difference to the other party. No shareholders, other than the Pre-IPO stockholders, are parties to the Tax Indemnification and S Corporation Distribution Agreement.

9) Stockholders' Equity

Common Stock

In May 2001, the Company amended its Restated Articles of Organization to increase the authorized number of shares of Common Stock to 75,000,000 shares from 50,000,000 shares.

On March 30, 2000, ASTeX completed the registration and sale of 1,917,250 shares of common stock at $40.42 per share. The net proceeds from the offering were approximately $73,200,000.

On April 5, 1999, the Company closed the initial public offering of its Common Stock. In connection with this offering and the exercise of an over-allotment option by the underwriters, the Company sold 6,375,000 shares of Common Stock at a price

of $14.00 per share. The net proceeds to the Company were approximately $82,000,000. Underwriting discounts and commissions were approximately $6,200,000 and other offering costs were approximately $1,000,000.

On April 5, 1999 the Company distributed $40,000,000, which was the estimated amount of the Company's undistributed S corporation earnings as of the day prior to the closing of the offering.

On March 5, 1999, ASTeX completed the registration and sale of 1,533,800 shares of common stock at $14.34 per share. On April 6, 1999, the underwriters exercised their over-allotment option to purchase an additional 230,070 shares of common stock. The net proceeds from the offering were approximately $23.8 million.

Stock Purchase Plans

The Company's 1999 Employee Stock Purchase Plan (the "Purchase Plan") authorizes the issuance of up to an aggregate of 450,000 shares of Common Stock to participating employees. Offerings under the Purchase Plan commence on June 1 and December 1 and terminate, respectively, on November 30 and May 31. Under the Purchase Plan, eligible employees may purchase shares of Common Stock through payroll deductions of up to 10% of their compensation. The price at which an employee's option is exercised is the lower of (1) 85% of the closing price of the Common Stock on the NASDAQ National Market on the day that each offering commences or (2) 85% of the closing price on the day that each offering terminates. During 2001 and 2000 the Company issued 111,835 and 83,118 shares, respectively, of Common Stock to employees who participated in the Purchase Plan at exercise prices of $13.12 and $19.06 in 2001 and $21.04 and $12.86 in 2000. As of December 31, 2001 there were 218,527 shares reserved for issuance.

The Company's International Employee Stock Purchase Plan (the "Foreign Purchase Plan") authorizes the issuance of up to an aggregate of 50,000 shares of Common Stock to participating employees. The initial offering under the Foreign Purchase Plan commenced on March 1, 2000 and terminated May 31, 2000. Additional offerings under the Foreign Purchase Plan commence on June 1 and December 1 and terminate, respectively, on November 30 and May 31. Under the Foreign Purchase Plan, eligible employees may purchase shares of Common Stock through payroll deductions of up to 10% of their compensation. The price at which an employee's option is exercised is the lower of (1) 85% of the closing price of the Common Stock on the NASDAQ National Market on the day that each offering commences or (2) 85% of the closing price on the day that each offering terminates. During 2001 and 2000, the Company issued 13,333 and 7,248 shares of Common Stock to employees who participated in the Foreign Purchase Plan at exercise prices of $13.12 and $19.06 and $33.47 and $12.86 per share, respectively. As of December 31, 2001 and 2000, there were 29,419 and 42,752 shares reserved for issuance, respectively.

Stock Option Plans

In April 2001, the Company's Board of Directors approved an annual increase in the number of shares that may be granted under the 1995 Stock Incentive Plan of 5% of the total shares of the Company's stock on July 1 of each year. In May 2000, the stockholders of the Company approved an annual increase in the number of shares that may be granted under the 1995 Stock Incentive Plan of 4% of the total shares of the Company's stock on July 1 of each year. The annual increase will occur until such time as the aggregate number of shares which may be issued under the Plan is 9,750,000 shares, subject to adjustment for certain changes in MKS' capitalization.

The Company has granted options to employees under the 1995 Stock Incentive Plan and the 1993 Stock Option Plan (the "Plans"). The Plans are administered by the Company's board of directors. The Company grants options to directors under the 1996 Director Stock Option Plan and the 1997 Director Stock Option Plan (the "Director Plans").

At December 31, 2001, 916,563 options to purchase shares of the Company's common stock were reserved for issuance under the Plans. At December 31, 2001, under the Director Plans, options to purchase 163,500 shares of common stock were reserved for issuance. Stock options are granted at 100% of the fair value of the Company's common stock. Generally, stock options granted under the Plans prior to 2000 vest 20% after one year and 5% per quarter thereafter, and expire 10 years after the grant date. Generally, stock options granted under the Plans in 2001 and 2000 vest 25% after one year and 6.25% per quarter thereafter, or vest immediately, and expire 10 years after the grant date. Under the Director Plans, certain options granted in 1999 vest immediately. Generally, options granted under the Director Plans vest at the earlier of (1) the next annual meeting, (2) 13 months from date of grant, or (3) the effective date of an acquisition as defined in the Director Plans.

