MKS INSTRUMENTS INC
Form 424B5
January 07, 2004

THE INFORMATION IN THIS PROSPECTUS SUPPLEMENT AND THE ACCOMPANYING PROSPECTUS IS NOT COMPLETE AND MAY BE CHANGED. THIS PROSPECTUS SUPPLEMENT AND THE ACCOMPANYING PROSPECTUS ARE NOT AN OFFER TO SELL THESE SECURITIES AND ARE NOT SOLICITING AN OFFER TO BUY THESE SECURITIES IN ANY STATE WHERE THE OFFER OR SALE IS NOT PERMITTED.

Filed Pursuant to Rule 424(b)(5)
Registration No. 333-109753

SUBJECT TO COMPLETION

PRELIMINARY PROSPECTUS SUPPLEMENT DATED JANUARY 6, 2004

PROSPECTUS SUPPLEMENT

(TO PROSPECTUS DATED NOVEMBER 18, 2003)

7,000,000 SHARES

[MKS LOGO]

COMMON STOCK

We are offering 2,000,000 shares of our common stock, and the selling stockholders are offering 5,000,000 shares of our common stock. We will not receive any proceeds from the sale of shares of our common stock by the selling stockholders.

Our common stock is traded on the Nasdaq National Market under the symbol "MKSI." The last reported sale price of our common stock on the Nasdaq National Market on January 5, 2004, was $29.93 per share.

INVESTING IN OUR COMMON STOCK INVOLVES A HIGH DEGREE OF RISK. SEE "RISK FACTORS" BEGINNING ON PAGE S-5 OF THE PROSPECTUS SUPPLEMENT.

	PER SHARE	TOTAL
Public offering price	$	$
Underwriting discount	$	$
Proceeds, before expenses, to MKS Instruments	$	$
Proceeds, before expenses, to the selling stockholders	$	$

The underwriters may also purchase up to an additional 300,000 shares from us and up to an additional 750,000 shares from the selling stockholders at the public offering price, less the underwriting discount, within 30 days from the date of this prospectus supplement to cover overallotments.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus supplement is truthful or complete. Any representation to the

contrary is a criminal offense.

The shares will be ready for delivery on or about , 2004.

MERRILL LYNCH & CO.

JPMORGAN

ADAMS, HARKNESS & HILL, INC.

NEEDHAM & COMPANY, INC.

The date of this prospectus supplement is , 2004.

[INSIDE FRONT COVER (PG. 2)]

This page is produced in four-color process. Amidst a shaded background, at the top center is the phrase "Broad Technology Portfolio for Controlling Advanced Manufacturing Processes." Two paragraphs appear at the bottom of this page, and are as follows:

"MKS Instruments is a leading worldwide provider of process control solutions for advanced manufacturing processes such as semiconductor device manufacturing and thin-film manufacturing for flat panel displays, optical storage media, architectural glass and electro-optical products. We also provide technology for medical imaging equipment."

"Our instruments, components and subsystems incorporate sophisticated technologies to power, measure, control and monitor increasingly complex gas-related semiconductor manufacturing processes, thereby enhancing our customers' uptime, yield and throughput, and improving their productivity and return on invested capital."

In the center of the page is a photo montage, displaying images of a semiconductor process chamber surrounded by several process control products. Each of these images has a text label adjacent to it.

(Labels for images)

"HELIUM COOLING SUBSYSTEM

MATERIALS DELIVERY

CONTROL & INFORMATION TECHNOLOGY

POWER DELIVERY

REACTIVE GAS GENERATION

COMPOSITION MONITORING

PRESSURE MANAGEMENT

EFFLUENT MANAGEMENT

PRESSURE CONTROL

VACUUM MEASUREMENT

VACUUM PROCESS COMPONENTS

EXHAUST MONITORING"

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PROSPECTUS SUPPLEMENT

PROSPECTUS

PROSPECTUS SUPPLEMENT SUMMARY

This summary highlights selected information contained elsewhere in this prospectus supplement and the accompanying prospectus. You should read the entire prospectus supplement and the accompanying prospectus carefully, including the "Risk Factors" section and our consolidated financial statements and related notes incorporated by reference into this prospectus supplement. The information in this prospectus supplement, unless otherwise indicated, assumes that the underwriters will not exercise their overallotment option.

MKS INSTRUMENTS, INC.

We are a leading worldwide provider of instruments, components,

subsystems and process control solutions that measure, control, power and monitor critical parameters of semiconductor and other advanced manufacturing processes.

We are organized into three product groups: Instruments and Control Systems, Power and Reactive Gas Products and Vacuum Products. Our products are derived from our core competencies in pressure measurement and control, materials delivery, gas and thin-film composition analysis, control and information management, power and reactive gas generation and vacuum technology.

Our products are used in diverse markets and applications including the manufacture of, among other things:

- semiconductor devices for diverse electronics applications;
- flat panel displays for hand-held devices, laptop computers, desktop computer monitors and television sets;
- magnetic and optical storage media;
- optical filters and fiber optic cables for data and telecommunications;
- optical coatings for eyeglasses, architectural glass and solar panels;
- magnetic resonance imaging (MRI) medical equipment;
- gas lasers;
- cutting tools; and
- freeze-dried pharmaceuticals.

We have a diverse base of customers that include manufacturers of semiconductor capital equipment, semiconductor devices, data storage equipment, medical equipment and flat panel displays, as well as industrial manufacturing companies, and university, government and industrial research laboratories. For the nine months ended September 30, 2003 and the year ended December 31, 2002, we estimate that approximately 67% and 70% of our net sales, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers.

Our objective is to be the leading worldwide provider of process control solutions used to help our customers enhance productivity and improve their return on invested capital. The principal elements of our solution and strategy to achieve this objective are:

- technology leadership;
- comprehensive product offering;
- global infrastructure and world class manufacturing capabilities;
- strategic acquisitions; and
- close working relationships with customers.

We are a Massachusetts corporation organized in June 1961. Our principal

executive offices are located at Six Shattuck Road, Andover, MA 01810, and our telephone number is (978) 975-2350. Our web site is located at www.mksinst.com. The information on our Internet web site is not incorporated by reference in this prospectus supplement. Unless the context otherwise requires, references in this prospectus supplement to "MKS," "we," "us," and "our" refer to MKS Instruments, Inc.

THE OFFERING

Common stock offered by:	
MKS Instruments	2,000,000 shares
Selling stockholders	5,000,000 shares
Total	7,000,000 shares
Common stock to be outstanding after this offering	53,772,761 shares
Use of proceeds	For general corporate purposes including working capital, product development and capital expenditures, as well as potential acquisitions. See "Use of Proceeds." We wi not receive any of the proceeds from the s of common stock by the selling stockholder
Nasdaq National Market symbol	MKSI

Our common stock to be outstanding after this offering is based on shares outstanding as of September 30, 2003 and excludes the following as of that date:

- 7,897,582 shares of common stock issuable upon the exercise of options outstanding as of such date at a weighted average exercise price of $19.59 per share;

- 4,563,344 shares of common stock reserved for future issuance under our stock option plans; and

- 327,739 shares of common stock reserved for sale under our employee stock purchase plans.

See "Capitalization" on page S-14 of this prospectus supplement and note 8 of notes to our 2002 consolidated financial statements, which are incorporated by reference into this prospectus supplement.

In addition, the underwriters have a 30-day option to purchase up to 300,000 additional shares from us and 750,000 additional shares from the selling stockholders to cover overallotments. Some of the disclosures in this prospectus supplement would be different if the underwriters exercise their overallotment option. Unless we tell you otherwise, the information in this prospectus supplement assumes that the underwriters will not exercise their overallotment option.

SUMMARY CONSOLIDATED FINANCIAL DATA

The summary consolidated financial data set forth below should be read in conjunction with "Selected Consolidated Financial Data," "Management's Discussion and Analysis of Financial Condition and Results of Operations" included elsewhere in this prospectus supplement and our consolidated financial

statements and the notes to the consolidated financial statements incorporated by reference into this prospectus supplement. Our historical results are not necessarily indicative of results for any future period. The "As Adjusted" column in the table below reflects the application of the net proceeds from the sale by us of the shares of common stock in this offering at an assumed public offering price of $29.93 per share and after the deduction of the underwriting discount and estimated offering expenses.

	YEAR ENDED DECEMBER 31,			NINE MONTHS ENDED SEPTEMBER 30, (UNAUDITED)	
	2002	2001	2000	2003	2002
	(IN THOUSANDS, EXCEPT PER SHARE DATA)				
STATEMENT OF OPERATIONS DATA(1):					
Net sales	$314,773	$286,808	$466,852	$235,513	$237,215
Gross profit(2)	105,795	85,583	205,396	80,573	80,760
Income (loss) from operations(3)	(43,047)	(47,360)	91,535	(18,155)	(32,227)
Net income (loss)(3)	(39,537)	(31,043)	60,260	(18,521)	(20,306)
Net income (loss) per share(3):					
Basic	(0.79)	(0.83)	1.74	(0.36)	(0.41)
Diluted	$ (0.79)	$ (0.83)	$ 1.67	$ (0.36)	$ (0.41)
Weighted average common shares:					
Basic	50,000	37,493	34,596	51,475	49,567
Diluted	50,000	37,493	36,170	51,475	49,567

	DECEMBER 31, 2002	SEPTEMBER 30, 2003 (UNAUDITED)	
		ACTUAL	AS ADJU
	(IN THOUSANDS)		
BALANCE SHEET DATA:			
Cash and cash equivalents	$ 88,820	$ 67,100	124,0
Short-term and long-term investments	55,874	66,756	66,7
Working capital	192,008	191,880	248,8
Total assets	685,623	673,185	730,1
Short-term obligations	18,472	16,780	16,7
Long-term obligations, less current portion	11,726	9,298	9,2
Stockholders' equity	610,690	599,804	656,7

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(1) Amounts have been restated to reflect the acquisition of Applied Science and Technology, Inc. ("ASTeX") in a pooling of interests transaction effective January 26, 2001.

(2) Gross profit for the year ended December 31, 2001 includes significant charges for excess and obsolete inventory of $16.6 million. These charges were primarily caused by a significant reduction in demand, including reduced demand for older technology products.

(3) Loss from operations, net loss and net loss per share for the year ended

December 31, 2002 includes restructuring and asset impairment charges of $2.7 million and purchase of in-process technology of $8.4 million. Loss from operations, net loss and net loss per share for the year ended December 31, 2001 includes restructuring and asset impairment charges of $3.7 million, merger expenses of $7.7 million and purchase of in-process technology of $2.3 million. Loss from operations, net loss and net loss per share for the nine months ended September 30, 2003 includes restructuring, asset impairment and other charges of $0.6 million. Loss from operations, net loss and net loss per share for the nine months ended September 30, 2002 includes restructuring and asset impairment charges of $2.4 million and purchase of in-process technology of $8.4 million.

RISK FACTORS

An investment in our common stock involves a high degree of risk. You should carefully consider the risks described below and all of the other information contained in this prospectus supplement and the accompanying prospectus before deciding whether to purchase our common stock. The risks and uncertainties described below are not the only risks and uncertainties we face. Additional risks and uncertainties not presently known to us or that we currently deem immaterial may also impair our business operations. If any of the following risks actually occur, our business, financial condition and results of operations would suffer. In such case, the trading price of our common stock could decline, and you may lose all or part of your investment in our common stock.

OUR BUSINESS DEPENDS SUBSTANTIALLY ON CAPITAL SPENDING IN THE SEMICONDUCTOR INDUSTRY WHICH IS CHARACTERIZED BY PERIODIC FLUCTUATIONS THAT MAY CAUSE A REDUCTION IN DEMAND FOR OUR PRODUCTS.

We estimate that approximately 67%, 70%, 64% and 76% of our net sales for the nine months ended September 30, 2003 and the years ended December 31, 2002, 2001 and 2000, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers, and we expect that sales to such customers will continue to account for a substantial majority of our sales. Our 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 our 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. Most recently, in 2001, 2002 and 2003, we have experienced a significant reduction in demand from OEM customers, and lower gross margins due to reduced absorption of manufacturing overhead. As a result of this significant reduction in demand, particularly for older technology products, we incurred significant charges for excess and obsolete inventory of $16.6 million in 2001. 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. We cannot be certain that semiconductor downturns will not continue or 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 our business, financial condition and results of operations.

OUR QUARTERLY OPERATING RESULTS HAVE VARIED, AND ARE LIKELY TO CONTINUE TO VARY SIGNIFICANTLY. THIS MAY RESULT IN VOLATILITY IN THE MARKET PRICE OF OUR COMMON STOCK.

A substantial portion of our shipments occur shortly after an order is received and therefore we operate with a low level of backlog. As a result, a decrease in demand for our products from one or more customers could occur with limited advance notice and could have a material adverse effect on our results of operations in any particular period. A significant percentage of our 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 our results of operations. Factors that could cause fluctuations in our 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, the semiconductor capital equipment market experienced a significant downturn during 2001, 2002 and 2003. As a result, we experienced a reduction in demand from OEM customers, which has had a material adverse effect on our quarterly operating results during these years. During 2001, gross margins were negatively affected by significant charges for excess and obsolete inventory of $2.6 million in the second quarter and $14.0 million in the fourth quarter. These charges 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 we may in the future experience quarterly or annual fluctuations and that, in one or more future quarters, our operating results may fall below the expectations of public market analysts or investors. In any such event, the price of our common stock could decline significantly.

THE LOSS OF NET SALES TO ANY ONE OF OUR MAJOR CUSTOMERS WOULD LIKELY HAVE A MATERIAL ADVERSE EFFECT ON US.

Our top ten customers accounted for approximately 43%, 49%, 39% and 52% of our net sales for the nine months ended September 30, 2003 and the years ended December 31, 2002, 2001 and 2000, respectively. 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 our business, financial condition and results of operations. During the nine months ended September 30, 2003 and the years ended December 31, 2002, 2001 and 2000, one customer, Applied Materials, accounted for approximately 17%, 23%, 18% and 30%, respectively, of our net sales. None of our significant customers, including Applied Materials, has entered into an agreement requiring it to purchase any minimum quantity of our products. The demand for our products from our 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 of net sales 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. Our future success will continue to depend upon:

- our ability to maintain relationships with existing key customers;
- our ability to attract new customers;
- our ability to introduce new products in a timely manner for existing and new customers; and
- the success of our customers in creating demand for their capital equipment products which incorporate our products.

AS PART OF OUR BUSINESS STRATEGY, WE HAVE ENTERED INTO AND MAY ENTER INTO OR SEEK TO ENTER INTO BUSINESS COMBINATIONS AND ACQUISITIONS THAT MAY BE DIFFICULT TO INTEGRATE, DISRUPT OUR BUSINESS, DILUTE STOCKHOLDER VALUE OR DIVERT MANAGEMENT ATTENTION.

We have made several acquisitions since 2000. As a part of our business strategy, we 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 our ongoing business and distraction of management, expenses related to the acquisition and potential unknown liabilities associated with acquired businesses.

As a result of our recent acquisitions, we have added several different decentralized accounting systems, resulting in a complex reporting environment. We expect that we will need to continue to modify our accounting policies, internal controls, procedures and compliance programs to provide consistency across all our operations.

If we are not successful in completing acquisitions that we may pursue in the future, we may be required to reevaluate our growth strategy, and we may incur substantial expenses and devote significant

management time and resources in seeking to complete proposed acquisitions that will not generate benefits for us.

In addition, with future acquisitions, we could use substantial portions of our available cash as all or a portion of the purchase price. We could also issue additional securities as consideration for these acquisitions, which could cause significant stockholder dilution. Our recent acquisitions and any future acquisitions may not ultimately help us achieve our strategic goals and may pose other risks to us.

WE HAVE HAD SIGNIFICANT OPERATING AND NET LOSSES, AND WE MAY HAVE FUTURE LOSSES.

We have not reported an annual operating profit or annual net income since 2000. We cannot predict whether we will experience operating losses and net losses in the future.

AN INABILITY TO CONVINCE SEMICONDUCTOR DEVICE MANUFACTURERS TO SPECIFY THE USE OF OUR PRODUCTS TO OUR CUSTOMERS THAT ARE SEMICONDUCTOR CAPITAL EQUIPMENT MANUFACTURERS WOULD WEAKEN OUR COMPETITIVE POSITION.

