

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

Form 10-K

(MARK ONE)

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2013

or

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from _____ to _____

Commission File number 0-23621

MKS INSTRUMENTS, INC.

(Exact Name of Registrant as Specified in Its Charter)

Massachusetts
(State or other Jurisdiction of
Incorporation or Organization)

2 Tech Drive, Suite 201, Andover, Massachusetts
(Address of Principal Executive Offices)

04-2277512
(IRS Employer
Identification No.)

01810
(Zip Code)

(Registrant's Telephone Number, including area code)
(978) 645-5500

Securities registered pursuant to Section 12(b) of the Act:

<u>Title of class</u>	<u>Name of exchange on which registered</u>
Common Stock, no par value	NASDAQ Global Select Market

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes No

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

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§ 229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K.

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer Accelerated filer Non-accelerated filer Smaller reporting company
(Do not check if a smaller reporting company)

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes No

Aggregate market value of the voting and non-voting common equity held by nonaffiliates of the registrant as of June 30, 2013 based on the closing price of the registrant's Common Stock on such date as reported by the NASDAQ Global Select Market: \$1,410,691,554.

Number of shares outstanding of the issuer's Common Stock, no par value, as of February 19, 2014: 53,389,633

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive Proxy Statement for MKS' Annual Meeting of Stockholders to be held on May 5, 2014 are incorporated by reference into Part III of this Form 10-K.

TABLE OF CONTENTS

PART I

Item 1.	Business	2
Item 1A.	Risk Factors	10
Item 1B.	Unresolved Staff Comments	18
Item 2.	Properties	18
Item 3.	Legal Proceedings	20
Item 4.	Mine Safety Disclosures	20

PART II

Item 5.	Market for the Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities	21
Item 6.	Selected Financial Data	23
Item 7.	Management's Discussion and Analysis of Financial Condition and Results of Operations	24
Item 7A.	Quantitative and Qualitative Disclosures about Market Risk	40
Item 8.	Financial Statements and Supplementary Data	42
Item 9.	Changes in and Disagreements with Accountants on Accounting and Financial Disclosure	85
Item 9A.	Controls and Procedures	85
Item 9B.	Other Information	86

PART III

Item 10.	Directors, Executive Officers and Corporate Governance	87
Item 11.	Executive Compensation	87
Item 12.	Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters	87
Item 13.	Certain Relationships and Related Transactions and Director Independence	87
Item 14.	Principal Accountant Fees and Services	87

PART IV

Item 15.	Exhibits and Financial Statement Schedules	88
SIGNATURES		92

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995, Section 27A of the Securities Act and Section 21E of the Securities Exchange Act. When used herein, the words “believe,” “anticipate,” “plan,” “expect,” “estimate,” “intend,” “may,” “see,” “will,” “would” and similar expressions are intended to identify forward-looking statements although not all forward looking statements contain these identifying words. These forward-looking statements reflect management’s current opinions and are subject to certain risks and uncertainties that could cause actual results to differ materially from those stated or implied. MKS assumes no obligation to update this information. Risks and uncertainties include, but are not limited to, those discussed in the section entitled “Risk Factors” of this annual report on Form 10-K.

PART I

Item 1. Business

MKS Instruments, Inc. (the “Company” or “MKS”) was founded in 1961 as a Massachusetts corporation. We are a global provider of instruments, subsystems and process control solutions that measure, control, power, monitor and analyze critical parameters of advanced manufacturing processes to improve process performance and productivity. We also provide services relating to the maintenance and repair of our products, software maintenance, installation services and training.

We group our products into four groups of similar products based upon the similarity of product function. These four groups of products are: Instruments and Control Products, Power and Reactive Gas Products, Vacuum Products and Analytical Solutions Group Products. Our products are derived from our core competencies in pressure measurement and control, materials delivery, gas composition analysis, control and information technology, power and reactive gas generation and vacuum technology. Our products are used in diverse markets, applications and processes. Our primary served markets are manufacturers of capital equipment for semiconductor devices, and for other thin film applications including flat panel displays, solar cells, light emitting diodes (“LEDs”), data storage media and other advanced coatings. We also leverage our technology into other markets with advanced manufacturing processes including medical equipment, pharmaceutical manufacturing, energy generation and environmental monitoring.

We have four reportable segments: Advanced Manufacturing Capital Equipment, Analytical Solutions Group, Europe Region Sales & Service and Asia Region Sales & Service. The Advanced Manufacturing Capital Equipment segment includes the development, manufacture, sales and servicing of instruments and control products, power and reactive gas products, materials delivery products and vacuum products, all of which are utilized in semiconductor processing and other similar advanced manufacturing processes. Sales in this segment include both external sales and intercompany sales (which are recorded at agreed upon transfer prices). External sales of these products made in Europe or Asia are reported as sales in the Europe Region Sales & Service or Asia Region Sales & Service segments. The Analytical Solutions Group includes, gas composition analysis, information technology products and custom fabrication services. The Europe and Asia region sales and service segments mainly resell and service the Advanced Manufacturing Capital Equipment and Analytical Solutions Group products sold into their respective regions. For further information on our segments please see Note 21 to the Notes to the Consolidated Financials contained in this Annual Report on Form 10-K.

For over 50 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 includes manufacturers of semiconductor capital equipment and semiconductor devices, thin film capital equipment used in the manufacture of flat panel displays, LEDs, solar cells, data storage media and other coating applications; and other industrial, medical, pharmaceutical manufacturing, energy generation, environmental monitoring and other advanced manufacturing companies, as well as university, government and industrial research laboratories.

[Table of Contents](#)

We file reports, proxy statements and other documents with the Securities and Exchange Commission (“SEC”). You may read and copy any document we file at the SEC Headquarters at the Office of Investor Education and Assistance, 100 F Street, NE, 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>.

Our internet address is <http://www.mksinst.com>. We are not including the information contained in our website as part of, or incorporating it by reference into, this annual report on Form 10-K. We make available free of charge through our internet site our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to these reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), as soon as reasonably practicable after we electronically file such materials with, or furnish them to the SEC.

Markets and Applications

We are focused on improving process performance and productivity by measuring, controlling, powering, monitoring and analyzing advanced manufacturing processes in semiconductor, thin film and certain other advanced market sectors. Approximately 68%, 62% and 61% of our net sales for the years 2013, 2012 and 2011, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers. Approximately 32%, 38% and 39% of our net sales in the years 2013, 2012 and 2011, respectively, were for other advanced manufacturing applications. These include, but are not limited to, thin film processing equipment applications such as flat panel displays, LEDs, solar cells, data storage media and other thin film coatings as well as medical equipment; pharmaceutical manufacturing, energy generation and environmental monitoring processes; other industrial manufacturing; and university, government and industrial research laboratories.

During the years 2013, 2012 and 2011, international net sales accounted for approximately 46%, 49% and 52% of our net sales, respectively. Net sales by our Japan and Korea subsidiaries were 20%, 23% and 16% for the years 2013, 2012 and 2011, respectively. Long-lived assets, excluding long-term income tax receivables located in the U.S. were \$60.7 million, \$62.2 million and \$56.8 million as of December 31, 2013, 2012 and 2011, respectively. Long-lived assets, excluding long-term income tax receivable located outside the U.S. were \$19.0 million, \$20.5 million and \$17.7 million as of December 31, 2013, 2012 and 2011, respectively.

Semiconductor Manufacturing Applications

The majority of our sales are derived from products sold to semiconductor capital equipment manufacturers and semiconductor device manufacturers. Our products are used in the major semiconductor processing steps such as depositing thin films of material onto silicon wafer substrates and etching and cleaning circuit patterns. In addition, we provide specialized instruments and software to monitor and analyze process performance.

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 Japan, Korea, Taiwan and the United States.

Other Advanced Manufacturing Applications

Our products are used in the manufacture of flat panel displays, LEDs, data storage media, solar cells and other coating applications including architectural glass that require the same or similar thin film processes as semiconductor manufacturing.

[Table of Contents](#)

Flat Panel Display Manufacturing

Flat panel displays are used in electronic hand-held devices, laptop computers, desktop computer monitors and television sets. We sell products to flat panel display equipment manufacturers and to end-users in the flat panel display market. Major manufacturers of flat panel displays are concentrated in China, Japan, Korea and Taiwan, and major manufacturers of flat panel display equipment are concentrated in Japan and the United States. The transition to larger panel sizes and higher display resolution is driving the need for improved process control to reduce defects.

Light Emitting Diodes

LEDs are made using vacuum processes similar to semiconductor chip manufacturing. Because of their high brightness and long life, as well as environmentally friendly benefits such as lower power consumption, LEDs are expected to experience rapid acceptance in back side lighting of flat screen television displays and are emerging in general lighting applications.

Solar Cells

Our products are used in crystalline silicon and emerging thin film processes to manufacture photovoltaic cells. Crystalline silicon technology requires wafer based deposition systems and is currently the dominant manufacturing technology. Thin film deposition on a non-silicon substrate, such as glass, is the emerging technology.

Data Storage Media

Our products are used to manufacture storage media that store and read data magnetically; optical storage media that store and read data using laser technology; hard disks; data storage devices; and digital video discs.

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

Other Advanced Coatings

Thin film coatings for diverse applications such as architectural glass and packaging are deposited using processes similar to those used in semiconductor manufacturing. Thin film processing manufacturers are concentrated in Europe, Japan and the United States.

Other Advanced Applications

Our products are used in other advanced applications, including energy generation and environmental monitoring processes such as nuclear fuel processing, fuel cell research, greenhouse gas monitoring, and chemical agent detection; medical instrument sterilization; consumable medical supply manufacturing and pharmaceutical applications. Our power delivery products are also incorporated into other end-market products such as medical imaging equipment. 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. Major equipment and process providers and research laboratories are concentrated in Europe, Japan and the United States.

[Table of Contents](#)

Product Groups

We group our products into four product groups, based upon the similarity of the product function, type of product and manufacturing processes. These four groups of products are: Instruments and Control Products, Power and Reactive Gas Products, Vacuum Products and Analytical Solutions Group Products.

Instruments and Control Products

This product group includes pressure measurement and control, materials delivery and control products.

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. These products are typically used to measure the pressure of the gases being distributed upstream of the process chambers, process chamber pressures and pressures between process chambers, vacuum pumps and exhaust lines. 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. 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.

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 combines MKS flow, pressure measurement and control technologies to provide customers with integrated subsystems and precise control capabilities that are optimized for a given application.

Flow Measurement and Control Products. Flow measurement products include gas flow measurement products based upon thermal conductivity and pressure technologies. The flow control products combine the flow measurement device with valve control elements based upon solenoid, piezo-electric and piston pump technologies. These products measure and automatically control the mass flow rate of gases into the process chamber.

Control Products. We design and manufacture a suite of products that allow semiconductor and other manufacturing customers to better control their processes through computer-controlled automation. These products include digital control network products, process chamber, 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 as well as conventional discrete digital and analog signals. Chamber and system control computers process these signals in real time and allow customers to precisely manage the process conditions.

Connecting sensors, chambers and tools to the factory network is essential for improving quality and productivity. Our 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, we believe that we help customers optimize their processes through advanced process control, and diagnose equipment problems from a remote location, which is referred to as “e-diagnostics.”

[Table of Contents](#)

Power and Reactive Gas Products

This group of products includes power delivery and reactive gas generation products used in semiconductor and other thin film applications and in medical imaging equipment applications.

Power Delivery Products. We design and manufacture microwave, direct current and radio frequency power delivery systems as well as radio frequency matching networks and metrology products. In the semiconductor, thin film and other market sectors, our power supplies are used to provide energy to various etching, stripping and deposition processes. Our power amplifiers are also used in medical imaging equipment.

Reactive Gas Generation Products. We design and manufacture reactive gas generation products, which create reactive species. A reactive species is an atom or molecule in an unstable state, which is used to facilitate various chemical reactions in processing of thin films (deposition of films, etching and cleaning of films and surface modifications). A number of different technologies are used to create reactive gas including different plasma technologies and barrier discharge technologies.

Processing Thin Films. Our reactive gas products include ozone generators and subsystems used for deposition of insulators onto semiconductor devices, ozonated water delivery systems for advanced semiconductor wafer and flat panel display cleaning, microwave plasma based products for photo resist removal and a line of remote plasma generators which provide reactive gases for a wide range of semiconductor, flat panel and other thin film process applications.

Equipment Cleaning. As materials are deposited on wafers, films, or solar cells, the deposited material also accumulates on the walls of the vacuum process chamber. Our atomic fluorine generators are used to clean the process chambers between deposition steps to reduce particulates and contamination caused by accumulated build up on the chamber walls.

Vacuum Products

This group of products consists of vacuum technology products, including vacuum containment components, vacuum gauges, vacuum valves, effluent management subsystems and custom stainless steel chambers, vessels and pharmaceutical process equipment hardware and housings.

Vacuum Gauging Products. We offer a wide range of vacuum instruments consisting of vacuum measurement sensors and associated power supply and readout units as well as transducers where the sensor and electronics are integrated within a single package. These gauges complement our Baratron® capacitance manometers for medium and high vacuum ranges. Our indirect gauges use thermal conductivity and ionization gauge technologies to measure pressure and vacuum levels, and our direct gauges use the pressure measurement technology of a Micro-electromechanical systems (MEMS)-based piezo sensor.

Vacuum Valves, Stainless Steel Components, Process Solutions and Custom Stainless Steel Hardware. Our vacuum valves are used for vacuum isolation of vacuum lines, load locks, vacuum chambers and pumps for chamber isolation and vacuum containment. Our vacuum process solutions consist of vacuum fittings, traps and heated lines that are used downstream from the semiconductor process chamber to control process effluent gases by preventing condensable materials from depositing particles near or back into the process chamber.

Custom Manufactured Components. Our design and manufacturing facilities build high purity chambers for material and thin film coating processes. We design and build custom panels, weldments, American Society of Manufacturing Engineers vessels and housings, as well as a line of Bioprocessing Equipment Standard certified components for biopharmaceutical processes.

[Table of Contents](#)

Analytical Solutions Group Products

This product group includes gas composition analysis products, information technology products and custom fabrication services.

Gas Composition Analysis Products. Gas composition analysis instruments are sold to a wide variety of industries including the engine development, environmental emissions monitoring, air safety monitoring and semiconductor industries.

Mass Spectrometry-Based Gas Composition Analysis Instruments. These products are based on quadrupole 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 bench top laboratory systems and as process gas monitoring systems used in the diagnosis of semiconductor manufacturing process systems.

Fourier Transform Infra-Red (FTIR) Based Gas Composition Analysis Products. FTIR-based products provide information about the composition of gases 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 emissions to ensure environmental compliance and monitoring ambient air for safety. These instruments are provided as standalone monitors and as process gas monitoring systems.

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.

Information Technology Products. We design software products including design of experiment and multivariate analysis software for analyzing large and complex data sets. Our focus is on providing solutions which improve the quality and yield of manufacturing processes for the pharmaceutical, biotech and other industries.

Custom Fabrication. Our fabrication facility builds precision machined components and electromechanical assemblies for the analytical instrument, scientific, semiconductor and medical industries to ultra-high vacuum standards.

Customers

Our largest customers include leading semiconductor capital equipment manufacturers such as Applied Materials and Lam Research. Sales to our top ten customers accounted for approximately 46%, 42% and 41% of net sales for the years 2013, 2012 and 2011, respectively. Applied Materials accounted for approximately 17%, 14% and 14% and Lam Research accounted for 12%, 10% and 9% of our net sales for the years 2013, 2012 and 2011, respectively.

Sales, Marketing, Service and Support

Our worldwide sales, marketing, service and support organization is critical to our strategy of maintaining close relationships with semiconductor capital equipment and device manufacturers, and manufacturers of other advanced applications. We sell our products primarily through our direct sales force. As of December 31, 2013, we had 163 sales employees worldwide, located in China, France, Germany, Japan, Korea, the Netherlands, Singapore, Sweden, Taiwan, the United Kingdom and the United States. We also maintain sales representatives and agents in a number of countries, who supplement our direct sales force. We maintain a marketing staff that identifies customer requirements, assists in product planning and specifications, and focuses on future trends in semiconductor and other markets.

[Table of Contents](#)

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 internal worldwide sales and support organizations in nine countries and external third party worldwide sales and support organizations in six countries. Technical support is provided from offices in China, France, Germany, Japan, Korea, Singapore, Taiwan, the United Kingdom and the United States. Repair and calibration services are provided at nineteen internal and four third party service depots located worldwide. We typically provide warranties from one to three years, depending upon the type of product, with the majority of our products ranging from one to two years.

Research and Development

Our products incorporate sophisticated technologies to power, measure, control and monitor increasingly complex gas-related semiconductor and other advanced manufacturing processes, thereby enhancing uptime, yield and throughput for our customers. Our products have continuously advanced as we strive to meet our customers' evolving needs. We have developed, and continue to develop, new products to address industry trends, such as the shrinking of integrated circuit critical dimensions to 22 nanometers and below and, in the flat panel display and solar markets, the transition to larger substrate sizes, which require more advanced process control technology. In addition, we have developed, and continue to develop, products that support the migration to new classes of materials and ultra-thin layers, 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. We involve our marketing, engineering, manufacturing and sales personnel in the development of new products in order to reduce the time to market for new products. Our employees also work closely with our customers' development personnel helping us to identify and define future technical needs on which to focus research and development efforts. We support research at academic institutions targeted at advances in materials science and semiconductor process development.

As of December 31, 2013, we had 350 research and development employees, primarily located in the United States. Our research and development expenses were \$63.6 million, \$60.1 million and \$61.0 million for the years 2013, 2012 and 2011, respectively. Our research and development efforts include numerous projects, none of which are individually material, and generally have a duration of 3 to 30 months depending upon whether the product is an enhancement of existing technology or a new product. Our current initiatives include projects to enhance the performance characteristics of older products, to develop new products and to integrate various technologies into subsystems.

Manufacturing

Our primary manufacturing facilities are located primarily in the United States, China, Mexico, Korea, Germany, the United Kingdom and Israel. Manufacturing activities include the assembly and testing of components and subassemblies, which are integrated into our 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 lean manufacturing techniques and responsiveness to customers' significantly fluctuating product demands to be a competitive advantage. As of December 31, 2013, we had 1,543 manufacturing related employees located mostly in the United States and China.

Competition

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

- historical customer relationships;
- product quality, performance and price;

[Table of Contents](#)

- 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 single 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 are well established in specific product niches. Hitachi and Horiba offer materials delivery products that compete with our product line of mass flow controllers. Nor-Cal Products, Inc. and VAT, Inc. offer products that compete with our vacuum components. Inficon offers products that compete with our vacuum measurement and gas analysis products. Brooks Automation and Inficon offer products that compete with our vacuum gauging products. Advanced Energy offers products that compete with our power delivery and reactive gas generator 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 December 31, 2013, we owned 338 U.S. patents, 589 foreign patents and had 93 pending U.S. patent applications that expire at various dates through 2033. Foreign counterparts of certain of these applications have been filed or may be filed at the appropriate time.

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.

Employees

As of December 31, 2013, we employed 2,394 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.

Acquisitions

On March 12, 2013, we acquired Alter S.r.l. (“Alter”) located in Reggio Emilia, Italy. Alter develops advanced microwave power generators, components and systems for industrial microwave heating, microwave plasma coating and semiconductor applications. The purchase price net of cash acquired and after final debt and working capital adjustments, was \$2.4 million. Total cash paid as of June 30, 2013, net of cash acquired was \$2.0 million. During June 2013, one of two holdback provisions was met and we released \$0.1 million. We will pay the remaining \$0.4 million subject to a final holdback provision being met.

In August 2013, the Company purchased \$268 thousand of net assets of which \$388 thousand was completed technology.

On August 29, 2012, we acquired Plasmart, Inc. (“Plasmart”) located in Daejeon, Korea. Plasmart develops radio frequency (RF), plasma generation and monitoring systems for the semiconductor, flat panel display, active matrix organic light emitting diodes and solar photovoltaic industries. The purchase price was \$22.6 million, net of \$0.1 million of cash acquired.

Item 1A. Risk Factors

The following factors could materially affect MKS' business, financial condition or results of operations and should be carefully considered in evaluating the Company and its business, in addition to other information presented elsewhere in this report.

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.

Approximately 68%, 62% and 61% of our net sales for the years 2013, 2012 and 2011, 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 portion of our sales. Our business depends upon the capital expenditures of semiconductor device manufacturers, which in turn depends upon the demand for semiconductors.

Historically, the semiconductor market has been highly cyclical and has experienced periods of overcapacity, resulting in significantly reduced demand for capital equipment which may result in lower gross margins due to reduced absorption of manufacturing overhead. In addition, many semiconductor manufacturers have operations and customers in Asia, a region that in past years has experienced serious economic problems including currency devaluations, debt defaults, lack of liquidity and recessions.

The cyclicity of the semiconductor market is demonstrated by the changes in sales to semiconductor capital equipment and device manufacturers in past years. For example, our sales to semiconductor capital equipment manufacturers and semiconductor device manufacturers increased by 14% in 2013, but decreased by 20% and 8% in 2012 and 2011, respectively, compared to the prior year. We cannot be certain of the timing or magnitude of future semiconductor industry downturns or recoveries. A decline in the level of orders as a result of any additional downturn or slowdown in the semiconductor capital equipment industry could have a material adverse effect on our business, financial condition and results of operations.

We are exposed to risks associated with instability in the financial markets and any weakness in the global economy.

The markets for semiconductors and flat panel displays in particular depend largely on consumer spending. Economic uncertainty exacerbates negative trends in consumer spending and may cause certain of our customers to push out, cancel, or refrain from placing equipment or service orders, which may affect our ability to convert backlog to sales and may reduce our net sales. Difficulties in obtaining capital and deteriorating market conditions may also lead to the inability of some customers to obtain affordable financing, resulting in lower sales for us. Customers with liquidity issues may lead to additional bad debt expense for us. These conditions may also similarly affect key suppliers, which could affect their ability to deliver parts and result in delays for our products. Further, these conditions and uncertainty about future economic conditions make it challenging for us to forecast our operating results, make business decisions, and identify the risks that may affect our business, financial condition and results of operations. If we are not able to timely and appropriately adapt to changes resulting from a difficult macroeconomic environment, our business, financial condition or results of operations may be materially and adversely affected.

International sales accounted for approximately 46%, 49% and 52%, of net sales for the years 2013, 2012 and 2011, respectively, a substantial portion of which were sales to China, Japan, Korea and other Asian countries and 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 affecting the global economy generally, as well as economic slowdowns in particular regions, such as Asia, Europe, or specific countries such as Japan and Korea.

[Table of Contents](#)

Our quarterly operating results have fluctuated, and are likely to continue to vary significantly, which may result in volatility in the market price of our Common Stock.

A substantial portion of our shipments occurs 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 is 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 in capital spending by customers;
- production capacity constraints; and
- specific features requested by customers.

In addition, our quarterly operating results may be adversely affected due to charges incurred in a particular quarter, for example, relating to inventory obsolescence, warranty, bad debt or asset impairments.

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 fluctuate or 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 46%, 42% and 41% of our net sales for the years 2013, 2012 and 2011, respectively. During the years 2013, 2012 and 2011, one customer, Applied Materials, accounted for approximately 17%, 14% and 14%, respectively, of our net sales and another customer Lam Research, accounted for 12%, 10% and 9%, 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. None of our significant customers have entered into an agreement with us requiring it to purchase any minimum quantity of our products. The demand for our products from our semiconductor capital equipment customers depends on the cyclical nature of our served markets, specifically 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 and satisfy any required qualification periods;
- our ability to introduce new products in a timely manner for existing and new customers; and
- the successes of our customers in creating demand for their capital equipment products that incorporate our products.

[Table of Contents](#)

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 and costly to integrate, may be disruptive to our business, may dilute stockholder value or may divert management attention.

We have made acquisitions and, 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, technology and personnel of the acquired companies, the potential disruption of our ongoing business and distraction of management, possible internal control weaknesses of the acquired companies, expenses related to the acquisition and potential unknown liabilities associated with acquired businesses. If we are not successful in completing acquisitions that we may pursue in the future, we may be required to re-evaluate our growth strategy, and we may incur substantial expenses and devote significant management time and resources in seeking to complete proposed acquisitions that may 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, or obtain debt financing, which could reduce our future cash flow from operations, without achieving the desired accretion to our business. Further, our prior acquisitions and any future acquisitions may not ultimately help us achieve our strategic goals and may pose other risks to us.