The following table presents the activity for options under the Plans:

	Year Ended December 31,					
	2001		2000		1999	
	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price
Outstanding — beginning of period	3,924,098	$14.54	3,603,131	$8.56	3,011,329	$7.11
Granted	3,064,619	$20.99	1,134,384	29.66	1,358,977	12.49
Exercised	(567,921)	$ 8.86	(672,472)	7.93	(338,441)	6.70
Forfeited or Expired	(607,837)	$18.87	(140,945)	14.86	(428,734)	12.30
Outstanding — end of period	5,812,959	$18.04	3,924,098	$14.54	3,603,131	$8.56
Exercisable at end of period	3,295,692	$16.83	1,852,368	$8.56	1,509,406	$6.40

The following table summarizes information with respect to options outstanding and exercisable under the Plans at December 31, 2001:

	Options Outstanding			Options Exercisable	
	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life (In Years)	Number of Shares	Weighted Average Exercise Price
$4.43-$10.44	1,573,692	$ 5.80	5.33	1,309,100	$5.62
$11.98-19.00	1,752,576	$16.64	7.87	429,408	$15.37
$19.24-$29.50	1,949,994	$24.56	8.81	1,279,664	$24.77
$30.34-$61.50	536,697	$34.79	7.00	277,520	$35.33
	5,812,959	$18.04	7.42	3,295,692	$16.83

The following table presents activity for options under the Director Plans:

	Year Ended December 31,					
	2001		2000		1999	
	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price
Outstanding — beginning of period	99,276	$ 19.15	100,368	$ 10.95	34,368	$ 4.81
Granted	46,500	$ 24.71	24,000	44.88	66,000	14.15
Exercised	---	---	(25,092)	10.95	---	---
Outstanding — end of period	145,776	$ 20.92	99,276	$ 19.15	100,368	$10.95
Exercisable at end of period	104,900	$ 19.20	75,276	$ 10.95	76,368	$ 9.86

The following table summarizes information with respect to options outstanding and exercisable under the Director Plans at December 31, 2001:

	Options Outstanding			Options Exercisable	
	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life (In Years)	Number of Shares	Weighted Average Exercise Price
$4.43-$8.00	25,776	$ 4.81	4.85	25,776	$4.81
$14.00-$14.40	49,500	$14.15	7.20	49,500	$14.15
$20.13-$29.00	46,500	$24.71	9.23	5,624	$20.13
$44.88	24,000	$44.88	8.38	24,000	$44.88
	145,776	$20.92	7.63	104,900	$19.20

The Company has adopted the disclosure-only provisions of Statement of Financial Accounting Standards No. 123, "Accounting for Stock-Based Compensation" ("SFAS 123"). The Company has chosen to continue to account for stock-based compensation using the intrinsic value method prescribed in Accounting Principles Board Opinion No. 25, "Accounting for Stock Issued to Employees" and related interpretations. The Company is required to disclose pro forma net income and net income per common share amounts had compensation cost for the Company's stock based compensation plans been determined based on the fair value at the grant date for awards under the plans. Had compensation expense for the stock based compensation plans been consistent with the method of SFAS 123, the amounts reported for 2001, 2000 and 1999 would have been:

	2001	2000	1999
Net Income (loss) reported	$(31,043)	$60,260	$22,786
Pro form net income (loss) for SFAS No. 123	$(51,395)	$53,320	$19,920
Pro forma net income (loss) per share for SFAS No. 123:			
Basic	$ (1.37)	$ 1.54	$ 0.66
Diluted	$ (1.37)	$ 1.47	$ 0.63

The weighted average fair value of options at the date of grant was estimated using the Black-Scholes model and was $14.65 with the following assumptions in 2001: expected life of 5 years, weighted average interest rate of 4.27%, expected volatility of 83%, and no dividend yield. In 2000, the weighted average fair value of MKS options at the date of grant was $22.74, with the following assumptions: expected life of 5 years, weighted average interest rate of 6.37%, expected volatility of 88%, and no dividend yield. In 1999, the weighted average fair value of options at the date of grant was $9.54, with the following assumptions: expected life of 5 years, weighted average interest rate of 5.49%, expected volatility of 64%, and no dividend yield.

The fair value of purchase rights granted in 2001, 2000 and 1999 under the Purchase Plan was $7.19, $7.64 and $5.11, respectively. The fair value of the employees' purchase rights was estimated using the Black-Scholes model with the following assumptions in 2001: expected life of 6 months, interest rate of 5.03%, expected volatility of 83%, and no dividend yield. In 2000, the following assumptions were made: expected life of 6 months, interest rate of 5.57%, expected volatility of 88%, and no dividend yield. In 1999, the following assumptions were made: expected life of 6 months, interest rate of 4.87%, expected volatility of 64%, and no dividend yield.

The weighted average fair value of ASTeX options granted during fiscal 2000 and 1999 was $18.53 and $4.08, respectively.

The fair value of each ASTeX option grant was estimated on the date of grant using the Black-Scholes option-pricing model with the following weighted average assumptions used for grants issued in fiscal 2000 and 1999: no dividend yield for all years; expected volatility of 72% and 82% for 2000 and 1999, respectively; risk-free interest rates of 5.92% for 2000 grants and 4.72% for 1999 grants; and expected lives of 4 years for all grants.