The markets for our products are highly competitive. Our competitive success often depends upon factors outside of our 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,

our success will depend in part on our ability to have semiconductor device manufacturers specify that our products be used at their semiconductor fabrication facilities. In addition, we may encounter difficulties in changing established relationships of competitors that already have a large installed base of products within such semiconductor fabrication facilities.

IF OUR PRODUCTS ARE NOT DESIGNED INTO SUCCESSIVE GENERATIONS OF OUR CUSTOMERS' PRODUCTS, WE 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. Our success depends on our products being designed into new generations of equipment for the semiconductor industry. We must develop products that are technologically current so that they are positioned to be chosen for use in each successive generation of semiconductor capital equipment. If our products are not chosen by our customers, our net sales may be reduced during the lifespan of our customers' products. In addition, we must make a significant capital investment to develop products for our customers well before our products are introduced and before we can be sure that we will recover our capital investment through sales to the customers in significant volume. We are thus also at risk during the development phase that our products may fail to meet our customers' technical or cost requirements and may be replaced by a competitive product or alternative technology solution. If that happens, we may be unable to recover our development costs.

THE SEMICONDUCTOR INDUSTRY IS SUBJECT TO RAPID DEMAND SHIFTS WHICH ARE DIFFICULT TO PREDICT. AS A RESULT, OUR INABILITY TO EXPAND OUR MANUFACTURING CAPACITY IN RESPONSE TO THESE RAPID SHIFTS MAY CAUSE A REDUCTION IN OUR MARKET SHARE.

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

WE OPERATE IN A HIGHLY COMPETITIVE INDUSTRY.

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

- historical customer relationships;
- product quality, performance and price;
- breadth of product line;
- manufacturing capabilities; and
- customer service and support.

Although we believe that we compete favorably with respect to these

factors, there can be no assurance that we will continue to do so. We encounter substantial competition in most of our product lines. Certain of our competitors may have greater financial and other resources than we have. In some cases, competitors are smaller than we are, but well established in specific product niches. We may encounter difficulties in changing established relationships of competitors with a large installed base of products at such customers' fabrication facilities. In addition, our 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 our products.

SALES TO FOREIGN MARKETS CONSTITUTE A SUBSTANTIAL PORTION OF OUR NET SALES; THEREFORE, OUR NET SALES AND RESULTS OF OPERATIONS COULD BE ADVERSELY AFFECTED BY DOWNTURNS IN ECONOMIC CONDITIONS IN COUNTRIES OUTSIDE OF THE UNITED STATES.

International sales include sales by our foreign subsidiaries, but exclude direct export sales, which were less than 10% of our total net sales for the nine months ended September 30, 2003 and each of the years ended December 31, 2002, 2001 and 2000. International sales accounted for approximately 41%, 36%, 31% and 23% of net sales for the nine months ended September 30, 2003 and the years ended December 31, 2002, 2001 and 2000, respectively, a significant portion of which were sales to Japan.

We anticipate that international sales will continue to account for a significant portion of our net sales. In addition, certain of our key domestic customers derive a significant portion of their revenues from sales in international markets. Therefore, our sales and results of operations could be adversely affected by economic slowdowns and other risks associated with international sales.

RISKS RELATING TO OUR INTERNATIONAL OPERATIONS COULD ADVERSELY AFFECT OUR OPERATING RESULTS.

We have substantial international sales, service and manufacturing operations in Europe and Asia, which expose us to foreign operational and political risks that may harm our business. Our international operations are subject to inherent risks, which may adversely affect us, including:

- political and economic instability in countries where we have sales, service and manufacturing operations, particularly in Asia;
- fluctuations in the value of currencies and high levels of inflation, particularly in Asia and Europe;
- changes in labor conditions and difficulties in staffing and managing foreign operations, including, but not limited to, labor unions;
- greater difficulty in collecting accounts receivable and longer payment cycles;
- burdens and costs of compliance with a variety of foreign laws;
- increases in duties and taxation;
- imposition of restrictions on currency conversion or the transfer of funds;
- changes in export duties and limitations on imports or exports;

- expropriation of private enterprises; and

- unexpected changes in foreign regulations.

If any of these risks materialize, our operating results may be adversely affected.

UNFAVORABLE CURRENCY EXCHANGE RATE FLUCTUATIONS MAY LEAD TO LOWER GROSS MARGINS, OR MAY CAUSE US TO RAISE PRICES WHICH COULD RESULT IN REDUCED SALES.

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

KEY PERSONNEL MAY BE DIFFICULT TO ATTRACT AND RETAIN.

Our 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 our business, financial condition and results of operations. We believe that our future success will depend in part on our ability to attract and retain highly skilled technical, financial, managerial and marketing personnel. We cannot be certain that we will be successful in attracting and retaining such personnel.

OUR PROPRIETARY TECHNOLOGY IS IMPORTANT TO THE CONTINUED SUCCESS OF OUR BUSINESS. OUR FAILURE TO PROTECT THIS PROPRIETARY TECHNOLOGY MAY SIGNIFICANTLY IMPAIR OUR COMPETITIVE POSITION.

As of September 30, 2003, we owned 185 U.S. patents, 126 foreign patents and had 83 pending U.S. patent applications. Although we seek to protect our intellectual property rights through patents, copyrights, trade secrets and other measures, we cannot be certain that:

- we will be able to protect our technology adequately;

- competitors will not be able to develop similar technology independently;

- any of our pending patent applications will be issued;

- intellectual property laws will protect our intellectual property rights; or

- third parties will not assert that our products infringe patent, copyright or trade secrets of such parties.

PROTECTION OF OUR INTELLECTUAL PROPERTY RIGHTS MAY RESULT IN COSTLY LITIGATION.

Litigation may be necessary in order to enforce our patents, copyrights

or other intellectual property rights, to protect our trade secrets, to determine the validity and scope of the proprietary rights of others or to defend against claims of infringement. We have been in the past, and currently are, involved in lawsuits enforcing our intellectual property rights, and may be involved in such litigation in the future. Such litigation could result in substantial costs and diversion of resources and could have a material adverse effect on our business, financial condition and results of operations.

We may need to expend significant time and expense to protect our intellectual property regardless of the validity or successful outcome of such intellectual property claims. If we lose any

litigation, we may be required to seek licenses from others or change, stop manufacturing or stop selling some of our products.

THE MARKET PRICE OF OUR COMMON STOCK HAS FLUCTUATED AND MAY CONTINUE TO FLUCTUATE FOR REASONS OVER WHICH WE HAVE NO CONTROL.

The stock market has from time to time experienced, and is likely to continue to experience, extreme price and volume fluctuations. 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 our common stock has fluctuated greatly since our 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 we were the object of securities class action litigation, it could result in substantial costs and a diversion of our management's attention and resources.

OUR DEPENDENCE ON SOLE, LIMITED SOURCE SUPPLIERS, AND INTERNATIONAL SUPPLIERS, COULD AFFECT OUR ABILITY TO MANUFACTURE PRODUCTS AND SYSTEMS.

We rely on sole, limited source suppliers, and international suppliers, for a few of our components and subassemblies that are critical to the manufacturing of our 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 our suppliers to develop technologically advanced products to support our growth and development of new systems.

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

WE ARE SUBJECT TO GOVERNMENTAL REGULATIONS. IF WE FAIL TO COMPLY WITH THESE

REGULATIONS, OUR BUSINESS COULD BE HARMED.

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

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

CERTAIN STOCKHOLDERS HAVE A SUBSTANTIAL INTEREST IN US AND MAY BE ABLE TO EXERT SUBSTANTIAL INFLUENCE OVER OUR ACTIONS.

As of September 30, 2003, John R. Bertucci, who is our Chairman, Chief Executive Officer, President and a member of our board of directors, and certain members of his family, beneficially owned in the aggregate approximately 21% of our outstanding common stock. As a result, these stockholders, acting together, are able to exert substantial influence over our actions. Pursuant to the acquisition of the ENI business of Emerson Electric Co., we issued 12,000,000 shares of common stock to Emerson and its wholly owned subsidiary, Astec America Inc. Emerson owned approximately 23% of our outstanding common stock as of September 30, 2003, and James G. Berges, the President and a director of Emerson, is a member of our board of directors. Accordingly, Emerson is able to exert substantial influence over our actions.

SOME PROVISIONS OF OUR RESTATED ARTICLES OF ORGANIZATION, AS AMENDED, OUR AMENDED AND RESTATED BY-LAWS AND MASSACHUSETTS LAW COULD DISCOURAGE POTENTIAL ACQUISITION PROPOSALS AND COULD DELAY OR PREVENT A CHANGE IN CONTROL OF US.

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 price 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 we have no present plans to issue any preferred stock, our 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 us. The issuance of preferred stock could adversely affect the voting power of the holders of our common stock, including the loss of voting control to others. In addition, our amended and restated 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 us.

YOU WILL BE RELYING ON THE JUDGMENT OF OUR MANAGEMENT REGARDING OUR USE OF PROCEEDS.

We have not designated any specific use for the net proceeds from the sale of our common stock described in this prospectus supplement. Rather, we expect to use the net proceeds of this offering for general corporate purposes, including working capital, product development and capital expenditures, as well as potential acquisitions. Consequently, our management will have significant flexibility in applying the net proceeds. You will be relying on the judgment of our management regarding the application of the proceeds. Our management will have the ability to change the application of the proceeds of this offering without stockholder approval.

YOU WILL EXPERIENCE AN IMMEDIATE AND SUBSTANTIAL DILUTION IN THE BOOK VALUE OF YOUR INVESTMENT.

The public offering price of the common stock in this offering is higher than the tangible pro forma book value of our common stock on a per share basis after the offering. As a result, investors purchasing common stock in this offering will incur immediate and substantial dilution. In the past, we issued options to acquire common stock at prices significantly below the public offering price in this offering. To the extent these options are exercised, there will be further dilution to investors.

SPECIAL NOTE REGARDING FORWARD-LOOKING INFORMATION

This prospectus supplement includes and incorporates forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. These statements relate to future events or our future financial performance. The words "anticipates," "believes," "estimates," "expects," "intends," "may," "plans," "potential," "projects," "will," "would" and similar expressions and the negative of these terms are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. We cannot guarantee that we actually will achieve the plans, intentions or expectations disclosed in our forward-looking statements and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. We have included important factors in the cautionary statements included or incorporated in this prospectus supplement, particularly under the heading "Risk Factors," that we believe could cause actual results or events to differ materially from the forward-looking statements that we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make. We do not assume any obligation to update any forward-looking statements.

USE OF PROCEEDS

We estimate that the net proceeds from the sale of the 2,000,000 shares of our common stock, based on an assumed offering price of $29.93 per share, will be approximately $57.0 million, after deducting the underwriting discount and estimated offering expenses payable by us. If the underwriters exercise their overallotment option in full, we estimate the net proceeds from this offering will be approximately $65.6 million, after deducting the underwriting discount and estimated offering expenses payable by us.

We expect to use the net proceeds from this offering for general corporate purposes, including working capital, product development and capital

expenditures. We may also use a portion of the net proceeds to acquire other complementary products, technologies or businesses when the opportunity arises; however, we currently have no commitments or agreements with respect to any such transactions. As of the date of this prospectus supplement, we cannot specify with certainty the particular uses for the net proceeds we will receive in this offering. Accordingly, our management will have broad discretion in applying our net proceeds of this offering. Pending such uses, the net proceeds of this offering will be invested in investment grade, interest-bearing instruments.

PRICE RANGE OF OUR COMMON STOCK

Our common stock is traded on the Nasdaq National Market under the symbol "MKSI". The following table sets forth for the periods indicated the high and low sales prices per share of our common stock as reported by the Nasdaq National Market.

	HIGH	LOW
YEAR ENDED DECEMBER 31, 2001		
First Quarter	$24.63	$15.41
Second Quarter	31.97	17.13
Third Quarter	29.94	15.17
Fourth Quarter	27.67	16.16
YEAR ENDED DECEMBER 31, 2002		
First Quarter	$34.29	$22.05
Second Quarter	39.46	16.54
Third Quarter	20.75	9.75
Fourth Quarter	20.15	8.41
YEAR ENDED DECEMBER 31, 2003		
First Quarter	$20.44	$10.68
Second Quarter	21.15	11.79
Third Quarter	27.55	17.22
Fourth Quarter	29.41	20.36
YEAR ENDING DECEMBER 31, 2004		
First Quarter (through January 5, 2004)	$29.93	$28.60

On January 5, 2004, the last reported sale price of our common stock on the Nasdaq National Market was $29.93. As of September 30, 2003, there were 51,772,761 shares of our common stock outstanding held by approximately 216 holders of record.

DIVIDEND POLICY

We have never declared or paid any cash dividends. We currently intend to retain earnings, if any, to support our growth strategy and do not anticipate paying cash dividends in the foreseeable future. Payment of future dividends, if any, will be at the discretion of our board of directors after taking into account various factors, including our financial condition, operating results, current and anticipated cash needs, plans for expansion, and changes in tax and regulatory rulings.

CAPITALIZATION

The following table sets forth our capitalization as of September 30, 2003:

- on an actual basis; and

- on an as adjusted basis to reflect the sale of 2,000,000 shares of our common stock by us at an assumed public offering price of $29.93 per share after deducting the estimated underwriting discount and offering expenses payable by us.

	AS OF SEPTEMBER 30, 2003	
	(UNAUDITED)	
	ACTUAL	AS ADJUSTED
	(IN THOUSANDS, EXCEPT SHARE DATA)	
Long-term obligations, less current portion.....	$ 9,298	$ 9,298
Stockholders' equity:		
Preferred Stock, $0.01 par value; 2,000,000 shares authorized, none issued and outstanding.....	--	--
Common stock, no par value; 200,000,000 shares authorized, 51,772,761 shares issued and outstanding (actual); 53,772,761 shares issued and outstanding (as adjusted).....	113	113
Additional paid-in capital.....	584,058	641,046
Retained earnings.....	10,102	10,102
Accumulated other comprehensive income.....	5,531	5,531
Total stockholders' equity.....	599,804	656,792
Total capitalization.....	$609,102	$666,090

Our common stock to be outstanding after this offering is based on shares outstanding as of September 30, 2003 and excludes the following as of that date:

- 7,897,582 shares of common stock issuable upon the exercise of options outstanding as of such date at a weighted average exercise price of $19.59 per share;

- 4,563,344 shares of common stock reserved for future issuance under our stock option plans; and

- 327,739 shares of common stock reserved for sale under our employee stock purchase plans.

See note 8 of notes to our 2002 consolidated financial statements, which are incorporated by reference into this prospectus supplement.

SELECTED CONSOLIDATED FINANCIAL DATA

The following selected consolidated financial data as of December 31, 2002 and 2001 and for the years ended December 31, 2002, 2001 and 2000 have been derived from our consolidated financial statements, which are incorporated by reference into this prospectus supplement, and have been audited by PricewaterhouseCoopers LLP, independent accountants, as indicated in their

report. The following selected consolidated financial data as of December 31, 2000 have been derived from our consolidated financial statements, which are not incorporated by reference into this prospectus supplement, and have been audited by PricewaterhouseCoopers LLP, independent accountants, as indicated in their report. The selected consolidated financial data as of September 30, 2003 and for the nine months ended September 30, 2003 and 2002 are unaudited. In the opinion of management, all necessary adjustments for a fair statement (consisting of only normal recurring adjustments) have been included in the unaudited interim results. The data should be read in conjunction with the consolidated financial statements, including the notes thereto, which are incorporated by reference into this prospectus supplement, and with "Management's Discussion and Analysis of Financial Condition and Results of Operations" included elsewhere in this prospectus supplement.