As a result of our previous acquisitions, we have several different decentralized operating and accounting systems. We will need to continue to modify our accounting policies, internal controls, procedures and compliance programs to provide consistency across all of our operations. In order to increase efficiency and operating effectiveness and improve corporate visibility into our decentralized operations, we are currently implementing a worldwide Enterprise Resource Planning (“ERP”) system. We expect to continue to implement the ERP system in phases over the next few years. Any future implementations may risk potential disruption of our operations during the conversion periods and the implementations could require significantly more management time and higher implementation costs than currently estimated.

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 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. We must develop products that are technologically advanced so that they are positioned to be chosen for use in each successive generation of capital equipment. If customers do not choose our products, 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.

[Table of Contents](#)

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. 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.

Manufacturing interruptions or delays could affect our ability to meet customer demand and lead to higher costs, while the failure to estimate customer demand accurately could result in excess or obsolete inventory.

Our business depends on its timely supply of equipment, services and related products that meet the rapidly changing technical and volume requirements of our customers, which depends in part on the timely delivery of parts, components and subassemblies (collectively, parts) from suppliers, including contract manufacturers. Cyclical industry conditions and the volatility of demand for manufacturing equipment increase capital, technical, operational and other risks for us and for companies throughout our supply chain. We may also experience significant interruptions of our manufacturing operations, delays in our ability to deliver products or services, increased costs or customer order cancellations as a result of:

- volatility in the availability and cost of materials, including rare earth elements;
- information technology or infrastructure failures; and
- natural disasters or other events beyond our control (such as earthquakes, floods or storms, regional economic downturns, pandemics, social unrest, political instability, terrorism, or acts of war), particularly where we conduct manufacturing.

In addition, if we need to rapidly increase our business and manufacturing capacity to meet increases in demand or expedited shipment schedules, this may exacerbate any interruptions in our manufacturing operations and supply chain and the associated effect on our working capital. Moreover, if actual demand for our products is different than expected, we may purchase more/fewer parts than necessary or incur costs for canceling, postponing or expediting delivery of parts. If we purchase inventory in anticipation of customer demand that does not materialize, or if our customers reduce or delay orders, we may incur excess inventory charges. Any or all of these factors could materially and adversely affect our business, financial condition and results of operations.

A material amount of our assets represents goodwill and intangible assets, and our net income would be reduced if our goodwill or intangible assets become impaired.

As of December 31, 2013, our goodwill and intangible assets, net, represented approximately \$164.0 million, or 13.5% of our total assets. Goodwill is generated in our acquisitions when the cost of an acquisition exceeds the fair value of the net tangible and identifiable intangible assets we acquire. Goodwill is subject to an impairment analysis at least annually based on the fair value of the reporting unit. Intangible assets, which relate primarily to the developed technologies, customer relationships, patents and trademarks and in-process research and development acquired by us as part of our acquisitions of other companies, are subject to an impairment analysis whenever events or changes in circumstances exist that indicate that the carrying value of the intangible asset might not be recoverable. We will continue to monitor and evaluate the carrying value of goodwill and intangible assets. If market and economic conditions or business performance deteriorate, the likelihood of the Company recording an impairment charge would increase, which could materially and adversely affect our results of operations.

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, we may not be able to 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. Competitors may develop products that offer price or performance features superior to those of our products. If our competitors develop superior products, we may lose existing customers and market share.

We have significant foreign operations, and outsource certain operations offshore, which pose significant risks.

We have significant international sales, service, engineering and manufacturing operations in Europe, Israel and Asia, and have outsourced a portion of our manufacturing and service to a subcontractor in Mexico. In the future, we may expand the level of manufacturing and certain other operations that we perform offshore in order to take advantage of cost efficiencies available to us in those countries. However, we may not achieve the significant cost savings or other benefits that we would anticipate from moving manufacturing and other operations to a lower cost region. These foreign operations expose us to operational and political risks that may harm our business, including:

- political and economic instability;
- fluctuations in the value of currencies, particularly in Asia and Europe;
- changes in labor conditions and difficulties in staffing and managing foreign operations, including, but not limited to, the formation of labor unions;
- reduced or less certain protection for intellectual property rights;
- 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;
- costs associated with compliance programs for import and export regulations;
- 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.

The Company may have risks associated with export violations in its Shanghai office.

In May 2012, an employee from the our Shanghai, China subsidiary was arrested as part of a U.S. government investigation into violations of U.S. law, including providing false information to obtain U.S. export licenses for certain MKS pressure transducers. U.S. government authorities have made it clear that MKS is not a target of the investigation. MKS is cooperating with the government's investigation. In addition, MKS conducted its own investigation into these matters. Although MKS has taken corrective human resources actions and has implemented additional export compliance procedures, we cannot be certain these efforts will be sufficient to avoid similar situations. While MKS does not expect any of the alleged violations to have a material adverse effect upon its business, the Company cannot be certain of the outcome of the governmental investigation, which could include the identification of other violations, fines, penalties, restrictions on export activities or other governmental actions.

Unfavorable currency exchange rate fluctuations may lead to lower operating margins or may cause us to raise or reduce 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 or decrease 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, most 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 foreign exchange contracts 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.

Changes in tax rates or tax regulation could affect results of operations.

As a global company, we are subject to taxation in the United States and various other countries. Significant judgment is required to determine and estimate worldwide tax liabilities. Our future annual and quarterly effective tax rates could be affected by numerous factors, including changes in the: applicable tax laws; composition of pre-tax income in countries with differing tax rates; and/or valuation of our deferred tax assets and liabilities. In addition, we are subject to regular examination by the Internal Revenue Service, state, local and foreign tax authorities. We regularly assess the likelihood of favorable or unfavorable outcomes resulting from these examinations to determine the adequacy of our provision for income taxes. Although we believe our tax estimates are reasonable, there can be no assurance that any final determination will not be materially different from the treatment reflected in our historical income tax provisions and accruals, which could materially and adversely affect our financial condition and results of operations.

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 sales and marketing personnel. We cannot be certain that we will be successful in attracting and retaining such personnel.

[Table of Contents](#)

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 December 31, 2013, we owned 338 U.S. patents, 589 foreign patents and had 93 pending U.S. patent applications that expire at various dates through 2033. 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;
- domestic and international 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 are, from time to time, involved in lawsuits enforcing or defending our intellectual property rights. Such litigation could result in substantial costs and diversion of resources and could have a material adverse effect on our business, financial condition, results of operations, or cash flows.

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, pay royalties, 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. Historically, the market price of shares of our Common Stock has fluctuated greatly 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.

We may not pay dividends on our Common Stock.

Holders of our Common Stock are only entitled to receive such dividends when and if they are declared by our board of directors. Although we have declared cash dividends on our Common Stock for the past few years, we are not required to do so and may reduce or eliminate our cash dividend in the future. This could adversely affect the market price of our Common Stock.

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.

[Table of Contents](#)

We believe we could obtain and qualify alternative sources for most sole, limited source and international supplier parts however, the transition time may be long. Seeking alternative sources for these 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 products. We must ensure that the affected products meet a variety of 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. In addition, the European Union has issued directives relating to regulation of recycling and hazardous substances, which may be applicable to our products, or to which some customers may voluntarily elect to adhere to. China has adopted, and certain other Asian countries have indicated, an intention to adopt similar regulations. We must comply with any applicable regulation adopted in connection with these types of directives in order to ship affected products into countries that adopt these types of regulations. 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, or customer demands beyond such requirements, 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.

New regulations and customer demands related to conflict minerals and hazardous materials may adversely affect us

The Dodd-Frank Wall Street Reform and Consumer Protection Act imposes new disclosure requirements regarding the use in our products of “conflict minerals” mined from the Democratic Republic of Congo and adjoining countries, whether or not the components of our products are manufactured by us or third parties. To meet the initial disclosure requirements, which begin in 2014, we began due diligence in 2013 to determine the sources of the conflict minerals in our very broad product portfolio. In addition, several of our customers have recently requested us to disclose to them our use of numerous other hazardous materials in our products. Our supply chain is very complex and we may be unable to verify the origin for all metals used in our products. This new requirement could affect the pricing, sourcing and availability of minerals used in the manufacture of components we use in our products. In addition, there are additional costs associated with complying with the disclosure requirements and customer requests, such as costs related to our due diligence to determine the source of any conflict minerals or any other hazardous materials used in our products. We may face difficulties in satisfying customers who may require that all of the components of our products are certified as conflict mineral free and/or free of numerous other hazardous materials.

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.

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

[Table of Contents](#)

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 the Company.

Changes in financial accounting standards may adversely affect our reported results of operations.

A change in accounting standards or practices could have a significant effect on our reported results and may even affect our reporting of transactions completed before the change was effective. New accounting pronouncements and varying interpretations of existing accounting pronouncements have occurred and may occur in the future. Such changes may adversely affect our reported financial results or may impact our related business practice.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

The following table provides information concerning MKS' principal and certain other owned and leased facilities as of December 31, 2013:

<u>Location</u>	<u>Sq. Ft.</u>	<u>Activity</u>	<u>Reportable Segment</u>	<u>Lease Expires</u>
Akishima, Japan	26,500	Manufacturing, Customer Support and Service	Asia Region Sales & Service	September 11, 2018
Andover, Massachusetts	118,000	Manufacturing, Research & Development and Corporate Headquarters	Advanced Manufacturing Capital Equipment and Analytical Solutions Group	(1)
Austin, Texas	20,880	Manufacturing, Sales, Customer Support, Service and Research & Development	Advanced Manufacturing Capital Equipment and Analytical Solutions Group	June 30, 2015
Berlin, Germany	20,750	Manufacturing, Customer Support, Service and Research & Development	Advanced Manufacturing Capital Equipment	December 13, 2014
Boulder, Colorado	124,000	Manufacturing, Customer Support, Service and Research & Development	Advanced Manufacturing Capital Equipment	(2)
Carmiel, Israel	11,800	Manufacturing and Research & Development	Advanced Manufacturing Capital Equipment	December 31, 2017
Cheshire, United Kingdom	16,000	Manufacturing, Sales, Customer Support and Service	Analytical Solutions Group and Europe Region Sales & Service	November 6, 2018
Colorado Springs, Colorado	24,000	Research & Development	Advanced Manufacturing Capital Equipment	(3)
Daejeon, Korea	21,400	Manufacturing, Sales, Customer Support, Service and Research & Development	Advanced Manufacturing Capital Equipment	(4)

Table of Contents

<u>Location</u>	<u>Sq. Ft.</u>	<u>Activity</u>	<u>Reportable Segment</u>	<u>Lease Expires</u>
Filderstadt, Germany	9,300	Sales and Service	Europe Region Sales & Service	July 31, 2014
Hellebaek, Denmark	6,400	Manufacturing and Research & Development	Advanced Manufacturing Capital Equipment	December 31, 2014
Kyunggi, Korea	45,600	Sales, Customer Support and Service	Asia Region Sales & Service	(5)
Lawrence, Massachusetts	40,000	Manufacturing	Advanced Manufacturing Capital Equipment and Analytical Solutions Group	(3)
Lod, Israel	7,600	Customer Support and Research & Development	Advanced Manufacturing Capital Equipment	December 31, 2014
Methuen, Massachusetts	85,000	Manufacturing, Customer Support, Service and Research & Development	Advanced Manufacturing Capital Equipment and Analytical Solutions Group	(3)
Munich, Germany	20,100	Manufacturing, Sales, Customer Support, Service and Research & Development	Europe Region Sales & Service	(6)
Nogales, Mexico	101,600	Manufacturing and Service	Advanced Manufacturing Capital Equipment	August 31, 2022
Reggio Emilia, Italy	10,000	Manufacturing, Customer Support, Service and Research & Development	Advanced Manufacturing Capital Equipment	August 31, 2019
Rochester, New York	156,000	Manufacturing, Sales, Customer Support, Service and Research & Development	Advanced Manufacturing Capital Equipment	(3)
San Jose, California	20,400	Sales, Customer Support and Service	Advanced Manufacturing Capital Equipment and Analytical Solutions Group	January 31, 2018
Shanghai, China	18,700	Sales, Customer Support and Service	Asia Region Sales & Service	February 28, 2014
Shenzhen, China	242,000	Manufacturing	Advanced Manufacturing Capital Equipment	May 31, 2017
Shropshire, United Kingdom	25,000	Manufacturing	Analytical Solutions Group	June 23, 2022
Singapore	13,700	Sales, Customer Support and Service	Asia Region Sales & Service	November 30, 2015
Taiwan	24,900	Sales, Customer Support and Service	Asia Region Sales & Service	August 31, 2015
Tokyo, Japan	6,000	Sales and Customer Support	Asia Region Sales & Service	December 31, 2014
Umea, Sweden	7,000	Sales, Customer Support and Research & Development	Analytical Solutions Group	December 31, 2014
Wilmington, Massachusetts	118,000	Manufacturing, Sales, Customer Support, Service and Research & Development	Advanced Manufacturing Capital Equipment	(3)

Table of Contents

- (1) MKS owns one facility with 82,000 square feet of space used for manufacturing and research and development and leases 36,000 square feet of space used for its corporate headquarters with a lease term that expires on May 31, 2018.
- (2) MKS leases two facilities, of which one has 39,000 square feet of space and the other has 38,000 square feet of space. Both leases expire on May 31, 2015. MKS also owns a third and fourth facility with 27,000 and 20,000 square feet of space, respectively.
- (3) This facility is owned by MKS.
- (4) MKS owns 18,100 square feet of space and leases 3,300 square feet of space with an expiration date of March 1, 2014.
- (5) MKS leases 36,500 square feet of space with an expiration date of May 2, 2020. MKS leases 9,100 square feet of space with an expiration date of January 31, 2015.
- (6) MKS owns 14,800 square feet of space and leases 1,600 square feet of space with an expiration date of August 31, 2014 and 2,400 square feet of space with an expiration date of December 31, 2014.

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

Item 3. *Legal Proceedings*

We are subject to various 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.

Item 4. *Mine Safety Disclosures*

Not applicable.

PART II**Item 5. Market for the Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities****Price Range of Common Stock**

Our Common Stock is traded on the NASDAQ Global Select Market under the symbol MKSI. On February 19, 2014, the closing price of our Common Stock, as reported on the NASDAQ Global Select Market, was \$29.55 per share. 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 Global Select Market.

	2013		2012	
	High	Low	High	Low
First Quarter	\$29.45	\$25.67	\$34.99	\$27.33
Second Quarter	29.02	24.64	29.75	23.93
Third Quarter	28.97	24.71	29.75	24.18
Fourth Quarter	31.00	26.39	25.87	22.45

On February 19, 2014, we had approximately 130 stockholders of record.

Dividend Policy and Cash Dividends

Holders of our Common Stock are entitled to receive dividends when and if they are declared by our board of directors. During 2013, our board of directors declared four quarterly dividends of \$0.16 per share, which totaled \$34.0 million or \$0.64 per share. During 2012, our board of directors declared four quarterly dividends, two quarterly dividends of \$0.15 per share and two quarterly dividends of \$0.16 per share, which totaled \$32.7 million or \$0.62 per share. Future dividend declarations, if any, as well as the record and payment dates for such dividends, are subject to the final determination of our board of directors. The board of directors intends to declare and pay cash dividends on our Common Stock based on the financial conditions and results of operations of the Company, although it has no obligation to do so.

On February 10, 2014, our board of directors declared a quarterly cash dividend of \$0.16 per share to be paid on March 14, 2014 to shareholders of record as of March 3, 2014.

Purchase of Equity Shares

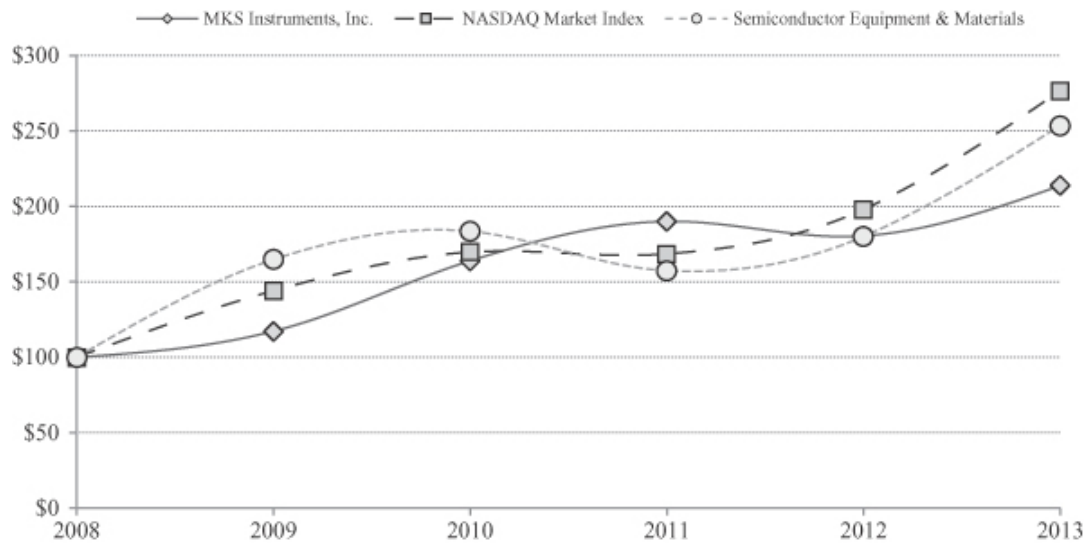
On July 25, 2011, our board of directors approved and on July 27, 2011, we publicly announced, a share repurchase program for the repurchase of up to an aggregate of \$200 million of our outstanding Common Stock from time to time in open market purchases, privately negotiated transactions or through other appropriate means (the "Program"). The timing and quantity of any shares repurchased will depend upon a variety of factors, including business conditions, stock market conditions and business development activities, including, but not limited to, merger and acquisition opportunities. These repurchases may be commenced, suspended or discontinued at any time without prior notice. During the twelve months ended December 31, 2013, we repurchased approximately 107,000 shares of our common stock for \$2.9 million at an average price of \$26.87 per share. No repurchases occurred during the three months ended December 31, 2013.

We have repurchased approximately 627,000 shares of our common stock pursuant to the Program since its adoption.

Comparative Stock Performance

The following graph compares the cumulative total shareholder return (assuming reinvestment of dividends) from investing \$100 on December 31, 2008, and plotted at the last trading day of each of the fiscal years ended December 31, 2009, 2010, 2011, 2012 and 2013, in each of MKS' Common Stock; an industry group index of semiconductor equipment/material manufacturers (the "Morningstar Semiconductor Equipment & Materials Industry Group"), compiled by Morningstar, Inc.; and the NASDAQ Market Index of companies. The stock price performance on the graph below is not necessarily indicative of future price performance. Our Common Stock is listed on the NASDAQ Global Select Market under the ticker symbol MKSI.

Performance Graph



	2008	2009	2010	2011	2012	2013
MKS Instruments, Inc.	\$ 100.00	\$ 117.65	\$ 165.65	\$ 192.52	\$ 182.58	\$ 216.89
NASDAQ Market Index	\$ 100.00	\$ 145.34	\$ 171.70	\$ 170.34	\$ 200.57	\$ 281.14
Morningstar Semiconductor Equipment & Materials Industry Group	\$ 100.00	\$ 166.62	\$ 185.72	\$ 158.90	\$ 182.29	\$ 257.49

Item 6. Selected Financial Data
Selected Consolidated Financial Data

	Years Ended December 31,				
	2013	2012	2011	2010	2009
(in thousands, except per share data)					
Statement of Operations Data					
Net sales	\$ 669,420	\$ 643,508	\$ 822,517	\$ 853,114	\$ 392,693
Gross profit	266,574	269,479	374,988	378,638	130,216
Income (loss) from operations(1)	58,387	74,223	184,925	195,507	(171,661)
Income (loss) from continuing operations	35,776	48,029	129,731	132,919	(149,361)
Income (loss) from discontinued operations, net of taxes(2)	—	—	—	9,668	(63,298)
Net income (loss)(3)	\$ 35,776	\$ 48,029	\$ 129,731	\$ 142,587	\$(212,659)
Basic income (loss) per share:					
Continuing operations	\$ 0.67	\$ 0.91	\$ 2.49	\$ 2.66	\$ (3.03)
Net income (loss)	\$ 0.67	\$ 0.91	\$ 2.49	\$ 2.85	\$ (4.31)
Diluted income (loss) per share:					
Continuing operations	\$ 0.67	\$ 0.90	\$ 2.45	\$ 2.61	\$ (3.03)
Net income (loss)	\$ 0.67	\$ 0.90	\$ 2.45	\$ 2.80	\$ (4.31)
Cash dividends paid per common share	\$ 0.64	\$ 0.62	\$ 0.60	\$ —	\$ —
Balance Sheet Data					
Cash and cash equivalents	\$ 288,902	\$ 287,588	\$ 312,916	\$ 162,476	\$ 111,009
Short-term investments	300,715	327,653	252,603	269,457	160,786
Working capital	748,010	788,871	788,470	643,209	461,581
Long-term investments	60,405	12,158	7,873	—	4,853
Total assets(4)	1,213,018	1,152,562	1,133,935	982,413	774,069
Short-term obligations	—	—	1,932	—	12,885
Stockholders' equity	\$1,021,523	\$1,012,156	\$ 990,012	\$ 847,039	\$ 684,933

(1) Income from operations for 2013 includes \$1.4 million of restructuring charges and \$1.1 million from an insurance reimbursement related to a 2012 litigation settlement. Income from operations for 2012 includes \$5.3 million for litigation settlement and \$1.3 million of acquisition related costs from our acquisition of Plasmart, Inc. in August 2012. Loss from operations for 2009 includes an impairment charge of \$143.0 million related to the write-down of goodwill, intangible, and long-lived assets and \$5.5 million of restructuring charges.

(2) Income from discontinued operations, net of taxes for 2010 includes a \$4.4 million gain on the sale of the two discontinued product lines. Loss from discontinued operations, net of taxes for 2009 includes charges related to the discontinued product lines of \$53.8 million for the goodwill impairment and \$7.3 million for the intangible assets impairment.

(3) Net income for 2013 includes charges, net of tax, of \$0.9 million of restructuring costs and a benefit, net of tax, of \$0.7 million for an insurance reimbursement related to a 2012 litigation settlement. Net income for 2012 includes charges, net of tax, of \$3.3 million for a litigation settlement and \$0.8 million of acquisition related costs. Net loss for 2009 includes charges, net of tax, of \$202.7 million related to the write-down of goodwill, intangible and long-lived assets and \$3.6 million of restructuring charges.

(4) For the year ended December 31, 2012 and 2011, total assets have been revised to adjust for a prior period error related to uncertain tax benefits, which had been shown net instead of gross in the balance sheet.

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

Overview

We are a global provider of instruments, subsystems and process control solutions that measure, control, power, monitor and analyze critical parameters of advanced manufacturing processes to improve process performance and productivity. We also provide services relating to the maintenance and repair of our products, software maintenance, installation services and training.

Our products are derived from our core competencies in pressure measurement and control, materials delivery, gas composition analysis, control and information technology, power and reactive gas generation and vacuum technology. Our products are used in diverse markets, applications and processes. Our primary service markets are manufacturers of capital equipment for semiconductor devices, and for other thin film applications including flat panel displays, solar cells and light emitting diodes ("LEDs"), data storage media and other advanced coatings. We also leverage our technology into other markets with advanced manufacturing applications including medical equipment, pharmaceutical manufacturing, energy generation and environmental monitoring.

We have a diverse base of customers that includes manufacturers of semiconductor capital equipment and semiconductor devices, thin film capital equipment used in the manufacture of flat panel displays, LEDs, solar cells, data storage media and other coating applications; and other industrial, medical, energy generation, environmental monitoring and manufacturing companies, and university, government and industrial research laboratories. During the years 2013, 2012 and 2011, approximately 68%, 62% and 61% of our net sales, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers. We expect that sales to semiconductor capital equipment manufacturers and semiconductor device manufacturers will continue to account for a substantial portion of our sales.

We have four reportable segments: Advanced Manufacturing Capital Equipment, Analytical Solutions Group, Europe Region Sales & Service and Asia Region Sales & Service. The Advanced Manufacturing Capital Equipment segment includes the development, manufacture, sales and servicing of instruments and control products, power and reactive gas products and vacuum products, all of which are utilized in semiconductor processing and other similar advanced manufacturing processes. Sales in this segment include both external sales and intercompany sales (which are recorded at agreed upon transfer prices). External sales of these products made in Europe or Asia are reported as sales in the Europe Region Sales & Service or Asia Region Sales & Service segments. The Analytical Solutions Group includes, gas composition analysis, information technology products and custom fabrication services. The Europe and Asia Region Sales and Service groups mainly resell and service the Advanced Manufacturing Capital Equipment and Analytical Solutions Group products sold into their respective regions.