Accumulated Other Comprehensive Income

The balance of accumulated other comprehensive income (loss) was comprised of the following:

	Cumulative Translation Adjustments	Financial Instruments Designated as Cash Flow Hedges and Unrealized Gain (loss) on Investment	Accumulated Other Comprehensive Income (loss)
Balance at December 31, 1999	$1,132	$(228)	$904
Foreign currency translation adjustment, net of taxes of $628	(1,056)	---	(1,056)
Changes in value of financial instruments designated as cash flow hedges, net of taxes of $(359)	---	603	603
Balance at December 31, 2000	$76	$ 375	$451
Foreign currency translation adjustment, net of taxes of $854	(1,209)		(1,209)
Changes in value of financial instruments designated as cash flow hedges and unrealized gain (loss) on investments, net of taxes of $38		104	104
Balance at December 31, 2001	$ (1,133)	$ 479	$(654)

10) Income Taxes

Prior to its initial public offering, MKS was treated as an S corporation for federal income tax purposes. As an S corporation, the Company was not subject to federal, and certain state, income taxes. MKS terminated its S corporation status upon the closing of its initial public offering in 1999 and became subject to taxes at C corporation tax rates. This change in tax status and tax rates resulted in a non-recurring, non-cash deferred tax credit to net income of $3,770,000 and a deferred tax charge to other comprehensive income of $497,000 in 1999.

The Pre-IPO stockholders are liable for individual Federal, and certain state, income taxes on their allocated portions of the MKS taxable income as an S corporation. For the tax year ending December 31, 1999, the Pre-IPO stockholders were allocated a portion of the MKS 1999 taxable income. A reconciliation of the Company's 2001, 2000 and 1999 effective tax rate to the U.S. federal statutory rate follows:

	2001	2000	1999
U.S. Federal income tax statutory rate	(35.0)%	35.0%	35.0%
Non-recurring deferred tax credit	---	---	(13.7)
Pre-IPO stockholder 1999 allocated taxable income	---	---	(7.3)
Nondeductible goodwill and merger expenses	7.6	0.7	---
State income taxes, net of federal benefit	(3.2)	3.3	2.4
Effect of foreign operations taxed at various rates	(0.6)	0.7	2.3
Foreign sales corporation tax benefit	(1.1)	(1.2)	(1.7)
Other	(0.3)	(1.2)	(0.3)
	(32.6)%	37.3%	16.7%

The components of income before income taxes and the historical related provision for income taxes consist of the following:

	Year Ended December 31,		
	2001	2000	1999
Income (loss) before income taxes:			
United States	$(52,571)	$87,654	$23,689
Foreign	6,515	8,456	3,678
	(46,056)	96,110	27,367
Current taxes:			
United States Federal	(5,892)	29,778	6,514
State	337	5,203	1,291
Foreign	1,994	3,697	1,806
	(3,561)	38,678	9,611
Deferred taxes:			
United States Federal	(8,842)	(2,593)	(4,804)
State and Foreign	(2,610)	(235)	(226)
	(11,452)	(2,828)	(5,030)
Provision for income taxes	$(15,013)	$ 35,850	$ 4,581

At December 31, 2001 and 2000 the components of the deferred tax asset and deferred tax liability were as follows:

	2001	2000
Deferred tax assets (liabilities):		
Inventories	$10,054	$4,086
Intercompany profits	3,094	2,572
Net operating loss carryforwards	4,046	45
Depreciable assets	1,395	1,457
Compensation and accrued liabilities	1,779	1,236
Investment booked under the equity method	(885)	(753)
Other	1,387	328
Total	$20,870	$8,971

At December 31, 2001, MKS had approximately $6,857,000 of net operating loss carryforwards which arose as part of the Company's acquisition of On-Line. The future utilization of these net operating losses, which begin to expire in 2009, may

be limited by the change of ownership rules under Section 382 of the Internal Revenue Code. In addition, at December 31, 2001, MKS also has approximately $21,946,000 of state net operating loss carryforwards which begin to expire in 2006. The Company believes that it is more likely than not that the net deferred tax assets will be realized.

11) Employee Benefit Plans

The Company has a 401(k) profit-sharing plan for U.S. employees meeting certain requirements in which eligible employees may contribute from 1% up to 12% of their compensation. The Company, at its discretion, may provide a matching contribution which will generally match up to the first 2% of each participant's compensation, plus 25% of the next 4% of compensation. At the discretion of the Board of Directors, the Company may also make additional contributions for the benefit of all eligible employees. The Company's contributions are generally paid annually, and were $2,960,000 and $2,371,000 for the years ended December 31, 2000 and 1999. Approximately $2,184,000 has been expensed as the estimated Company contribution for the year ended December 31, 2001.

The Company maintains a bonus plan which provides cash awards to key employees, at the discretion of the Compensation Committee of the Board of Directors, based upon operating results and employee performance. Bonus expense to key employees was $0, $7,579,000, and $3,900,000 for the years ended December 31, 2001, 2000 and 1999, respectively.

12) Segment Information and Significant Customer

See Note 1 for a brief description of the Company's business. The Company is organized around four principal operating segments domestically and by geographic locations internationally. The Company's current domestic operating segments qualify for aggregation under SFAS 131, "Disclosure About Segments of an Enterprise and Related Information," as the products are manufactured and distributed in a similar manner, have similar long-term margins and are sold to a similar customer base. The Company has three reportable segments: North America, Far East, and Europe. Net sales to unaffiliated customers are based on the location in which the sale originated. Transfers between geographic areas are at negotiated transfer prices and have been eliminated from consolidated net sales. Income from operations consists of total net sales less operating expenses and does not include either interest income, interest expense or income taxes. The Company had one customer comprising 18%, 30% and 29% of net sales for the years ended December 31, 2001, 2000 and 1999, respectively.