	YEAR ENDED DECEMBER 31,			NINE MONTHS ENDED SEPTEMBER 30,	
	2002	2001	2000	2003	2002
	(IN THOUSANDS, EXCEPT PER SHARE DATA)				
STATEMENT OF OPERATIONS DATA(1):					
Net sales	$314,773	$286,808	$466,852	$235,513	$237,215
Gross profit(2)	105,795	85,583	205,396	80,573	80,760
Income (loss) from operations(3)	(43,047)	(47,360)	91,535	(18,155)	(32,227)
Net income (loss)(3)	(39,537)	(31,043)	60,260	(18,521)	(20,306)
Net income (loss) per share(3):					
Basic	(0.79)	(0.83)	1.74	(0.36)	(0.41)
Diluted	$ (0.79)	$ (0.83)	$ 1.67	$ (0.36)	$ (0.41)
Weighted average common shares:					
Basic	50,000	37,493	34,596	51,475	49,567
Diluted	50,000	37,493	36,170	51,475	49,567

	DECEMBER 31,			SEPTEMBER 30,
	2002	2001	2000	2003
	(IN THOUSANDS)			
BALANCE SHEET DATA:				
Cash and cash equivalents	$ 88,820	$120,869	$123,082	$ 67,100
Short-term and long-term investments	55,874	27,654	35,004	66,756
Working capital	192,008	216,855	237,321	191,880
Total assets	685,623	411,189	454,403	673,185
Short-term obligations	18,472	14,815	19,134	16,780
Long-term obligations, less current portion	11,726	11,257	12,386	9,298
Stockholders' equity	610,690	352,871	357,522	599,804

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(1) Amounts have been restated to reflect the acquisition of Applied Science and Technology, Inc. ("ASTeX") in a pooling of interests transaction effective January 26, 2001.

(2) Gross profit for the year ended December 31, 2001 includes significant charges for excess and obsolete inventory of $16.6 million. These charges

were primarily caused by a significant reduction in demand, including reduced demand for older technology products.

(3) Loss from operations, net loss and net loss per share for the year ended December 31, 2002 includes restructuring and asset impairment charges of $2.7 million and purchase of in-process technology of $8.4 million. Loss from operations, net loss and net loss per share for the year ended December 31, 2001 includes restructuring and asset impairment charges of $3.7 million, merger expenses of $7.7 million and purchase of in-process technology of $2.3 million. Loss from operations, net loss and net loss per share for the nine months ended September 30, 2003 includes restructuring, asset impairment and other charges of $0.6 million. Loss from operations, net loss and net loss per share for the nine months ended September 30, 2002 includes restructuring and asset impairment charges of $2.4 million and purchase of in-process technology of $8.4 million.

MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

OVERVIEW

We are a leading worldwide provider of instruments, components, subsystems and process control solutions that measure, control, power and monitor critical parameters of semiconductor and other advanced manufacturing processes.

We are organized into three product groups: Instruments and Control Systems, Power and Reactive Gas Products and Vacuum Products. Our products are derived from our core competencies in pressure measurement and control, materials delivery, gas and thin-film composition analysis, control and information management, power and reactive gas generation and vacuum technology. Our products are used to manufacture semiconductors and thin film coatings for diverse markets such as flat panel displays, optical and magnetic storage media, architectural glass, and electro-optical products. We also provide technologies for medical imaging equipment.

We have a diverse base of customers that include manufacturers of semiconductor capital equipment, semiconductor devices, data storage equipment, medical equipment and flat panel displays, as well as industrial manufacturing companies, and university, government and industrial research laboratories. For the nine months ended September 30, 2003 and the year ended December 31, 2002, we estimate that approximately 67% and 70% of our net sales, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers.

A significant portion of our sales are to operations in international markets. International sales include sales by our foreign subsidiaries, but exclude direct export sales, which were less than 10% of our total net sales for the nine months ended September 30, 2003 and each of the years ended December 31, 2002, 2001 and 2000. For the nine months ended September 30, 2003 and the year ended December 31, 2002, international sales accounted for approximately 41% and 36% of net sales, respectively.

RECENT ACQUISITIONS

On January 31, 2002, we completed the acquisition of the ENI business

("ENI") of Emerson Electric Co. ("Emerson"), a 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. We acquired ENI in order to offer higher value and more integrated application solutions by combining ENI's solid-state power conversion technology with our core competency in plasma and reactive gas solutions. The acquisition has been accounted for under the purchase method of accounting.

Also in 2002, we acquired three companies that expanded our position in distributed computer-based process control and data management. On March 13, 2002, we acquired Tenta Technology Ltd. ("Tenta"), a privately held company that designs and supplies modular, computer-based process control systems for 300mm semiconductor process tool applications. On April 5, 2002, we acquired IPC Fab Automation GmbH ("IPC"), a privately held developer and provider of web-based hardware and software that enables e-diagnostics and advanced process control for advanced manufacturing applications. On October 1, 2002, we acquired EquipNet Ltd. ("EquipNet"), a privately held company that develops web-based connectivity equipment for the semiconductor industry.

On September 30, 2003, we acquired Wenzel Instruments ("Wenzel"), a privately held developer of solid state MicroElectroMechanical System ("MEMS") based vacuum sensor technology for advanced manufacturing processes.

The results of operations of these acquired companies are included in our consolidated statement of operations as of and since the date of purchase.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

"Management's Discussion and Analysis of Financial Condition and Results of Operations" discusses our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these consolidated 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 consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. On an on-going basis, we evaluate our estimates and judgments, including those related to revenue recognition, inventory, intangible assets, goodwill and other long-lived assets, in-process research and development and income taxes. We base our 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.

We believe the following critical accounting policies affect our more significant judgments and estimates used in the preparation of our consolidated financial statements:

Revenue recognition. Revenue from product sales is recorded upon transfer of title and risk of loss to the customer provided that there is evidence of an arrangement, the sales price is fixed or determinable, and collection of the related receivable is reasonably assured. In most transactions, we have no obligations to our customers after the date products are shipped other than pursuant to warranty obligations. In some instances, we provide installation and training to customers after the product has been shipped. In accordance with EITF 00-21 "Accounting For Revenue Arrangements With Multiple Deliverables", we defer revenue related to installation and training until the services are performed. We provide 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. We monitor and track the amount of product returns, provide for accounts receivable allowances and reduce 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. We make estimates evaluating our accounts receivable allowance for doubtful accounts. We continuously monitor collections and payments from our customers and maintain 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 accounts receivable and our future operating results.

Inventory. We value our inventory at the lower of cost (first-in, first-out method) or market. We regularly review inventory quantities on hand and record a provision to write down excess and obsolete inventory to our estimated net realizable value, if less than cost, based primarily on our estimated forecast of product demand. As demonstrated during 2002 and 2001, demand for our products can fluctuate significantly. We recorded significant charges for excess and obsolete inventory of $16.6 million in 2001. The charges were primarily caused by a significant reduction in demand including reduced demand for older technology products. A significant increase in the demand for our products could result in an 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, our 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 our inventory and our reported operating results.

Intangible assets, goodwill and other long-lived assets. We review intangible assets and other long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of these assets may not be recoverable. Factors we consider important which could indicate an impairment include significant under performance relative to expected historical or projected future operating results, significant changes in the manner of our use of the asset or the strategy for our overall business and significant and negative industry or economic trends. When we determine that the carrying value of the asset may not be recoverable based upon the existence of one or more of the above indicators of impairment, we compare the undiscounted cash flows to the carrying value of the asset. If an impairment is indicated, the asset is written down to its estimated fair value. Intangible assets, such as purchased technology, are generally recorded in connection with a business acquisition. The value assigned to intangible assets is determined based on estimates and judgment regarding expectations for the success and life cycle of products and technology acquired. If actual product acceptance differs significantly from the

estimates, we may be required to record an impairment charge to write down the asset to its net realizable value. We assess goodwill for impairment at least annually, or more frequently when events and circumstances occur indicating that the recorded goodwill may be impaired. If the book value of a reporting unit exceeds its fair value, the implied fair value of goodwill is compared with the carrying amount of goodwill. If the carrying amount of goodwill exceeds the implied fair value, an impairment loss is recorded in an amount equal to that excess. The fair value of a reporting unit is estimated using the discounted cash flow approach, and is dependent on estimates and judgments related to future cash flows and discount rates.

In-process research and development. We value tangible and intangible assets acquired through our business acquisitions at fair value including in-process research and development ("IPR&D"). We determine 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. The value of IPR&D is determined using the income approach, which discounts expected future cash flows from projects under development to their net present value. Each project is analyzed and estimates and judgments are made 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. During 2002 and 2001, we expensed approximately $8.4 million and $2.3 million, respectively, in IPR&D charges primarily related to the ENI acquisition and the On-Line acquisition because the technological feasibility of certain products under development had not been established and no future alternative uses existed. If we acquire 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.

Income taxes. We evaluate the realizability of our net deferred tax assets and assess the need for a valuation allowance on a quarterly basis. The future benefit to be derived from our deferred tax assets is dependent upon our ability to generate sufficient future taxable income to realize the assets. We record a valuation allowance to reduce our net deferred tax assets to the amount that may be more likely than not to be realized. To the extent we established a valuation allowance, an expense will be recorded within the provision for income taxes line on the statement of income. During the year ended December 31, 2002, we established a full valuation allowance for our net deferred tax assets. In periods subsequent to establishing a valuation allowance, if we were to determine that we would be able to realize our net deferred tax assets in excess of their net recorded amount, an adjustment to the valuation allowance would be recorded as a reduction to income tax expense in the period such determination was made. Also in future periods, if we were to determine that we would not be able to realize the recorded amount of our remaining net deferred tax assets, an adjustment to the valuation allowance would be recorded as an increase to income tax expense in the period such determination was made.

RESULTS OF OPERATIONS

The following table sets forth for the periods indicated the percentage of total net sales of certain line items included in our consolidated statement of operations:

NINE MONTHS ENDED

	YEAR ENDED DECEMBER 31,			SEPTEMBER 30,	
	2002	2001	2000	2003	2002
Net sales	100.0%	100.0%	100.0%	100.0%	100.0
Cost of sales	66.4	70.2	56.0	65.8	66.0
Gross profit	33.6	29.8	44.0	34.2	34.0
Research and development	14.6	13.2	8.0	14.7	14.3
Selling, general and administrative	24.7	24.5	15.2	22.2	24.5
Amortization of goodwill and acquired intangible assets	4.4	3.8	1.1	4.7	4.3
Restructuring, asset impairment and other charges	0.9	1.3	--	0.3	1.0
Merger expenses	--	2.7	--	--	--
Purchase of in-process technology	2.7	0.8	0.1	--	3.5
Income (loss) from operations	(13.7)	(16.5)	19.6	(7.7)	(13.6
Interest income (expense), net	0.5	1.3	1.0	0.3	0.5
Income from litigation settlement	1.3	--	--	--	1.8
Other expense, net	1.3	0.9	--	--	1.7
Income (loss) before income taxes	(13.2)	(16.1)	20.6	(7.4)	(13.0
Provision (benefit) for income taxes	(0.6)	(5.3)	7.7	0.5	(4.4
Net income (loss)	(12.6)%	(10.8)%	12.9%	(7.9)%	(8.6

NINE MONTHS ENDED SEPTEMBER 30, 2003 COMPARED TO NINE MONTHS ENDED SEPTEMBER 30, 2002

Net Sales. Net sales decreased $1.7 million or 0.7% to $235.5 million for the nine months ended September 30, 2003 from $237.2 million for the nine months ended September 30, 2002. International net sales were approximately $97.5 million for the nine months ended September 30, 2003 or 41.4% of net sales and $81.3 million for the same period of 2002 or 34.3% of net sales. During the nine months ended September 30, 2002, we acquired ENI, Tenta and IPC. These acquisitions increased our net sales by $2.4 million for the nine months ended September 30, 2003 compared to the prior comparable period, as they were included in net sales for the full period in 2003 while net sales for the nine months ended September 30, 2002 includes their revenues only from the date of acquisition. This increase was offset by decreased domestic demand for our products from our semiconductor capital equipment manufacturer and semiconductor device manufacturer customers, as compared to the nine months ended September 30, 2002.

The semiconductor capital equipment market has experienced a significant downturn since 2001. As a result, since 2001, we have experienced a significant reduction in demand for products from our semiconductor capital equipment manufacturer and semiconductor device manufacturer customers. The semiconductor capital equipment industry has been cyclical, and we cannot determine how long the downturn will last. In the absence of significant improvement, net sales could continue to decline or remain low, and the amount of goodwill, other long-lived assets, and inventory considered realizable could be significantly reduced.

Gross Profit. Gross profit as a percentage of net sales increased slightly to 34.2% for the nine months ended September 30, 2003 from 34.0% for the same period of 2002. The small increase in the year to date gross profit percent is mainly due to a favorable foreign exchange impact, offset by higher materials costs of new products in initial production runs.

Research and Development. Research and development expense increased $0.9 million or 2.6% to $34.7 million or 14.7% of net sales for the nine months ended September 30, 2003 from $33.8 million or 14.3% of net sales for the same period of 2002. The increase was due mainly to increased compensation expense of $0.7 million, as a result of including a full nine months of costs in 2003 of the companies acquired during 2002.

Selling, General and Administrative. Selling, general and administrative expenses decreased $5.9 million or 10.1% to $52.4 million or 22.2% of net sales for the nine months ended September 30, 2003 from $58.2 million or 24.5% of net sales for the same period of 2002. The decrease was due primarily to lower compensation expense, as a result of lower headcount, of $2.1 million resulting from cost savings initiatives and decreased professional fees of $2.8 million.

Amortization of Acquired Intangible Assets. For the nine months ended September 30, 2003, amortization expense was $11.0 million, an increase of $0.9 million or 8.8% from the $10.1 million for the nine months ended September 30, 2002. The increase in amortization was due to amortization of intangibles from companies acquired in 2002.

Restructuring, Asset Impairment and Other Charges. During 2003, we continued the consolidation of recent acquisitions and recorded restructuring, asset impairment and other charges of $0.3 million for the quarter ended September 30, 2003 and $0.3 million for the quarter ended June 30, 2003. The charges in the third quarter of 2003 consisted of $0.1 million of severance costs related to workforce reductions and $0.2 million of professional fees and other costs related to the consolidation. The charges in the second quarter of 2003 consisted of $0.1 million of severance costs related to workforce reductions, an asset impairment charge of $0.1 million primarily for assets to be disposed, and $0.1 million of professional fees related to the consolidation. The severance costs and professional fees are accrued as of September 30, 2003 and are expected to be paid by the end of 2003.

The following table sets forth the activity in the restructuring reserves from December 31, 2002 to September 30, 2003 related to the 2002 and 2003 initiatives (in thousands):

	WORKFORCE REDUCTIONS	ASSET IMPAIRMENT	FACILITY CONSOLIDATIONS	TOTAL
Balance as of December 31, 2002.....	$ 326	$ --	$1,164	$1,490
Charges utilized in first quarter.....	(75)	--	(21)	(96)
Balance as of March 31, 2003.....	251	--	1,143	1,394
Restructuring provision in second quarter.....	112	92	100	304
Charges utilized in second quarter.....	(35)	(92)	(21)	(148)
Balance as of June 30, 2003.....	328	--	1,222	1,550
Restructuring provision in the third quarter.....	129	--	201	330
Charges utilized in third quarter.....	(373)	--	(201)	(574)
Balance as of September 30, 2003.....	$ 84	$ --	$1,222	$1,306

Purchase of In-process Technology. In-process research and development of $8.4 million for the nine months ended September 30, 2002 arose from the acquisitions we made in 2002.

Interest Income (Expense), Net. For the nine months ended September 30, 2003, net interest income was $0.8 million, a decrease of $0.4 million from the $1.2 million in the nine months ended September 30, 2002. The decrease in 2003 is mainly related to slightly lower investment balance and lower interest rates in 2003.

Income from Litigation Settlement. On November 30, 2000, Applied Science and Technology, Inc. ("ASTeX"), which we acquired in January 2001, brought suit in federal district court in Delaware against Advanced Energy Industries, Inc. ("Advanced Energy") for infringement of ASTeX's patent related to its Astron product. On May 17, 2002, a jury affirmed the validity of our patent and found that

Advanced Energy infringed the patent. On May 31, 2002, based on the jury's findings, the Court entered a judgment on the infringement claim in favor of us and against Advanced Energy, and awarded $4.2 million in damages to compensate us for Advanced Energy's infringing activity. Advanced Energy filed motions to overturn the verdict. During August of 2002, we entered into an agreement with Advanced Energy whereby Advanced Energy agreed to pay the awarded damages amount to us and withdraw its motions to overturn the verdict. We received the $4.2 million in September 2002, and recorded the amount as Income from litigation settlement.