We group our products into four groups of similar products based upon similarity of product function. These four groups of products are: Instruments and Control Products, Power and Reactive Gas Products, Vacuum Products and Analytical Solutions Group Products.

Net revenues to semiconductor capital equipment manufacture and semiconductor device manufacture customers increased by 14% in 2013 compared to the prior year. Throughout all of 2012, we witnessed a drop in semiconductor capital spending, but conditions stabilized in the fourth quarter of 2012 and our semiconductor net revenues increased sequentially in each quarter of 2013. Net revenues to semiconductor capital equipment manufacture and semiconductor device manufacture customers declined by 20% in 2012 compared to 2011, and declined by 8% in 2011 compared to 2010. The semiconductor capital equipment industry is subject to rapid demand shifts, which are difficult to predict, and we are uncertain as to the timing or extent of future demand or any future weakness in the semiconductor capital equipment industry.

[Table of Contents](#)

Our net revenues sold to other advanced markets, which exclude semiconductor capital equipment and semiconductor device product applications, decreased 13% in 2013 compared to the prior year. These advanced markets include general industrial, medical, solar, thin films, pharmaceutical and other markets. The decline in other advanced markets was primarily caused by a significant decrease in our solar product revenues, which declined by 73% in 2013 compared to the prior year, as the industry has contracted over the past few years due to oversupply. Excluding sales to customers in the solar market, revenues to other advanced markets declined by 5% in 2013 compared to the prior year. Approximately 32% of our net sales for 2013 were to other advanced markets and we anticipate that these markets will grow and could represent a larger portion of our revenue.

A significant portion of our net sales, is in international markets. During the years 2013, 2012 and 2011, international net sales accounted for approximately 46%, 49% and 52% of our net sales, respectively. A significant portion of our international net sales were sales in Japan and Korea. We expect that international net sales will continue to represent a significant percentage of our total net sales.

On March 12, 2013, we completed our acquisition of Alter S.r.l. (“Alter”) located in Reggio Emilia, Italy. Alter develops advanced microwave power generators, components and systems for industrial microwave heating, microwave plasma coating and semiconductor applications. The purchase price net of cash acquired and after final debt and working capital adjustments, was \$2.4 million. Total cash paid as of June 30, 2013, net of cash acquired was \$2.0 million. During June 2013, one of two holdback provisions was met and we released \$0.1 million. We will pay the remaining \$0.4 million, subject to a final holdback provision being met.

In August 2013, we purchased \$268 thousand of net assets of which \$388 thousand was completed technology.

On August 29, 2012, we completed our acquisition of Plasmart, Inc. (“Plasmart”) located in Daejeon, Korea. Plasmart develops radio frequency (RF), plasma generation and monitoring systems for the semiconductor, flat panel display, active matrix organic light emitting diodes and solar photovoltaic industries. The purchase price was \$22.6 million, net of \$0.1 million of cash acquired, after final working capital post-close adjustments.

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 financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. On an on-going basis, we evaluate our estimates and judgments, including those related to revenue recognition, allowance for doubtful accounts, inventory, warranty costs, stock-based compensation expense, 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 the most significant judgments, assumptions and estimates we use in preparing our consolidated financial statements:

Revenue Recognition and Allowance for Doubtful Accounts. 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. The Company does not frequently enter into arrangements with multiple deliverables however, for those revenue arrangements with multiple deliverables, we allocate revenue to each element based upon their

[Table of Contents](#)

relative selling price using vendor-specific objective evidence (“VSOE”), or third-party evidence (“TPE”) or based upon the relative selling price using estimated prices if VSOE or TPE does not exist. We then recognize revenue on each deliverable in accordance with our policies for product and service revenue recognition. We defer the fair value of any undelivered elements until the undelivered element is delivered. Fair value is the price charged when the element is sold separately. Shipping and handling fees billed to customers, if any, 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 sales return allowances and reduce revenue at the time of shipment for the estimated amount of such future returns, based on historical experience. While product returns have historically been within our expectations and the provisions established, there is no assurance that we will continue to experience the same return rates that we have in the past. Any significant increase in product return rates could have a material adverse impact on our operating results for the period or periods in which such returns materialize.

While we maintain a credit approval process, significant judgments are made by management in connection with assessing our customers’ ability to pay at the time of shipment. Despite this assessment, from time to time, our customers are unable to meet their payment obligations. We continuously monitor our customers’ credit worthiness, and use our judgment in establishing 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 its estimated net realizable value, if less than cost, based primarily on our estimated forecast of product demand. Once our inventory value is written-down and a new cost basis has been established, the inventory value is not increased due to demand increases. Demand for our products can fluctuate significantly. A significant increase in the demand for our products could result in a short-term increase in the cost of inventory purchases as a result of supply shortages or a decrease in the cost of inventory purchases as a result of volume discounts, 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. For 2013, 2012 and 2011, our total charges for excess and obsolete inventory totaled \$21.7 million, \$15.0 million and \$14.9 million, respectively. Included in our total charges for excess and obsolete inventory in 2013 is \$6.4 million of special charges for obsolete inventory related to a unique product in a solar application as a result of slowing market conditions, which provided uncertainty as to the net realizable value of this inventory.

Warranty Costs. We provide for the estimated costs to fulfill customer warranty obligations upon the recognition of the related revenue. We provide warranty coverage for our products ranging from 12 to 36 months, with the majority of our products ranging from 12 to 24 months. We estimate the anticipated costs of repairing our products under such warranties based on the historical costs of the repairs and any known specific product issues. The assumptions we use to estimate warranty accruals are re-evaluated periodically in light of actual experience and, when appropriate, the accruals are adjusted. Our determination of the appropriate level of warranty accrual is based upon estimates. Should product failure rates differ from our estimates, actual costs could vary significantly from our expectations.

Stock-Based Compensation Expense. We record compensation expense for all share-based payment awards to employees and directors based upon the estimated fair market value of the underlying instrument. Accordingly, share-based compensation cost is measured at the grant date, based upon the fair value of the award.

[Table of Contents](#)

We typically issue restricted stock units (“RSUs”) as stock-based compensation. We also provide employees the opportunity to purchase shares through an Employee Stock Purchase Plan (“ESPP”). For RSUs, the fair value is the stock price on the date of grant. For shares issued under our ESPP, we have estimated the fair value on the date of grant using the Black Scholes pricing model, which is affected by our stock price as well as assumptions regarding a number of complex and subjective variables. These variables include our expected stock price volatility over the term of the awards, expected life, risk free interest rate and expected dividends. Management determined that blended volatility, a combination of historical and implied volatility, is more reflective of market conditions and a better indicator of expected volatility than historical or implied volatility alone. We are also required to estimate forfeitures at the time of grant and revise those estimates in subsequent periods if actual forfeitures differ from those estimates.

Certain RSUs involve stock to be issued upon the achievement of performance conditions (performance shares) under our stock incentive plans. Such performance shares become available subject to time-based vesting conditions if, and to the extent that, financial or operational performance criteria for the applicable period are achieved. Accordingly, the number of performance shares earned will vary based on the level of achievement of financial or operational performance objectives for the applicable period. Until such time that our performance can ultimately be determined, each quarter we estimate the number of performance shares more likely than not to be earned based on an evaluation of the probability of achieving the performance objectives. Such estimates are revised, if necessary, in subsequent periods when the underlying factors change our evaluation of the probability of achieving the performance objectives. Accordingly, share-based compensation expense associated with performance shares may differ significantly from the amount recorded in the current period.

The assumptions used in calculating the fair value of share-based payment awards represents management’s best estimates, but these estimates involve inherent uncertainties and the application of management’s judgment. As a result, if factors change and we use different assumptions, our stock-based compensation expense could be materially different in the future.

Intangible Assets, Goodwill and Other Long-Lived Assets. As a result of our acquisitions, we have identified intangible assets and generated significant goodwill. Definite-lived intangible assets are valued based on estimates of future cash flows and amortized over their estimated useful life. Goodwill and indefinite-lived intangible assets are subject to annual impairment testing as well as testing upon the occurrence of any event that indicates a potential impairment. Intangible assets and other long-lived assets are also subject to an impairment test if there is an indicator of impairment. The carrying value and ultimate realization of these assets is dependent upon estimates of future earnings and benefits that we expect to generate from their use. If our expectations of future results and cash flows are significantly diminished, intangible assets and goodwill may be impaired and the resulting charge to operations may be material. When we determine that the carrying value of intangibles or other long-lived assets may not be recoverable based upon the existence of one or more indicators of impairment, we use the projected undiscounted cash flow method to determine whether an impairment exists, and then measure the impairment using discounted cash flows. To measure impairment for goodwill, we compare the fair value of our reporting units by measuring discounted cash flows to the book value of the reporting units. Goodwill would be impaired if the resulting implied fair value was less than the recorded book value of the goodwill.

The estimation of useful lives and expected cash flows require us to make significant judgments regarding future periods that are subject to some factors outside of our control. Changes in these estimates can result in significant revisions to the carrying value of these assets and may result in material charges to the results of operations.

We have elected to perform our annual goodwill impairment test as of October 31 of each year, or more often if events or circumstances indicate that there may be impairment. Goodwill is the amount by which the cost of acquired net assets exceeded the fair value of those net assets on the date of acquisition. We allocate goodwill to reporting units at the time of acquisition or when there is a change in the reporting structure and base that

[Table of Contents](#)

allocation on which reporting units will benefit from the acquired assets and liabilities. Reporting units are defined as operating segments or one level below an operating segment, referred to as a component. The estimated fair value of our reporting units was based on discounted cash flow models derived from internal earnings and internal and external market forecasts. Determining fair value requires the exercise of significant judgment, including judgments about appropriate discount rates, perpetual growth rates and the amount and timing of expected future cash flows. Discount rates are based on a weighted average cost of capital (“WACC”), which represents the average rate a business must pay its providers of debt and equity. The WACC used to test goodwill is derived from a group of comparable companies. Assumptions in estimating future cash flows are subject to a high degree of judgment and complexity. We make every effort to forecast these future cash flows as accurately as possible with the information available at the time the forecast is developed.

We have the option of first assessing qualitative factors to determine whether it is necessary to perform the current two-step impairment test or we can perform the two-step impairment test without performing the qualitative assessment. For the reporting units that did not experience any significant adverse changes in their business or reporting structures or any other adverse changes, and the reporting unit’s fair value substantially exceeded its amount from the prior year assessment, we performed the qualitative “Step 0” assessment. In performing the qualitative Step 0 assessment, we considered certain events and circumstances specific to the reporting unit and to the entity as a whole, such as macroeconomic conditions, industry and market considerations, overall financial performance and cost factors when evaluating whether it is more likely than not that the fair value of the reporting unit is less than its carrying amount. For the remaining reporting units that did not meet these criteria we performed the two-step goodwill impairment test. Under the two-step goodwill impairment test, we compared the fair value of each reporting unit to its respective carrying amount, including goodwill. If the fair value of the reporting unit exceeds the fair value, the second step of the goodwill impairment test must be completed to measure the amount of impairment loss, if any. The second step compares the implied fair value of goodwill with the carrying value of goodwill. The implied fair value is determined by allocating the fair value of the reporting unit to all of the assets and liabilities of that unit, the excess of the fair value over amounts assigned to its assets and liabilities is the implied fair value of goodwill. If the implied fair value of goodwill is less than the carrying value of goodwill, an impairment loss is recognized equal to the difference.

As of October 31, 2013, we performed our annual impairment assessment of goodwill and determined that it is more likely than not that the fair values of the reporting units exceed their carrying amount. We will continue to monitor and evaluate the carrying value of goodwill. If market and economic conditions or business performance deteriorate, this could increase the likelihood of us recording an impairment charge. However, management believes it is not reasonably likely that an impairment will occur at any of its reporting units over the next twelve months.

In-Process Research and Development. We value tangible and intangible assets acquired through our business acquisitions, including in-process research and development (“IPR&D”), at fair value. We determine IPR&D through established valuation techniques for various projects for the development of new products and technologies and capitalize IPR&D as an intangible asset. If the projects are completed, the intangible asset will be amortized to earnings over the expected life of the completed product. If the R&D projects are abandoned, we will write-off the related intangible asset.

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 in the utilization of core technology, the complexity, cost, time to complete development, any alternative future use or current technological feasibility and the stage of completion.

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

[Table of Contents](#)

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 is recorded within the provision for income taxes line in the consolidated statements of operations and comprehensive income. In future periods, if we were to determine that it was more likely than not 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.

Accounting for income taxes requires a two-step approach to recognize and measure uncertain tax positions. The first step is to evaluate the tax position for recognition by determining if, based on the technical merits, it is more likely than not that the position will be sustained upon audit, including resolutions of related appeals or litigation processes, if any. The second step is to measure the tax benefit as the largest amount that is more than 50% likely of being realized upon ultimate settlement. We re-evaluate these uncertain tax positions on a quarterly basis. This evaluation is based on factors including, but not limited to, changes in facts or circumstances, changes in tax law, effectively settled issues under audit and new audit activity. Any change in these factors could result in the recognition of a tax benefit or an additional charge to the tax provision.

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 statements of operations and comprehensive income data:

	Years Ended December 31,		
	2013	2012	2011
Net revenues:			
Product	84.9%	83.4%	87.4%
Service	15.1	16.6	12.6
Total net revenues	100.0%	100.0%	100.0%
Cost of revenues:			
Product	50.4	48.2	47.1
Service	9.8	9.9	7.3
Total cost of revenues	60.2%	58.1%	54.4%
Gross profit	39.8%	41.9%	45.6%
Research and development	9.5	9.3	7.4
Selling, general and administrative	21.2	19.8	15.6
Litigation	—	0.8	—
Insurance reimbursement	(0.1)	—	—
Completed acquisition costs	—	0.2	—
Restructuring	0.2	0.1	—
Amortization of acquired intangible assets	0.3	0.1	0.1
Income from operations	8.7%	11.6%	22.5%
Interest income, net	0.1	0.1	0.1
Income before income taxes	8.8%	11.7%	22.6%
Provision for income taxes	3.5	4.2	6.8
Net income	5.3%	7.5%	15.8%

[Table of Contents](#)**Year Ended December 31, 2013 Compared to 2012 and 2011***Net Revenues*

(Dollars in millions)	Years Ended December 31,			% Change in 2013	% Change in 2012
	2013	2012	2011		
Product	\$568.3	\$536.8	\$719.0	5.9%	(25.3)%
Service	101.1	106.7	103.5	(5.3)	3.1
Total net revenues	<u>\$669.4</u>	<u>\$643.5</u>	<u>\$822.5</u>	<u>4.0%</u>	<u>(21.8)%</u>

Product revenues increased \$31.5 million during 2013 compared to the prior year. Product revenues related to our semiconductor capital equipment manufacturer and semiconductor device manufacturer customers increased by \$59.4 million, or 17.8%. The increase in the semiconductor markets we serve was mainly the result of volume increases in four consecutive quarters in 2013 in product revenues to the semiconductor markets. Our product revenues for other advanced markets, which exclude semiconductor capital equipment and semiconductor device product applications, decreased by \$27.8 million, or 13.7%. The decrease in our non-semiconductor markets was primarily caused by volume decreases of \$21.0 million in our solar market and \$9.9 million in our general industrial market. The solar market has decreased over the past few years due to overcapacity. The industrial market decrease relates to specific projects.

Product revenues decreased \$182.2 million during 2012 compared to 2011. Product revenues related to our semiconductor capital equipment manufacturer and semiconductor device manufacturer customers decreased by \$101.3 million, or 23.3%, mainly the result of volume decreases throughout 2012. Our product revenues for other advanced markets, which exclude semiconductor capital equipment and semiconductor device product applications, decreased by \$80.9 million, or 28.4%. We saw a significant decrease in the solar and LED markets, which decreased by an aggregate of 63.4%, as end market customers continued to utilize existing product shipments from 2010 and 2011.

Service revenues consisted mainly of fees for services related to the maintenance and repair of our products, software maintenance, installation services and training. Service revenues decreased \$5.6 million during 2013 compared to the prior year. The decrease is primarily attributed to the timing and fulfillment of service orders as we transitioned and merged one of our service locations into an existing service site. Service revenues increased \$3.2 million during 2012 compared to 2011. The increase related primarily to our foreign locations where we had made investments in our service organizations.

Total international net revenues, including product and service, were \$305.5 million for 2013 or 45.6% of net sales, compared to \$316.6 million for 2012, or 49.2% of net sales, and \$431.4 million, or 52.5% of net sales, for 2011.

The following table sets forth our net revenues by reportable segment:

Net Revenues

(Dollars in millions)	Years Ended December 31,			% Change in 2013	% Change in 2012
	2013	2012	2011		
Advanced Manufacturing Capital Equipment	\$ 528.0	\$ 479.8	\$ 647.9	10.1%	(26.0)%
Analytical Solutions Group	56.3	62.8	61.3	(10.3)	2.4
Europe Region Sales & Service	48.5	51.4	75.3	(5.7)	(31.6)
Asia Region Sales & Service	218.0	229.7	305.4	(5.1)	(24.8)
Corporate, Eliminations and Other	(181.4)	(180.2)	(267.4)	(0.7)	32.6
Total net revenues	<u>\$ 669.4</u>	<u>\$ 643.5</u>	<u>\$ 822.5</u>	<u>4.0%</u>	<u>(21.8)%</u>

[Table of Contents](#)

Net revenues for the Advanced Manufacturing Capital Equipment segment increased by 10.1% in 2013 compared to the prior year. This increase is mainly due to an increase of 23.8% in revenues from our top two customers who represented approximately 29% of our total revenues in 2013. These customers operate mainly in the semiconductor market, which increased by 14% in 2013 compared to 2012.

Net revenues for the Analytical Solutions Group segment decreased by 10.3% in 2013 compared to the prior year and increased by 2.4% in 2012 compared to the prior year. This segment sells more to our other advanced markets rather than to our semiconductor market. We saw an overall decrease in other advanced markets of 12.7% in 2013 compared to 2012, largely driven by decreases in our solar and general industrial markets. While we saw an overall decrease in other advanced markets in 2012 of 24.3%, the overall increase in 2012 in the Analytical Solutions Group was primarily driven by an increase in sales in our general and industrial markets, which increased by 7.2% compared to the prior year.

The Europe Region Sales & Service segment decreased by 5.7% in 2013 compared to the prior year. The decrease in sales is primarily attributed to the timing of certain projects from a few customers in France.

The Asia Region Sales & Service segment revenues decreased by 5.1% in 2013 compared to the prior year. These decreases are primarily the result of decreases in sales to other advanced markets, mainly in the solar market which decreased by 80.1%. In addition, foreign exchange rates, primarily related to the Japanese Yen which decreased by approximately 22% in 2013, had an unfavorable impact on revenues for the Asia Region Sales & Service segment. Excluding the impact of solar and unfavorable foreign exchange revenues for the Asia Region Sales & Service segment increased by 2.9%.

Net revenues for the Advanced Manufacturing Capital Equipment segment, Europe Region Sales & Service segment and the Asia Region Sales & Service segment decreased by 26.0%, 31.6% and 24.8%, respectively, for 2012 compared to 2011. This was primarily caused by the decrease in our semiconductor capital equipment manufacturer and semiconductor device manufacturer customers which decreased 23.3% in the same period as noted above. The majority of our sales in these three reportable segments are sold to the semiconductor capital equipment and semiconductor device manufacturers. In addition, the decrease in the Europe Region Sales & Service segment was also impacted by a decrease related to the solar market.

The following is gross profit as a percentage of net revenues by product and service:

Gross Profit

(As a percentage of net revenues)	Years Ended December 31,			% Points Change in 2013	% Points Change in 2012
	2013	2012	2011		
Product	40.6%	42.2%	46.1%	(1.6)	(3.9)
Service	35.3	40.5	42.0	(5.2)	(1.5)
Total gross profit percentage	<u>39.8%</u>	<u>41.9%</u>	<u>45.6%</u>	<u>(2.1)</u>	<u>(3.7)</u>

Gross profit on product revenues decreased by 1.6 percentage points during 2013 compared to the prior year. The decrease was primarily due to a decrease of 2.7 percentage points due to unfavorable product mix, a decrease of 0.9 percentage points due to higher excess and obsolete inventory charges and 0.5 percentage points from unfavorable foreign exchange. These decreases were partially offset by an increase of 1.2 percentage points due to favorable revenue volumes and 1.1 percentage points due to lower overhead expenses.

Gross profit on product revenues decreased by 3.9 percentage points during 2012 compared to the prior year. The decrease was primarily due to a decrease of 3.7 percentage points due to unfavorable product revenue volume and overhead absorption from lower production and 0.3 percentage points due to higher excess and obsolete inventory charges. These decreases were partially offset by an increase of 0.2 percentage points due to lower compensation related expenses.

[Table of Contents](#)

Cost of service revenues consists primarily of costs for providing services for repair and training which includes salaries, related expenses and other overhead costs. Service gross profit for 2013 decreased by 5.2 percentage points compared to the prior year. The decrease was primarily attributed to a decrease of 2.3 percentage points due to unfavorable product mix, a decrease of 1.1 percentage points due to unfavorable foreign exchange, a decrease of 0.6 percentage points due to higher overhead charges, a decrease of 0.5 percentage points due to unfavorable revenue volumes and a decrease of 0.4 percentage points due to higher warranty charges.

Service gross profit for 2012 decreased by 1.5 percentage points compared to the prior year. This decrease was mainly attributed to a decrease of 3.6 percentage points due to higher overhead spending. This decrease was partially offset by an increase of 1.9 percentage points due to favorable product mix and an increase of 0.5 percentage points due to favorable revenue volume.

The following is gross profit as a percentage of net revenues by reportable segment:

Gross Profit

(As a percentage of net revenues)	Years Ended December 31,			% Points Change in 2013	% Points Change in 2012
	2013	2012	2011		
Advanced Manufacturing Capital Equipment	35.5%	35.7%	40.7%	(0.2)	(5.0)
Analytical Solutions Group	52.3	52.2	51.9	0.1	0.3
Europe Region Sales & Service	28.0	29.5	28.3	(1.5)	1.2
Asia Region Sales & Service	19.7	16.1	14.8	3.6	1.3
Corporate, Eliminations and Other	3.9	(7.4)	(4.8)	11.3	(2.6)
Total net revenues	<u>39.8%</u>	<u>41.9%</u>	<u>45.6%</u>	<u>(2.1)</u>	<u>(3.7)</u>

Gross profit for the Advanced Manufacturing Capital Equipment segment decreased 0.2 percentage points and 5.0 percentage points in 2013 and 2012, respectively, compared to the prior year. The decrease of 0.2 percentage points in 2013 is primarily due to higher excess and obsolete inventory charges and unfavorable product mix, partially offset by an increase in revenue volume. The decrease of 5.0 percentage points in 2012 is primarily due to a decline in revenue volume.

Gross profit for the Analytical Solutions Group increased 0.1 percentage points and 0.3 percentage points in 2013 and 2012, respectively, compared to the prior year. The slight increase of 0.1 percentage points in 2013 is primarily attributed to favorable product mix, partially offset by unfavorable revenue volume. The increase of 0.3 percentage points in 2012 is primarily attributed to product mix, favorable revenue volume and lower warranty charges, partially offset by lower overhead spending.

Gross profit for the Europe Region Sales & Service segment decreased 1.5 percentage points in 2013 as compared to 2012 and increased 1.2 percentage points in 2012 as compared to 2011. The decrease of 1.5 percentage points in 2013 is primarily related to unfavorable product mix. The increase of 1.2 percentage points in 2012 is primarily related to favorable product mix, partially offset by a decline in revenue volume.

Gross profit for the Asia Region Sales & Service segment increased 3.6 percentage points and 1.3 percentage points in 2013 and 2012, respectively, compared to the prior year. The increase of 3.6 percentage points in 2013 is primarily related to favorable product mix, lower excess and obsolete inventory charges and lower overhead spending, partially offset by unfavorable foreign exchange. The increase of 1.3 percentage points in 2012 is primarily related to favorable product mix, partially offset by lower revenue volume.

[Table of Contents](#)

Research and Development

(Dollars in millions)	Years Ended December 31,			% Change in 2013	% Change in 2012
	2013	2012	2011		
Research and development expenses	\$63.6	\$60.1	\$61.0	5.7%	(1.5)%

Research and development expenses increased \$3.5 million during 2013 compared to the prior year. The increase is primarily attributed to an increase of \$3.4 million in compensation-related costs, including variable compensation and an increase of \$0.4 million in project materials. These increases are partially offset by a decrease of \$0.6 million in consulting costs.