	Year Ended December 31, 2001			
	United States	Far East	Europe	Total
Net sales to unaffiliated customers	$196,768	$49,964	$40,076	$286,808
Intersegment net sales	46,907	1,012	984	48,903
Depreciation and amortization	25,718	406	581	26,705
Income (loss) from operations	(55,414)	2,878	5,176	(47,360)
Segment assets	358,786	29,063	23,340	411,189
Long-lived assets	122,445	5,543	5,284	133,272
Capital expenditures	13,491	616	531	14,638

	Year Ended December 31, 2000			
	United States	Far East	Europe	Total
Net sales to unaffiliated customers	$358,777	$67,015	$41,060	$466,852
Intersegment net sales	68,753	1,411	1,307	71,471
Depreciation and amortization	14,072	227	576	14,875
Income from operations	80,144	4,753	6,638	91,535
Segment assets	390,688	39,436	24,279	454,403
Long-lived assets	106,738	5,703	4,494	116,935
Capital expenditures	31,019	154	995	32,168

	Year Ended December 31, 1999			
	United States	Far East	Europe	Total
Net sales to unaffiliated customers	$200,223	$38,734	$26,335	$265,292
Intersegment net sales	40,117	706	986	41,809
Depreciation and amortization	8,691	252	547	9,490
Income from operations	20,870	1,413	2,754	25,037
Segment assets	208,137	31,272	14,363	253,772
Long-lived assets	41,800	6,524	2,874	51,198
Capital expenditures	6,746	241	357	7,344

Included in the Far East are Japan, Korea, Singapore and Taiwan. Included in Europe are Germany, France and the United Kingdom. Net sales to unaffiliated customers from Japan were $34,816,000, $50,187,000 and $30,696,000 for the years ended December 31, 2001, 2000 and 1999, respectively. Long-lived assets within Japan amounted to $4,618,000, $5,460,000 and $6,266,000 at December 31, 2001, 2000 and 1999, respectively.

13) Acquisitions

During the three years ended December 31, 2001, the Company completed a number of purchase acquisitions. The Consolidated Financial Statements include the operating results of each business from the date of the acquisition. A summary of purchase transactions is outlined as follows:

Acquired Company	Consideration Including Assumed Liabilities	IPR&D	Purchased Intangible Assets	Goodwill
Fiscal 2001				
On-Line Technologies, Inc.	$23,829	$ 2,340	$ 6,410	$ 16,050
Fiscal 2000				
Compact Instrument Technology, LLC	$ 8,700	$ ---	$ 1,600	$ 7,600
Telvac Engineering, Ltd.	1,600	---	---	800
Spectra International, LLC	19,000	310	11,600	6,100
D.I.P., Inc.	14,000	---	8,900	4,300
Shamrock Product Line from Sputtered Films, Inc.	6,382	---	---	4,463
Total	$49,682	$ 310	$22,100	$ 23,263
Fiscal 1999				
PlasmaQuest, Inc.	$147	$---	$---	$393

The $23.8 million in consideration paid for the acquisition of On-Line Technologies, Inc. included 660,000 shares of MKS common stock valued at approximately $12.1 million. The consideration paid for the acquisitions of Compact Instrument Technology, LLC, Spectra International, LLC, and D.I.P., Inc. included 137,131 shares of MKS common stock valued at $8.4 million; 183,293 shares of MKS common stock valued at $6.5 million and fully vested options to purchase 83,675 shares of common stock valued at $2.4 million; and 231,392 shares of MKS common stock valued at $6.8 million, respectively. The Spectra International, LLC acquisition includes contingent earnout payments of up to an aggregate of $12,000,000 over 5 years, which will be treated as compensation expense as it is earned.

The amounts allocated to in-process research and development ("IPR&D") were determined through established valuation techniques and were expensed upon acquisition because technical feasibility had not been established and no future alternative uses existed. In connection with the acquisition of On-Line, the Company obtained an appraisal from an independent appraiser of the fair value of its intangible assets. This appraisal valued purchased IPR&D of various projects for the development of new products and technologies at approximately $2,340,000. The projects were generally expected to have durations of 24 to 48 months. Because the technological feasibility of products under development had not been established and no future alternative uses existed, the purchased IPR&D was written off during the quarter ended June 30, 2001. The value of the purchased IPR&D was determined using the income approach, which discounts expected future cash flows from projects under development to their net present value. Each project was analyzed to determine the technological innovations included; the utilization of core technology; the complexity, cost and time to complete development; any alternative future use or current technological feasibility; and the stage of completion. The cash flows derived from the in-process technology projects were discounted at a rate of 25%. The Company believes this rate was appropriate given the risks associated with the technologies for which commercial feasibility had not been established. The percentage of completion for each in-process project was determined by identifying the elapsed time invested in the project as a ratio of the total time required to bring the project to technical and commercial feasibility. The percentage of completion for in-process projects acquired ranged from 55% to 65%, based on management's estimates of tasks completed and the tasks to be completed to bring the projects to technological and commercial feasibility.

Development of in-process technology remains a substantial risk to the Company due to a variety of factors including the remaining effort to achieve technical feasibility, rapidly changing customer requirements and competitive threats from other companies and technologies.