Other Expense. During 2001, we sold certain assets for proceeds of approximately $9.0 million, including a note receivable of approximately $3.9 million and warrants of $0.2 million. During 2002, due to the downturn in the semiconductor industry and its result on the acquirer's operations, and the acquirer's inability to raise financing, we considered the value of the note and warrants to be impaired. Accordingly, during 2002, we recorded a charge of $4.1 million to other expense for our estimate of the impairment on the note receivable and warrants.

Provision (Benefit) for Income Taxes. We recorded a provision for income taxes of $1.2 million for the nine months ended September 30, 2003, as compared to a tax benefit of $10.6 million for the nine months ended September 30, 2002. As a result of incurring significant operating losses since 2001, we determined that it is more likely than not that our deferred tax assets may not be realized, and since the fourth quarter of 2002 have established a full valuation allowance for our net deferred tax assets. Accordingly, we have not recorded a deferred tax benefit from the net operating loss incurred in the nine months ended September 30, 2003. The provision for income taxes in 2003 is comprised of tax expense from foreign operations and state taxes. Until an appropriate level of profitability is reached, we will not record deferred tax benefits from our net operating losses in future results of operations.

YEAR ENDED 2002 COMPARED TO 2001

Net Sales. Net sales increased 9.8% to $314.8 million for the year ended December 31, 2002 from $286.8 million for the year ended December 31, 2001. International net sales were approximately $114.6 million for the year ended December 31, 2002 or 36.4% of net sales and $90.0 million for the year ended December 31, 2001 or 31.4% of net sales. The increase in worldwide net sales in

2002 is from the incremental partial year revenues of $58.5 million from ENI, Tenta and IPC, companies which were acquired during the year. This increase was offset by a decline of $30.5 million or 10.6%, due to the worldwide slowdown in demand for our products from our semiconductor capital equipment manufacturer and semiconductor device manufacturer customers, which began in the first quarter of 2001 and continued through 2002.

Gross Profit. Gross profit as a percentage of net sales increased to 33.6% for the year ended December 31, 2002 from 29.8% for the year ended December 31, 2001. The increase in gross margin was primarily due to lower provisions for excess and obsolete inventory in 2002 compared to 2001. In 2001, we recorded significant charges for excess and obsolete inventory of $16.6 million, or 5.8% of net sales. These charges were primarily caused by a significant reduction in demand, including demand for older technology products. During 2002, we realized a benefit of $1.4 million in cost of sales, or 0.4% of net sales, from sales of inventory which were included as part of the excess and obsolete inventory charges in 2001. The lower excess and obsolete inventory charges in 2002 were offset by the addition of manufacturing overhead costs from the companies acquired in 2002, which resulted in a decrease in gross margin of approximately 2%.

Research and Development. Our research and development efforts are directed toward developing and improving our process control instruments, components and subsystems 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 21.2% to $46.0 million or 14.6% of net sales for the year ended December 31, 2002 from $38.0 million or 13.2% of net sales for the year ended December 31, 2001. Compensation expense increased by $2.7 million during 2002, which was comprised of an increase of $6.5 million from the companies acquired during the year,

offset by a $3.8 million decrease resulting from cost saving programs including workforce reductions, salary reductions, and furloughs. Also, expenses for project materials increased $3.5 million during 2002, primarily from the companies acquired during the year. Our 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 increased 10.9% to $77.8 million or 24.7% of net sales for the year ended December 31, 2002 from $70.2 million or 24.5% of net sales for the year ended December 31, 2001. The increase was due to increased compensation expense of $4.8 million primarily from the companies acquired during the year, increased professional fees of $1.1 million and other selling, general and administrative expenses.

Amortization of Goodwill and Acquired Intangible Assets. Amortization expense of $13.9 million for the year ended December 31, 2002, represents the amortization of the identifiable intangibles resulting from the acquisitions completed by us. In accordance with SFAS No. 142, we ceased amortizing goodwill on January 1, 2002. 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 us, of which $5.2 million relates to acquired intangibles and $5.8 million relates to goodwill.

Merger Costs. On January 26, 2001 we completed our 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, we 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 July 2001, the Financial Accounting Standards Board, or FASB, issued Statement of Financial Accounting Standards No. 141, or 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 business combination will be accounted for under the purchase method of accounting and included as part of the purchase price.

Purchase of In-process Technology. In-process research and development of $8.4 million and $2.3 million for the years ended December 31, 2002 and 2001 arose from the acquisitions we made in 2002 and 2001, respectively.

In January 2002, we acquired ENI in a transaction accounted for under the purchase method. The purchase price was allocated to the assets acquired, including intangible assets, based on their estimated fair values. The intangible assets include approximately $7.5 million for acquired in-process technology for projects, generally expected to have durations of 12 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 rates ranging from 25% to 30%. We believe these rates were 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 cost incurred to date of the project as a ratio of the total cost required to bring the project to technical and commercial feasibility. The percentage completion for in-process projects acquired ranged from 65% to 80% complete, based on our 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 2002.

In April 2001, we acquired On-Line in a transaction accounted for under the purchase method. 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%. We believe 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 2001.

Restructuring and Asset Impairment Charges. During 2002 we implemented a consolidation of recent acquisitions to accelerate product development, rationalize manufacturing operations, and reduce operating costs.As a result of these actions, we recorded restructuring and asset impairment charges of $2.7 million in 2002. The charges consisted of $0.6 million of severance costs related to a workforce reduction, $1.2 million related to consolidation of leased facilities, and an asset impairment charge of $0.9 million primarily related to the impairment of an intangible asset from the discontinuance of certain product development activities. The fair value of the impaired intangible asset was determined using the expected present value of future cash flows. The workforce reduction was across all functional groups and consisted of 225 employees, with 179 terminated during 2002. Severance costs of $0.3 million were paid during 2002. The remaining severance costs of $0.3 million are expected to be paid by the end of the first quarter of 2004. The facilities consolidation charges will be paid over the respective lease terms, the latest of which ends in 2007. The accrual for severance costs and lease payments is recorded in Other accrued expenses and Other liabilities.

A summary of the restructuring charges and related asset impairments during 2002 is outlined as follows (in thousands):

	INITIAL CHARGE	CASH PAYMENTS	NON-CASH CHARGES	ENDING ACCRUAL BALANCE
Workforce reductions	$ 631	$(300)	$ --	$ 331
Facility consolidations	1,228	(69)	--	1,159
Assets impairment	867	--	(867)	--
	$2,726	$(369)	$(867)	$1,490

As a result of the restructuring program, we expect to reduce cost of sales, research and development expenses, and selling, general, and administrative expenses. The restructuring program, once fully implemented, is expected to reduce costs by approximately $10.0 million per year. We began to realize a portion of the benefits in the fourth quarter of 2002.

When we 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. We had 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 potential customer did not purchase the systems, and the quotation expired in March 2001. We were unsuccessful in selling any systems of the product line after the acquisition and, with the expiration of the significant quote in March 2001, we evaluated the recoverability of the long-lived assets, primarily goodwill. As a result, based on a discounted

cash flow analysis we recorded an impairment charge for the carrying value of the related goodwill of approximately $3.7 million in the quarter ended March 31, 2001.

Interest Income (Expense), Net. During the year ended December 31, 2002, we generated net interest income of $1.5 million, primarily from interest on our invested cash and investments, offset by interest expense of $1.2 million on outstanding debt. Interest income declined $2.5 million to $2.7 million for the year ended December 31, 2002 from $5.2 million for the year ended December 31, 2001. The decrease was due to lower interest rate yields on investments during 2002 compared to 2001.

Income from Litigation Settlement. On November 30, 2000, ASTeX, which we acquired 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. On May 17, 2002, a jury affirmed the validity of our patent and found that Advanced Energy infringed the patent. On May 31, 2002, based on the jury's findings, the Court entered a judgment on the infringement claim in favor of us and against Advanced Energy, and awarded $4.2 million in damages to compensate us for Advanced Energy's infringing activity. Advanced Energy filed motions to overturn the verdict. During August of 2002, we entered into an agreement with Advanced Energy whereby Advanced Energy agreed to pay the awarded damages amount to us and withdraw its motions to overturn the verdict. We received the $4.2 million in September 2002, and recorded the amount as Income from litigation settlement.

Other Expense, Net. During 2001, we recorded a loss on the sale of an investment in a company of $1.1 million, which was recorded as other expense. Also during 2001, we sold certain assets for proceeds of approximately $9.0 million, including a note receivable of approximately $3.9 million and warrants of $0.2 million. The loss on the transaction was $1.2 million and was recorded as other expense in 2001. During 2002, due to the downturn in the semiconductor industry and its result on the acquirer's operations, and the acquirer's inability to raise financing, we considered the value of the note and warrants to be impaired. Accordingly, during 2002, we recorded a charge of $4.1 million to other expense for our estimate of the impairment on the note receivable and warrants.

Benefit for Income Taxes. We recorded a benefit for income taxes of $2.0 million for the year ended December 31, 2002, for an effective tax rate of 4.8%. We recorded a benefit for income taxes of $15.0 million for the year ended December 31, 2001, for an effective tax rate of 32.6% in 2001. The change in our effective tax rate from 2001 to 2002 was primarily due to the recording of a valuation allowance against our net deferred tax assets in 2002. As a result of incurring significant operating losses during 2001 and 2002, and the continuing uncertainty in the semiconductor industry, management determined that it is more likely than not our deferred tax assets may not be realized and, accordingly, recorded a charge of $13.4 million to establish a full valuation allowance for our deferred tax assets in the fourth quarter of 2002. The benefit for income taxes of $2.0 million for the year ended December 31, 2002 is primarily comprised of an estimated current tax benefit of $3.8 million from 2002 United States net operating losses which we may carryback against previously taxed income offset by $1.6 million of tax expense from foreign operations and state taxes.

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 our products from our 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 significant charges for excess and obsolete inventory of $16.6 million in 2001. These charges

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. Our research and development efforts are directed toward developing and improving our process control instruments, components and subsystems 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. Our 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 our 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 us, 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, we ceased amortizing approximately $40.3 million of goodwill.

Restructuring and Asset Impairment Charges. When we 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, we have 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 potential customer did not purchase the systems, and the quotation expired in March 2001. We have been unsuccessful in selling any systems of the product line since the acquisition and, with the expiration of the significant quote in March 2001, we evaluated the recoverability of the long-lived assets, primarily goodwill. As a result, based on a discounted cash flow analysis, we recorded an impairment charge for the carrying value of the related goodwill of approximately $3.7 million in the quarter ended March 31, 2001.

Merger Costs. On January 26, 2001 we completed our 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, we 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, we 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%. We believe 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.

Interest Income (Expense), Net. During the years ended December 31, 2001 and 2000, we generated net interest income of $3.7 million and $4.8 million, respectively, primarily from the invested net proceeds of our 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 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 our follow-on public stock offering. We decided not to proceed with the follow-on offering, and converted the registration statement to a shelf registration statement.

Provision (Benefit) 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.

LIQUIDITY AND CAPITAL RESOURCES

We had cash, cash equivalents and short-term marketable securities of $115.6 million at September 30, 2003, a decrease of $13.1 million from $128.7 million at December 31, 2002. We have historically financed our operations and capital requirements through a combination of cash provided by operations, long-term real estate financing, capital lease financing and short-term borrowings.

For the nine months ended September 30, 2003, our operating activities used $3.8 million in cash compared to $1.6 million for the nine months ended September 30, 2002. The cash used in operations for the nine months ended September 30, 2003 was impacted by the net loss of $18.5 million and an increase in operating assets of $8.5 million, offset by non-cash charges included in the net loss for depreciation and amortization of $22.2 million and an increase in operating liabilities of $1.0 million. The increase in operating assets consisted mainly of an increase in accounts receivable of $6.7 million due to the timing of shipments during the quarter. Net cash used in operating activities for the nine months ended September 30, 2002 resulted mainly from a net loss of $20.3 million, an increase in accounts receivable of $11.1 million, deferred tax benefits of $9.3 million, offset by non-cash charges for in-process research and development of $8.4 million, depreciation and amortization of $21.2 million, and asset impairment charges of $5.0 million.

We used $18.4 million of cash for investing activities in the nine months ended September 30, 2003 and $48.5 million in the nine months ended September 30, 2002. Investing activities in 2003 consisted of $4.7 million of purchases of capital assets, net purchases of short and long-term investments of $12.0 million and $2.2 million for the purchase of a business. Investing activities in 2002 consisted mainly of net purchases of short and long-term investments of $26.0 million, $16.3 million for the acquisition of businesses and $5.8 million for the purchases of capital assets.

Net cash used in financing activities of $0.7 million for the nine months ended September 30, 2003 consisted mainly of $4.7 million of payments on long-term debt and capital lease obligations offset by proceeds from the exercise of stock options of $4.4 million. Net cash provided by financing activities of $3.2 million for the nine months ended September 30, 2002 consisted mainly of proceeds from the exercise

of stock options of $7.5 million offset by principal payments $5.2 million on long-term debt and capital lease obligations.

On July 31, 2003, our $40.0 million unsecured line of credit facility with two domestic banks expired and we decided not to renew this facility. There had been no borrowings made under this line of credit.

We believe that our working capital, together with the cash anticipated to be generated from operations, will be sufficient to satisfy our estimated working capital and planned capital expenditure requirements through at least the next 12 months.

RECENTLY ISSUED ACCOUNTING PRONOUNCEMENTS

In April 2003, the Financial Accounting Standards Board ("FASB") issued SFAS No. 149 ("SFAS 149"), "Amendment of Statement 133 on Derivative Instruments and Hedging Activities." This statement amends SFAS 133 to provide clarification on the financial accounting and reporting of derivative instruments and hedging

activities and requires contracts with similar characteristics to be accounted for on a comparable basis. This statement is effective for contracts entered into or modified after June 30, 2003 and for hedging relationships designated after June 30, 2003. We adopted SFAS 149 on July 1, 2003 and the adoption did not have a material effect on our consolidated financial position or results of operations.

In November 2002, the Emerging Issues Task Force reached a consensus on issue 00-21, "Revenue Arrangements with Multiple Deliverables'("EITF 00-21"). EITF 00-21 addresses revenue recognition on arrangements encompassing multiple elements that are delivered at different points in time, defining criteria that must be met for elements to be considered to be a separate unit of accounting. If an element is determined to be a separate unit of accounting, the revenue for the element is recognized at the time of delivery. EITF 00-21 is effective for revenue arrangements entered into in fiscal periods beginning after June 15, 2003. We adopted EITF 00-21 on July 1, 2003 and the adoption did not have a material effect on our consolidated financial position or results of operations.

BUSINESS

OVERVIEW

We are a leading worldwide provider of instruments, components, subsystems and process control solutions that measure, control, power and monitor critical parameters of semiconductor and other advanced manufacturing processes.

We are organized into three product groups: Instruments and Control Systems, Power and Reactive Gas Products and Vacuum Products. Our products are derived from our core competencies in pressure measurement and control, materials delivery, gas and thin-film composition analysis, control and information management, power and reactive gas generation and vacuum technology.

Our products are used in diverse markets and applications including the manufacture of, among other things:

- semiconductor devices for diverse electronics applications;
- flat panel displays for hand-held devices, laptop computers, desktop computer monitors and television sets;
- magnetic and optical storage media;
- optical filters and fiber optic cables for data and telecommunications;
- optical coatings for eyeglasses, architectural glass and solar panels;
- magnetic resonance imaging (MRI) medical equipment;
- gas lasers;
- cutting tools; and
- freeze-dried pharmaceuticals.

For over 40 years, we have focused on satisfying the needs of our customers by establishing long-term, collaborative relationships. We have a

diverse base of customers that include manufacturers of semiconductor capital equipment, semiconductor devices, data storage equipment, medical equipment and flat panel displays, as well as industrial manufacturing companies, and university, government and industrial research laboratories. During the nine months ended September 30, 2003, and the years ended December 31, 2002, 2001 and 2000, we estimate that approximately 67%, 70%, 64% and 76% of our net sales, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers. Our top 10 customers for the nine months ended September 30, 2003 were Applied Materials, ASM International, Celerity Group, IBM Corporation, Lam Research, Novellus Systems, Phillips Medical, Toyko Electron, Ulvac and Unaxis.