Research and development expenses decreased \$0.9 million during 2012 compared to the prior year. The decrease resulted from additional cost control measures including a decrease of \$0.9 million in consulting costs and a \$0.5 million decrease in project materials. These decreases are partially offset by a \$0.4 million increase in patent related costs.

Our research and development is primarily focused on developing and improving our instruments, components, subsystems and process control solutions to improve process performance and productivity.

We have thousands of products and our research and development efforts primarily consist of a large number of projects related to these products, none of which is individually material to us. Current projects typically have durations of 3 to 30 months depending upon whether the product is an enhancement of existing technology or a new product. Our current initiatives include projects to enhance the performance characteristics of older products, to develop new products and to integrate various technologies into subsystems. These projects support in large part, the transition in the semiconductor industry to smaller integrated circuit geometries and in the flat panel display and solar markets to larger substrate sizes, which require more advanced process control technology. Research and development expenses consist primarily of salaries and related expenses for personnel engaged in research and development, fees paid to consultants, material costs for prototypes and other expenses related to the design, development, testing and enhancement of our products.

We believe that the continued investment in research and development and ongoing development of new products are essential to the expansion of our markets, and we expect to continue to make significant investment in research and development activities. We are subject to risks if products are not developed in a timely manner, due to rapidly changing customer requirements and competitive threats from other companies and technologies. Our success primarily depends on our products being designed into new generations of equipment for the semiconductor industry and other advanced technology markets. We develop products that are technologically advanced so that they are positioned to be chosen for use in each successive generation of semiconductor capital equipment. If our products are not chosen to be designed into our customers' products, our net revenues may be reduced during the lifespan of those products.

Selling, General and Administrative

(Dollars in millions)	Years Ended December 31,			% Change in 2013	% Change in 2012
	2013	2012	2011		
Selling, general and administrative expenses	\$142.0	\$127.2	\$128.0	11.7%	(0.6)%

Selling, general and administrative expenses increased \$14.8 million during 2013 compared to the prior year. The increase is primarily attributed to a \$10.0 million increase in compensation related costs primarily related to variable compensation and higher fringe benefit costs, a \$2.6 million increase related to executive retirement costs recorded in the fourth quarter of 2013 as a result of the retirement of our Chief Executive Officer in December 2013 and a \$1.6 million increase in consulting costs.

[Table of Contents](#)

Selling, general and administrative expenses decreased \$0.8 million during 2012 compared to the prior year. The decrease consists mainly of a \$2.5 million favorable impact from foreign exchange fluctuations, a \$0.5 million decrease in facilities related expenses, a \$0.4 million decrease in recruiting and relocation expenses and a \$0.3 million decrease in advertising and investor relations expenses. These decreases are partially offset by a \$1.8 million increase in professional fees, primarily related to legal expenses, a \$0.5 million increase in depreciation expense and a \$0.5 million increase in bad debt expense.

Litigation

(Dollars in millions)	Years Ended December 31,			% Change in 2013	% Change in 2012
	2013	2012	2011		
Litigation	\$ —	\$ 5.3	\$ —	(100.0)%	100.0%

Litigation with shareholders of one of our former subsidiaries was settled for \$5.3 million during the third quarter of 2012. The complaint alleged certain claims against us including breach of contract, implied covenants, and statutory violations. The claims sought unspecified damages and equitable relief. This litigation was long standing and we made the decision to reach a settlement primarily to eliminate future legal expenses related to the suit.

Insurance Reimbursement

(Dollars in millions)	Years Ended December 31,			% Change in 2013	% Change in 2012
	2013	2012	2011		
Insurance reimbursement	\$ (1.1)	\$ —	\$ —	(100.0)%	—%

In the second quarter of 2013, we recovered \$1.1 million from our insurance company relating to the 2012 litigation settlement with certain former shareholders that we settled in the third quarter of 2012.

Completed Acquisition Costs

(Dollars in millions)	Years Ended December 31,			% Change in 2013	% Change in 2012
	2013	2012	2011		
Completed acquisition costs	\$ 0.2	\$ 1.3	\$ —	(86.4)%	100.0%

We incurred \$0.2 million of acquisition costs in 2013 related to our March 2013 acquisition of Alter. These costs are comprised of legal fees. We incurred \$1.3 million of acquisition costs in 2012 related to our August 2012 acquisition of Plasmart. These costs consisted of investment banking fees, legal fees and due diligence costs.

Restructuring

(Dollars in millions)	Years Ended December 31,			% Change in 2013	% Change in 2012
	2013	2012	2011		
Restructuring	\$ 1.4	\$ 0.3	\$ —	297.1%	100.0%

During 2013, we incurred restructuring charges primarily related to the consolidation of certain facilities. The majority of these costs were related to severance expenses and these programs were substantially completed by December 31, 2013. The plans included a small reduction in headcount. During the fourth quarter of 2012, we implemented a workforce reduction plan as a result of a slowdown in our business. We reduced our worldwide workforce by 84 people and recorded a restructuring charge of \$0.3 million. This restructuring was substantially complete at December 31, 2012.

[Table of Contents](#)

Amortization of Acquired Intangible Assets

(Dollars in millions)	Years Ended December 31,			% Change in 2013	% Change in 2012
	2013	2012	2011		
Amortization of acquired intangible assets	\$ 2.1	\$ 1.0	\$ 1.0	106.7%	2.1%

Amortization increased by \$1.1 million during 2013 compared to the prior year. This increase is primarily attributed to an increase in intangible assets from our August 2012 acquisition of Plasmart and our March 2013 acquisition of Alter, offset by intangible assets that became fully amortized. Amortization expense remained relatively flat during 2012 compared to the prior year. Increased amortization expense from our August 2012 Plasmart acquisition was offset by intangible assets that became fully amortized during the year.

Interest Income, Net

(Dollars in millions)	Years Ended December 31,			% Change in 2013	% Change in 2012
	2013	2012	2011		
Interest income, net	\$ 0.9	\$ 0.9	\$ 1.1	—%	(18.9)%

Net interest income for 2013 remained flat compared to the prior year. Net interest income decreased \$0.2 million during 2012 compared to the prior year, partially due to higher interest expense related to the acquisition of Plasmart, which had debt when we acquired them in August 2012.

Provision for Income Taxes

(Dollars in millions)	Years Ended December 31,			% Change in 2013	% Change in 2012
	2013	2012	2011		
Provision for income taxes	\$23.5	\$27.1	\$56.3	(13.2)%	(51.9)%

The provision for income taxes in 2013, 2012 and 2011 are comprised of U.S. federal, state and foreign income taxes.

Our effective tax rate for the years 2013, 2012 and 2011 was 39.7%, 36.1%, and 30.3%, respectively. The effective tax rate in 2013, and related income tax expense was higher than the U.S. statutory tax rate primarily due to a decision made during the quarter ended September 30, 2013 to pay currently, at a substantially reduced rate, taxes on certain accumulated earnings of its Israeli subsidiary relating to calendar year periods 2002-2011 covered under its tax holiday that expired on December 31, 2011. This additional charge was partially offset by additional U.S. tax incentives realized and recognized as discrete events during the quarter ended September 30, 2013, and the geographic mix of income and profits earned by our international subsidiaries being taxed at rates lower than the U.S. statutory rate. Additionally, certain tax incentives realized by the Company were recognized as discrete events during the quarter ended March 31, 2013. These incentives were reinstated under The American Taxpayer Relief Act of 2012 that was signed into law on January 2, 2013.

The effective tax rate in 2012 and related income tax expense is higher than the U.S. statutory tax rate primarily due to the expiration of certain tax incentives under U.S. tax law noted above, and non-deductible acquisition costs that were offset in part by geographic mix of income and profits earned by our international subsidiaries being taxed at rates lower than the U.S. statutory tax rate. Had the extension been enacted prior to January 1, 2013, our effective tax rate for 2012 would have been reduced by approximately 3%.

The effective tax rate in 2011 and related income tax expense was lower than the U.S. statutory tax rate primarily due to geographic mix of income and profits earned by our international subsidiaries being taxed at rates lower than the U.S. statutory tax rate.

[Table of Contents](#)

At December 31, 2013, our total amount of gross unrecognized tax benefits, which excludes interest and penalties, was approximately \$47.7 million. At December 31, 2012, our total amount of gross unrecognized tax benefits, which excludes interest and penalties, was approximately \$40.7 million. The net increase at December 31, 2013 from December 31, 2012 was primarily attributable to an increase in new and existing reserves for uncertain tax positions in 2013. At December 31, 2013, there were \$24.8 million, excluding interest and penalties, of net unrecognized tax benefits that, if recognized, would affect our annual effective tax rate. We accrued interest and, if applicable, penalties for any uncertain tax positions. Interest and penalties were classified as a component of income tax expense. At December 31, 2013, 2012 and 2011, we had accrued interest on unrecognized tax benefits of approximately \$2.2 million, \$1.6 million and \$1.0 million, respectively.

Over the next 12 months it is reasonably possible that we may recognize approximately \$12.6 million of previously net unrecognized tax benefits related to various U.S. federal, state and foreign tax positions as a result of the conclusion of various audits and the expiration of statutes of limitations. We are subject to examination by U.S. federal, state and foreign tax authorities. The Internal Revenue Service commenced an examination of our U.S. federal tax filings for tax years 2007 through 2009 during the quarter ended June 30, 2012. As a result, the U.S. statute of limitations remains open between tax years 2007 through present. The statute of limitations for our tax filings in other jurisdictions varies between fiscal years 2006 through present.

On a quarterly basis, we evaluate both positive and negative evidence that affect the realizability of net deferred tax assets and assess the need for a valuation allowance. 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. During 2013, we decreased our valuation allowance by \$0.4 million primarily related to the expiration of US capital loss carry forwards. In 2012, we increased our valuation allowance by \$1.0 million primarily related to an increase in state tax credit carry forwards because we determined it is more likely than not that the deferred tax assets related to these attributes will not be realized. In 2011, we increased our valuation allowance by \$1.2 million primarily related to capital losses incurred from our foreign affiliates because we determined it is more likely than not that the deferred tax assets related to these attributes will not be realized.

In 2013, we recorded a net benefit to income tax expense of \$0.1 million, excluding interest and penalties, due to discrete reserve releases primarily related to the statutes of limitations expiring. In 2011, we recorded a net benefit to income tax expense of \$2.1 million, excluding interest and penalties, due to discrete reserve releases primarily related to the effective settlement of a German tax audit for years 2001 through 2005.

During 2006, we received a notification letter from the Israeli Ministry of Industry Trade and Labor (“MITL”) indicating that our Israeli operations were in compliance with requirements relating to the tax holiday granted to our manufacturing operations in Israel in 2001. This tax holiday expired at December 31, 2011 and was subject to meeting continued investment, employment and other requirements under the guidelines of the MITL. This tax holiday resulted in income tax savings of approximately \$1.0 million and \$2.7 million for the years 2011 and 2010, respectively. Upon expiration of its tax holiday, we elected to be treated under a new preferential Israeli tax regime under which a tax rate of 10% applies for 2012, is reduced to 7% for 2013, and increased to 9% for 2014. Our Israeli subsidiary is currently under examination for tax years 2009 through 2011 and expects the audit to be effectively settled during the quarter ended March 31, 2014.

On September 13, 2013, the U.S. Department of the Treasury and Internal Revenue Service released final tangible property regulations that provide guidance on the tax treatment regarding the deduction and capitalization of expenditures related to tangible property. While early adoption is available, the effective date to implement these regulations is for tax years beginning on or after January 1, 2014. The Company is currently assessing these rules and the impact to its financial statements, if any, but believes adoption of these regulations will not have a material impact on its consolidated results of operations, cash flows or financial position.

Our future effective income tax rate depends on various factors, such as tax legislation and the geographic composition of our pre-tax income. We monitor these factors and timely adjust our effective tax rate accordingly.

[Table of Contents](#)

Additionally, the effective tax rate could be adversely affected by changes in the valuation of deferred tax assets and liabilities. In particular, the carrying value of deferred tax assets, which are predominantly in the United States, is dependent on our ability to generate sufficient future taxable income in the United States. While we believe we have adequately provided for all tax positions, amounts asserted by taxing authorities could materially differ from our accrued positions as a result of uncertain and complex application of tax regulations. Additionally, the recognition and measurement of certain tax benefits include estimates and judgment by management and inherently includes subjectivity. Accordingly, we may record additional provisions due to U.S. federal, state, and foreign tax-related matters in the future as we revise estimates or settle or otherwise resolve the underlying matters.

Liquidity and Capital Resources

Cash, cash equivalents and short-term marketable investments totaled \$589.6 million at December 31, 2013, a decrease of \$25.6 million compared to \$615.2 million at December 31, 2012. This decrease was mainly due to dividend payments to common stockholders and net purchases of long-term investments, partially offset by net income and non-cash net charges. The primary driver in our current and anticipated future cash flows is and will continue to be cash generated from operations, consisting mainly of our net income, excluding non-cash changes and changes in operating assets and liabilities. In periods when our sales are growing, higher sales to customers will result in increased trade receivables, and inventories will generally increase as we build products for future sales. This may result in lower cash generated from operations. Conversely, in periods when our sales are declining, our trade accounts receivable and inventory balances will generally decrease, resulting in increased cash from operations.

Net cash provided by operating activities was \$76.1 million for 2013 and resulted mainly from net income of \$35.8 million, which included non-cash net charges of \$53.4 million, partially offset by an increase in working capital of \$9.3 million. The increase in working capital consisted primarily of an increase in trade accounts receivable of \$36.2 million and an increase in inventories of \$29.8 million. These increases are partially offset by an increase in income taxes of \$27.2 million, an increase in accounts payable of \$23.2 million and an increase in accrued compensation and other liabilities of \$7.7 million. The increase in trade accounts receivable and accounts payable was caused by an increase in our business in the fourth quarter of 2013 compared to the fourth quarter of 2012.

Net cash provided by operating activities was \$137.2 million for 2012 and resulted mainly from net income of \$48.0 million, which included non-cash net charges of \$43.4 million and a decrease in working capital of \$44.0 million. The decrease in working capital consisted primarily of a decrease in trade accounts receivable of \$38.3 million, a decrease in other current assets of \$7.7 million and a decrease in inventory of \$5.3 million. These decreases are partially offset by a decrease in accounts payable of \$8.3 million. The decrease in accounts payable and accounts receivable was caused by a slowdown in our business in the fourth quarter of 2012 compared to the fourth quarter of 2011.

Net cash used in investing activities was \$36.5 million for 2013 and resulted primarily from the net purchases of investments of \$21.6 million, \$12.4 million used for the purchases of production related equipment and facility expansion and \$2.3 million, primarily used for the acquisition of Alter. Net cash used in investing activities was \$117.9 million for 2012 and resulted primarily from the net purchases of investments of \$76.1 million, the acquisition of Plasmart of \$22.6 million net of cash acquired and \$17.7 million in purchases of production related equipment.

Net cash used in financing activities was \$37.1 million for 2013 and consisted primarily of \$34.0 million in dividend payments made to common stockholders and \$2.9 million for the repurchase of Common Stock. Net cash used in financing activities was \$47.0 million for 2012 and consisted primarily of \$32.7 million in dividend payments made to common stockholders, \$11.5 million for the repurchase of Common Stock, and \$6.5 million of net payments made on short-term borrowings. These decreases were partially offset by \$2.1 million of tax benefit from stock-based compensation.

[Table of Contents](#)

Our Japanese subsidiary has lines of credit and short-term borrowing arrangements with two financial institutions, which generally expire and are renewed at three month intervals. These lines of credit provide for aggregate borrowings as of December 31, 2013 of up to an equivalent of \$21.9 million U.S. dollars. There were no borrowings outstanding under these arrangements at December 31, 2013 and December 31, 2012.

We also had various lines of credit and short and long-term borrowing arrangements as a result of our acquisition of Plasmart in 2012 and Alter in March 2013. All of these lines of credit and borrowing arrangements were paid off and terminated in 2013. There were no outstanding balances at December 31, 2013 and 2012.

We have provided financial guarantees for certain unsecured borrowings and have standby letters of credit, some of which do not have fixed expiration dates. At December 31, 2013, our maximum exposure as a result of these performance bonds and standby letters of credit was approximately \$1.3 million.

On July 25, 2011, our board of directors approved a share repurchase program for the repurchase of up to an aggregate of \$200 million of our Common Stock from time to time in open market purchases, privately negotiated transactions or through other appropriate means. The timing and quantity of any shares repurchased will depend upon a variety of factors, including business conditions, stock market conditions and business development activities, including, but not limited to, merger and acquisition opportunities. These repurchases may be commenced, suspended or discontinued at any time without prior notice. During 2013, we repurchased approximately 107,000 shares of our Common Stock for \$2.9 million at an average price of \$26.87 per share. During 2012, we repurchased approximately 434,000 shares of our Common Stock for \$11.5 million at an average price of \$26.46 per share.

Holders of our Common Stock are entitled to receive dividends when they are declared by our board of directors. For the year ended December 31, 2013, we paid cash dividends of \$34.0 million in aggregate, or \$0.64 per share. Future dividend declarations, if any, as well as the record and payment dates for such dividends, are subject to the final determination of our board of directors.

On February 10, 2014, our board of directors declared a quarterly cash dividend of \$0.16 per share to be paid on March 14, 2014 to shareholders of record as of March 3, 2014.

Our total cash and cash equivalents and short-term marketable investments at December 31, 2013 consisted of \$321.4 million held in the U.S. and \$268.2 million held by our foreign subsidiaries, substantially all of which would be subject to tax in the U.S. if returned to the U.S. We believe our existing U.S. cash and short-term investment balances are adequate to meet domestic operating needs, including estimated working capital, planned capital expenditure requirements and any future cash dividends, if declared, or share repurchases in the next twelve months and foreseeable future.

Future payments due under debt, lease and purchase commitment obligations as of December 31, 2013 are as follows:

<u>Contractual Obligations (In thousands)</u>	<u>Payment Due By Period</u>					
	<u>Total</u>	<u>Less than 1 Year</u>	<u>1-3 years</u>	<u>3-5 years</u>	<u>After 5 years</u>	<u>Other (1)</u>
Operating lease obligations	\$ 28,045	\$ 7,484	\$ 9,916	\$ 6,790	\$ 3,855	\$ —
Purchase obligations(2)	132,018	125,453	6,565	—	—	—
Other long-term liabilities reflected on the Balance Sheet under U.S. GAAP(3)	63,073	—	—	—	16,328	46,745
Total	<u>\$ 223,136</u>	<u>\$ 132,937</u>	<u>\$ 16,481</u>	<u>\$ 6,790</u>	<u>\$ 20,183</u>	<u>\$ 46,745</u>

(1) This balance relates to our reserve for uncertain tax positions.

[Table of Contents](#)

- (2) As of December 31, 2013, we have entered into purchase commitments for certain inventory components and other equipment and services used in our normal operations. The majority of these purchase commitments covered by these arrangements are for periods of less than one year and aggregate to approximately \$132 million.
- (3) The majority of this balance relates to reserve for uncertain tax positions and accrued compensation for certain executives related to supplemental retirement benefits.

We believe that our current cash and investments position and available borrowing capacity, together with the cash anticipated to be generated from operations, will be sufficient to satisfy our estimated working capital, planned capital expenditure requirements, and any future cash dividends declared by our board of directors or share repurchases through at least the next 12 months and the foreseeable future.

Derivatives

We enter into derivative instruments for risk management purposes only, including derivatives designated as hedging instruments and those utilized as economic hedges. We operate internationally, and in the normal course of business, are exposed to fluctuations in interest rates and foreign exchange rates. These fluctuations can increase the costs of financing, investing and operating the business. We have used derivative instruments, such as forward contracts, to manage certain foreign currency exposure.

By nature, all financial instruments involve market and credit risks. We enter into derivative instruments with major investment grade financial institutions and no collateral is required. We have policies to monitor the credit risk of these counterparties. While there can be no assurance, we do not anticipate any material non-performance by any of these counterparties.

We hedge a portion of our forecasted foreign currency denominated intercompany sales of inventory, over a maximum period of eighteen months, using forward foreign exchange contracts accounted for as cash-flow hedges related to Japanese, South Korean, British and Euro currencies. To the extent these derivatives are effective in offsetting the variability of the hedged cash flows, and otherwise meet the hedge accounting criteria, changes in the derivatives' fair value are not included in current earnings but are included in accumulated other comprehensive income in stockholders' equity. These changes in fair value will subsequently be reclassified into earnings, as applicable, when the forecasted transaction occurs. To the extent that a previously designated hedging transaction is no longer an effective hedge, any ineffectiveness measured in the hedging relationship is recorded currently in earnings in the period it occurs. The cash flows resulting from forward exchange contracts are classified in the consolidated statements of cash flows as part of cash flows from operating activities. We do not enter into derivative instruments for trading or speculative purposes.

To the extent that hedge accounting criteria is not met, the foreign currency forward contracts are considered economic hedges and changes in the fair value of these contracts are recorded immediately in earnings in the period in which they occur. These include hedges that are used to reduce exchange rate risks arising from the change in fair value of certain foreign currency denominated assets and liabilities (i.e., payables, receivables) and other economic hedges where the hedge accounting criteria were not met.

We had forward exchange contracts with notional amounts totaling \$21.0 million outstanding at December 31, 2013 of which \$9.3 million were outstanding to exchange Korean Won to U.S. dollars. We had forward exchange contracts with notional amounts totaling \$41.4 million outstanding at December 31, 2012 of which \$19.4 million were outstanding to exchange Korean won to U.S. dollars.

As of December 31, 2013, the unrealized gain that will be reclassified from accumulated other comprehensive income to earnings over the next twelve months is immaterial. The ineffective portions of the derivatives are recorded in selling, general and administrative costs and were immaterial in 2013, 2012 and 2011.

[Table of Contents](#)

We sometimes hedge certain intercompany and other payables with forward exchange contracts. Typically, as these derivatives hedge existing amounts that are denominated in foreign currencies, the derivatives do not qualify for hedge accounting. The foreign exchange loss on these derivatives was a \$0.2 million in 2013, \$1.6 million in 2012 and zero in 2011.

Realized and unrealized gains and losses on forward exchange contracts that do not qualify for hedge accounting are recognized currently in earnings. The cash flows resulting from forward exchange contracts are classified in our consolidated statements of cash flows as part of cash flows from operating activities. We do not hold or issue derivative financial instruments for trading purposes.

Gains and losses on forward exchange contracts that qualify for hedge accounting are classified in cost of products in 2013 and totaled a gain of \$1.1 million. In 2012 and 2011, these gains and losses were classified in selling, general and administrative and totaled a loss of \$0.9 million and gain of \$4.0 million, respectively.

Off-Balance Sheet Arrangements

We do not have any financial partnerships with unconsolidated entities, such as entities often referred to as structured finance, special purpose entities or variable interest entities which are often established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes. Accordingly, we are not exposed to any financing, liquidity, market or credit risk that could arise if we had such relationships.

Recently Issued Accounting Pronouncements

On July 18, 2013, the Financial Accounting Standards Board issued Accounting Standards Update (“ASU”) 2013-11, “*Income Taxes (Topic 740): Presentation of an Unrecognized Tax Benefit When a Net Operating Loss Carry-forward, a Similar Tax Loss, or a Tax Credit Carry-forward Exists.*” Under the new standard, unrecognized tax benefits will be netted against all available same-jurisdiction loss or other tax carry-forwards that would be utilized, rather than only against carry-forwards that are created by unrecognized tax benefits. The provisions of this ASU are effective for interim and annual periods beginning on or after December 15, 2013. We do not expect the adoption of ASU No. 2013-11 to have a material effect on our consolidated financial statements.

Item 7A. Quantitative and Qualitative Disclosures about Market Risk

Market Risk and Sensitivity Analysis

Our primary exposures to market risks include fluctuations in interest rates on our investment portfolio, short-term debt as well as fluctuations in foreign currency exchange rates.

Foreign Exchange Rate Risk

We mainly enter into forward exchange contracts to reduce currency exposure arising from intercompany sales of inventory. We sometimes also enter into forward exchange contracts to reduce foreign exchange risks arising from the change in fair value of certain foreign currency denominated assets and liabilities.

We had forward exchange contracts with notional amounts totaling \$21.8 million outstanding and a net fair value asset of \$0.3 million at December 31, 2013. We had forward exchange contracts with notional amounts totaling \$41.4 million outstanding and a net fair value liability of \$0.3 million at December 31, 2012. The potential fair value loss for a hypothetical 10% adverse change in the currency exchange rate on our forward exchange contracts at December 31, 2013 and 2012 would be immaterial.