Amounts allocated to purchased intangible assets are amortized on a straight-line basis over periods not exceeding seven years.

The following unaudited pro forma results of operations of the Company give effect to the acquisitions made in 2001 and 2000 as if the acquisitions had occurred at the beginning of 2000.

	Year Ended December 31,	
	2001	2000
Net sales	$ 288,028	$ 485,842
Net income (loss)	$ (32,994)	$ 57,267
Net income (loss) per share:		
Basic	$ (0.88)	$ 1.61
Diluted	$ (0.88)	$ 1.54

These unaudited pro forma results have been prepared for comparative purposes only and do not purport to be indicative of the results of operations which actually would have resulted had the acquisitions occurred at the beginning of the period, or which may result in the future.

Pooling of Interest Combinations

On January 26, 2001, MKS acquired ASTeX. Each outstanding share of ASTeX common stock was exchanged for 0.7669 newly issued shares of common stock of MKS, resulting in the issuance of approximately 11.2 million shares of common stock of MKS. The acquisition was accounted for under the pooling of interests method of accounting, and accordingly, the consolidated financial statements reflect the combined financial position and results of operations and cash flows of MKS Instruments, Inc. and ASTeX, for all periods presented.

14) Sale of Assets and Restructuring Charges

In August 2001, the Company sold assets for proceeds of approximately $9.0 million. The proceeds consist primarily of approximately $4.7 million in cash and $3.9 million in a note receivable. The note receivable matures August 7, 2004, bears an annual interest rate of 9.0% and is included in other assets. The loss on the transaction was $1,246,000 before taxes.

In December 2001, the Company sold an investment in a company for approximately $367,000. The loss on the transactions was $1,133,000 before taxes.

During 1999, the Company consolidated its Modesto, California operations into its Woburn, Massachusetts and Colorado Springs, Colorado sites. The Company also consolidated its Beverly, Massachusetts operation into its Woburn site. These consolidations resulted in a restructuring charge of $1,497,000. The restructuring charge consisted of severance relating to the termination of 70 employees, abandonment of leasehold improvements and fixed assets, and facility costs (primarily future lease payments relating to abandoned facilities).

Also during 1999, the Company announced the consolidation of its recently acquired PlasmaQuest operations based in Dallas, Texas into its newly leased space in Wilmington, Massachusetts. This consolidation has resulted in a restructuring charge of approximately $763,000, primarily consisting of severance relating to the termination of 16 employees, abandonment of leasehold improvements and fixed assets, and facility costs (primarily future lease payments relating to the abandoned facility).

The following table summarizes the recorded accruals and uses of the 1999 restructuring and impairment actions:

	Asset impairments	Severance benefits	Exit costs	Total
First Quarter Restructuring				
Total charge	$ 606	$ 579	$ 312	$ 1,497
Cash payments	(8)	(546)	(140)	(694)
Noncash items	(598)	---	---	(598)
Adjustments of accrual	---	(33)	2	(31)
Accrual balance as of December 31, 1999	$ ---	$ ---	$ 174	$ 174
Cash payments	---	---	(172)	(172)
Adjustment of accrual	---	---	(2)	(2)
Accrual balance as of December 31, 2000	$ ---	$ ---	$ ---	$ ---
Fourth Quarter Restructuring				
Total charges	$ 183	$ 196	$ 384	$ 763
Noncash items	(183)	---	---	(183)
Accrual balance as of December 31, 1999	---	196	384	580
Cash payments	---	(196)	(340)	(536)
Adjustment of accrual	---	---	(44)	(44)
Accrual balance as of December 31, 2000	$ ---	$ ---	$ ---	$ ---

15) Intangible Assets

Intangible assets include the following at December 31:

(in thousands)	2001	2000	Useful Lives
Patents, completed technology and other acquired intangibles	$28,736	$22,965	3 – 7 years
Goodwill	40,271	28,508	5 – 7 years
	$69,007	$51,473	
Less: accumulated amortization	(16,722)	(6,148)	
	$52,285	$45,325	

16) Subsequent Event

On January 31, 2002, the Company completed its acquisition of the ENI Business of Emerson Electric Co. ("Emerson"), pursuant to an Agreement and Plan of Merger with respect to the acquisition of the ENI Business dated October 30, 2001 (the "Acquisition Agreement") between the Company and Emerson. The Company issued an aggregate of 12.0 million shares of its common stock to Emerson, in exchange for the businesses and assets of ENI. The acquisition has been accounted for under the purchase method.

The reasons for the acquisition of ENI was based upon the ability to offer higher value and more highly integrated application solutions by combining ENI's solid-state power conversion technology with the Company's core competency in plasma and reactive gas solutions.

The value of the MKS common stock was approximately $21.77 per share based on the average closing price of MKS' common stock for the five-day period including the date of the announcement of the signing of the acquisition agreement and the two days preceding and succeeding such date.

The purchase consideration is as follows:

Common stock	$261,264
Estimated transaction expenses	4,150
	$265,414

The preliminary allocation of the purchase price is summarized below:

Accounts receivable	$4,801
Inventories	21,440
Property and equipment	19,282
Developed technology	30,500
Patents	4,100
In-process research and development	7,300
Goodwill	196,759
Other net liabilities	(5,199)
Deferred tax liability	(13,569)
	$265,414

The actual purchase price allocation is dependent upon the finalization of the preliminary valuation report.