INDUSTRY BACKGROUND

In the past 40 years, significant advances in materials science and processing technologies have made possible the manufacture of products ranging from highly complex microprocessor chips to simple but effective airtight coatings for food packaging. In many materials processing applications, the ability to create specific gas mixtures at precisely controlled pressures; deliver precise, consistent and repeatable power; control the flow rate of gases and vapors; and reduce atmospheric and particle contamination, play a critical role in helping to:

- create and maintain the required process atmosphere;
- provide a source of materials to be deposited on a surface, such as a silicon wafer; and
- remove or etch materials from a surface to form a circuit pattern.

Currently, the largest commercial application employing materials science and processing technologies is the manufacture of semiconductors. Worldwide semiconductor sales have increased as the use of semiconductors has expanded beyond personal computers and computer systems to a wide array of additional applications such as data and telecommunications systems, automotive products, consumer goods, medical products and household appliances. The worldwide semiconductor industry is forecasted to grow at a compounded annual growth rate of 21% from $141 billion in revenues in 2002 to $249 billion in 2005 according to VLSI Research estimates. We believe that this growth will be facilitated by the ability of semiconductor device manufacturers to produce increasingly fast, more complex, higher performance semiconductors while steadily reducing cost per function, power consumption requirements and size of these products to meet end-user and system designer requirements. Advancements in semiconductor processing technologies have allowed semiconductor device designers to reduce circuit pattern sizes and subsequently increase the number of individual semiconductor circuits on a silicon wafer. These trends have driven the need for increasingly complex and sophisticated semiconductor device manufacturing processes, process equipment and process controls. The worldwide semiconductor capital equipment industry is forecasted to grow at a compounded annual growth rate of 20% from $17 billion in revenues in 2002 to $29 billion in 2005 according to VLSI Research estimates.

SEMICONDUCTOR MANUFACTURING PROCESS

The manufacturing of semiconductors requires hundreds of process steps. In addition, as semiconductors have become increasingly complex and geometries smaller, the number of process steps has increased, adding to the cost of a wafer as it undergoes production. Many of these process steps involve the controlled application or removal of layers of materials to or from a surface

referred to as a substrate. These process steps take place within a process chamber, which provides a controlled environment for the fabrication of semiconductor devices. Most of the key processes used in the production of semiconductors require precise automatic control of gas pressure, flow, composition and the precise application of power to energize gases in the process chamber.

To ensure the integrity and performance of the manufacturing process, semiconductor device manufacturers require sophisticated instruments that can provide precise automated control of all major process variables around and within the process chamber. The process steps required to produce circuit patterns involve the control of multiple gases flowing into the process chamber at specified intervals and at controlled pressure and vacuum levels as well as the application of the appropriate type of power to create the desired reaction within the process chamber. In a typical process step, the process chamber is evacuated to a base pressure established by a vacuum pumping system and measured with vacuum gauges. Automatic shut-off valves are sequenced to protect pumps and process instruments from exposure to atmospheric pressure. Chamber leak integrity may be checked by gas analyzers scanning for the presence of undesirable atmospheric gases or water vapor. Mass flow controllers automatically control the flow rates of multiple gases into the process chamber. A variety of different power sources activate the required chemical and physical reactions in the process chamber that add to or modify the thin films on the wafer surface. Simultaneously, the automatic pressure control system for the process chamber measures the pressure in the chamber and controls it at the desired level by electronically adjusting the position of a control valve located between the process chamber and the vacuum pump. Downstream of the process chamber, heated lines, particle traps, and vacuum valves and switches are used to prevent contamination of the process chamber as a result of the backstreaming of particles and exhaust gases back into the process chamber. This improves circuit quality, reduces maintenance and prolongs equipment life.

Uptime, yield and throughput are critical to controlling semiconductor manufacturing costs. Uptime is the amount of time that the semiconductor processing tool is available for processing. Yield is the ratio of acceptable circuits to total circuits processed. Throughput is the number of wafers that can be processed per hour. Uptime, yield and throughput depend in large part upon:

- precise, repeatable measurement and control of the specific gas pressure and composition, flow rates and power application;

- the maintenance of the vacuum integrity of the process chamber; and

- the prevention of wafer contamination from particles entering the chamber.

TRENDS IN SEMICONDUCTOR MANUFACTURING

Increased Manufacturing Complexity. The ability of semiconductor device manufacturers to offer integrated circuits with smaller geometries and greater functionality at higher speeds requires continuous improvements in semiconductor process equipment and process controls. The transition to smaller circuit patterns, such as 0.13 micron and smaller line-widths, requires more process steps. It has also led to the introduction of new materials such as copper and low-k dielectrics. These in turn require new technologies for delivery of gases and vapors to the process chamber. In addition, the introduction of advanced processes such as high density plasma has led to a need for lower pressures, which are more difficult to measure and control than higher pressures. These

trends, along with increased wafer sizes, which result in higher circuit value per wafer, are leading to the need for increased sophistication of semiconductor processing equipment, a heightened emphasis on uptime, yield and throughput and the need for more precise process controls and power supplies.

Increased Need for Precise Process Control. To address the increasing complexity of semiconductor devices, semiconductor device manufacturers typically develop processes to create particular device features using specific manufacturing equipment. The process for each feature is then documented and may be subsequently replicated for use in multiple fabrication facilities around the world. The precision, repeatability and reliability of the measurement and control instrumentation and power supply used for each process is critical to enhancing uptime, yield and throughput on manufacturing equipment at all facilities employing such processes. Semiconductor device manufacturers are placing increasing importance on uptime, yield, throughput and process consistency throughout their facilities to maximize capital equipment productivity and to reduce ongoing operating costs.

Demand for More Process Control Information. As the manufacturing process has become more complex, there has been a corresponding increase in the value of processed wafers. To help protect their investment in such wafers during the production process, semiconductor device manufacturers have made greater investments to obtain and effectively use the information generated during the manufacturing process to improve their production yields. Semiconductor device manufacturers are increasingly using connectivity solutions between process control sensors and the factory computer network in conjunction with advanced software for data analysis, to enable more efficient management and distribution of information for advanced process control.

Need for Capable, Broad-Based Suppliers. The increasing sophistication of semiconductor devices has led to greater complexity in the design of components and integrated subsystems used in semiconductor manufacturing process tools. To reduce supply chain complexity, improve quality and reliability and ensure long-term service and support, semiconductor capital equipment manufacturers and semiconductor device manufacturers are increasingly seeking to establish relationships with a smaller group of broad-based suppliers that meet their needs on a worldwide basis and provide:

- advanced technological capabilities to address the increasing complexities of the semiconductor manufacturing process;
- instrument and component designs that ensure repeatable processes around the world;
- value-added, integrated instruments and components; and
- a worldwide sales service and support infrastructure.

OTHER MARKETS

Many of the same processes used to manufacture semiconductors are also used to manufacture optical filters, fiber optic cables, flat panel displays, magnetic and optical storage media, architectural glass, solar panels and gas lasers. In addition, some of the components of semiconductor manufacturing

equipment play a key role in the manufacturing equipment of other industries. For example, in addition to providing power for semiconductor manufacturing applications such as etching, stripping and deposition, power supplies provide signal amplification in MRI equipment.

SOLUTION AND STRATEGY

Our objective is to be the leading worldwide provider of instruments, components, subsystems and process control solutions used to help our customers enhance productivity and improve their return on invested capital. The principal elements of our solution and strategy to achieve this objective are:

TECHNOLOGY LEADERSHIP

Our products incorporate sophisticated technologies to power, measure, control and monitor increasingly complex gas-related semiconductor manufacturing processes, thereby enhancing uptime, yield and throughput for our semiconductor device manufacturing customers. Our instruments, components and integrated subsystems provide:

- high precision operation over the extreme and variable pressure ranges required for semiconductor processes;

- precise, consistent and repeatable power delivery, measurement and control performance that allows processes to be replicated in manufacturing facilities around the world;

- efficient generation of reactive gases for advanced stripping, cleaning and etching;

- multiple, diverse and alternative technologies for controlling the flow rate and composition of gases and vapors needed for new classes of advanced materials for next generation semiconductor devices;

- innovative vacuum technologies that reduce atmospheric and particle contamination, thereby enhancing uptime, yield and throughput; and

- comprehensive information management technologies which enable customers to collect, organize and analyze their process data thereby allowing them to optimize their processes.

Our products have continuously advanced as our customers' needs have evolved. We have developed, and continue to develop, new products to address emerging industry trends such as the transition from the use of 200mm wafers to 300mm wafers and the shrinking of integrated circuit line-widths from 0.18 micron to 0.13 micron and smaller. In addition, we have developed, and continue to develop, products that support the migration to new classes of materials, such as copper for low resistance conductors, high-k dielectric materials for capacitors and gates and low-k dielectric materials for low loss insulators that are used in small geometry manufacturing.

COMPREHENSIVE PRODUCT OFFERING

We offer the broadest range of instruments, components, subsystems and process control solutions for the semiconductor and other advanced manufacturing industries. Our broad line of products consists of a wide range of gas pressure, flow and composition analysis measurement and control instruments, RF and DC power delivery systems, reactive gas generators, vacuum gauges, valves and components and information management products. By broadening our product portfolio, we have significantly expanded our revenue opportunity and account for a larger portion of the bill of materials for process equipment.

Our products are designed to meet the increasingly complex needs of our customers. With the increasing complexity of semiconductor processing, the increased sophistication of semiconductor capital equipment and the need for increased productivity of semiconductor manufacturing process tools, we deliver

products that reduce equipment size and improve process performance. Our subsystem products

combine several components into single integrated solutions. Our integrated solutions are optimized for particular applications and deliver higher performance at a lower cost than similar subsystems built from discrete components. Additionally, our integrated solutions are easier to install and configure, further reducing the overall cost to the customer.

GLOBAL INFRASTRUCTURE AND WORLD CLASS MANUFACTURING CAPABILITIES

As semiconductor device manufacturers have become increasingly global, they have required that their suppliers offer comprehensive local repair service and close customer support. Manufacturers require close support to enable them to calibrate, repair, modify, upgrade and retrofit their equipment to improve process consistency, uptime, yield and throughput. To meet these market requirements, we maintain a global sales and support organization in 10 countries worldwide. As of September 30, 2003, we had 15 manufacturing facilities in the United States and abroad. We believe that the ability to manufacture reliable instruments and components in a cost-effective manner is critical to meet the demanding just-in-time delivery requirements of our customers. We continue to devote significant resources to expand and maintain our worldwide production and service capabilities to meet the global demand for our products and solutions.

STRATEGIC ACQUISITIONS

We plan to continue to expand our product line and complement our internal growth through the acquisitions of complementary businesses, products and technologies. For example, our acquisition of ASTeX in January 2001 gave us a leading position in supplying reactive gas generation and delivery technology for plasma processing. Our acquisition of ENI in January 2002 provided us leading solid-state radio frequency (RF) and direct current (DC) plasma power supplies and matching networks, and instrumentation capabilities. ASTeX's core capabilities in plasma management provides complementary technology which enables us to enhance the design of solid state power supplies. Several of our most recent acquisitions have been integrated to provide a comprehensive offering for advanced process control, connectivity and information management, with better performance and smaller size as compared to discrete solutions. Information management, in particular, is increasingly being embedded in a number of our products as a means to improve information delivery capabilities. Since 2000, we have acquired 11 companies in total which have allowed us to leverage our global infrastructure to introduce these acquired products and technologies to new markets, regions and applications.

CLOSE WORKING RELATIONSHIPS WITH CUSTOMERS

We have focused on satisfying the needs of semiconductor device manufacturers and semiconductor capital equipment manufacturers and have established long-term relationships with many of our customers. We work with our customers at the pre-design and design stage to identify and respond to their requests for current and future generations of products. These close working relationships allow us to understand and address the cost and performance expectations of our customers. Our comprehensive product offering enables us to meet a broad range of customer needs and provide a single source of solutions for semiconductor device and semiconductor capital equipment manufacturers as they seek to consolidate their supplier relationships to a smaller select group. We plan to enhance our relationships with our major customers and identify opportunities to develop similar relationships with additional semiconductor

device manufacturers and semiconductor capital equipment manufacturers.

MARKETS AND APPLICATIONS

We are focused on three market sectors: semiconductor manufacturing applications; thin-film manufacturing applications; and other non-semiconductor manufacturing applications. We estimate that approximately 67%, 70%, 64% and 76% of our net sales for the nine months ended September 30, 2003, and the years ended December 31, 2002, 2001 and 2000, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers. Approximately 11%, 8%, 11% and 11% of our net sales in the nine months ended September 30, 2003 and the years ended December 31, 2002,

2001 and 2000, respectively, were for thin-film processing equipment applications, including compact disks, digital video disks (DVDs) and other digital storage media; flat panel displays for computer and television screens; and thin-film coatings for architectural glass and optics. Approximately 22%, 22%, 25% and 13% of our net sales in the nine months ended September 30, 2003 and the years ended December 31, 2002, 2001 and 2000, respectively, were for other non-semiconductor manufacturing applications. These include, but are not limited to, industrial manufacturing, MRI medical equipment, biopharmaceutical manufacturing, and university, government and industrial research laboratories.

We estimate that approximately 41%, 36%, 31% and 23% of our net sales for the nine months ended September 30, 2003 and the years ended December 31, 2002, 2001 and 2000, respectively, were to customers located in international markets. International sales include sales by our foreign subsidiaries, but exclude direct export sales, which were less than 10% of our total net sales for the nine months ended September 30, 2003 and each of the years ended December 31, 2002, 2001 and 2000.

SEMICONDUCTOR MANUFACTURING APPLICATIONS

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

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

Our 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. In addition, we provide specialized instruments that monitor the performance of manufacturing equipment and products that distribute and manage process control information. We anticipate that the semiconductor manufacturing market will continue to account for a substantial portion of our sales. While the semiconductor device manufacturing market is global, major semiconductor capital equipment manufacturers are concentrated in Europe, Japan and the United States.

THIN-FILM MANUFACTURING APPLICATIONS

Flat Panel Display Manufacturing

Our products are used in the manufacture of flat panel displays, which require the same or similar fabrication processes as semiconductor

manufacturing. Flat panel displays are used in electronic hand-held devices, laptop computers, desktop computer monitors, and television sets. Computer monitors and television sets with flat panel display technology are designed to replace bulkier cathode ray tube (CRT) technology in computer monitors and television sets. We sell products to flat panel equipment manufacturers and to end-users in the flat panel display market. The transition to larger panel sizes and higher display resolution is driving the need for tighter process controls to reduce defects. The major manufacturers for flat panel displays are concentrated in Japan, Korea and Taiwan, and the major manufacturers for flat panel display equipment are concentrated in Japan and the United States.

Magnetic and Optical Storage Media.

Our products are used to manufacture:

- 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; and
- digital video or versatile disks (DVDs).

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

Optical Filters, Optical Fibers and Other Coating Processes

Our products are used in optical filter, optical fiber and other optical thin-film coating processes. Our 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 higher data transmission rates 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 Europe, Japan and the United States.

Our 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 Europe, Japan and the United States.

OTHER NON-SEMICONDUCTOR MANUFACTURING APPLICATIONS

Our 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. Our products are also incorporated into several other end-market products such as MRI medical equipment, industrial vehicles, and analytical instruments. In addition, our products are 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 Europe, Japan and the United States.

PRODUCTS

During 2002, we consolidated our product groups to accelerate product development, rationalize manufacturing operations, and reduce operating costs. This realignment of operations has organized us into three product groups: Instruments and Control Systems, Power and Reactive Gas Products and Vacuum Products.

1. INSTRUMENTS AND CONTROL SYSTEMS

PRESSURE MEASUREMENT AND CONTROL PRODUCTS. Each of our Pressure Measurement and Control product lines consists of products that are designed for a variety of pressure ranges and accuracies.

Baratron Pressure Measurement Products. Our Baratron products are high-precision pressure measurement instruments. We have 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. We believe we offer the widest range of gas pressure measurement instruments in the semiconductor and advanced thin-film materials processing industries.

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 that 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 subsystem. Our 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.

MATERIALS DELIVERY PRODUCTS. Each of our Materials Delivery product lines consists of products that are designed for a variety of flow 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. Our 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. We have also developed pressure-based mass flow controllers, based on Baratron pressure instrument measurement and control technology, which restrict flow in the gas line to transform pressure control into mass flow control.