Interest Rate Risk

Due to its short-term duration, the fair value of our cash and investment portfolio at December 31, 2013 and 2012 approximated its carrying value. Interest rate risk was estimated as the potential decrease in fair value resulting from a hypothetical 10% increase in interest rates for securities contained in the investment portfolio. The resulting hypothetical fair value was not materially different from the year-end carrying values.

From time to time, we have outstanding lines of credit and short-term borrowings with variable interest rates, primarily denominated in Japanese yen. There were no borrowings outstanding under these arrangements at December 31, 2013 or December 31, 2012.

Item 8. Financial Statements and Supplementary Data

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

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

In our opinion, the accompanying consolidated balance sheets and the related consolidated statements of operations and comprehensive income, of stockholders' equity, and of cash flows present fairly, in all material respects, the financial position of MKS Instruments, Inc. and its subsidiaries at December 31, 2013 and December 31, 2012, and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2013 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2013, based on criteria established in *Internal Control — Integrated Framework (1992)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). The Company's management is responsible for these financial statements, for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Report on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on these financial statements and on the Company's internal control over financial reporting based on our integrated audits. We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement and whether effective internal control over financial reporting was maintained in all material respects. Our audits of the financial statements included examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

As described in Management's Report on Internal Control over Financial Reporting, management has excluded Alter S.r.l. ("Alter") from its assessment of internal control over financial reporting as of December 31, 2013 because Alter was acquired by the Company in a purchase business combination during 2013. We have also excluded Alter from our audit of internal control over financial reporting. Alter is a wholly-owned subsidiary whose total assets and total revenues represent less than 1%, respectively, of the related consolidated financial statement amounts as of and for the year ended December 31, 2013.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts
February 26, 2014

MKS Instruments, Inc.
Consolidated Balance Sheets

	December 31,	
	2013	2012
	(in thousands, except share data)	
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 288,902	\$ 287,588
Short-term investments	300,715	327,653
Trade accounts receivable, net of allowances of \$2,751 and \$2,879 at December 31, 2013 and 2012, respectively	116,744	82,060
Inventories	142,727	134,639
Deferred income taxes	13,428	8,194
Other current assets	16,715	28,048
Total current assets	879,231	868,182
Property, plant and equipment, net	77,536	80,516
Long-term investments	60,405	12,158
Goodwill	150,909	150,733
Intangible assets, net	13,090	11,561
Other assets	31,847	29,412
Total assets	<u>\$ 1,213,018</u>	<u>\$ 1,152,562</u>
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	\$ 40,074	\$ 16,803
Accrued compensation	43,662	20,955
Income taxes payable	10,444	4,148
Other current liabilities	34,242	37,405
Total current liabilities	128,422	79,311
Other liabilities	63,073	61,095
Commitments and contingencies (Note 23)		
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; 53,363,450 and 52,748,849 shares issued and outstanding at December 31, 2013 and 2012, respectively	113	113
Additional paid-in capital	730,571	718,005
Retained earnings	278,966	278,583
Accumulated other comprehensive income	11,873	15,455
Total stockholders' equity	<u>1,021,523</u>	<u>1,012,156</u>
Total liabilities and stockholders' equity	<u>\$ 1,213,018</u>	<u>\$ 1,152,562</u>

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

MKS Instruments, Inc.
Consolidated Statements of Operations and Comprehensive Income

	Years Ended December 31,		
	2013	2012	2011
(in thousands, except per share data)			
Net Revenues:			
Products	\$ 568,317	\$ 536,774	\$ 719,002
Services	101,103	106,734	103,515
Total net revenues	669,420	643,508	822,517
Cost of revenues:			
Cost of products	337,464	310,485	387,445
Cost of service	65,382	63,544	60,084
Total cost of revenues	402,846	374,029	447,529
Gross profit	266,574	269,479	374,988
Research and development	63,570	60,118	61,033
Selling, general and administrative	142,014	127,185	128,015
Litigation	—	5,316	—
Insurance reimbursement	(1,071)	—	—
Completed acquisition costs	171	1,258	—
Restructuring	1,364	343	—
Amortization of acquired intangible assets	2,139	1,036	1,015
Income from operations	58,387	74,223	184,925
Interest income	999	1,059	1,159
Interest expense	85	146	32
Income before income taxes	59,301	75,136	186,052
Provision for income taxes	23,525	27,107	56,321
Net income	<u>\$ 35,776</u>	<u>\$ 48,029</u>	<u>\$ 129,731</u>
Other comprehensive income:			
Changes in value of financial instruments designated as cash flow hedges, net of tax expense (1)	\$ 62	\$ 150	\$ 1,570
Foreign currency translation adjustments, net of tax of \$0 for 2013, 2012 and 2011	(3,604)	1,664	129
Unrealized (loss) gain on investments, net of tax (benefit) expense (2)	(40)	31	133
Total comprehensive income	<u>\$ 32,194</u>	<u>\$ 49,874</u>	<u>\$ 131,563</u>
Net income per share:			
Basic	<u>\$ 0.67</u>	<u>\$ 0.91</u>	<u>\$ 2.49</u>
Diluted	<u>\$ 0.67</u>	<u>\$ 0.90</u>	<u>\$ 2.45</u>
Cash dividends paid per common share	<u>\$ 0.64</u>	<u>\$ 0.62</u>	<u>\$ 0.60</u>
Weighted average common shares outstanding:			
Basic	<u>53,061</u>	<u>52,686</u>	<u>52,169</u>
Diluted	<u>53,481</u>	<u>53,234</u>	<u>52,847</u>

(1) Tax expense was \$551, \$88 and \$937 for the years ended December 31, 2013, 2012 and 2011, respectively.

(2) Tax (benefit) expense was \$(355), \$19 and \$79 for the years ended December 31, 2013, 2012 and 2011, respectively.

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

MKS Instruments, Inc.
Consolidated Statements of Stockholders' Equity

	<u>Common Stock</u>		<u>Additional Paid-In Capital</u>	<u>Retained Earnings</u>	<u>Accumulated Other Comprehensive Income</u>	<u>Total Stockholders' Equity</u>
	<u>Shares</u>	<u>Amount</u>				
Balance at December 31, 2010	50,648,601	\$ 113	\$663,792	\$171,356	\$ 11,778	\$ 847,039
Net issuance under stock-based plans	1,929,135		28,546			28,546
Stock-based compensation			11,225			11,225
Tax effect from stock-based plans			5,019			5,019
Stock repurchase	(85,788)		(1,163)	(844)		(2,007)
Cash dividend				(31,373)		(31,373)
Comprehensive income (net of tax):						
Net income				129,731		129,731
Other comprehensive income					1,832	1,832
Balance at December 31, 2011	52,491,948	\$ 113	\$707,419	\$268,870	\$ 13,610	\$ 990,012
Net issuance under stock-based plans	691,501		1,564			1,564
Stock-based compensation			13,031			13,031
Tax effect from stock-based plans			1,862			1,862
Stock repurchase	(434,600)		(5,871)	(5,630)		(11,501)
Cash dividend				(32,686)		(32,686)
Comprehensive income (net of tax):						
Net income				48,029		48,029
Other comprehensive income					1,845	1,845
Balance at December 31, 2012	52,748,849	\$ 113	\$718,005	\$278,583	\$ 15,455	\$1,012,156
Net issuance under stock-based plans	721,601		(464)			(464)
Stock-based compensation			13,992			13,992
Tax effect from stock-based plans			495			495
Stock repurchase	(107,000)		(1,457)	(1,418)		(2,875)
Cash dividend				(33,975)		(33,975)
Comprehensive income (net of tax):						
Net income				35,776		35,776
Other comprehensive income					(3,582)	(3,582)
Balance at December 31, 2013	<u>53,363,450</u>	<u>\$ 113</u>	<u>\$730,571</u>	<u>\$278,966</u>	<u>\$ 11,873</u>	<u>\$1,021,523</u>

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

MKS Instruments, Inc.
Consolidated Statements of Cash Flows

	Years Ended December 31,		
	2013	2012	2011
	(in thousands)		
Cash flows from operating activities:			
Net income	\$ 35,776	\$ 48,029	\$ 129,731
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	17,102	14,442	12,980
Stock-based compensation	13,992	13,031	11,225
Provision for excess and obsolete inventory	21,671	15,028	14,857
Provision for doubtful accounts	631	888	449
Deferred income taxes	(3,089)	3,819	7,549
Excess tax benefits from stock-based compensation	(935)	(2,105)	(5,338)
Other	200	41	118
Changes in operating assets and liabilities:			
Trade accounts receivable	(36,153)	38,288	17,923
Inventories	(29,797)	5,341	(11,697)
Income taxes	27,237	(3,126)	(5,345)
Other current and non-current assets	(1,441)	7,689	(7,674)
Accrued compensation and other liabilities	7,721	4,083	2,904
Accounts payable	23,172	(8,281)	(11,646)
Net cash provided by operating activities	<u>76,087</u>	<u>137,167</u>	<u>156,036</u>
Cash flows from investing activities:			
Acquisition of business, net of cash acquired	(2,326)	(22,607)	—
Purchases of investments	(550,076)	(435,961)	(475,777)
Maturities of investments	417,566	313,298	385,613
Sales of investments	110,928	46,559	100,094
Purchases of property, plant and equipment	(12,410)	(17,705)	(15,567)
Other	(216)	(1,451)	(441)
Net cash used in investing activities	<u>(36,534)</u>	<u>(117,867)</u>	<u>(6,078)</u>
Cash flows from financing activities:			
Proceeds from short-term borrowings	6	2,896	41,802
Payments on short-term borrowings	(776)	(9,348)	(39,915)
Repurchases of common stock	(2,875)	(11,501)	(2,007)
Net proceeds related to employee stock awards	(464)	1,564	28,546
Dividend payments	(33,975)	(32,686)	(31,373)
Excess tax benefit from stock-based compensation	935	2,105	5,338
Net cash (used in) provided by financing activities	<u>(37,149)</u>	<u>(46,970)</u>	<u>2,391</u>
Effect of exchange rate changes on cash and cash equivalents	(1,090)	2,342	(1,909)
Increase (decrease) in cash and cash equivalents	1,314	(25,328)	150,440
Cash and cash equivalents at beginning of year	287,588	312,916	162,476
Cash and cash equivalents at end of year	<u>\$ 288,902</u>	<u>\$ 287,588</u>	<u>\$ 312,916</u>
Supplemental disclosure of cash flow information:			
Cash paid during the period for:			
Interest	\$ 60	\$ 212	\$ 19
Income taxes	\$ 5,974	\$ 18,033	\$ 52,561

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

MKS INSTRUMENTS, INC.
NOTES TO UNAUDITED CONSOLIDATED FINANCIAL STATEMENTS
(in thousands, except share and per share data)

1) Business Description

MKS Instruments, Inc. (“MKS” or the “Company”) was founded in 1961 and is a global provider of instruments, subsystems and process control solutions that measure, control, power, monitor and analyze critical parameters of advanced manufacturing processes to improve process performance and productivity of advanced manufacturing processes. MKS groups its products into four product groups based upon the similarity of the product function, type of product and manufacturing processes. These four groups of products are: Instruments and Control Products, Power and Reactive Gas Products, Vacuum Products and Analytical Solutions Group Products. MKS’ products are derived from its core competencies in pressure measurement and control, materials delivery, gas composition analysis, control and information technology, power and reactive gas generation and vacuum technology.

The Company has four reportable segments: Advanced Manufacturing Capital Equipment, Analytical Solutions Group, Europe Region Sales & Service, and Asia Region Sales & Service.

2) Basis of Presentation

The consolidated financial statements include the accounts of MKS Instruments, Inc. and its wholly owned subsidiaries. All intercompany accounts and transactions have been eliminated in consolidation.

Use of Estimates

The consolidated financial statements have been prepared in accordance with accounting principles generally accepted in the United States of America (“U.S. GAAP”). The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. On an on-going basis, management evaluates its estimates and judgments, including those related to revenue recognition and allowance for doubtful accounts, inventory, warranty costs, stock-based compensation, intangible assets, goodwill, other long-lived assets, in process research and development and other acquisition expenses and income taxes. Management bases its estimates and judgments on historical experience and on various other factors that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

Revision of prior period financial statements

During the three months ended September 30, 2013, the Company identified a prior period error which affected the previous balance sheets of all interim periods in 2013 and all interim and annual periods in 2012 and 2011 and certain footnote disclosures for annual periods in 2012, 2011 and 2010. The Company previously reported the amounts of its uncertain tax positions on the balance sheets net instead of gross. The Company considered the guidance in Accounting Standards Codification (“ASC”) Topic 740-10-45, Other Presentation Matters and ASC Topic 210-20, Offsetting with respect to this matter. The error had no impact to the income statement, statements of cash flows or the statements of stockholders’ equity of any previously reported periods. In evaluating whether our previously issued consolidated financial statements were materially misstated, the Company considered the guidance in ASC Topic 250, Accounting Changes and Error Corrections, ASC Topic 250-10-S99-1, Assessing Materiality, and ASC Topic 250-10-S99-2, Considering the Effects of Prior Year Misstatements when Quantifying Misstatements in Current Year Financial Statements. The Company concluded

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

this error was not material to the prior reporting periods, or to the 2013 results, and therefore, amendments of previously filed reports were not required. Accordingly, during the three months ended September 30, 2013, the Company recorded these prior period adjustments to correct this error. The revisions for these corrections to the applicable prior periods are reflected in the financial information herein and will be reflected in future filings containing such financial information.

The tables below reflect the revisions in the balance sheet line items for the periods ended December 31, 2012.

	December 31, 2012		
	As previously reported	Adjustment	As revised
Other assets	\$ 11,692	\$ 17,720	\$29,412
Other liabilities	\$ 43,375	\$ 17,720	\$61,095

The tables below reflect the sections in certain footnotes that were affected by the revision for the periods ended December 31, 2012.

	December 31, 2012		
	As previously reported	Adjustment	As revised
Other Assets			
Deferred tax assets, net	\$ 9,497	\$ —	\$ 9,497
Long-term income tax receivable	—	17,720	17,720
Other	2,195	—	2,195
	<u>\$ 11,692</u>	<u>\$ 17,720</u>	<u>\$29,412</u>

	December 31, 2012		
	As previously reported	Adjustment	As revised
Other Liabilities			
Long-term income tax payable	\$ 20,880	\$ 17,720	\$38,600
Accrued compensation	18,750	—	18,750
Other	3,745	—	3,745
	<u>\$ 43,375</u>	<u>\$ 17,720</u>	<u>\$61,095</u>

	December 31, 2012		
	As previously reported	Adjustment	As revised
Income Taxes			
Current taxes:			
United States	\$ 10,431	\$ 4,314	\$14,745
State	783	—	783
Foreign	12,074	(4,314)	7,760
	<u>\$ 23,288</u>	<u>\$ —</u>	<u>\$23,288</u>

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

	December 31, 2011		
	As previously reported	Adjustment	As revised
Current taxes:			
United States	\$ 25,824	\$ 15,032	\$ 40,856
State	2,602	—	2,602
Foreign	20,346	(15,032)	5,314
	<u>\$ 48,772</u>	<u>\$ —</u>	<u>\$ 48,772</u>

Segment Note

A reconciliation of segment assets to consolidated total assets is as follows:

	December 31, 2012		
	As previously reported	Adjustment	As revised
Total segment assets	\$ 216,699	\$ —	\$ 216,699
Cash and cash equivalents and investments	627,399	—	627,399
Other current assets	36,242	—	36,242
Property, plant and equipment, net	80,516	—	80,516
Goodwill and intangible assets, net	162,294	—	162,294
Other assets	11,692	17,720	29,412
Consolidated total assets	<u>\$1,134,842</u>	<u>\$ 17,720</u>	<u>\$1,152,562</u>

3) Summary of Significant Accounting Policies

Revenue Recognition and Accounts Receivable Allowances

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, the Company has no obligations to customers after the date products are shipped other than pursuant to warranty obligations. In some instances, the Company provides installation, training, support and services to customers after the product has been shipped. The Company does not frequently enter into arrangements with multiple deliverables however, for those revenue arrangements with multiple deliverables, the Company allocates revenue to each element based upon their relative selling price using vendor-specific objective evidence (“VSOE”), or third-party evidence (“TPE”) or based upon the relative selling price using estimated prices if VSOE or TPE does not exist. The Company then recognizes revenue on each deliverable in accordance with its policies for product and service revenue recognition. The Company provides for the estimated costs to fulfill customer warranty obligations upon the recognition of the related revenue. Shipping and handling fees, if any, billed to customers are recognized as revenue. The related shipping and handling costs are recognized in cost of sales. Accounts receivable allowances include sales returns and bad debt allowances. The Company monitors and tracks the amount of product returns and reduces revenue at the time of shipment for the estimated amount of such future returns, based on historical experience. The Company makes estimates evaluating its allowance for doubtful accounts. The Company continuously monitors collections and payments from its customers and maintains a provision for estimated credit losses based upon its historical experience and any specific customer collection issues that it has identified.

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

Research and Development

Research and development costs are expensed as incurred and consist mainly of compensation related expenses and project materials. The Company's research and development efforts include numerous projects, which generally have a duration of 3 to 30 months. Acquired in-process research and development ("IPR&D") expenses, which are capitalized at fair value as an intangible asset until the related project is completed, are then amortized over the estimated useful life of the product. The Company monitors projects and if they are abandoned, the Company immediately writes them off.

Advertising Costs

Advertising costs are expensed as incurred and were immaterial in 2013, 2012 and 2011.

Stock-Based Compensation

The accounting for share-based compensation expense requires the measurement and recognition of compensation expense for all share-based payment awards made to employees and directors based on estimated fair values. For restricted stock units ("RSUs"), the fair value is the fair value on the date of grant. The Company also provides employees the opportunity to purchase shares through an employee stock purchase plan. For shares issued under its employee stock purchase plan, the Company has estimated the fair value on the date of grant using the Black Scholes pricing model, which is affected by the Company's stock price as well as assumptions regarding a number of complex and subjective variables. These variables include the Company's expected stock price volatility over the term of the awards, expected life, risk free interest rate and expected dividends. The Company is also required to estimate forfeitures at the time of grant and revise those estimates in subsequent periods if actual forfeitures differ from those estimates.

Management determined that blended volatility, a combination of historical and implied volatility, is more reflective of market conditions and a better indicator of expected volatility than historical or implied volatility alone. The assumptions used in calculating the fair value of share-based payment awards represent management's best estimates, but these estimates involve inherent uncertainties and the application of management judgment. As a result, if factors change and the Company uses different assumptions, its stock-based compensation expense could be materially different in the future.

Other Comprehensive Income

For foreign subsidiaries where the functional currency is the local currency, assets and liabilities are translated into U.S. dollars at the current exchange rate on the balance sheet date. Revenue and expenses are translated at average rates of exchange prevailing during the year. Translation adjustments resulting from this process are recorded to Other Comprehensive Income ("OCI").

Unrealized gains and losses on securities classified as available-for-sale are included in accumulated other comprehensive income in consolidated stockholders' equity.

For derivative instruments designated as cash-flow hedges, the effective portion of the derivative's gain (loss) is initially reported as a component of OCI and is subsequently recognized in earnings when the hedged exposure is recognized in earnings.

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

Net Income Per Share

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

Cash and Cash Equivalents and Investments

All highly liquid investments with a maturity date of three months or less at the date of purchase are considered to be cash equivalents. The appropriate classification of investments in securities is determined at the time of purchase. Debt securities that the Company does not have the intent and ability to hold to maturity are classified as “available-for-sale” and are carried at fair value. Mutual funds that are bought and held principally for the purpose of selling them in the near term are classified as “trading” and are carried at fair value.

The Company reviews its investment portfolio on a monthly basis to identify and evaluate individual investments that have indications of possible impairment. The factors considered in determining whether a loss is other-than-temporary include: the length of time and extent to which fair market value has been below the cost basis, the financial condition and near-term prospects of the issuer, credit quality, and the Company’s ability to hold the investment for a period of time sufficient to allow for any anticipated recovery in fair value.

Concentrations of Credit Risk

The Company’s significant concentrations of credit risk consist principally of cash and cash equivalents, investments, forward exchange contracts and trade accounts receivable. The Company maintains cash and cash equivalents with financial institutions including some banks with which it had borrowings. The Company maintains investments primarily in U.S. Treasury and government agency securities and corporate debt securities. The Company enters into forward currency contracts with high credit-quality financial institutions in order to minimize credit risk exposure. The Company’s customers are primarily concentrated in the semiconductor industry, and a limited number of customers account for a significant portion of the Company’s revenues. The Company regularly monitors the creditworthiness of its customers and believes it has adequately provided for potential credit loss exposures. Credit is extended for all customers based primarily on financial condition, and collateral is not required.

The Company had one customer comprising 17%, 14% and 14% of net sales for 2013, 2012 and 2011, respectively and another customer comprising 12%, 10% and 7% of net sales for 2013, 2012 and 2011. During the years 2013, 2012 and 2011, approximately 68%, 62% and 61% of the Company’s net sales, respectively, were to semiconductor capital equipment manufacturers and semiconductor device manufacturers. There were two customers comprising 10% or more of the Company’s accounts receivable balance as of December 31, 2013.

Inventories

Inventories are stated at the lower of cost or market, cost being determined using a standard costing system which approximates cost based on a first-in, first-out method. The Company regularly reviews inventory quantities on hand and records a provision to write-down excess and obsolete inventory to its estimated net realizable value, if less than cost, based primarily on its estimated forecast of product demand.

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

Property, Plant and Equipment

Property, plant and equipment are stated at cost. Expenditures for major renewals and betterments that extend the useful lives of property, plant and equipment are capitalized. Expenditures for maintenance and repairs are charged to expense as incurred. When assets are sold or otherwise disposed of, the cost and related accumulated depreciation are eliminated from the accounts and any resulting gain or loss is recognized in earnings.

Depreciation is provided on the straight-line method over the estimated useful lives of twenty to thirty-one and one-half years for buildings and three to seven years for machinery and equipment, furniture and fixtures and office equipment, which includes enterprise resource planning software. Leasehold improvements are amortized over the shorter of the lease term or the estimated useful life of the leased asset.

Intangible Assets

Intangible assets resulting from the acquisitions of businesses are estimated by management based on the fair value of assets acquired. These include acquired customer lists, technology, patents, trade names, covenants not to compete and IPR&D. Intangible assets are amortized from two to ten years on a straight-line basis which represents the estimated periods of benefit and the expected pattern of consumption.

Goodwill

Goodwill is the amount by which the cost of acquired net assets exceeded the fair value of those net assets on the date of acquisition. The Company allocates goodwill to reporting units at the time of acquisition or when there is a change in the reporting structure and bases that allocation on which reporting units will benefit from the acquired assets and liabilities. Reporting units are defined as operating segments or one level below an operating segment, referred to as a component. The Company assesses goodwill for impairment on an annual basis as of October 31 or more frequently when events and circumstances occur indicating that the recorded goodwill may be impaired.

The estimated fair value of the Company's reporting units were based on discounted cash flow models derived from internal earnings and internal and external market forecasts. Determining fair value requires the exercise of significant judgment, including judgments about appropriate discount rates, perpetual growth rates and the amount and timing of expected future cash flows. Discount rates are based on a weighted average cost of capital ("WACC"), which represents the average rate a business must pay its providers of debt and equity. The WACC used to test goodwill is derived from a group of comparable companies. Assumptions in estimating future cash flows are subject to a high degree of judgment and complexity. The Company makes every effort to forecast these future cash flows as accurately as possible with the information available at the time the forecast is developed.

The Company has the option of first assessing qualitative factors to determine whether it is necessary to perform the current two-step impairment test or the Company can perform the two-step impairment test without performing the qualitative assessment. For the reporting units that did not experience any significant adverse changes in their business or reporting structures or any other adverse changes, and the reporting unit's fair value substantially exceeded its amount from the prior year assessment, the Company performed the qualitative "Step 0" assessment. In performing the qualitative Step 0 assessment, the Company considered certain events and circumstances specific to the reporting unit and to the entity as a whole, such as macroeconomic conditions, industry and market considerations, overall financial performance and cost factors when evaluating whether it is more likely than not that the fair value of the reporting unit is less than its carrying amount. For the remaining reporting units that did not meet these criteria, the Company performed the two-step goodwill impairment test. Under the two-step goodwill impairment test, the Company compared the fair value of each reporting unit to its

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

respective carrying amount, including goodwill. If the fair value of the reporting unit exceeds the fair value, the second step of the goodwill impairment test must be completed to measure the amount of impairment loss, if any. The second step compares the implied fair value of goodwill with the carrying value of goodwill. The implied fair value is determined by allocating the fair value of the reporting unit to all of the assets and liabilities of that unit, the excess of the fair value of the amounts assigned to its assets and liabilities is the implied fair value of goodwill. If the implied fair value of goodwill is less than the carrying amount of goodwill, an impairment loss is recognized equal to the difference.