The $7,300,000 allocated to in-process research and development represents the purchased in-process technology for projects that, as of the date of the acquisition, had not yet reached technological feasibility and had no future alternative use. The projects were generally expected to have durations of up to 12 months. Based on preliminary assessments, the value of these projects was determined by estimating the resulting net cash flows from the sale of the products resulting from the completion of the projects, reduced by the portion of the revenue attributable to developed technology and the percentage of completion of the project. The resulting cash flows were then discounted back to their present value at appropriate discount rates.

The nature of the efforts to develop the purchased in-process research and development into commercially viable products principally relates to the completion of all planning, designing, prototyping and testing activities that are necessary to establish that the product can be produced to meet its design specification including function, features and technical performance requirements. The resulting net cash flows from such products are based on estimates of revenue, cost of revenue, research and development costs, sales and marketing costs, and income taxes from such projects.

The amounts allocated to in-process research and development will be charged to the statements of operations in the first quarter of fiscal 2002.

Goodwill represents the excess of purchase price over the fair value of the underlying net identifiable assets. The deferred tax liability relates to differences between book and tax bases of acquired assets and liabilities assumed.

MKS Instruments, Inc.
Supplemental Financial Data
(Unaudited)

	Quarter Ended			
	Mar 31	Jun 30	Sep 30	Dec 31
2001				
Statement of Income (Loss) Data				
Net sales	$110,888	$ 72,656	$ 53,201	$ 50,063
Gross profit (1)	43,195	25,818	16,096	474
Income (loss) from operations	(681)	(6,296)	(13,701)	(26,682)
Net income (loss)	(2,105)	(4,182)	(9,071)	(15,685)
Net income (loss) per share				
Basic	$ (0.06)	$ (0.11)	$ (0.24)	$ (0.41)
Diluted	$ (0.06)	$ (0.11)	$ (0.24)	$ (0.41)
2000				
Statement of Income Data				
Net sales	$ 96,158	$108,767	$121,769	$140,158
Gross profit	41,225	48,981	54,419	60,771
Income from operations	18,504	22,277	24,417	26,337
Net income	11,959	14,449	15,955	17,897
Net income per share				
Basic	$ 0.36	$ 0.43	$ 0.47	$ 0.49
Diluted	$ 0.34	$ 0.41	$ 0.44	$ 0.47

(1) Gross profit for the year ended December 31, 2001 includes special charges for excess and obsolete inventory of $14.0 million in the fourth quarter of 2001 and $2.6 million in the second quarter of 2001. These charges were significantly higher than normal and were primarily caused by a significant reduction in demand, including reduced demand for older technology products.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

None.

PART III

Item 10. Directors and Officers of the Registrant

The information required by this item is set forth under the captions "Election of Directors" and "Executive Officers" in our Proxy Statement for the 2002 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 11. Executive Compensation

The information required by this item is set forth under the caption "Executive Compensation" in our Proxy Statement for the 2002 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management

The information required by this item is set forth under the caption "Security Ownership of Certain Beneficial Owners and Management" in our Proxy Statement for the 2002 Annual Meeting of Stockholders and is incorporated herein by reference.

Item 13. Certain Relationships and Related Transactions

The information required by this item is set forth under the caption "Certain Relationships and Related Transactions" in our Proxy Statement for the 2002 Annual Meeting of Stockholders and is incorporated herein by reference.

PART IV

Item 14. Exhibits, Financial Schedules and Reports on Form 8-K

(a) The following documents are filed as a part of this Report:

(1) Financial Statements. See below for index to Consolidated Financial Statements under Item 8.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS AND FINANCIAL STATEMENT SCHEDULE

Financial Statements:

Report of Independent Accountants	27-28
Consolidated Balance Sheets at December 31, 2001 and 2000	29
Consolidated Statements of Income for the years ended December 31, 2001, 2000 and 1999	30
Consolidated Statements of Stockholders' Equity for the years ended December 31, 2001, 2000 and 1999	31
Consolidated Statements of Cash Flows for the years ended December 31, 2001, 2000 and 1999	32
Notes to Consolidated Financial Statements	33

Financial Statement Schedule:

Schedule II -Valuation and Qualifying Accounts	53

MKS Instruments, Inc.
SCHEDULE II - VALUATION AND QUALIFYING ACCOUNTS
For the years ended December 31, 1999, 2000 and 2001

Description	Column A Balance at Beginning of Year	Column B Charged to Costs and Expenses	Column C Charged to Other Accounts	Column D Deductions	Column E Balance at End of Year
Year ended December 31, 1999:					
Allowance for doubtful accounts	$1,033,439	$659,979	$98,625	$122,972	$ 1,669,071
Year Ended December 31, 2000:					
Allowance for doubtful accounts	$1,669,071	$978,893	$ ---	$694,178	$ 1,953,786
Year Ended December 31, 2001:					
Allowance for doubtful accounts	$1,953,786	$1,711,395	$ ---	$382,927	$ 3,282,254

(2) Exhibits.

(a) The Exhibits listed in Exhibit Index immediately preceding such Exhibits are filed as part of this Annual Report on Form 10-K.