Our 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 our 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 AND THIN-FILM COMPOSITION ANALYSIS PRODUCTS. The technologies used in these products include mass spectrometry and infrared spectroscopy. Gas and thin-film composition analysis instruments are sold to a variety of industries including the semiconductor industry.

Mass Spectrometry-based Gas Composition Analysis Instruments. These products are based on quadruple mass spectrometer sensors that separate gases based on molecular weight. These sensors include built-in electronics and are provided with software that analyzes the composition of background and process gases in the process chamber. These instruments are provided both as portable laboratory systems and as process gas monitoring systems used in the diagnosis of semiconductor manufacturing process systems.

Fourier Transform Infra-Red (FTIR) Based Gas and Thin-Film Composition Analysis Products. FTIR-based products provide information about the composition of gases and thin-films by measuring the absorption of infra-red light as it passes through the sample being measured. Gas analysis applications include measuring the compositions of mixtures of reactant gases; measuring the purity of individual process gases; measuring the composition of process exhaust gas streams to determine process health; monitoring gases to ensure environmental health and safety; and monitoring combustion exhausts. These instruments are provided as portable laboratory systems and as process gas monitoring systems used in the diagnosis of manufacturing processes.

Mass spectrometry-based and FTIR-based gas monitoring systems can indicate out-of-bounds conditions -- such as the presence of undesirable contaminant gases and water vapor or out-of-tolerance amounts of specific gases in the process -- which alert operators to diagnose and repair faulty equipment.

Leak Detection Products. We manufacture a range of mass spectrometer-based helium leak detection products. Helium leak detection is used in a variety of industries including semiconductor, HVAC, automotive and aerospace to ensure the leak integrity of both manufactured products and manufacturing equipment. We believe that our product is the smallest mass spectrometer-based leak detector currently available.

Optical Monitoring Instruments. We manufacture a range of optical monitoring instruments that are sold primarily for thin-film coating 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.

CONTROL AND INFORMATION TECHNOLOGY PRODUCTS. We design and manufacture a suite of products that allow customers to better control their processes through computer-controlled automation. The products include digital control network products, process chamber and system controllers and connectivity products. Digital control network products are used to connect sensors, actuators and subsystems to the chamber and system control computers. They support a variety of industry-standard connection methods including DeviceNet, Profibus, ethernet and conventional discrete digital and analog signals. Chamber and system control computers process these signals in real time and allow the customer to precisely manage the process conditions. Connectivity products allow information to flow from the process sensors and subsystems and from the process tool control computer to the factory network. By enabling this information flow, customers can better optimize their processes through new techniques known as Advanced Process Control (APC), and diagnose problems with the equipment and process from a remote location (e-diagnostics).

2. POWER AND REACTIVE GAS PRODUCTS

In the Power and Reactive Gas Products Group, we design and manufacture a wide variety of power supplies and reactive gas generation modules used in semiconductor device manufacturing and medical equipment markets.

Power Delivery Products. Our power delivery products are used in the semiconductor, flat panel display, data storage and medical markets. In the semiconductor, flat panel and data storage markets, our microwave, RF and DC power supplies are used to provide energy to various etching, stripping and deposition processes. In the medical market, our power delivery products are used to provide power for MRI equipment. Our power delivery products cover frequencies ranging from DC to 2.45GHZ (gigahertz) at power levels from tens of watts to over 100 kilowatts. A range of impedance matching units transfer power from the power supplies to the customer's process. They are automated with modern digital control electronics that ensure optimum power transfer and rapid response to changing process conditions. Our MRI power amplifiers are used in the most advanced MRI systems including the 3T (three Tesla) machines. These machines provide higher resolution images to medical professionals, allowing better diagnosis and treatment. Our high power and high frequency technology is particularly well suited to these applications.

Reactive Gas Generation Products. 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. Examples of our reactive gas products include ozone generators and subsystems used for deposition of

insulators on to semiconductor devices, ozonated water delivery systems for advanced semiconductor wafer and flat panel display cleaning, atomic fluorine generators for process chamber cleaning, and microwave plasma based products for photo resist removal.

3. VACUUM PRODUCTS

In the Vacuum Products Group, we design and manufacture a wide variety of vacuum technology products, including vacuum gauges, valves and components.

Vacuum Gauging Products. We offer 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. These gauges are used to measure vacuum at pressures lower than those measurable with a Baratron instrument or to measure vacuum in the Baratron instrument range where less accuracy is required. Our indirect pressure gauges use thermal conductivity and ionization gauge technologies to measure pressure from atmospheric pressure to one trillionth of atmospheric pressure.

Vacuum Valves and Components. Our vacuum valves are used on the gas lines between the process chamber and the pump downstream of the process chamber. Our 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 devices with small circuit patterns cannot tolerate contamination from atmospheric leaks or particles. Our vacuum components are designed to minimize such contamination and thus increase yields and uptimes.

APPLICATION-SPECIFIC INTEGRATED SUBSYSTEMS

We also combine products and technologies to provide application-specific integrated subsystems. Integrated subsystems are made by each product group, depending upon the application of the subsystem. Our integrated subsystems represented approximately 18% of revenues for the year ended December 31, 2002.

For example, we have a line of integrated flow and pressure control subsystems that combine two or more of our products and technologies into products for specific process applications. We have developed a range of Back-Side Wafer Cooling Subsystems which are needed to control the flow and pressure of the helium used to effect the cooling of wafers in semiconductor manufacturing. By combining the functions of our Baratron pressure measurement instruments, flow measurement instruments, control electronics and valves into a range of compact instruments, this product line addresses the need for smaller components that save valuable clean room space.

CUSTOMERS

We are organized into three product groups. Each product group's largest customers are leading semiconductor capital equipment manufacturers such as Applied Materials, Lam Research, Novellus Systems and Tokyo Electron, and semiconductor device manufacturers such as IBM and Intel. Sales to our top ten customers accounted for approximately 43%, 49%, 39% and 52% of net sales for the nine months ended September 30, 2003 and for the years ended December 31, 2002, 2001 and 2000, respectively. Applied Materials accounted for approximately 17%, 23%, 18% and 30% of our net sales for the nine months ended September 30, 2003 and the years ended December 31, 2002, 2001 and 2000, respectively.

SALES, MARKETING AND SUPPORT

Our worldwide sales, marketing and support organization is critical to our strategy of maintaining close relationships with semiconductor capital equipment manufacturers and semiconductor device

manufacturers. We sell our products primarily through our direct sales force. As of September 30, 2003, we had 172 sales employees worldwide in China, France, Germany, Japan, Korea, the Netherlands, Singapore, Taiwan, the United Kingdom and the United States. Sales representatives and agents in countries including Canada, China, India, Israel, and Italy and in select U.S. cities supplement this direct sales force. We maintain a marketing staff that identifies customer requirements, assists in product planning and specifications, and focuses 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, we maintain a worldwide sales and support organization in 10 countries. Technical support is provided by applications engineers located at offices in China, France, Germany, Japan, Korea, the Netherlands, Singapore, Taiwan, the United Kingdom and the United States. Repair and calibration services are provided at 22 service depots located worldwide. We provide warranties from one to three years, depending upon the type of product.

RESEARCH AND DEVELOPMENT

Our research and development is focused on developing and improving our instruments, components, subsystems and process control solutions for semiconductor and advanced thin-film processing applications and on identifying and developing products for new applications in which gas management plays a critical role. We have undertaken an initiative to involve our marketing, engineering, manufacturing and sales personnel in the concurrent development of new products in order to reduce the time to market for new products. Our employees also work closely with customers' development personnel. These relationships help us identify and define future technical needs on which to focus research and development efforts. We participate 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 we support research at academic institutions targeted at advances in materials science and semiconductor process development. Our research and development expense was $34.7 million, $46.0 million, $38.0 million and $37.3 million for the nine months ended September 30, 2003 and for the years ended December 31, 2002, 2001 and 2000, respectively. Our research and development efforts include numerous projects that generally have a duration of 18 to 30 months. In addition, we acquired in-process technology of $8.4 million in 2002 and $2.3 million in 2001.

MANUFACTURING

Our manufacturing facilities are located in the United States, the United Kingdom, Germany, Israel, Japan and China. Manufacturing activities include the assembly and testing of components and subassemblies, which are integrated into products. We outsource some of our subassembly work. We purchase a wide range of electronic, mechanical and electrical components, some of which are designed to our specifications. We consider our ability to flexibly respond to customers' significantly fluctuating product demands by using lean manufacturing techniques to be a distinct competitive advantage.

COMPETITION

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

- historical customer relationships;

- product quality, performance and price;

- breadth of product line;

- manufacturing capabilities; and

- customer service and support.

Although we believe that we compete favorably with respect to these factors, there can be no assurance that we will continue to do so.

We encounter substantial competition in most of our product lines, although no one competitor competes with us across all product lines. Certain of our competitors may have greater financial and other resources than us. In some cases, competitors are smaller than we are, but well established in specific product niches. Mykrolis offers products that compete with our pressure and materials delivery products. Advanced Energy, Horiba/STEC and Celerity/Unit Instruments each offer materials delivery products that compete with our product line of mass flow controllers. Nor-Cal Products and MDC Vacuum Products each offer products that compete with our vacuum components. Inficon offers products that compete with our vacuum measurement and gas analysis products. Helix Technology offers products that compete with our vacuum gauging products. Advanced Energy offers products that compete with our power delivery and reactive gas generator products and with certain data management and information products.

PATENTS AND OTHER INTELLECTUAL PROPERTY RIGHTS

We rely on a combination of patent, copyright, trademark and trade secret laws and license agreements to establish and protect our proprietary rights. As of September 30, 2003, we owned 185 U.S. patents, 126 foreign patents and had 83 pending U.S. patent applications. Foreign counterparts of certain of these applications have been filed or may be filed at the appropriate time. Although we believe that certain patents may be important for certain aspects of our business, we believe that our success also depends upon close customer contact, innovation, technological expertise, responsiveness and worldwide distribution.

We require each of our employees, including our executive officers, to enter into standard agreements pursuant to which the employee agrees to keep confidential all of our proprietary information and to assign to us all inventions while they are employed by us.

For a discussion of litigation relating to our intellectual property, see "Business -- Legal Proceedings."

EMPLOYEES

As of September 30, 2003, we employed approximately 2,048 persons. We believe that our ongoing success depends upon our continued ability to attract and retain highly skilled employees for whom competition is intense. None of our employees are represented by a labor union or are party to a collective bargaining agreement. We believe that our employee relations are good.

LEGAL PROCEEDINGS

On April 3, 2003, Advanced Energy filed suit against us in federal district court in Colorado, seeking a declaratory judgment that Advanced

Energy's Xstream product does not infringe three patents held by our subsidiary ASTeX. On May 14, 2003, we brought suit in federal district court in Delaware against Advanced Energy for infringement of five ASTeX patents, including the three patents at issue in the Colorado action. We seek injunctive relief and damages for Advanced Energy's infringement. On December 24, 2003, the Colorado court granted our motion to transfer Advanced Energy's Colorado suit to Delaware. The case is in the early stages of pre-trial discovery.

On November 30, 2000, ASTeX, which we acquired in January 2001, brought suit in federal district court in Delaware against Advanced Energy for infringement of ASTeX's patent related to its Astron product. On May 17, 2002, a jury affirmed the validity of our patent and found that Advanced Energy infringed the patent. On May 31, 2002, based on the jury's findings, the Court entered a judgment on the infringement claim in favor of us and against Advanced Energy, and awarded $4.2 million in damages to compensate us for Advanced Energy's infringing activity. Advanced Energy filed motions to overturn the verdict. During August of 2002, we entered into an agreement with Advanced Energy whereby Advanced Energy agreed to pay the awarded damages amount to us and withdraw its motions to overturn the verdict. We received the $4.2 million in September 2002, and recorded the amount as Income from litigation settlement.

On November 3, 1999, On-Line Technologies, Inc., which was acquired by us 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. We believe that the counterclaim is without merit. We cannot be certain of the outcome of this litigation, but we plan to assert our claims and oppose the counterclaims against us vigorously.

We are 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 our results of operations, financial condition or cash flows.

MANAGEMENT

EXECUTIVE OFFICERS AND DIRECTORS

The following table sets forth information as of September 30, 2003 regarding our executive officers and directors:

NAME	AGE	TITLE
John R. Bertucci.....	62	Chairman, Chief Executive Officer and President
Ronald C. Weigner.....	57	Vice President and Chief Financial Officer
Leo Berlinghieri.....	50	Vice President and Chief Operating Officer
Robert L. Klimm.....	52	Vice President and General Manager, Power and Reacti Gas Products Group
Donald K. Smith.....	50	Vice President and Chief Technical Officer
John A. Smith.....	53	Vice President and General Manager, Instruments and Control Systems

William D. Stewart	59	Vice President and General Manager, Vacuum Products
Gerald L. Colella	47	Vice President, Global Business Operations and Globa Quality
Robert R. Anderson	65	Director
James G. Berges	56	Director
Richard S. Chute	65	Director, Clerk
Hans-Jochen Kahl	64	Director
Owen W. Robbins	73	Director
Louis P. Valente	73	Director

Mr. Bertucci has served as one of our directors since 1974 and has been Chairman of the board of directors and Chief Executive Officer since November 1995. Mr. Bertucci served as our President from 1974 to May 1999 and again from November 2001 to the present. From 1970 to 1974, he was Vice President and General Manager. Mr. Bertucci has an M.S. in Industrial Administration and a B.S. in Metallurgical Engineering from Carnegie Mellon University. Mr. Bertucci is a member of the board of trustees of Carnegie-Mellon University and a member of the executive board of The Massachusetts High Technology Council.

Mr. Weigner has served as our Vice President and Chief Financial Officer since November 1995. From September 1993 until November 1995, he was Vice President and Corporate Controller and from 1980 to 1993 he was Corporate Controller. Mr. Weigner is a certified public accountant and has a B.S. in Business Administration from Boston University.

Mr. Berlinghieri has served as our Vice President and Chief Operating Officer since July 2003. From November 1995 to June 2003, Mr. Berlinghieri served as Vice President, Global Sales and Service. From 1980 to November 1995, he served in various management positions with us, including Manufacturing Manager, Production and Inventory Control Manager, and Director of Customer Support Operations. Mr. Berlinghieri is Director at Large of the TQM-BASE Council, Inc., a non-profit quality management consortium comprised of Boston area semiconductor capital equipment manufacturers.

Mr. Klimm has served as our Vice President and General Manager, Power and Reactive Gas Products Group since September 2002. Prior to this position, he served as Vice President and General Manager of our ASTeX Products Group from August 2001 to September 2002, and of our Materials Delivery and Analysis Products Group from December 1999 to August 2001. Before joining us, Mr. Klimm was Vice President and General Manager of the Factory Automation Division of PRI Automation from 1997 to September 1999. Mr. Klimm has an M.B.A. from the Sloan School at MIT, an M.A. in Electrical Engineering from Northeastern University and a B.S. in Electrical Engineering from Lehigh University.

Dr. Donald K. Smith has served as our Vice President and Chief Technical Officer since March 2000. Prior to this position, Dr. Smith served as President of Compact Instrument Technology, LLC, from April 1999 to March 2000. From 1987 until October 1999, he was Senior Vice President of Advanced Technology and was a Founder and Director of Applied Science and Technology, Inc. From 1981 until 1987, he was a Research Scientist at the Massachusetts Institute of Technology. Dr. Smith holds an M.S. and Ph.D. in electrical engineering from the University of Wisconsin and a B.S. from Davidson College.

Dr. John A. Smith has served as our Vice President and General Manager of the Instruments and Control Systems Product Group, which comprises Pressure Measurement and Control, Materials Delivery, Gas Composition and Analysis, and Control and Information Technology Products, since December 2002. Prior to this position, Dr. Smith served as Vice President and General Manager of Materials

Delivery Products (MDP) and Advanced Process Control (APC), from February 2002 to December 2002. From July 1994 until February 2002, he was Managing Director of MKS Instruments, U.K. Ltd. Dr. Smith has a Ph.D. in Electronic Engineering from the University of Manchester, U.K.