As of October 31, 2013, the Company performed its annual impairment assessment of goodwill and determined that it is more likely than not that the fair values of the reporting units exceed their carrying amount.

Impairment of Long-Lived Assets

The Company evaluates the recoverability of its long-lived assets whenever events and changes in circumstances indicate that the carrying amount of an asset may not be fully recoverable. This periodic review may result in an adjustment of estimated depreciable lives or asset impairment. When indicators of impairment are present, the carrying values of the asset are evaluated in relation to their operating performance and future undiscounted cash flows of the underlying business. If the future undiscounted cash flows are less than their carrying value, impairment exists. The impairment is measured as the difference between the carrying value and the fair value of the underlying asset. Fair values are based on estimates of market prices and assumptions concerning the amount and timing of estimated future cash flows and assumed discount rates, reflecting varying degrees of perceived risk.

Foreign Exchange

The functional currency of the majority of the Company's foreign subsidiaries is the applicable local currency. For those subsidiaries, assets and liabilities are translated to U.S. dollars at year-end exchange rates. Income and expense accounts are translated at the average exchange rates prevailing during the year. The resulting translation adjustments are included in accumulated other comprehensive income in consolidated stockholders' equity. Foreign exchange transaction gains and losses, which arise from transaction activity, are reflected in selling, general and administrative expenses in the statement of operations.

Net foreign exchange gains and losses resulting from re-measurement are included in selling general and administrative expense and were a loss of \$1,937, a gain of \$301 and a loss of \$126, respectively, for the years ended December 31, 2013, 2012 and 2011. These amounts do not reflect the corresponding gain (loss) from foreign exchange contracts. See Note 7 "Derivatives" regarding foreign exchange contracts.

Income Taxes

The Company records income taxes using the asset and liability method. Deferred income tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective income tax bases, and operating loss and tax credit carry forwards. On a quarterly basis, the Company evaluates both the positive and negative evidence that affects the realizability of net deferred tax assets and assesses the need for a valuation allowance. The future benefit to be derived from its deferred tax assets is dependent upon its ability to generate sufficient future taxable income to realize the assets. The Company records a valuation allowance to reduce its net deferred tax assets to the amount that is more likely than not to be realized. To the extent the Company establishes a valuation allowance an expense will be recorded as a component of the provision for income taxes on the

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

statement of operations. As of December 31, 2011, the Company had a valuation allowance of \$26,475 primarily related to capital losses incurred from its divested operations, and state tax credit carry forwards. During 2012, the Company increased its valuation allowance by \$1,022 primarily related to an increase in state tax credit carry forwards as management determined it is more likely than not that the deferred tax assets related to these attributes will not be realized. As a result, the valuation allowance was \$27,497 at December 31, 2012. During 2013, the Company decreased its valuation allowance by \$395 primarily related to the expiration of US capital loss carry forwards. As a result, the valuation allowance was \$27,102 at December 31, 2013.

Accounting for income taxes requires a two-step approach to recognize and measure uncertain tax positions. The first step is to evaluate the tax position for recognition by determining if, based on the technical merits, it is more likely than not that the position will be sustained upon audit, including resolutions of related appeals or litigation processes, if any. The second step is to measure the tax benefit as the largest amount that is more than 50% likely of being realized upon ultimate settlement. The Company re-evaluates these uncertain tax positions on a quarterly basis. This evaluation is based on factors including, but not limited to, changes in facts or circumstances, changes in tax law, effectively settled issues under audit and new audit activity. Any change in these factors could result in the recognition of a tax benefit or an additional charge to the tax provision.

4) Recently Issued Accounting Pronouncements

On July 18, 2013, the Financial Accounting Standards Board issued Accounting Standards Update (“ASU”) 2013-11, “*Income Taxes (Topic 740): Presentation of an Unrecognized Tax Benefit When a Net Operating Loss Carry-forward, a Similar Tax Loss, or a Tax Credit Carry-forward Exists.*” Under the new standard, unrecognized tax benefits will be netted against all available same-jurisdiction loss or other tax carry-forwards that would be utilized, rather than only against carry-forwards that are created by unrecognized tax benefits. The provisions of this ASU are effective for interim and annual periods beginning on or after December 15, 2013. The adoption of ASU No. 2013-11 is not expected to have a material effect on the Company’s consolidated financial statements.

5) Investments

The fair value of short-term investments with maturities or estimated lives of less than one year consists of the following:

	Years Ended December 31,	
	2013	2012
Available-for-sale investments:		
Time deposits	\$ 3,439	\$ 52
Bankers acceptance drafts	491	242
Commercial paper and certificates of deposit	114,984	—
Corporate obligations	18,351	—
U.S. treasury obligations	—	13,054
U.S. agency obligations	162,450	313,514
	<u>299,715</u>	<u>326,862</u>
Trading investments:		
Mutual funds (1)	1,000	791
	<u>\$ 300,715</u>	<u>\$ 327,653</u>

(1) The mutual funds are associated with the Company’s supplemental defined contribution retirement obligations.

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

The fair value of long-term available-for-sale investments with maturities or estimated lives of more than one year consists of the following:

	Years Ended December 31,	
	2013	2012
Time deposits	\$ 54	\$ —
U.S. agency obligations	60,351	12,158
	<u>\$ 60,405</u>	<u>\$ 12,158</u>

The following table shows the gross unrealized gains and (losses) aggregated by investment category for short-term and long-term available-for-sale investments:

	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
As of December 31, 2013:				
Short-term investments:				
Available-for-sale investments:				
Time deposits	\$ 3,439	\$ —	\$ —	\$ 3,439
Bankers acceptance drafts	491	—	—	491
Commercial paper and certificates of deposit	114,973	15	(4)	114,984
Corporate obligations	18,360	—	(9)	18,351
U.S. agency obligations	162,430	22	(2)	162,450
	<u>\$299,693</u>	<u>\$ 37</u>	<u>\$ (15)</u>	<u>\$299,715</u>
Long-term investments:				
Time deposits	\$ 54	\$ —	\$ —	\$ 54
U.S. agency obligations	60,374	9	(32)	60,351
	<u>\$ 60,428</u>	<u>\$ 9</u>	<u>\$ (32)</u>	<u>\$ 60,405</u>

	Cost	Gross Unrealized Gains	Gross Unrealized (Losses)	Estimated Fair Value
As of December 31, 2012:				
Short-term investments:				
Available-for-sale investments:				
Time deposits	\$ 52	\$ —	\$ —	\$ 52
Bankers acceptance drafts	242	—	—	242
U.S. treasury obligations	13,045	9	—	13,054
U.S. agency obligations	313,262	258	(6)	313,514
	<u>\$326,601</u>	<u>\$ 267</u>	<u>\$ (6)</u>	<u>\$326,862</u>
Long-term investments:				
U.S. agency obligations	\$ 12,156	\$ 2	\$ —	\$ 12,158

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

Interest income is accrued as earned. Dividend income is recognized as income on the date the stock trades “ex-dividend.” The cost of marketable securities sold is determined by the specific identification method and realized gains or losses are reflected in income and was not material in 2013, 2012 and 2011.

The unrealized gains and losses for trading investments were immaterial in 2013.

6) Fair Value Measurements

In accordance with the provisions of fair value accounting, a fair value measurement assumes that the transaction to sell an asset or transfer a liability occurs in the principal market for the asset or liability or, in the absence of a principal market, the most advantageous market for the asset or liability and defines fair value based upon an exit price model.

The fair value measurement guidance establishes a fair value hierarchy which requires an entity to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. The guidance describes three levels of inputs that may be used to measure fair value:

- | | |
|---------|---|
| Level 1 | Quoted prices in active markets for identical assets or liabilities as of the reporting date. Active markets are those in which transactions for the asset or liability occur in sufficient frequency and volume to provide pricing information on an ongoing basis. |
| Level 2 | Observable inputs other than Level 1 prices, such as quoted prices for similar assets or liabilities; quoted prices in markets that are not active; or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities. Level 2 assets and liabilities include debt securities with quoted prices that are traded less frequently than exchange-traded instruments or securities or derivative contracts that are valued using a pricing model with inputs that are observable in the market or can be derived principally from or corroborated by observable market data. |
| Level 3 | Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities. Level 3 assets and liabilities include financial instruments whose value is determined using pricing models, discounted cash flow methodologies, or similar techniques, as well as instruments for which the determination of fair value requires significant management judgment or estimation. |

In certain cases, the inputs used to measure fair value may fall into different levels of the fair value hierarchy. In such cases, we categorize such assets and liabilities based on the lowest level input that is significant to the fair value measurement in its entirety. Our assessment of the significance of a particular input to the fair value measurement in its entirety requires judgment and considers factors specific to the asset.

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

Assets and liabilities of the Company measured at fair value on a recurring basis as of December 31, 2013, are summarized as follows:

Description	December 31, 2013	Fair Value Measurements at Reporting Date Using		
		Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Cash equivalents:				
Money market funds	\$ 38,166	\$ 38,166	\$ —	\$ —
Bankers acceptance drafts	32	—	32	—
Commercial paper and certificates of deposit	10,400	—	10,400	—
Trading securities:				
Mutual funds	1,000	1,000	—	—
Available-for-sale securities:				
Time deposits	3,493	—	3,493	—
Bankers acceptance drafts	491	—	491	—
Commercial paper and certificates of deposit	114,984	—	114,984	—
Corporate obligations	18,351	—	18,351	—
U.S. agency obligations	222,801	—	222,801	—
Derivatives — currency forward contracts	920	—	920	—
Total assets	\$ 410,638	\$ 39,166	\$ 371,472	\$ —
Liabilities:				
Derivatives — currency forward contracts	\$ 656	\$ —	\$ 656	\$ —
Reported as follows:				
Assets:				
Cash and cash equivalents (1)	\$ 48,598	\$ 38,166	\$ 10,432	\$ —
Short-term investments	300,715	1,000	299,715	—
Other current assets	920	—	920	—
	<u>\$ 350,233</u>	<u>\$ 39,166</u>	<u>\$ 311,067</u>	<u>\$ —</u>
Long-term investments	\$ 60,405	\$ —	\$ 60,405	\$ —
Liabilities:				
Other current liabilities	\$ 656	\$ —	\$ 656	\$ —

(1) The cash and cash equivalent amounts presented in the table above do not include cash of \$234,675 and non-negotiable time deposits of \$5,629 as of December 31, 2013.

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

Assets and liabilities of the Company measured at fair value on a recurring basis as of December 31, 2012, are summarized as follows:

Description	December 31, 2012	Fair Value Measurements at Reporting Date Using		
		Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Cash equivalents:				
Money market funds	\$ 51,291	\$ 51,291	\$ —	\$ —
Bankers acceptance drafts	16	—	16	—
Trading securities:				
Mutual funds	791	791	—	—
Available-for-sale securities:				
Bankers acceptance drafts	242	—	242	—
U.S. treasury obligations	13,054	—	13,054	—
U.S. agency obligations	325,672	295,665	30,007	—
Derivatives — currency forward contracts	961	—	961	—
Total assets	<u>\$ 392,027</u>	<u>\$ 347,747</u>	<u>\$ 44,280</u>	<u>\$ —</u>
Liabilities:				
Derivatives — currency forward contracts	<u>\$ 1,310</u>	<u>\$ —</u>	<u>\$ 1,310</u>	<u>\$ —</u>
Reported as follows:				
Assets:				
Cash and cash equivalents (1)	\$ 51,307	\$ 51,291	\$ 16	\$ —
Short-term investments (2)	327,601	284,298	43,303	—
Other current assets	961	—	961	—
	<u>\$ 379,869</u>	<u>\$ 335,589</u>	<u>\$ 44,280</u>	<u>\$ —</u>
Long-term investments	<u>\$ 12,158</u>	<u>\$ 12,158</u>	<u>\$ —</u>	<u>\$ —</u>
Liabilities:				
Other current liabilities	<u>\$ 1,310</u>	<u>\$ —</u>	<u>\$ 1,310</u>	<u>\$ —</u>

- (1) The cash and cash equivalent amounts presented in the table above do not include cash of \$185,143 and non-negotiable time deposits of \$51,138 as of December 31, 2012.
- (2) The short-term investments presented in the table above do not include non-negotiable time deposits of \$52 as of December 31, 2012.

Money Market Funds

Money market funds are cash and cash equivalents, and are classified within Level 1 of the fair value hierarchy.

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

Trading Mutual Fund Investments

As of December 31, 2013, trading investments consisted of certain U.S. and international equity mutual funds and government agency fixed income mutual funds.

Available-For-Sale Investments

As of December 31, 2013 and 2012, available-for-sale investments consisted of time deposits and drafts denominated in the Euro currency, commercial paper, certificates of deposit, corporate obligations, U.S. treasury obligations and U.S. agency obligations.

The Company measures its debt and equity investments at fair value. The Company's available-for-sale investments are classified within Level 1 and Level 2 of the fair value hierarchy.

Derivatives

As a result of the Company's global operating activities, the Company is exposed to market risks from changes in foreign currency exchange rates, which may adversely affect its operating results and financial position. When deemed appropriate, the Company minimizes its risks from foreign currency exchange rate fluctuations through the use of derivative financial instruments. The principal market in which the Company executes its foreign currency contracts is the institutional market in an over-the-counter environment with a relatively high level of price transparency. The market participants usually are large commercial banks. The forward foreign currency exchange contracts are valued using broker quotations, or market transactions and are classified within Level 2 of the fair value hierarchy.

7) Derivatives

The Company enters into derivative instruments for risk management purposes only, including derivatives designated as hedging instruments and those utilized as economic hedges. The Company operates internationally and, in the normal course of business, is exposed to fluctuations in interest rates and foreign exchange rates. These fluctuations can increase the costs of financing, investing and operating the business. The Company has used derivative instruments, such as forward contracts, to manage certain foreign currency exposure.

By nature, all financial instruments involve market and credit risks. The Company enters into derivative instruments with major investment grade financial institutions and no collateral is required. The Company has policies to monitor the credit risk of these counterparties. While there can be no assurance, the Company does not anticipate any material non-performance by any of these counterparties.

The Company hedges a portion of its forecasted foreign currency denominated intercompany sales of inventory, over a maximum period of eighteen months, using forward foreign exchange contracts accounted for as cash-flow hedges related to Japanese, South Korean, British and Euro currencies. To the extent these derivatives are effective in off-setting the variability of the hedged cash flows, and otherwise meet the hedge accounting criteria, changes in the derivatives' fair value are not included in current earnings but are included in OCI in stockholders' equity. These changes in fair value will subsequently be reclassified into earnings, as applicable, when the forecasted transaction occurs. To the extent that a previously designated hedging transaction is no longer an effective hedge, any ineffectiveness measured in the hedging relationship is recorded currently in earnings in the period it occurs. The cash flows resulting from forward exchange contracts are classified in the consolidated statements of cash flows as part of cash flows from operating activities. The Company does not enter into derivative instruments for trading or speculative purposes.

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

To the extent the hedge accounting criteria is not met, the related foreign currency forward contracts are considered as economic hedges and changes in the fair value of these contracts are recorded immediately in earnings in the period in which they occur. These include hedges that are used to reduce exchange rate risks arising from the change in fair value of certain foreign currency denominated assets and liabilities (i.e., payables, receivables) and other economic hedges where the hedge accounting criteria were not met.

As of December 31, 2013 and 2012, the Company had outstanding forward foreign exchange contracts with gross notional values of \$21,018 and \$41,448, respectively. The following tables provide a summary of the primary net hedging positions and corresponding fair values held as of December 31, 2013 and 2012:

<u>Currency Hedged (Buy/Sell)</u>	<u>December 31, 2013</u>	
	<u>Gross Notional Value</u>	<u>Fair Value (1)</u>
U.S. Dollar/Japanese Yen	\$ 7,191	\$ 920
U.S. Dollar/South Korean Won	9,254	(521)
U.S. Dollar/Euro	2,806	(85)
U.S. Dollar/U.K. Pound Sterling	1,767	(50)
Total	\$ 21,018	\$ 264

<u>Currency Hedged (Buy/Sell)</u>	<u>December 31, 2012</u>	
	<u>Gross Notional Value</u>	<u>Fair Value (1)</u>
U.S. Dollar/Japanese Yen	\$ 13,992	\$ 961
U.S. Dollar/South Korean Won	19,374	(1,180)
U.S. Dollar/Euro	4,217	(57)
U.S. Dollar/U.K. Pound Sterling	3,865	(73)
Total	\$ 41,448	\$ (349)

(1) Represents the net receivable (payable) amount included in the consolidated balance sheet.

The following table provides a summary of the fair value amounts of the Company's derivative instruments:

<u>Derivatives Designated as Hedging Instruments</u>	<u>Years Ended December 31,</u>	
	<u>2013</u>	<u>2012</u>
<u>Derivative assets:</u>		
Forward exchange contracts	\$ 920	\$ 961
<u>Derivative liabilities:</u>		
Forward exchange contracts	(656)	(1,310)
Total net derivative asset (liability) designated as hedging instruments (1)	\$ 264	\$ (349)

(1) The derivative asset of \$920 and derivative liability of \$656 are classified in other current assets and other current liabilities, respectively, in the consolidated balance sheet as of December 31, 2013. The derivative asset of \$961 and derivative liability of \$1,310 are classified in other current assets and other current liabilities, respectively, in the consolidated balance sheet as of December 31, 2012

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

The net amount of existing losses as of December 31, 2013 that is expected to be reclassified from accumulated OCI into earnings within the next twelve months is not immaterial.

The following table provides a summary of the gains (losses) on derivatives designated as hedging instruments:

<u>Derivatives Designated as Cash Flow Hedging Relationships</u>	<u>Years Ended December 31,</u>		
	<u>2013</u>	<u>2012</u>	<u>2011</u>
Forward exchange contracts:			
Net (loss) gain recognized in OCI (1)	\$ (48)	\$ 936	\$ 4,311
Net gain (loss) reclassified from accumulated OCI into income (2)	\$ 1,086	\$(930)	\$(4,021)

(1) Net change in the fair value of the effective portion classified in OCI.

(2) Effective portion classified as cost of products in 2013 and selling, general and administrative in 2012 and 2011.

The following table provides a summary of (losses) on derivatives not designated as hedging instruments:

<u>Derivatives Not Designated as Hedging Instruments</u>	<u>Years Ended December 31,</u>		
	<u>2013</u>	<u>2012</u>	<u>2011</u>
Forward exchange contracts:			
Net (loss) recognized in income (1)	\$(215)	\$(1,606)	\$—

(1) The Company has a forward foreign exchange contract that hedges an intercompany loan with its Korean subsidiary. This hedge does not qualify for hedge accounting and any gains (losses) are recorded immediately in selling, general and administrative expenses.

8) Inventories

Inventories consist of the following:

	<u>Years Ended December 31,</u>	
	<u>2013</u>	<u>2012</u>
Raw material	\$ 75,687	\$ 76,610
Work-in-process	24,304	19,708
Finished goods	42,736	38,321
	<u>\$ 142,727</u>	<u>\$ 134,639</u>

Inventory related excess and obsolete charges of \$21,671, \$15,028 and \$14,857 were recorded in cost of products in the years ended December 31, 2013, 2012 and 2011, respectively. Included in excess and obsolete charges for 2013 is \$6,423 of special charges for obsolete inventory related to a unique product in a solar application as a result of slowing market conditions, which provided uncertainty as to the net realizable value of this inventory.

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

9) Property, Plant and Equipment

Property, plant and equipment consist of the following:

	Years Ended December 31,	
	2013	2012
Land	\$ 9,225	\$ 9,188
Buildings	68,569	68,831
Machinery and equipment	116,475	115,032
Furniture and fixtures, office equipment and software	59,068	51,669
Leasehold improvements	20,590	18,003
Construction in progress	3,702	9,227
	<u>277,629</u>	<u>271,950</u>
Less: accumulated depreciation	200,093	191,434
	<u>\$ 77,536</u>	<u>\$ 80,516</u>

Depreciation of property, plant and equipment totaled \$14,964, \$13,406 and \$11,965 for the years ended 2013, 2012 and 2011, respectively.

10) Acquisitions**Alter S.r.l**

On March 12, 2013, the Company acquired Alter S.r.l. ("Alter"), located in Reggio Emilia, Italy. The aggregate purchase price, net of cash acquired and after final debt and working capital adjustments was \$2,426. Total cash paid as of June 30, 2013, net of cash acquired of \$21 was \$2,058. During June 2013, one of two holdback provisions was met and the Company released \$123. The Company will pay the remaining \$368 subject to a final holdback provision being met. Alter develops advanced microwave power generators, components and systems for industrial microwave heating, microwave plasma coating and semiconductor applications. This acquisition strengthens the Company's existing microwave plasma expertise and product portfolio, and extends its opportunity into high growth, non-plasma microwave applications for industrial processes, food and beverage manufacturing and other markets.

The following table summarizes the estimated fair value of the assets acquired and liabilities assumed at the date of the acquisition:

Current assets	\$1,053
Property and equipment	211
Intangible assets	2,806
Other assets	67
Total assets acquired	<u>4,137</u>
Debt (Note 15)	770
Deferred taxes and other liabilities	920
Total liabilities assumed	<u>1,690</u>
Total purchase price	2,447
Cash acquired	(21)
Total purchase price, net of cash acquired	<u>\$2,426</u>

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

The intangible assets associated with the acquisition are not deductible for tax purposes. The following table reflects the allocation of the acquired intangible assets and related estimates of useful lives. These acquired intangibles will be amortized on a straight-line basis.

Current developed technology	\$2,208	9 year useful life
Trademarks and trade names	598	3 year useful life
	<u>\$2,806</u>	

The results of this acquisition were included in the Company's consolidated operations beginning on March 12, 2013. The pro forma consolidated statements reflecting the operating results of Alter, had it been acquired as of January 1, 2013, would not differ materially from the operating results of the Company as reported for the year ended December 31, 2013. Alter is included in the Company's Power and Reactive Gas Products group and the Advanced Manufacturing Capital Equipment reportable segment.

Plasmart, Inc.

On August 29, 2012, the Company acquired Plasmart, Inc. ("Plasmart"), located in Daejeon, Korea. Plasmart develops radio frequency (RF) plasma generation and monitoring systems for the semiconductor, flat panel display, active matrix organic light emitting diodes and solar photovoltaic industries. Plasmart's expertise in RF systems and access to the important Korean market were key drivers in the selection of Plasmart for acquisition. The aggregate purchase price, net of cash acquired, consisted of \$22,607, subject to final working capital adjustments in the fourth quarter of 2012 of \$1,778. Acquisition related costs of \$1,258 and step-up inventory of \$303 were expensed as incurred.

The following table summarizes the estimated fair value of the assets acquired and liabilities assumed at the date of the acquisition.

Current assets	\$ 5,536
Property, plant and equipment	3,565
Other assets	554
Intangible assets	10,745
Goodwill	9,989
Total assets acquired	<u>\$30,389</u>
Debt (Note 15)	4,561
Deferred taxes and other liabilities	3,128
Total liabilities assumed	<u>\$ 7,689</u>
Total purchase price	\$22,700
Cash acquired	(93)
Total purchase price, net of cash acquired	<u>\$22,607</u>

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

The goodwill and other intangible assets associated with the acquisition are not deductible for tax purposes. The following table reflects the allocation of the acquired intangible assets and related estimates of useful lives. These acquired intangibles will be amortized on a straight-line basis.

Current developed technology	\$ 5,029	7.5 – 9.5 years useful life
Trade names	335	7 year useful life
Customer relationships	5,381	10 year useful life
	<u>\$10,745</u>	

This transaction resulted in an amount of purchase price that exceeded the estimated fair value of tangible and intangible assets, which was allocated to goodwill. The Company believes that the amount of goodwill relative to identifiable intangible assets relates to several factors including: (1) potential buyer-specific synergies related to market opportunities for a combined product offering and (2) potential to leverage the Company's sales force and intellectual property to attract new customers and revenue.

The results of this acquisition were included in the Company's consolidated operations beginning on August 29, 2012. The pro forma consolidated statements reflecting the operating results of Plasmart, had they been acquired as of January 1, 2012, would not differ materially from the operating results of the Company as reported for the year ended December 31, 2012. Plasmart is included in the Power and Reactive Gas Products group and the Advanced Manufacturing Capital Equipment reportable segment.