Exhibit No.	Title
+3.2(1)	Restated Articles of Organization
+3.3(2)	Articles of Amendment
+3.4(3)	Amended and Restated By-Laws
+4.1(3)	Specimen certificate representing the common stock
10.1	Amended and Restated 1995 Stock Incentive Plan and Amendments thereto
+10.2(4)	Applied Science and Technology, Inc. 1993 Stock Option Plan, as amended
+10.3(4)	Applied Science and Technology, Inc. 1994 Formula Stock Option Plan, as amended
+10.4(3)	1996 Amended and Restated Director Stock Option Plan
+10.5(3)	1997 Director Stock Option Plan
10.6	Amended and Restated 1999 Employee Stock Purchase Plan
+10.7(5)	MKS Instruments, Inc. International Employee Stock Purchase Plan
10.8	MKS Instruments, Inc. International Employee Stock Purchase Plan 2001 Amendment
+10.9(3)	Amended and Restated Employment Agreement dated as of December 15, 1995 between Leo Berlinghieri and the Registrant
+10.10(3)	Amended and Restated Employment Agreement dated as of December 15, 1995 between Ronald C. Weigner and the Registrant
+10.11(3)	Amended and Restated Employment Agreement dated as of December 15, 1995 between William D. Stewart and the Registrant
+10.12(6)	Employment Agreement dated as of December 6, 1999 between Robert Klimm and the Registrant
+10.13(7)	Employment Agreement dated as of March 10, 2000 between the Registrant and Donald Smith
+10.14(1)	Employment Agreement dated as of October 18, 2000 between the Registrant and F. Thomas McNabb
+10.15(3)	Lease Agreement dated as of October 12, 1989, as extended November 1, 1998, by and between Aspen Industrial Park Partnership and the Registrant
+10.16(3)	Lease dated as of September 21, 1995 by and between General American Life Insurance Company and the Registrant
+10.17(3)	Lease dated as of January 1, 1996 between MiFuji Kanzai Co. Ltd. and the Registrant (covering Floor 5)
+10.18(3)	Lease dated as of April 21, 1997 between MiFuji Kanzai Co. Ltd. and the Registrant (covering Floors 1 and 2)
+10.19(1)	Lease dated as of August 9, 2000 between Aspen Industrial Partnership, LLP and the Registrant
+10.20(3)	Loan Agreement dated as of November 1, 1993, as last amended January 1, 2001, between Fleet National Bank (f/k/a The First National Bank of Boston) and the Registrant
+10.21(6)	First Amended and Restated Loan Agreement dated as of January 1, 2000 between Fleet National Bank (f/k/a BankBoston, N.A.), The Chase Manhattan Bank, and the Registrant
+10.22(8)	Second Amendment dated as of January 1, 2001 to First Amended and Restated Loan Agreement dated as of January 1, 2000 among Fleet National Bank (f/k/a BankBoston, N.A.), The Chase Manhattan Bank and the Registrant
10.23(9)	Credit Agreement dated July 31, 2001 between Fleet National Bank as Agent and Lender, The Chase Manhattan Bank as Lender, and Registrant as Borrower

+10.24(9)	Ninth Amendment dated July 31, 2001 to the Loan Agreement dated October 31, 1995 between Fleet National Bank as Lender and the Registrant as Borrower
10.25	Consent, Waiver and First Amendment to Credit Agreement dated as of January 28, 2002 between MKS and Fleet National Bank and JP Morgan Chase Bank
10.26	Consent, Waiver and Tenth Amendment to Loan Agreement dated as of January 28, 2002 between MKS and Fleet National Bank
+10.27(10)	Loan Agreement between ASTeX Realty Corp. and Citizens Bank of Massachusetts, dated March 6, 2000 (the "Loan Agreement")
+10.28(10)	Exhibit A to the Loan Agreement
+10.29(3)	Split-Dollar Agreement dated as of September 12, 1991 between the Registrant, John R. Bertucci and Claire R. Bertucci and Richard S. Chute, Trustees of the John R. Bertucci Insurance Trust of January 10, 1986
+10.30(3)	Split-Dollar Agreement dated as of September 12, 1991 between the Registrant, John R. Bertucci and John R. Bertucci and Thomas H. Belknap, Trustees of the Claire R. Bertucci Insurance Trust of January 10, 1986
+10.31(3)	Form of Tax Indemnification and S Corporation Distribution Agreement
+10.32(11)	Agreement and Plan of Merger with respect to the Acquisition of the ENI Business dated October 30, 2001 between the Registrant and Emerson Electric Co.
+10.33(12)	Shareholder Agreement dated as of January 31, 2002 among the Registrant and Emerson Electric Co.
21.1	Subsidiaries of the Registrant
23.2	Consent of PricewaterhouseCoopers LLP
23.3	Consent of KPMG LLP

+ Previously filed

(1) Incorporated by reference to the Registration Statement on Form S-4 (File No. 333-49738) filed with the Securities and Exchange Commission on November 13, 2000, as amended.

(2) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the three and six months ended June 30, 2001.

(3) Incorporated by reference to the Registration Statement on Form S-1 (file No. 333-71363) filed with the Securities and Exchange Commission on January 28, 1999, as amended.

(4) Incorporated by reference to the Registration Statement on Form S-8 (File No. 333-54490) filed with the Securities and Exchange Commission on January 29, 2001, as amended.