Mr. Stewart has served as our Vice President and General Manager, Vacuum Products Group since November 1997. From October 1986 to November 1997, he was President of HPS, which we acquired in 1986. Mr. Stewart co-founded HPS in 1976. Mr. Stewart has an M.B.A. from Northwestern University and a B.S. in Business Administration from the University of Colorado. Mr. Stewart also serves on the board of directors of the Janus Fund.

Mr. Colella has served as our Vice President of Global Business Operations since October 1997. From March 1996 to October 1997, Mr. Colella served as our Director of Materials Planning and Logistics and from February 1994 to March 1996, he served as our Materials Planning and Logistics Manager. Mr. Colella joined MKS in April 1983 as a Purchase Contract Administrator. He holds an M.B.A. from Southern New Hampshire University, Manchester, New Hampshire, as well as a Bachelors Degree in Secondary Education from the University of Lowell, Lowell, Massachusetts.

Mr. Anderson has served as one of our directors since January 2001. Mr. Anderson is a private investor. From October 1998 to October 2000, Mr. Anderson served as Chairman of Yield Dynamics, Inc., a private semiconductor control software company and presently serves as a director. He also served as CEO of Yield Dynamics from October 1998 to April 2000. Mr. Anderson also served as CEO of Silicon Valley Research, Inc., a semiconductor design automation software company from December 1996 to August 1998 and as Chairman from January 1994 to January 2001. Mr. Anderson currently serves as a director of Metron Technology N.V., a distributor of parts and equipment for the semiconductor industry, Trikon Technologies, Inc., a manufacturer of semiconductor process equipment, and Aehr Test Systems, Inc., a manufacturer of semiconductor test and burn-in equipment. He also serves as a director to three other private development stage companies, and as a trustee of Bentley College.

Mr. Berges has served as one of our directors since February 2002. Since May 1999, Mr. Berges has served as President of Emerson Electric Co. From 1997 to May 1999, Mr. Berges served as Vice Chairman of Emerson Electric Co. Mr. Berges also serves on the board of directors of Emerson and PPG Industries, Inc.

Mr. Chute has served as one of our directors since 1974. Mr. Chute was a member of the law firm of Hill & Barlow, a Professional Corporation, from 1971 to January 2003, and is currently in private practice.

Mr. Kahl has served as one of our directors since January 2001. From June 1994 through September 1996, Mr. Kahl served as a consultant to Ebara, a Japanese manufacturer of industrial water pumps and vacuum process equipment for the semiconductor industry. Mr. Kahl was employed by Leybold AG, formerly Leybold-Heraeus GmbH, a leading international manufacturer of vacuum pumps and other vacuum process equipment for the semiconductor industry, from July 1983 to March 1992, where he served as a managing director and was primarily responsible for sales, marketing and strategic planning. From September 1995 to November 2000, he was a director of Applied Science and Technology, Inc.

(ASTeX) which we acquired. Since November 1996, he has served as a director of Solid State Management, a privately held manufacturer of high precision measurement tools.

Mr. Robbins has served as one of our directors since February 1996. Mr.

Robbins was Executive Vice President of Teradyne, Inc., a manufacturer of electronic test systems and backplane connection systems used in the electronics and telecommunications industries, from March 1992 to May 1997, and Chief Financial Officer from February 1980 to May 1997.

Mr. Valente has served as one of our directors since February 1996. Mr. Valente is Chairman of Palomar Medical Technologies, Inc., a company which designs, manufactures and markets cosmetic lasers, since September 1997. He has been a director of Palomar Medical Technologies, Inc. since February 1997 and was its President and Chief Executive Officer from May 1997 to May 2002. Mr. Valente is also a director of Surgilight, Inc., Medical Information Technology, Inc. and a privately held medical company.

PRINCIPAL AND SELLING STOCKHOLDERS

The following table sets forth certain information regarding the ownership of our common stock as of September 30, 2003 by (i) each selling stockholder, (ii) each of our directors, (iii) each of our named executive officers for the year ended December 31, 2002, and (iv) all of our executive officers and directors as a group.

	SHARES BENEFICIALLY OWNED PRIOR TO OFFERING		SHARES BEING	SHARES BENEFICIALLY OWNED AFTER OFFERING(1)	
BENEFICIAL OWNER	NUMBER	PERCENT	OFFERED	NUMBER	PERCENT
Emerson Electric Co.(1)	12,000,000	23.2%	3,000,000	9,000,000	16.7%
John R. Bertucci(2)	5,577,805	10.8%	1,000,000	4,577,805	8.5%
Claire R. Bertucci(3)	5,337,927	10.3%	1,000,000	4,337,927	8.1%
Ronald C. Weigner(4)	363,361	*	--	363,361	*
William D. Stewart(5)	286,893	*	--	286,893	*
Leo Berlinghieri(4)	285,740	*	--	285,740	*
Robert R. Anderson(6)	76,634	*	--	76,634	*
John A. Smith(7)	69,237	*	--	69,237	*
Richard S. Chute(4)	43,092	*	--	43,092	*
Owen W. Robbins(4)	43,092	*	--	43,092	*
Louis P. Valente(4)	36,310	*	--	36,310	*
Hans-Jochen Kahl(8)	35,135	*	--	35,135	*
James G. Berges	--	--	--	--	*
All directors and executive officers as a group (14 persons)(9)	12,719,974	23.1%	2,000,000	10,719,974	19.4%

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* Less than 1%

(1) Consists of 12,000,000 shares owned by Emerson Electric Co. ("Emerson") and its wholly owned subsidiary, Astec America Inc. ("Astec America"). The 3,000,000 shares being offered hereby are owned by Emerson. Of the 450,000 shares that may be offered pursuant to overallotments, if any, 36,611 are owned by Emerson Electric and 413,389 are owned by Astec America.

(2) Consists of 5,077,094 shares held directly by Mr. Bertucci, 4,710 shares held by a limited partnership, 462,259 shares held by trusts for which Mr.

Bertucci serves as a co-trustee and 33,742 shares subject to options exercisable within 60 days of September 30, 2003. Excludes shares beneficially owned by Mrs. Bertucci.

(3) Mrs. Bertucci is the wife of Mr. Bertucci. Excludes shares beneficially owned by Mr. Bertucci.

(4) Consists of options exercisable within 60 days of September 30, 2003.

(5) Includes 285,206 options exercisable within 60 days of September 30, 2003.

(6) Includes 25,131 options exercisable within 60 days of September 30, 2003.

(7) Includes 67,179 options exercisable within 60 days of September 30, 2003.

(8) Includes 15,757 options exercisable within 60 days of September 30, 2003.

(9) Includes 1,385,563 options exercisable within 60 days of September 30, 2003. Also includes all of the shares beneficially owned by Mrs. Bertucci, which are deemed to be beneficially owned by Mr. Bertucci.

RELATIONSHIP WITH SELLING STOCKHOLDERS

Mr. Bertucci is our Chairman, Chief Executive Officer and President.

On January 31, 2002, we acquired ENI pursuant to an Agreement and Plan of Merger dated October 30, 2001 between Emerson and us. The purchase price was approximately $266,530,000, including the issuance of 12,000,000 shares of our common stock to Emerson. During 2002, we purchased materials and services from Emerson and its subsidiaries totaling approximately $1,156,000.

In connection with the acquisition of ENI and pursuant to a shareholders agreement with Emerson, we agreed to elect and, pursuant to a voting agreement, Mr. and Mrs. Bertucci and certain of their affiliates and designees agreed to vote their shares to elect, a designee of Emerson to our board of directors until such time as Emerson owns less than 12.5% of our outstanding shares. Accordingly, upon the closing of the acquisition, we elected James Berges to our board of directors. Mr. Berges is currently President and a director of Emerson.

Pursuant to the shareholders agreement between Emerson and us, we have granted Emerson rights to require us to file registration statements under the Securities Act of 1933, as amended ("Securities Act") covering resales of all shares of common stock held by Emerson. The agreement also grants "piggy-back" registration rights to Emerson, permitting them to include their shares of common stock in a registration of securities by us. The agreement also obligates us to pay the expenses of these registrations.

UNDERWRITING

We intend to offer the shares through the underwriters. Merrill Lynch, Pierce, Fenner & Smith Incorporated, J.P. Morgan Securities Inc., Adams, Harkness & Hill, Inc. and Needham & Company, Inc. are acting as representatives of the underwriters named below. Subject to the terms and conditions described in a purchase agreement among us, the selling stockholders and the underwriters, we and the selling stockholders have agreed to sell to the underwriters, and the underwriters severally have agreed to purchase from us and the selling

stockholders, the number of shares listed opposite their names below.

UNDERWRITER	NUMBER OF SHARES
Merrill Lynch, Pierce, Fenner & Smith Incorporated	
J.P. Morgan Securities Inc.	
Adams, Harkness & Hill, Inc.	
Needham & Company, Inc.	
Total	7,000,000

The underwriters have agreed to purchase all the shares sold under the purchase agreement if any of these shares are purchased. If an underwriter defaults, the purchase agreement provides that the purchase commitments of the nondefaulting underwriters may be increased or the purchase agreement may be terminated.

We and the selling stockholders have agreed to indemnify the underwriters against certain liabilities, including liabilities under the Securities Act, or to contribute to payments the underwriters may be required to make in respect of those liabilities.

The underwriters are offering the shares, subject to prior sale, when, as and if issued to and accepted by them, subject to approval of legal matters by their counsel, including the validity of the shares, and other conditions contained in the purchase agreement, such as the receipt by the underwriters of officers' certificates and legal opinions. The underwriters reserve the right to withdraw, cancel or modify offers to the public and to reject orders in whole or in part.

COMMISSIONS AND DISCOUNTS

The representatives have advised us and the selling stockholders that the underwriters propose initially to offer the shares to the public at the public offering price on the cover page of this prospectus and to dealers at that price less a concession not in excess of $ per share. The underwriters may allow, and the dealers may reallow, a discount not in excess of $ per share to other dealers. After the public offering, the public offering price, concession and discount may be changed.

The following table shows the public offering price, underwriting discount and proceeds, before expenses, to us and the selling stockholders. This information assumes either no exercise or full exercise by the underwriters of their overallotment options.

	PER SHARE	WITHOUT OPTION	WITH OPTION
Public offering price	$	$	$
Underwriting discount	$	$	$
Proceeds, before expenses, to MKS Instruments	$	$	$
Proceeds, before expenses, to the selling stockholders	$	$	$

The expenses of the offering, not including the underwriting discount, are estimated at $250,000 and are payable by us, provided that Mr. and Mrs. Bertucci will bear that percentage of expenses that is equal to the portion that the aggregate number of shares that are offered by them bears to the total number of shares offered under this prospectus.

OVERALLOTMENT OPTION

We and the selling stockholders have granted options to the underwriters to purchase up to 1,050,000 shares at the public offering price less the underwriting discount. The underwriters may exercise these options for 30 days from the date of this prospectus solely to cover any overallotments. If the underwriters exercise these options, each will be obligated, subject to conditions contained in the purchase agreement, to purchase a number of additional shares proportionate to that underwriter's initial amount reflected in the above table.

NO SALES OF SIMILAR SECURITIES

We and the selling stockholders and our executive officers and directors have agreed, with exceptions, not to sell or transfer any common stock for 90 days after the date of this prospectus supplement without first obtaining the written consent of Merrill Lynch. Specifically, we and these other individuals have agreed not to directly or indirectly:

- offer, pledge, sell or contract to sell any common stock;
- sell any option or contract to purchase any common stock;
- purchase any option or contract to sell any common stock;
- grant any option, right or warrant for the sale of any common stock;
- lend or otherwise dispose of or transfer any common stock;
- request or demand that we file a registration statement related to the common stock; or
- enter into any swap or other agreement that transfers, in whole or in part, the economic consequences of ownership of any common stock whether any such swap or transaction is to be settled by delivery of shares or other securities, in cash or otherwise.

This lockup provision applies to common stock and to securities convertible into or exchangeable or exercisable for or repayable with common stock. It also applies to common stock owned now or acquired later (other than in the public market) by the person executing the agreement or for which the person executing the agreement later acquires the power of disposition.

ELECTRONIC OFFER, SALE AND DISTRIBUTION OF SHARES

Merrill Lynch will be facilitating Internet distribution for this offering to certain of its Internet subscription customers. Merrill Lynch intends to allocate a limited number of shares for sale to its online brokerage customers. An electronic prospectus supplement is available on the Internet web site maintained by Merrill Lynch. Other than the prospectus supplement in

electronic format, the information on the Merrill Lynch web site is not a part of this prospectus.

QUOTATION ON THE NASDAQ NATIONAL MARKET

The shares are quoted on the Nasdaq National Market under the symbol "MKSI."

PRICE STABILIZATION AND SHORT POSITIONS

Until the distribution of the shares is completed, SEC rules may limit underwriters and selling group members from bidding for and purchasing our common stock. However, the representatives may

engage in transactions that stabilize the price of the common stock, such as bids or purchases to peg, fix or maintain that price.

If the underwriters create a short position in the common stock in connection with the offering, i.e., if they sell more shares than are listed on the cover of this prospectus, the representatives may reduce that short position by purchasing shares in the open market. The representatives may also elect to reduce any short position by exercising all or part of the overallotment option described above. Purchases of the common stock to stabilize its price or to reduce a short position may cause the price of the common stock to be higher than it might be in the absence of such purchases.

Neither we nor any of the underwriters make any representation or prediction as to the direction or magnitude of any effect that the transactions described above may have on the price of the common stock. In addition, neither we nor any of the underwriters make any representation that the representatives will engage in these transactions or that these transactions, once commenced, will not be discontinued without notice.

PASSIVE MARKET MAKING

In connection with this offering, underwriters and selling group members may engage in passive market making transactions in the common stock on the Nasdaq National Market in accordance with Rule 103 of Regulation M under the Securities Exchange Act of 1934, as amended, during a period before the commencement of offers or sales of common stock and extending through the completion of distribution. A passive market maker must display its bid at a price not in excess of the highest independent bid of that security. However, if all independent bids are lowered below the passive market maker's bid, that bid must then be lowered when specified purchase limits are exceeded.

OTHER RELATIONSHIPS

Some of the underwriters and their affiliates have engaged in, and may in the future engage in, investment banking and other commercial dealings in the ordinary course of business with us. They have received customary fees and commissions for these transactions. Merrill Lynch provides option administration and related services to us in connection with our stock option plans. Merrill Lynch also provides services to certain of our officers and directors in connection with sales of our common stock by these officers and directors pursuant to plans that meet the requirements of Rule 10b5-1 under the Securities Exchange Act of 1934, as amended. In addition, JPMorgan provides services to us in connection with our corporate cash management and foreign exchange activities and provides an overdraft facility for our Japanese subsidiary, in each case in the ordinary course of business.

LEGAL MATTERS

The validity of the common stock offered hereby and certain other legal matters will be passed upon for us by Hale and Dorr LLP, Boston, Massachusetts. Certain legal matters with respect to this offering will be passed upon for the underwriters by Wilson Sonsini Goodrich & Rosati, Professional Corporation, New York, New York.

PROSPECTUS

8,600,000 Shares

(MKS LOGO)

Common Stock

We may, from time to time, issue up to 2,300,000 shares of common stock, and the selling stockholders may, from time to time, offer up to 6,300,000 shares of common stock. We will not receive any of the proceeds from the sale of shares by the selling stockholders.

We and the selling stockholders identified in this prospectus (or their pledges, donees, transferees or other successors-in-interest) may offer the shares from time to time through public or private transactions at prevailing market prices, at prices related to prevailing market prices or at privately negotiated prices.

Our common stock is traded on the Nasdaq National Market under the symbol "MKSI." The last reported sale price of our common stock on the Nasdaq National Market on October 14, 2003 was $23.70 per share.

INVESTING IN OUR COMMON STOCK INVOLVES A HIGH DEGREE OF RISK. SEE "RISK FACTORS" BEGINNING ON PAGE 2.

NEITHER THE SECURITIES AND EXCHANGE COMMISSION NOR ANY STATE SECURITIES COMMISSION HAS APPROVED OR DISAPPROVED OF THESE SECURITIES OR DETERMINED IF THIS PROSPECTUS IS TRUTHFUL OR COMPLETE. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.