11) Goodwill and Intangible Assets

Goodwill

The changes in the carrying amount of goodwill and accumulated impairment losses were as follows:

	2013			2012		
	Gross Carrying Amount	Accumulated Impairment Loss	Net	Gross Carrying Amount	Accumulated Impairment Loss	Net
Beginning balance at January 1	\$ 290,147	\$ (139,414)	\$ 150,733	\$ 279,498	\$ (139,414)	\$ 140,084
Acquired goodwill(1)	—	—	—	9,989	—	9,989
Foreign currency translation	176	—	176	660	—	660
Ending balance at December 31	<u>\$ 290,323</u>	<u>\$ (139,414)</u>	<u>\$ 150,909</u>	<u>\$ 290,147</u>	<u>\$ (139,414)</u>	<u>\$ 150,733</u>

(1) On August 29, 2012, the Company purchased Plasmart, Inc. for \$22,607, net of cash acquired. The Company recorded \$9,989 of goodwill in connection with the acquisition.

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

Goodwill associated with each of our reportable segments is as follows:

	Years Ended December 31,	
	2013	2012
Reportable segment:		
Advanced Manufacturing Capital Equipment	\$ 142,241	\$ 142,065
Analytical Solutions Group	8,668	8,668
Europe Region Sales & Service	—	—
Asia Region Sales & Service	—	—
Total goodwill	<u>\$ 150,909</u>	<u>\$ 150,733</u>

Intangible Assets

The Company is required to test certain long-lived assets when indicators of impairment are present. For the purposes of the impairment test, long-lived assets are grouped with other assets and liabilities at the lowest level for which identifiable cash flows are largely independent of the cash flows of other assets and liabilities. There were no intangible asset impairment charges in 2013, 2012 or 2011.

Components of the Company's acquired intangible assets are comprised of the following:

<u>As of December 31, 2013</u>	<u>Gross</u>	<u>Accumulated Amortization</u>	<u>Foreign Currency Translation</u>	<u>Net</u>
Completed technology(1)	\$ 84,680	\$ (78,072)	\$ 519	\$ 7,127
Customer relationships	14,571	(9,831)	454	5,194
Patents, trademarks, trade names and other(1)	25,636	(24,951)	84	769
	<u>\$ 124,887</u>	<u>\$ (112,854)</u>	<u>\$ 1,057</u>	<u>\$ 13,090</u>

(1) In August 2013, the Company purchased \$268 of net assets of which \$388 was completed technology. In March 2013, the Company purchased Alter for \$2,426, net of cash acquired. The Company recorded \$2,806 of separately identified intangible assets, of which \$2,208 was completed technology and \$598 was trademarks and trade names.

<u>As of December 31, 2012</u>	<u>Gross</u>	<u>Accumulated Amortization</u>	<u>Foreign Currency Translation</u>	<u>Net</u>
Completed technology(1)	\$ 82,084	\$ (77,243)	\$ 254	\$ 5,095
Customer relationships(1)	14,571	(8,886)	312	5,997
Patents, trademarks, trade names and other(1)	25,038	(24,587)	18	469
	<u>\$ 121,693</u>	<u>\$ (110,716)</u>	<u>\$ 584</u>	<u>\$ 11,561</u>

(1) On August 29, 2012, the Company purchased Plasmart for \$22,607, net of cash acquired. The Company recorded \$10,745 of separately identified intangible assets, of which \$5,029 was completed technology, \$5,381 was customer relationships and \$335 was trade names

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

Aggregate amortization expense related to acquired intangible assets for the years 2013, 2012 and 2011 was \$2,139, \$1,036 and \$1,015, respectively.

<u>Year</u>	<u>Amount</u>
2014	\$1,800
2015	1,784
2016	1,601
2017	1,570
2018	1,561
Thereafter	4,774

12) Other Assets

	<u>Years Ended December 31,</u>	
	<u>2013</u>	<u>2012</u>
Other Current Assets:		
Income tax receivable	\$ 39	\$ 12,768
Other	16,676	15,280
Total other current assets	<u>\$ 16,715</u>	<u>\$ 28,048</u>
Other Assets:		
Deferred tax assets, net	\$ 9,208	\$ 9,497
Long-term income tax receivable	20,516	17,720
Other	2,123	2,195
Total other assets	<u>\$ 31,847</u>	<u>\$ 29,412</u>

13) Other Liabilities

	<u>Years Ended December 31,</u>	
	<u>2013</u>	<u>2012</u>
Other Current Liabilities:		
Product warranties	\$ 6,956	\$ 8,266
Deferred revenue	5,556	9,280
Other	21,730	19,859
Total other current liabilities	<u>\$ 34,242</u>	<u>\$ 37,405</u>
Other Liabilities:		
Long-term income tax payable	\$ 46,745	\$ 38,600
Accrued compensation	9,646	18,750
Other	6,682	3,745
Total other liabilities	<u>\$ 63,073</u>	<u>\$ 61,095</u>

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

14) Product Warranties

The Company provides for the estimated costs to fulfill customer warranty obligations upon the recognition of the related revenue. While the Company engages in extensive product quality programs and processes, including actively monitoring and evaluating the quality of its component suppliers, the Company's warranty obligation is affected by shipment volume, product failure rates, utilization levels, material usage and supplier warranties on parts delivered to the Company. Should actual product failure rates, utilization levels, material usage, or supplier warranties on parts differ from the Company's estimates, revisions to the estimated warranty liability would be required. The product warranty liability is included in other current liabilities in the consolidated balance sheets.

Product warranty activities were as follows:

	<u>Years Ended December 31,</u>	
	<u>2013</u>	<u>2012</u>
Beginning balance	\$ 8,266	\$ 8,315
Provisions for product warranties	2,755	4,514
Direct charges to warranty liability	(3,987)	(4,985)
Foreign currency translation	(78)	422
Ending balance	<u>\$ 6,956</u>	<u>\$ 8,266</u>

15) Debt**Credit Agreements and Short-Term Borrowings**

The Company's Japanese subsidiary has lines of credit and short-term borrowing arrangements with two financial institutions which generally expire and are renewed at three month intervals. The lines of credit provide for aggregate borrowings as of December 31, 2013 of up to an equivalent of \$21,878 U.S. dollars. One of the borrowing arrangements has an interest rate based on the Tokyo Interbank Offer Rate at the time of borrowing and the other has an interest rate based on the Japanese Short-term Prime Lending Rate. There were no borrowings outstanding under these arrangements at December 31, 2013 and 2012.

The Company also had various lines of credit and short and long-term borrowing arrangements as a result of its acquisitions of Plasmart in 2012 and Alter in March 2013. All of these lines of credit and borrowing arrangements were paid off and terminated in 2013. There were no outstanding balances at December 31, 2013 and 2012.

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

16) Income Taxes

A reconciliation of the Company's effective tax rate to the U.S. federal statutory rate is as follows:

	Years Ended December 31,		
	2013	2012	2011
U.S. Federal income tax statutory rate	35.0%	35.0%	35.0%
Federal tax credits	(1.8)	—	(0.7)
State income taxes, net of federal benefit	1.3	1.3	1.1
Effect of foreign operations taxed at various rates	0.3	(2.6)	(4.1)
Qualified production activity tax benefit	(1.4)	(0.5)	(1.1)
Deferred tax asset valuation allowance	(0.7)	1.4	0.6
Income tax charges on accumulated foreign earnings	10.9	—	—
Tax benefit related to reinstatement of tax incentives	(4.0)	—	—
Other	0.1	1.5	(0.5)
	<u>39.7%</u>	<u>36.1%</u>	<u>30.3%</u>

The components of income from continuing operations before income taxes and the related provision for income taxes consist of the following:

	Years Ended December 31,		
	2013	2012	2011
Income from continuing operations before income taxes:			
United States	\$29,546	\$28,652	\$108,474
Foreign	29,755	46,484	77,578
	<u>\$59,301</u>	<u>\$75,136</u>	<u>\$186,052</u>
Current taxes:			
United States	\$11,338	\$14,745	\$ 40,856
State	1,159	783	2,602
Foreign	14,117	7,760	5,314
	26,614	23,288	48,772
Deferred taxes:			
United States	(1,730)	2,019	7,795
State and Foreign	(1,359)	1,800	(246)
	<u>(3,089)</u>	<u>3,819</u>	<u>7,549</u>
Provision for income taxes	<u>\$23,525</u>	<u>\$27,107</u>	<u>\$ 56,321</u>

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

The significant components of the deferred tax assets and deferred tax liabilities are as follows:

	Years Ended December 31,	
	2013	2012
Deferred tax assets:		
Loss carry-forwards and credits	\$ 28,138	\$ 29,032
Inventory and warranty reserves	10,890	10,959
Accounts receivable and other accruals	2,615	2,647
Stock-based compensation	3,581	5,032
Executive supplemental retirement benefits	8,026	6,132
Other	63	—
Total deferred tax assets	\$ 53,313	\$ 53,802
Deferred tax liabilities:		
Acquired intangible assets	(2,782)	(5,857)
Depreciation and amortization	(5,085)	(4,461)
Other	(1,202)	(1,145)
Total deferred tax liabilities	(9,069)	(11,463)
Valuation allowance	(27,102)	(27,497)
Net deferred tax assets	\$ 17,142	\$ 14,842

At December 31, 2013, the Company had gross Massachusetts research and other tax credit carry forwards of \$8,689. These credit carry forwards will expire at various dates through 2028. In addition, at December 31, 2013, the Company had U.S. federal capital loss carry forwards of \$59,275 that will expire in 2015.

Although the Company believes that its tax positions are consistent with applicable U.S. federal, state and international laws, it maintains certain tax reserves at December 31, 2013 in the event its tax positions were to be challenged by the applicable tax authority and additional tax assessed on audit.

A reconciliation of the beginning and ending amount of gross unrecognized tax benefits is as follows:

	Years Ended December 31,		
	2013	2012	2011
Balance at beginning of year	\$40,674	\$36,540	\$22,028
Decreases for prior years	—	—	(3)
Increases for the current year	7,308	4,134	16,663
Reductions related to settlements with taxing authorities	—	—	(2,148)
Reductions related to expiration of statute of limitations	(298)	—	—
Balance at end of year	\$47,684	\$40,674	\$36,540

At December 31, 2013, the total amount of gross unrecognized tax benefits, which excludes interest and penalties, was approximately \$47,684. The net increase from December 31, 2012 was primarily attributable to a current year increase in reserves for new and existing uncertain tax positions. At December 31, 2013, there are \$24,758, excluding interest and penalties, of net unrecognized tax benefits that, if recognized, would affect our annual effective tax rate. In 2013, the Company recorded a net benefit to income tax expense of \$140, excluding

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

interest and penalties, due to discrete reserve releases primarily related to statutes of limitations expiring. In 2011, the Company recorded a net benefit to income tax expense of \$2,148, excluding interest and penalties, due to discrete reserve releases primarily related to the effective settlement of a German tax audit for years 2001 through 2005.

The Company accrues interest and, if applicable, penalties for any uncertain tax positions. Interest and penalties are classified as a component of income tax expense. At December 31, 2013, 2012 and 2011, the Company had accrued interest on unrecognized tax benefits of approximately \$2,159, \$1,571 and \$973, respectively.

Over the next 12 months it is reasonably possible that the Company may recognize approximately \$12,614 of previously net unrecognized tax benefits related to various U.S. federal, state and foreign tax positions as a result of the conclusion of various audits and the expiration of the statute of limitations. The Company is subject to examination by U.S. federal, state and foreign tax authorities. The Internal Revenue Service commenced an examination of its U.S. federal tax filings for open tax years 2007 through present during the quarter ended June 30, 2012. As a result, the U.S. statute of limitations remains open between tax years 2007 through present. The statute of limitations for the Company's tax filings in other jurisdictions varies between fiscal years 2006 through present.

On a quarterly basis, the Company evaluates both positive and negative evidence that affects the realizability of net deferred tax assets and assesses the need for a valuation allowance. The future benefit to be derived from its deferred tax assets is dependent upon its ability to generate sufficient future taxable income to realize the assets. During 2013, the Company decreased its valuation allowance by \$395 primarily related to the expiration of US capital loss carry forwards. In 2012 we increased our valuation allowance by \$1,022 primarily related to an increase in state tax credit carry forwards because the Company determined it is more likely than not that the deferred tax assets related to these attributes will not be realized. In 2011, the Company increased its valuation allowance by \$1,208 primarily related to capital losses incurred from our foreign affiliates because we determined it is more likely than not that the deferred tax assets related to these attributes will not be realized.

Through December 31, 2013, the Company has not provided deferred income taxes on the undistributed earnings of its foreign subsidiaries because such earnings were intended to be permanently reinvested outside the U.S. Determination of the potential deferred income tax liability on these undistributed earnings is not practicable because such liability, if any, is dependent on circumstances existing if and when remittance occurs. At December 31, 2013, the Company had \$440,841 of undistributed earnings in its foreign subsidiaries.

During 2006, the Company received a notification letter from the Israeli Ministry of Industry Trade and Labor ("MITL") indicating that its Israeli operations were in compliance with requirements relating to the tax holiday granted to its manufacturing operations in Israel in 2001. This tax holiday expired at December 31, 2011 and was subject to meeting continued investment, employment and other requirements under the guidelines of the MITL. This tax holiday resulted in income tax savings of approximately \$1,000 and \$2,700 for the years 2011 and 2010, respectively. Upon expiration of its tax holiday, the Company elected to be treated under a new preferential Israeli tax regime under which a tax rate of 10% applies for 2012, is reduced to 7% for 2013, and increased to 9% for 2014. The Company's Israeli subsidiary is currently under examination for tax years 2009 through 2011 and expects the audit to be effectively settled during the quarter ended March 31, 2014.

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

On September 13, 2013, the U.S. Department of the Treasury and Internal Revenue Service released final tangible property regulations that provide guidance on the tax treatment regarding the deduction and capitalization of expenditures related to tangible property. While early adoption is available, the effective date to implement these regulations is for tax years beginning on or after January 1, 2014. The Company is currently assessing these rules and the impact to its financial statements, if any, but believes adoption of these regulations will not have a material impact on its consolidated results of operations, cash flows or financial position.

On January 2, 2013, the American Taxpayer Relief Act of 2012 reinstated certain tax incentives with retroactive application to January 1, 2012, the tax effect of which was recognized as a discrete event in the first quarter of 2013. Had the extension been enacted prior to January 1, 2013, our effective tax rate for 2012 would have been reduced by approximately 3%.

17) Stockholders' Equity

Stock Repurchase

On July 25, 2011, the Company's board of directors approved a share repurchase program for the repurchase of up to an aggregate of \$200,000 of its outstanding Common Stock from time to time in open market purchases, privately negotiated transactions or through other appropriate means. The timing and quantity of any shares repurchased will depend upon a variety of factors, including business conditions, stock market conditions and business development activities, including, but not limited to, merger and acquisition opportunities. These repurchases may be commenced, suspended or discontinued at any time without prior notice.

During 2013, the Company repurchased 107,000 shares of its Common Stock for \$2,875 at an average price of \$26.87 per share. During 2012, the Company repurchased 434,600 shares of its Common Stock for \$11,501 at an average price of \$26.46 per share.

Dividends

Holders of the Company's Common Stock are entitled to receive dividends when they are declared by the Company's board of directors. During 2013, the board of directors authorized four quarterly dividends, of \$0.16 per share, which totaled \$33,975. Future dividend declarations, if any, as well as the record and payment dates for such dividends, are subject to the final determination of the Company's board of directors.

On February 10, 2014, the Company's board of directors declared a quarterly cash dividend of \$0.16 per share to be paid on March 14, 2014 to shareholders of record as of March 3, 2014.

18) Stock-Based Compensation

Employee Stock Purchase Plans

The Company's Fourth Restated 1999 Employee Stock Purchase Plan (the "Purchase Plan") authorizes the issuance of up to an aggregate of 1,950,000 shares of Common Stock to participating employees. Offerings under the Purchase Plan commence on June 1 and December 1 and terminate, respectively, on November 30 and May 31. Under the Purchase Plan, eligible employees may purchase shares of Common Stock through payroll deductions of up to 10% of their compensation or up to an annual maximum amount of \$21,250. The price at which an employee's purchase option is exercised is the lower of (1) 85% of the closing price of the Common Stock on the NASDAQ Global Select Market on the day that each offering commences, or (2) 85% of the closing

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

price on the day that each offering terminates. During 2013 and 2012, the Company issued 138,674 and 141,975 shares, respectively, of Common Stock to employees who participated in the Purchase Plan at an exercise price of \$20.42 and \$23.96 per share in 2013 and \$22.40 and \$22.01 per share in 2012. As of December 31, 2013, there were 212,074 shares reserved for future issuance under the Purchase Plan.

The Company's Third Amended and Restated International Employee Stock Purchase Plan (the "Foreign Purchase Plan") authorizes the issuance of up to an aggregate of 400,000 shares of Common Stock to participating employees. Offerings under the Foreign Purchase Plan commence on June 1 and December 1 and terminate, respectively, on November 30 and May 31. Under the Foreign Purchase Plan, eligible employees may purchase shares of Common Stock through payroll deductions of up to 10% of their compensation or up to an annual maximum amount of \$21,250. The price at which an employee's purchase option is exercised is the lower of (1) 85% of the closing price of the Common Stock on the NASDAQ Global Select Market on the day that each offering commences, or (2) 85% of the closing price on the day that each offering terminates. During 2013 and 2012, the Company issued 33,929 and 29,954 shares, respectively, of Common Stock to employees who participated in the Foreign Purchase Plan at an exercise price of \$20.42 and \$23.96 per share in 2013 and \$22.40 and \$22.01 per share in 2012. As of December 31, 2013, there were 62,541 shares reserved for future issuance under the Foreign Purchase Plan.

Equity Incentive Plans

The Company has granted options to employees under the 2004 Stock Incentive Plan (the "2004 Plan") and under the Second Restated 1995 Stock Incentive Plan (the "1995 Plan"), and to directors under the 1997 Director Stock Plan (the "1997 Director Plan") (collectively, the "Plans"). The Company has also granted restricted stock units ("RSU"s) to employees and directors under the 2004 Plan. The Plans are administered by the Compensation Committee of the Company's board of directors.

The Company's equity incentive Plans are intended to attract and retain employees and to provide an incentive for them to assist the Company to achieve long-range performance goals and to enable them to participate in the long-term growth of the Company. Employees may be granted RSUs, options to purchase shares of the Company's stock and other equity incentives under the Plans.

The Company's 2004 Plan was adopted by the board of directors on March 4, 2004 and approved by the stockholders on May 13, 2004. As of December 31, 2013, there were 15,000,000 shares authorized for issuance under the 2004 Plan. The Company may grant options, RSUs, stock appreciation rights and other stock-based awards to employees, officers, directors, consultants and advisors under the 2004 Plan. As of December 31, 2013, there were 10,916,285 shares available for future grants under the 2004 Plan.

The Company's 1995 Plan expired in November 2005 and no further awards may be granted under the 1995 Plan, although there are still outstanding options which may be exercised under this plan.

The Company's 1997 Director Plan expired in February 2007 and no further awards may be granted under the 1997 Director Plan, although there are still outstanding options which may be exercised under this plan.

Stock options were granted at an exercise price equal to 100% of the fair value of the Company's Common Stock at the date of grant. Generally, stock options granted to employees under the Plans in 2001 and after, vested 25% after one year and 6.25% per quarter thereafter, and expire 10 years after the grant date. Options granted to directors generally vested at the earliest of (1) one day prior to the next annual meeting, (2) 13 months from date of grant, or (3) the effective date of an acquisition. All stock options are fully vested as of December 31, 2013. RSUs granted in 2013 and 2012 generally vest 33.3% per year after the date of grant. RSUs

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

granted in 2010 and prior, generally vest three years from the date of grant. RSUs granted to employees who are at least 60 years old and have a combined years of age plus years of service (as defined) equal to 70 years or more, are expensed immediately. RSUs granted to directors generally vest at the earliest of (1) one day prior to the next annual meeting, (2) 13 months from date of grant, or (3) the effective date of an acquisition. Certain equity incentive awards involve RSUs that are subject to performance conditions (“performance shares”) under the Company’s stock incentive plans. Such performance shares are available, subject to time-based vesting conditions if, and to the extent that, financial or operational performance criteria for the applicable period are achieved. Accordingly, the number of performance shares earned will vary based on the level of achievement of financial or operational performance objectives for the applicable period.

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

	Years Ended December 31,					
	2013		2012		2011	
	Non-vested RSUs	Weighted Average Grant Date Fair Value	Non-vested RSUs	Weighted Average Grant Date Fair Value	Non-vested RSUs	Weighted Average Grant Date Fair Value
Non-vested RSUs — beginning of period	942,203	\$ 26.58	1,115,005	\$ 21.50	1,327,306	\$ 18.34
Granted	501,954	\$ 26.81	426,583	\$ 29.14	397,492	\$ 30.27
Vested	(688,376)	\$ 25.09	(557,314)	\$ 19.01	(569,891)	\$ 20.42
Forfeited or expired	(23,747)	\$ 27.17	(42,071)	\$ 22.36	(39,902)	\$ 18.36
Non-vested RSUs — end of period	<u>732,034</u>	<u>\$ 28.08</u>	<u>942,203</u>	<u>\$ 26.58</u>	<u>1,115,005</u>	<u>\$ 21.50</u>

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

	Years Ended December 31,					
	2013		2012		2011	
	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price	Options	Weighted Average Exercise Price
Outstanding — beginning of period	255,649	\$ 21.74	420,712	\$ 21.97	1,793,214	\$ 22.38
Exercised	(88,336)	\$ 21.15	(123,650)	\$ 18.78	(1,351,684)	\$ 22.46
Forfeited or expired	(31,580)	\$ 27.04	(41,413)	\$ 32.32	(20,818)	\$ 22.66
Outstanding — end of period	<u>135,733</u>	<u>\$ 20.88</u>	<u>255,649</u>	<u>\$ 21.74</u>	<u>420,712</u>	<u>\$ 21.97</u>
Exercisable at end of period	<u>135,733</u>	<u>\$ 20.88</u>	<u>255,649</u>	<u>\$ 21.74</u>	<u>420,712</u>	<u>\$ 21.97</u>

The following table summarizes information with respect to options outstanding and exercisable under the Plans at December 31, 2013:

	Options Outstanding and Exercisable			Aggregate Intrinsic Value (In Thousands)
	Number of Shares	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life (In Years)	
\$14.45 – \$29.93	<u>135,733</u>	<u>\$ 20.88</u>	<u>0.95</u>	<u>\$ 1,227</u>

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

The weighted average remaining contractual life of options exercisable was 0.95 years at December 31, 2013.

The aggregate intrinsic value in the table above represents the total pre-tax intrinsic value, based on the Company's closing stock price of \$29.92 as of December 31, 2013, which would have been received by the option holders had all option holders exercised their options as of that date. The total number of in-the-money options exercisable as of December 31, 2013 was 105,873.

The total cash received from employees as a result of employee stock option exercises during the years 2013 and 2012 was approximately \$1,869 and \$2,322, respectively. In connection with these exercises, the tax benefit realized by the Company for the years 2013 and 2012 were approximately \$94 and \$299, respectively.

The Company settles employee stock option exercises and restricted stock vesting with newly issued common shares.

Stock-Based Compensation Expense

The Company recognized the full impact of its share-based payment plans in the consolidated statements of operations and comprehensive income for the years 2013, 2012 and 2011. As of December 31, 2013 and 2012, the Company capitalized \$471 of such cost on its consolidated balance sheet. The following table reflects the effect of recording stock-based compensation for the years 2013, 2012 and 2011:

	Years Ended December 31,		
	2013	2012	2011
Stock-based compensation expense by type of award:			
Restricted stock	\$12,982	\$11,836	\$10,126
Employee stock purchase plan	1,010	1,195	1,099
Total stock-based compensation	13,992	13,031	11,225
Tax effect on stock-based compensation	(495)	(1,862)	(5,019)
Net effect on net income	<u>\$13,497</u>	<u>\$11,169</u>	<u>\$ 6,206</u>
Effect on net earnings per share:			
Basic	<u>\$ 0.25</u>	<u>\$ 0.21</u>	<u>\$ 0.12</u>
Diluted	<u>\$ 0.25</u>	<u>\$ 0.21</u>	<u>\$ 0.12</u>

The pre-tax effect within the consolidated statements of operations and comprehensive income of recording stock-based compensation for the years 2013, 2012 and 2011 was as follows:

	Years Ended December 31,		
	2013	2012	2011
Cost of sales	\$ 2,038	\$ 1,867	\$ 1,511
Research and development expense	1,902	2,278	2,197
Selling, general and administrative expense	10,052	8,886	7,517
Total pre-tax stock-based compensation expense	<u>\$13,992</u>	<u>\$13,031</u>	<u>\$11,225</u>

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

Valuation Assumptions

The Company determines the fair value of restricted stock based on the closing market price of the Company's Common Stock on the date of the award, and estimates the fair value of stock options and employee stock purchase rights using the Black-Scholes valuation model. Such values are recognized as expense on a straight-line basis over the requisite service periods, net of estimated forfeitures except for retirement eligible employees in which the Company expenses the fair value of the grant in the period the grant is issued. The estimation of stock-based awards that will ultimately vest requires significant judgment. The Company considers many factors when estimating expected forfeitures, including types of awards and historical experience. Actual results, and future changes in estimates, may differ substantially from the Company's current estimates.