(5) Incorporated by reference to the Registration Statement on Form S-8 (File No. 333-31224) filed with the Securities and Exchange Commission on February 28, 2000.

(6) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the fiscal year ended December 31, 1999.

(7) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2000.

(8) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the fiscal year ended December 31, 2000.

(9) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2001.

(10) Incorporated by reference to Applied Science and Technology, Inc.'s Quarterly Report on Form 10-Q for the quarter ended March 25, 2000.

(11) Incorporated by reference to the Registrant's Definitive Proxy Statement on Schedule 14A (Commission File No. 000-23621) filed with the Securities and Exchange Commission on December 4, 2001.

(12) Incorporated by reference to the Registrant's report on Form 8-K filed with the Securities and Exchange Commission on February 12, 2002.

(b) Reports on Form 8-K.

The Company filed a Current Report on Form 8-K with the Securities and Exchange Commission on November 27, 2001 pertaining to the retroactive effect of the January 26, 2001 business combination of MKS Instruments, Inc. (the "Company") and Applied Science and Technology, Inc. ("ASTeX"), which was accounted for under the pooling of interest method of accounting.

The Company filed a report on Form 8-K with the Securities and Exchange Commission on November 7, 2001 announcing the execution of the Agreement and Plan of Merger, dated October 30, 2001, with respect to the acquisition of the ENI business between the Company and Emerson Electric Co.

(c) Exhibits.

The Company hereby files as exhibits to our Annual Report on Form 10-K those exhibits listed in Item 14(a)(2) above.

(d) Financial Statement Schedules.

Not applicable.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

MKS INSTRUMENTS, INC.

By: /s/ John R. Bertucci
John R. Bertucci
President, Chairman of the Board of Directors
and Chief Executive Officer
(Principal Executive Officer)

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities and on the date indicated.

SIGNATURES	TITLE	DATE
/s/ John R. Bertucci John R. Bertucci	President, Chairman of the Board of Directors and Chief Executive Officer (Principal Executive Officer)	March 29, 2002
/s/ Ronald C. Weigner Ronald C. Weigner	Vice President and Chief Financial Officer (Principal Financial and Accounting Officer)	March 29, 2002
/s/ Robert R. Anderson Robert R. Anderson	Director	March 29, 2002
/s/ James G. Berges James G. Berges	Director	March 29, 2002
/s/ Richard S. Chute Richard S. Chute	Director	March 29, 2002
/s/ Hans-Jochen Kahl Hans-Jochen Kahl	Director	March 29, 2002
/s/ Owen W. Robbins Owen W. Robbins	Director	March 29, 2002
/s/ Louis P. Valente Louis P. Valente	Director	March 29, 2002

Board of Directors

John R. Bertucci
Chairman, Chief Executive Officer and President
MKS Instruments, Inc.

Robert R. Anderson
Chairman and Chief Executive Officer (retired)
Yield Dynamics, Inc.

James G. Berges
President
Emerson Electric Co.

Richard S. Chute, Esquire
Hill & Barlow, a Professional Corporation

Hans-Jochen Kahl
Managing Director (retired)
Leybold AG

Owen W. Robbins
Executive Vice President (retired)
Teradyne, Inc.

Louis P. Valente
Chairman and Chief Executive Officer
Palomar Medical Technologies, Inc.

Management

John R. Bertucci
Chairman, Chief Executive Officer and President

Ronald C. Weigner
Vice President and Chief Financial Officer

Leo Berlinghieri
Vice President, Global Sales and Service

Paul Blackborow
Vice President, Corporate Marketing

Gerald G. Colella
Vice President, Global Business Operations

William P. Donlan
Vice President, Treasurer and Corporate Controller

Robert L. Klimm
Vice President and General Manager
ASTeX® Products

Edward L. Maier
Vice President and General Manager
ENI® Products

George E. Manning
Vice President, Global Human Resources

F. Thomas McNabb
Vice President and General Manager
Pressure Measurement and Control Products

Donald K. Smith
Vice President and Chief Technical Officer

John A. Smith
Vice President and General Manager
Materials Delivery and APC Products

William D. Stewart
Vice President and General Manager
HPS® Products

Corporate Headquarters

MKS Instruments, Inc.
Six Shattuck Road
Andover, Massachusetts 01810-2449
phone: 978.975.2350

Stockholder Information

Outside Counsel
Hale and Dorr, LLP
Boston, Massachusetts

Hill & Barlow, a Professional Corporation
Boston, Massachusetts

Independent Auditors
PricewaterhouseCoopers LLP
Boston, Massachusetts

Stock Listing
Nasdaq National Market
Symbol: MKSI

Transfer Agent
Fleet National Bank
c/o Equiserve
P.O. Box 43010
Providence, Rhode Island 02940-3010
phone: 816.843.4299
www.equiserve.com

Stockholders may direct inquiries or requests for information to:
Ronald C. Weigner
Vice President and Chief Financial Officer
MKS Instruments, Inc.
Six Shattuck Road
Andover, Massachusetts 01810-2449
phone: 978.975.2350
www.mksinst.com

Annual Meeting of Stockholders
May 16, 2002
10:00 a.m.
Andover Country Club
60 Canterbury Street
Andover, Massachusetts 01810

MKS Instruments, Inc.
Six Shattuck Road
Andover, Massachusetts 01810-2449
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