The date of this prospectus is November 18, 2003

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YOU SHOULD RELY ONLY ON THE INFORMATION CONTAINED IN THIS PROSPECTUS. NEITHER WE NOR THE SELLING STOCKHOLDERS HAVE AUTHORIZED ANYONE TO PROVIDE YOU WITH INFORMATION DIFFERENT FROM THAT CONTAINED IN THIS PROSPECTUS. WE AND THE SELLING STOCKHOLDERS ARE OFFERING TO SELL, AND SEEKING OFFERS TO BUY, SHARES OF COMMON STOCK ONLY IN JURISDICTIONS WHERE OFFERS AND SALES ARE PERMITTED. THE INFORMATION CONTAINED IN THIS PROSPECTUS IS ACCURATE ONLY AS OF THE DATE OF THIS PROSPECTUS, REGARDLESS OF THE TIME OF DELIVERY OF THIS PROSPECTUS OR OF ANY SALE OF OUR COMMON STOCK. THE INFORMATION IN OUR INTERNET WEBSITE IS NOT INCORPORATED BY REFERENCE INTO THIS PROSPECTUS. IN THIS PROSPECTUS, "MKS," "WE," "US" AND "OUR" REFER TO MKS INSTRUMENTS, INC. (UNLESS THE CONTEXT OTHERWISE REQUIRES).

ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed with the SEC utilizing a "shelf" registration process. Under this shelf process, we may sell up to a total of 2,300,000 shares of common stock in one or more offerings and the selling stockholders may sell up to a total of 6,300,000 shares of common stock in one or more offerings. We have provided to you in this prospectus a general description of the securities we and the selling stockholders may offer. Each time we or the selling stockholders sell securities, we will provide a prospectus supplement that will contain specific information about the terms of that offering. We may also add, update or change in the prospectus supplement any of the information contained in this prospectus. This prospectus, together with applicable prospectus supplements, will include all material information relating to such offering.

MKS INSTRUMENTS, INC.

We are a leading worldwide provider of instruments, components and subsystems that measure, control, power and monitor critical parameters of semiconductor and other advanced manufacturing process environments.

Our objective is to enable our customers to improve their manufacturing process productivity and yields. Our strategy is to develop and provide sensor and data management instruments, components and subsystems that control critical parameters of the process environment in which advanced materials are manufactured. We are undertaking this strategy by further developing our core technologies, acquiring complementary technologies, embedding process expertise into our products, and integrating our products into process management subsystems that "surround the process chamber."

We are organized into three product groups: Instruments and Control Systems; Power and Reactive Gas Products; and Vacuum Products. Our products are derived from our core competencies in pressure measurement and control; materials delivery; gas and thin-film composition analysis; control and

information management; power and reactive gas generation; and vacuum technology.

Our products are used in diverse markets and applications including the manufacture of, among other things:

- semiconductor devices for diverse consumer electronics applications;
- flat panel displays for hand-held devices, laptop computers, desktop computer monitors and television sets;
- magnetic and optical storage media;
- optical filters and fiber optic cables for data and telecommunications;
- optical coatings for eyeglasses, architectural glass and solar panels;
- magnetic resonance imaging (MRI) medical equipment;
- gas lasers;
- cutting tools; and
- freeze-dried pharmaceuticals.

We are a Massachusetts corporation organized in June 1961. Our principal executive offices are located at Six Shattuck Road, Andover, MA 01810, and our telephone number is (978) 975-2350. Our web site is located at www.mksinst.com. The information on our Internet website is not incorporated by reference in this prospectus. Unless the context otherwise requires references in this prospectus to "MKS", "we," "us," and "our" refer to MKS Instruments, Inc.

RISK FACTORS

Investing in our securities involves risk. Please see the risk factors described in our Quarterly Report on Form 10-Q for the quarter ended June 30, 2003, which is incorporated by reference in this prospectus. Before making an investment decision, you should carefully consider these risks as well as other information we include or incorporate by reference in this prospectus. The risks and uncertainties not presently known to us or that we currently deem immaterial may also affect our business operations.

SPECIAL NOTE REGARDING FORWARD-LOOKING INFORMATION

This prospectus includes and incorporates forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. All statements, other than statements of historical facts, included or incorporated in this prospectus regarding our strategy, future operations, financial position, future revenues, projected costs, prospects, plans and objectives of management are forward-looking statements. The words "anticipates," "believes," "estimates," "expects," "intends," "may," "plans," "potential," "projects," "will," "would" and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. We cannot guarantee that we actually will achieve the plans, intentions or expectations disclosed in our forward-looking statements and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. We have included important factors in

the cautionary statements included or incorporated in this prospectus, particularly under the heading "Risk Factors", that we believe could cause actual results or events to differ materially from the forward-looking statements that we make. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures or investments we may make. We do not assume any obligation to update any forward-looking statements.

USE OF PROCEEDS

Unless otherwise indicated in the accompanying prospectus supplement, we expect to use the net proceeds from the sale of any securities sold by us hereby for general corporate purposes, including working capital, product development and capital expenditures. A portion of such net proceeds may also be used for the acquisition of businesses, products and technologies that are complementary to ours. There are currently no commitments or agreements with respect to any such material acquisition. Pending such uses, we intend to invest any such net proceeds in investment-grade, interest-bearing securities.

We will not receive any of the proceeds from the sale of shares by the selling stockholders.

SELLING STOCKHOLDERS

The following table sets forth, to our knowledge, information about the selling stockholders as of September 1, 2003. As of September 1, 2003, we had 51,645,208 shares of common stock issued and outstanding. Beneficial ownership is determined in accordance with the rules of the SEC, and includes voting or investment power with respect to shares, as well as any shares as to which the selling stockholder has the right to acquire beneficial ownership within 60 days after September 1, 2003 through the exercise or conversion of any stock option or other right. Unless otherwise indicated below, to our knowledge, all selling stockholders named in the table have sole voting and investment power with respect to their shares of common stock, except to the extent authority is shared by spouses under applicable law. The inclusion of any shares in this table does not constitute an admission of beneficial ownership for the selling stockholder named below.

	SHARES BENEFICIALLY OWNED PRIOR TO OFFERING			BENEFICIALLY OWNED AFTER OFFERING(1)	
NAME OF SELLING STOCKHOLDER	NUMBER	PERCENT	NUMBER OF SHARES OFFERED	NUMBER	PERCENT
John R. Bertucci.....	5,617,805(2)	10.9%	1,150,000	4,467,804	8.2%
Claire R. Bertucci.....	5,377,927	10.4%	1,150,000	4,227,927	7.8%
Emerson Electric Co.....	12,000,000(3)	23.2%	4,000,000	8,000,000	14.8%

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(1) We do not know when or in what amounts a selling stockholder may offer shares for sale. The selling stockholders might not sell any or all of the shares offered by this prospectus. Because the selling stockholders may offer all or some of the shares pursuant to this prospectus, and because there are currently no agreements, arrangements or understandings with respect to the sale of any of the shares, we cannot estimate the number of

the shares that will be held by the selling stockholders after completion of any offering. However, for purposes of this table, we have assumed that, after completion of the offering, all shares offered by us pursuant to this prospectus will be outstanding and none of the shares covered by this prospectus will be held by the selling stockholders.

(2) Consists of 5,117,094 shares held directly by Mr. Bertucci, 4,710 shares held by a limited partnership, 462,259 shares held by trusts for which Mr. Bertucci serves as a co-trustee and 33,742 shares subject to options exercisable within 60 days of September 1, 2003.

(3) Consists of (a) 3,036,611 shares held directly by Emerson Electric Co. and 963,389 shares held by Astec America Inc., a wholly owned subsidiary of Emerson Electric Co., all of which shares are covered by this prospectus and (b) 8,000,000 shares owned by Astec America Inc. not covered by this prospectus.

RELATIONSHIP WITH SELLING STOCKHOLDERS

Mr. Bertucci is the President, Chairman and Chief Executive Officer of MKS. Claire R. Bertucci is Mr. Bertucci's wife.

On January 31, 2002, we acquired the business of Emerson Electric Co. ("Emerson") and its subsidiaries operating as the "ENI Division" of Emerson, pursuant to an Agreement and Plan of Merger dated October 30, 2001 between Emerson and us. The purchase price was approximately $265,000,000, and included the issuance of an aggregate of 12,000,000 shares of our common stock to Emerson and its subsidiaries. During 2002, MKS purchased materials and services from Emerson and its subsidiaries totaling approximately $1,156,000.

In connection with the acquisition of the ENI Division and pursuant to a Shareholders Agreement with Emerson, we agreed to elect, and, pursuant to a Voting Agreement, Mr. and Mrs. Bertucci and certain of their affiliates and designees agreed to vote their shares to elect, a designee of Emerson to our Board of Directors until such time as Emerson owns less than 12.5% of our outstanding shares. Accordingly, upon the closing of the acquisition, we elected James G. Berges to our Board of Directors. Mr. Berges is currently President and a director of Emerson.

Pursuant to the Shareholders Agreement between Emerson and us, we have granted Emerson the right to require us to file a registration statement under the Securities Act of 1933, covering resales of all shares of

common stock held by Emerson and its subsidiaries. The Shareholders Agreement also grants "piggy-back" registration rights to Emerson, permitting it to include its shares of common stock in a registration of securities by us. The Shareholders Agreement also obligates us to pay the expenses of these registrations.

PLAN OF DISTRIBUTION

The securities being offered hereby may be sold in one or more of the following ways from time to time:

- through agents to the public or to investors;

- to underwriters for resale to the public or to investors; or

- directly to investors.

We will set forth in a prospectus supplement the terms of the offering of securities, including:

- the name or names of any agents or underwriters;
- the purchase price of the securities being offered and the proceeds we will receive from the sale;
- any over-allotment options under which underwriters may purchase additional securities from us;
- any agency fees or underwriting discounts and other items constituting agents' or underwriters' compensation;
- any public offering price; and
- any discounts or concessions allowed or reallowed or paid to dealers.

In addition, any shares that qualify for sale pursuant to Rule 144 may be sold under Rule 144 rather than pursuant to this prospectus.

AGENTS

We and the selling stockholders may designate agents who agree to use their reasonable efforts to solicit purchases for the period of their appointment or to sell securities on a continuing basis.

UNDERWRITERS

If we and the selling stockholders use underwriters for a sale of securities, the underwriters will acquire the securities for their own account. The underwriters may resell the securities in one or more transactions, including negotiated transactions, at a fixed public offering price or at varying prices determined at the time of sale. The obligations of the underwriters to purchase the securities will be subject to the conditions set forth in the applicable underwriting agreement. Any public offering price and any discounts or concessions allowed or paid to dealers may be changed from time to time. We may use underwriters with whom we have a material relationship. We will describe in any prospectus supplement which names the underwriter the nature of any such relationship.

DIRECT SALES

We and the selling stockholders may also sell securities directly to one or more purchasers without using underwriters or agents.

The selling stockholders may sell securities through a broker-dealer as principal and resale by such broker-dealer for its own account pursuant to this prospectus, or through block trades in which the broker-dealer so engaged will attempt to sell the shares as agent but may position and resell a portion of the block as principal to facilitate the transaction.

Underwriters, dealers and agents that participate in the distribution of the securities may be underwriters as defined in the Securities Act and any discounts or commissions they receive from us and any profit on their resale of the securities may be treated as underwriting discounts and commissions under the Securities Act.

We will identify in the applicable prospectus supplement any underwriters,

dealers or agents and will describe their compensation. We may have agreements with the underwriters, dealers and agents to indemnify them against specified civil liabilities, including liabilities under the Securities Act. Underwriters, dealers and agents may engage in transactions with or perform services for us or our subsidiaries in the ordinary course of their businesses.

TRADING MARKETS

In connection with an offering, an underwriter may purchase and sell securities in the open market. These transactions may include short sales, stabilizing transactions and purchases to cover positions created by short sales. Shorts sales involve the sale by the underwriters of a greater number of securities than they are required to purchase in the offering. "Covered" short sales are sales made in an amount not greater than the underwriters' option to purchase additional securities from the Company in the offering, if any. If the underwriters have an over-allotment option to purchase additional securities from the Company, the underwriters may close out any covered short position by either exercising their over-allotment option or purchasing securities in the open market. In determining the source of securities to close out the covered short position, the underwriters may consider, among other things, the price of securities available for purchase in the open market as compared to the price at which they may purchase securities through the over-allotment option. "Naked" short sales are any sales in excess of such option or where the underwriters do not have an over-allotment option. The underwriters must close out any naked short position by purchasing securities in the open market. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of the securities in the open market after pricing that could adversely affect investors who purchase in the offering.

Accordingly, to cover these short sales positions or to otherwise stabilize or maintain the price of the securities, the underwriters may bid for or purchase securities in the open market and may impose penalty bids. If penalty bids are imposed, selling concessions allowed to syndicate members or other broker-dealers participating in the offering are reclaimed if securities previously distributed in the offering are repurchased, whether in connection with stabilization transactions or otherwise. The effect of these transactions may be to stabilize or maintain the market price of the securities at a level above that which might otherwise prevail in the open market. The imposition of a penalty bid may also effect the price of the securities to the extent that it discourages resale of the securities. The magnitude or effect of any stabilization or other transactions is uncertain. These transactions may be effected on the Nasdaq National Market or otherwise and, if commenced, may be discontinued at any time.

VALIDITY OF COMMON STOCK

The validity of the common stock offered hereby will be passed upon for us by Hale and Dorr LLP, Boston, Massachusetts.

EXPERTS

The financial statements of MKS Instruments, Inc. incorporated in this prospectus by reference to the Annual Report on Form 10-K for the year ended December 31, 2002 have been so incorporated in reliance on the report of PricewaterhouseCoopers LLP, independent accountants, and, in so far as they relate to the consolidated statement of operations, stockholders' equity and cash flows of Applied Science and Technology, Inc. and its subsidiaries for the year ended July 1, 2000 on the report of KPMG LLP, independent accountants. Such financial statements have been so incorporated in reliance on the reports of such independent accountants given on the authority of said firms as experts in auditing and accounting.

WHERE YOU CAN FIND MORE INFORMATION

We file reports, proxy statements and other documents with the Securities and Exchange Commission. You may read and copy any document we file at the SEC's public reference room at Judiciary Plaza Building,

450 Fifth Street, N.W., Room 1024, Washington, D.C. 20549. You should call 1-800-SEC-0330 for more information on the public reference room. Our SEC filings are also available to you on the SEC's Internet site at http://www.sec.gov.

This prospectus is part of a registration statement that we filed with the SEC. The registration statement contains more information than this prospectus regarding us and our common stock, including certain exhibits and schedules. You can obtain a copy of the registration statement from the SEC at the address listed above or from the SEC's Internet site.

INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

The SEC allows us to "incorporate" into this prospectus information that we file with the SEC in other documents. This means that we can disclose important information to you by referring to other documents that contain that information. The information incorporated by reference is considered to be part of this prospectus. Information contained in this prospectus and information that we file with the SEC in the future and incorporate by reference in this prospectus automatically updates and supersedes previously filed information. We incorporate by reference the documents listed below and any future filings we make with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Securities Exchange Act of 1934, prior to the sale of all the shares covered by this prospectus.

1. Our Annual Report on Form 10-K for the fiscal year ended December 31, 2002;

2. Our Quarterly Report on Form 10-Q for the fiscal quarter ended March 31, 2003;

3. Our Quarterly Report on Form 10-Q for the fiscal quarter ended June 30, 2003;

4. Our Current Report on Form 8-K filed with the SEC on October 16, 2003;

5. All of our filings pursuant to the Exchange Act after the date of filing the initial registration statement and prior to effectiveness of the registration statement; and

6. The description of our common stock contained in our Registration Statement on Form 8-A dated March 2, 1999.

You may request a copy of these documents, which will be provided to you at no cost, by writing or telephoning us using the following contact information:

MKS Instruments, Inc.
Six Shattuck Road
Andover, MA 01810
Attention: Chief Financial Officer
Telephone: (978) 975-2350

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7,000,000 SHARES

(MKS LOGO)

COMMON STOCK

PROSPECTUS SUPPLEMENT

MERRILL LYNCH & CO.

JPMORGAN
ADAMS, HARKNESS & HILL, INC.
NEEDHAM & COMPANY, INC.

JANUARY , 2004