There were no options granted during 2013, 2012 and 2011. The total intrinsic value of options exercised during 2013, 2012 and 2011 was approximately \$684, \$1,228 and \$9,458, respectively.

The weighted average fair value per share of employee stock purchase rights granted in 2013, 2012 and 2011 was \$5.76, \$7.24 and \$5.87, respectively. The fair value of the employees' purchase rights was estimated using the Black-Scholes option-pricing model with the following weighted average assumptions:

	<u>Years Ended December 31,</u>		
	<u>2013</u>	<u>2012</u>	<u>2011</u>
Employee stock purchase rights:			
Expected life (years)	0.5	0.5	0.5
Risk-free interest rate	0.1%	0.1%	0.2%
Expected volatility	27.7%	32.2%	31.9%
Expected annual dividends per share	\$0.64	\$0.62	\$0.60

Expected volatilities for 2013, 2012 and 2011 are based on a combination of implied and historical volatilities of the Company's Common Stock; the expected life represents the weighted average period of time that options granted are expected to be outstanding giving consideration to vesting schedules and the Company's historical exercise patterns; and the risk-free interest rate is based on the U.S. Treasury yield curve in effect at the time of grant for periods corresponding with the expected life of the option.

The total intrinsic value of options exercised and the total fair value of shares vested during 2013, 2012 and 2011 was approximately \$19,221, \$16,498 and \$27,199, respectively. As of December 31, 2013, the unrecognized compensation cost related to restricted stock was approximately \$10,934, and will be recognized over an estimated weighted average amortization period of 1.33 years.

19) Employee Benefit Plans

The Company has a 401(k) profit-sharing plan for U.S. employees meeting certain requirements in which eligible employees may contribute between 1% and 50% of their annual compensation to this plan, and, with respect to employees who are age 50 and older, certain specified additional amounts, limited by an annual maximum amount determined by the Internal Revenue Service. The Company, at its discretion, may provide a matching contribution of 50% of each participant's contributions up to 6% of eligible salary. At the discretion of the board of directors, the Company may also make additional contributions for the benefit of all eligible employees. The Company's contributions were \$2,334, \$2,245 and \$2,276 for 2013, 2012 and 2011, respectively.

The Company has one foreign defined benefit plan which is frozen for Company contributions. The total accrual and projected benefit obligation is not material for this plan.

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

The Company maintains a bonus plan which provides cash awards to key employees, at the discretion of the compensation committee of the board of directors, based upon operating results and employee performance. The bonus expense was \$12,258, \$6,248 and \$7,559 in 2013, 2012 and 2011, respectively.

The Company provides supplemental retirement benefits for certain of its officers and executive officers. The total cost of these benefits was \$4,988, \$3,454 and \$3,931 for 2013, 2012 and 2011, respectively. The accumulated benefit obligation was \$21,403 at December 31, 2013 of which \$14,517 was included in other current liabilities and \$6,886 was included in other long-term liabilities. The accumulated benefit obligation was \$16,353 at December 31, 2012 and was included in other long-term liabilities.

In the fourth quarter of 2013, the Company's Chief Executive Officer ("CEO") retired. In June of 2014, the Company will make a payment of approximately \$13,718 to its former CEO related to these accrued supplemental retirement benefits.

20) Net Income Per Share

Basic earnings per share ("EPS"), is computed by dividing income available to common stockholders by the weighted-average number of common shares outstanding during the period. The computation of diluted EPS is similar to the computation of basic EPS except that the denominator is increased to include the number of additional common shares that would have been outstanding (using the treasury stock method), if securities containing potentially dilutive common shares (stock options and restricted stock units) had been converted to such common shares, and if such assumed conversion is dilutive.

The following is a reconciliation of basic to diluted net income per share:

	Years Ended December 31,		
	2013	2012	2011
Numerator:			
Net income	\$ 35,776	\$ 48,029	\$ 129,731
Denominator:			
Shares used in net income per common share — basic	53,061,000	52,686,000	52,169,000
Effect of dilutive securities:			
Stock options, restricted stock and employee stock purchase plan	420,000	548,000	678,000
Shares used in net income per common share — diluted	53,481,000	53,234,000	52,847,000
Net income per common share:			
Basic	\$ 0.67	\$ 0.91	\$ 2.49
Diluted	\$ 0.67	\$ 0.90	\$ 2.45

As of December 31, 2013, 2012 and 2011, stock options and restricted stock units relating to an aggregate of approximately 868,000, 1,198,000 and 1,536,000 shares, respectively, were outstanding. In 2013, 2012 and 2011, the potential dilutive effect of 83,000, 204,000 and 259,000 weighted average shares, respectively, of stock options were excluded from the computation of diluted weighted-average shares outstanding as the shares would have an anti-dilutive effect on EPS.

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

21) Business Segment, Geographic Area, Product and Significant Customer Information

The Company develops, manufactures, sells and services products that measure, control, power and monitor critical parameters of advanced manufacturing processes. The Company's Chief Operating Decision Maker ("CODM") utilizes consolidated financial information to make decisions about allocating resources and assessing performance for the entire Company. In addition, certain disaggregated financial information is also provided to the CODM. Based upon the information provided to the CODM, the Company has determined it has eight operating segments and four reportable segments.

The eight operating segments are PFMC Products, Controls Products, ASTeX Products, ENI Products, HPS Products (Vacuum Products), Analytical Solutions Group, Europe Region Sales & Service and Asia Region Sales & Service.

PFMC Products, Controls Products, ASTeX Products, ENI Products and HPS Products comprise a single reportable segment due to the similarities of the segments. This reportable segment, Advanced Manufacturing Capital Equipment, includes the development, manufacturing, sales and servicing of instruments and control products, power and reactive gas products and vacuum products, all of which are utilized in semiconductor processing and other similar advanced manufacturing processes. Sales in this segment include both external sales and intercompany sales (which are stated at agreed upon transfer prices). External sales of these products made in Europe or Asia are reported as sales in the Europe Region Sales & Service or Asia Region Sales & Service segments.

Analytical Solutions Group, Europe Region Sales & Service and Asia Region Sales & Service are each separate reportable segments. The Company has reported corporate expenses and certain intercompany pricing transactions in a Corporate, Eliminations and Other reconciling column. The Analytical Solutions Group includes gas composition analysis and information technology products and custom fabrication services. The Europe and Asia sales and service segments mainly resell and service the Advanced Manufacturing Capital Equipment and Analytical Solutions Group products sold in their respective regions.

MKS derives the segment results directly from the manner in which results are reported in its management reporting system. The accounting policies MKS uses to derive reportable segment results are substantially the same as those used for external reporting purposes except that a substantial portion of the sales of the Advanced Manufacturing Capital Equipment and Analytical Solutions Group segments are intercompany sales to the regions at tax-based transfer prices and certain significant costs, including stock-based compensation and management incentive compensation, are not allocated to the segments and are included in Corporate, Eliminations and Other. The CODM reviews several metrics of each operating segment, including net revenues and gross profit (loss).

The following is net revenues by reportable segment:

	Years Ended December 31,		
	2013	2012	2011
Advanced Manufacturing Capital Equipment	\$ 528,001	\$ 479,751	\$ 647,908
Analytical Solutions Group	56,324	62,765	61,303
Europe Region Sales & Service(1)	48,518	51,440	75,253
Asia Region Sales & Service(1)	218,048	229,731	305,448
Corporate, Eliminations and Other	<u>(181,471)</u>	<u>(180,179)</u>	<u>(267,395)</u>
	<u>\$ 669,420</u>	<u>\$ 643,508</u>	<u>\$ 822,517</u>

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

(1) The Europe and Asia foreign sales and service operations do not represent total geographical Europe and Asia financial information. These sales and service operations only represent the sales from the resale and service of Advanced Manufacturing Capital Equipment and Analytical Solutions Group products in their respective regions. The Advanced Manufacturing Capital Equipment and Analytical Solutions Group segments both have sales in each region. Accordingly, total geographical sales include sales from multiple reportable segments.

The following is gross profit by reportable segment:

	Years Ended December 31,		
	2013	2012	2011
Advanced Manufacturing Capital Equipment	\$187,685	\$171,308	\$263,863
Analytical Solutions Group	29,431	32,741	31,800
Europe Region Sales & Service(1)	13,600	15,156	21,323
Asia Region Sales & Service(1)	42,948	36,962	45,267
Corporate, Eliminations and Other	(7,090)	13,312	12,735
	<u>\$266,574</u>	<u>\$269,479</u>	<u>\$374,988</u>

(1) The Europe and Asia foreign sales and service operations do not represent total geographical Europe and Asia financial information. These sales and service operations only represent the sales from the resale and service of Advanced Manufacturing Capital Equipment and Analytical Solutions Group products in their respective regions. The Advanced Manufacturing Capital Equipment and Analytical Solutions Group segments both have sales in each region. Accordingly, total geographical sales include sales from multiple reportable segments.

The following is capital expenditures by reportable segment for the years ended December 31, 2013, 2012 and 2011:

	Product Groups		Foreign Sales & Service Operations		Corporate, Eliminations and Other	Total
	Advanced Manufacturing Capital Equipment	Analytical Solutions Group	Europe	Asia		
December 31, 2013:						
Capital expenditures	\$ 8,729	\$ 513	\$ 250	\$ 857	\$ 2,061	\$12,410
December 31, 2012:						
Capital expenditures	\$ 11,817	\$ 1,228	\$ 132	\$ 886	\$ 3,642	\$17,705
December 31, 2011:						
Capital expenditures	\$ 11,947	\$ 868	\$ 362	\$ 1,552	\$ 838	\$15,567

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

The following is depreciation and amortization expense by reportable segment for the years ended December 31, 2013, 2012 and 2011:

	Product Groups		Foreign Sales & Service Operations		Corporate, Eliminations and Other	Total
	Advanced Manufacturing Capital Equipment	Analytical Solutions Group	Europe	Asia		
December 31, 2013:						
Depreciation and amortization	\$ 11,836	\$ 1,252	\$ 348	\$ 1,177	\$ 2,489	\$17,102
December 31, 2012:						
Depreciation and amortization	\$ 9,594	\$ 1,176	\$ 326	\$ 1,711	\$ 1,635	\$14,442
December 31, 2011:						
Depreciation and amortization	\$ 8,143	\$ 1,470	\$ 366	\$ 1,539	\$ 1,462	\$12,980

Total income tax expense is impracticable to present by reportable segment because the necessary information is not available or used by the CODM.

The following is segment assets by reportable segment:

	Product Groups		Foreign Sales & Service Operations		Corporate, Eliminations and Other	Total
	Advanced Manufacturing Capital Equipment	Analytical Solutions Group	Europe	Asia		
December 31, 2013:						
Segment assets:						
Accounts receivable	\$ 20,767	\$ 5,603	\$ 6,538	\$44,207	\$ 39,629	\$116,744
Inventory	117,822	4,391	4,254	25,094	(8,834)	142,727
Total segment assets	<u>\$ 138,589</u>	<u>\$ 9,994</u>	<u>\$ 10,792</u>	<u>\$69,301</u>	<u>\$ 30,795</u>	<u>\$259,471</u>

	Product Groups		Foreign Sales & Service Operations		Corporate, Eliminations and Other	Total
	Advanced Manufacturing Capital Equipment	Analytical Solutions Group	Europe	Asia		
December 31, 2012:						
Segment assets:						
Accounts receivable	\$ 9,644	\$ 5,889	\$ 5,813	\$32,088	\$ 28,626	\$ 82,060
Inventory	108,397	3,841	3,691	29,534	(10,824)	134,639
Total segment assets	<u>\$ 118,041</u>	<u>\$ 9,730</u>	<u>\$ 9,504</u>	<u>\$61,622</u>	<u>\$ 17,802</u>	<u>\$216,699</u>

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

A reconciliation of segment assets to consolidated total assets is as follows:

	Years Ended December 31,	
	2013	2012
Total segment assets	\$ 259,471	\$ 216,699
Cash and cash equivalents and investments	650,022	627,399
Other current assets	30,143	36,242
Property, plant and equipment, net	77,536	80,516
Goodwill and intangible assets, net	163,999	162,294
Other assets	31,847	29,412
Consolidated total assets	<u>\$ 1,213,018</u>	<u>\$ 1,152,562</u>

Information about the Company's operations in different geographic regions is presented in the tables below. Net revenues to unaffiliated customers are based on the location in which the sale originated. Transfers between geographic areas are at negotiated transfer prices and have been eliminated from consolidated net revenues.

	Years Ended December 31,		
	2013	2012	2011
Net revenues:			
United States	\$363,948	\$326,894	\$391,122
Korea	75,401	64,541	29,193
Japan	56,978	81,883	106,003
Europe	77,910	85,362	115,362
Asia (excluding Korea and Japan)	95,183	84,828	180,837
	<u>\$669,420</u>	<u>\$643,508</u>	<u>\$822,517</u>

	Years Ended December 31,	
	2013	2012
Long-lived assets:(1)		
United States	\$ 60,700	\$ 62,203
Europe	5,484	5,844
Asia	13,475	14,664
	<u>\$ 79,659</u>	<u>\$ 82,711</u>

(1) Long-lived assets include property, plant and equipment, net and certain other assets, excluding long-term income tax receivable.

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

Worldwide Product Information

Because the reportable segment information above does not reflect worldwide sales of the Company's products, the Company groups its products into four groups of similar products based upon the similarity of product function. Worldwide net revenue for each group of products is as follows:

	Years Ended December 31,		
	2013	2012	2011
Instruments and Control Products	\$266,838	\$258,521	\$348,735
Power and Reactive Gas Products	273,357	251,669	327,151
Vacuum Products	74,537	66,418	81,782
Analytical Solutions Group Products	54,688	66,900	64,849
	<u>\$669,420</u>	<u>\$643,508</u>	<u>\$822,517</u>

Sales of Instruments and Control Products, Power and Reactive Gas Products and Vacuum Products are included in the Company's Advanced Manufacturing Capital Equipment Products segment as well as in the foreign sales and service operations because the products are sold through the foreign sales and service operations in their respective regions. Sales of the Analytical Solutions Group Products are included in the Analytical Solutions Group Products segment as well as in the foreign sales and service operations because the products are sold through the foreign sales and service operations in their respective regions.

Major Customers

The Company had two customers with net revenues greater than 10% of total net revenues in the periods shown as follows:

	Years Ended December 31,		
	2013	2012	2011
Customer A	17.0%	14.5%	13.6%
Customer B	12.3%	10.1%	6.5%

22) Restructurings

In the second and third quarters of 2013, the Company initiated restructuring plans to consolidate a small sales office and a small engineering facility into other MKS facilities. The plans included a small reduction in headcount. The Company recorded restructuring charges of \$1,364 during 2013. The restructuring charges were primarily for severance and other charges associated with the reductions in workforce. The restructuring was substantially complete at December 31, 2013.

During the fourth quarter of 2012, the Company implemented a workforce reduction plan as a result of a continued slowdown in the business. The Company reduced its worldwide workforce by 84 people and recorded a restructuring charge of \$343.

23) Commitments and Contingencies

During the third quarter of 2012, the Company settled litigation with shareholders of its former subsidiary for \$5,316. The complaint alleged certain claims against the Company including breach of contract and implied covenants, and statutory violations. The claims sought unspecified damages and equitable relief. The Company

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

believed that it had meritorious factual and legal defenses to the allegations raised, but reached a settlement primarily to eliminate future legal expenses related to the suit. In the second quarter of 2013, the Company recovered \$1,071 from its insurance company relating to the 2012 litigation settlement.

The Company is subject to various other legal proceedings and claims, which have arisen in the ordinary course of business. In the opinion of management, the ultimate disposition of these matters will not have a material adverse effect on the Company's results of operations, financial condition or cash flows.

The Company leases certain of its facilities and machinery and equipment under operating leases expiring in various years through 2022. Generally, the facility leases require the Company to pay maintenance, insurance and real estate taxes. Rental expense under operating leases totaled \$7,896, \$8,219 and \$7,747 for 2013, 2012 and 2011, respectively.

Minimum lease payments under operating leases are as follows:

Year ending December 31,	<u>Operating Leases</u>
2014	\$ 7,484
2015	5,745
2016	4,171
2017	3,862
2018	2,928
Thereafter	3,855
Total minimum lease payments	<u>\$ 28,045</u>

As of December 31, 2013, the Company has entered into purchase commitments for certain inventory components and other equipment and services used in its normal operations. The majority of these purchase commitments covered by these arrangements are for periods of less than one year and aggregate to approximately \$132,018.

To the extent permitted by Massachusetts law, the Company's Restated Articles of Organization, as amended, require the Company to indemnify any of its current or former officers or directors or any person who has served or is serving in any capacity with respect to any of the Company's employee benefit plans. The Company believes that the estimated exposure for these indemnification obligations is currently not material. Accordingly, the Company has no material liabilities recorded for these requirements as of December 31, 2013.

The Company also enters into agreements in the ordinary course of business which include indemnification provisions. Pursuant to these agreements, the Company indemnifies, holds harmless and agrees to reimburse the indemnified party, generally its customers, for losses suffered or incurred by the indemnified party in connection with certain patent or other intellectual property infringement claims, and, in some instances, other claims, by any third party with respect to the Company's products. The term of these indemnification obligations is generally perpetual after execution of the agreement. The maximum potential amount of future payments the Company could be required to make under these indemnification agreements is, in some instances, not contractually limited. The Company has never incurred costs to defend lawsuits or settle claims related to these indemnification obligations. As a result, the Company believes the estimated fair value of these obligations is minimal. Accordingly, the Company has no liabilities recorded for these obligations as of December 31, 2013.

MKS INSTRUMENTS, INC.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(in thousands, except share and per share data)

As part of past acquisitions and divestitures of businesses or assets, the Company has provided a variety of indemnifications to the sellers and purchasers for certain events or occurrences that took place prior to the date of the acquisition or divestiture. Typically, certain of the indemnifications expire after a defined period of time following the transaction, but certain indemnifications may survive indefinitely. The maximum potential amount of future payments the Company could be required to make for such obligations is undeterminable at this time. Other than obligations recorded as liabilities at the time of the acquisitions, historically the Company has not made significant payments for these indemnifications. Accordingly, no material liabilities have been recorded for these obligations.

In conjunction with certain asset sales, the Company may provide routine indemnifications whose terms range in duration and often are not explicitly defined. Where appropriate, an obligation for such indemnification is recorded as a liability. Because the amounts of liability under these types of indemnifications are not explicitly stated, the overall maximum amount of the obligation under such indemnifications cannot be reasonably estimated. Other than obligations recorded as liabilities at the time of the asset sale, historically the Company has not made significant payments for these indemnifications.

MKS Instruments, Inc.
Supplemental Financial Data

	Quarter Ended			
	March 31	June 30	Sept. 30	Dec. 31
(Table in thousands, except per share data) (Unaudited)				
2013				
Statement of Operations Data				
Net sales	\$ 141,645	\$ 156,928	\$ 166,453	\$ 204,394
Gross profit	54,702	61,958	62,234	87,680
Income from operations	4,676	10,427	12,332	30,952
Net income	\$ 5,761	\$ 7,320	\$ 2,458	\$ 20,237
Net income per share:				
Basic	\$ 0.11	\$ 0.14	\$ 0.05	\$ 0.38
Diluted	\$ 0.11	\$ 0.14	\$ 0.05	\$ 0.38
Cash dividends paid per common share	\$ 0.16	\$ 0.16	\$ 0.16	\$ 0.16
2012				
Statement of Operations Data				
Net sales	\$ 190,868	\$ 177,397	\$ 141,447	\$ 133,796
Gross profit	83,791	76,516	56,571	52,601
Income from operations	33,369	27,847	6,392	6,615
Net income	\$ 22,768	\$ 18,572	\$ 2,580	\$ 4,109
Net income per share:				
Basic	\$ 0.43	\$ 0.35	\$ 0.05	\$ 0.08
Diluted	\$ 0.43	\$ 0.35	\$ 0.05	\$ 0.08
Cash dividends paid per common share	\$ 0.15	\$ 0.15	\$ 0.16	\$ 0.16

[Table of Contents](#)

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

None.

Item 9A. *Controls and Procedures*

Evaluation of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2013. The term “disclosure controls and procedures,” as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended (the “Exchange Act”), means controls and other procedures of an issuer that are designed to ensure that information required to be disclosed by the issuer in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC’s rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by an issuer in the reports that it files or submits under the Exchange Act is accumulated and communicated to the issuer’s management, including its principal executive and principal financial officers, or persons performing similar functions as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of our disclosure controls and procedures as of December 31, 2013, our Chief Executive Officer and Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level to ensure that information required to be disclosed by us in reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in Securities and Exchange Commission rules and forms and is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer as appropriate to allow timely decisions regarding required disclosure.

Management’s Report on Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is defined in Rules 13a-15(f) and 15d-15(f) promulgated under the Exchange Act as a process designed by, or under the supervision of, the Company’s Chief Executive Officer and Chief Financial Officer or persons performing similar functions and effected by the Company’s board of directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles and includes those policies and procedures that:

- Pertain to the maintenance of records that in reasonable detail accurately and fairly reflect the transactions and dispositions of the assets of the Company;
- Provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and
- Provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Company’s assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

[Table of Contents](#)

Our management assessed the effectiveness of our internal control over financial reporting as of December 31, 2013. In making this assessment, our management used the 1992 published criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in *Internal Control—Integrated Framework*.

Based on our assessment, management concluded that, as of December 31, 2013, our internal control over financial reporting was effective based on those criteria.

Management has excluded the operations of Alter S.r.l. (“Alter”) from its assessment of internal control over financial reporting as of December 31, 2013 because this entity was acquired by the Company in a purchase business combination during the first half of fiscal year 2013. The total assets and total revenues of the acquired business of Alter represent less than 1% of the related consolidated financial statement amounts of the Company as of and for the year ended December 31, 2013.

Our internal controls over financial reporting as of December 31, 2013 have been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their attestation report which appears in Item 8 of this Annual Report on Form 10-K.

Changes in Internal Control over Financial Reporting

There was no change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during our fourth fiscal quarter that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

None.

PART III

Item 10. *Directors, Executive Officers and Corporate Governance*

The information required by this item will be set forth under the captions “Election of Directors,” “Executive Officers,” “Code of Ethics,” “Directors — Audit Committee Financial Expert” and “Corporate Governance” in our definitive proxy statement for the 2013 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year, and is incorporated herein by reference.

We are also required under Item 405 of Regulation S-K to provide information concerning delinquent filers of reports under Section 16 of the Securities and Exchange Act of 1934, as amended. This information will be set forth under the caption “Section 16(a) Beneficial Ownership Reporting Compliance” in our definitive proxy statement for the 2014 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year, and is incorporated herein by reference.

Item 11. *Executive Compensation*

The information required by this item will be set forth under the captions “Executive Officers — Executive Compensation” and “Executive Officers — Compensation Discussion and Analysis” in our definitive proxy statement for the 2014 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year, and is incorporated herein by reference.

Item 12. *Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters*

The information required by Item 403 of Regulation S-K will be set forth under the caption “Security Ownership of Certain Beneficial Owners and Management” in our definitive proxy statement for the 2014 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year, and is incorporated herein by reference.

The information required by Item 201(d) of Regulation S-K will be set forth under the caption “Executive Officers — Equity Compensation Plan Information” in our definitive proxy statement for the 2014 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year, and is incorporated herein by reference.

Item 13. *Certain Relationships and Related Transactions and Director Independence*

The information required by this item will be set forth under the caption “Executive Officers – Certain Relationships and Related Transactions” and “Corporate Governance” in our definitive proxy statement for the 2014 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year, and is incorporated herein by reference.

Item 14. *Principal Accountant Fees and Services*

The information required by this item will be set forth under the caption “Independent Registered Public Accounting Firm” in our definitive proxy statement for the 2014 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission no later than 120 days after the end of our fiscal year, and is incorporated herein by reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules

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

1. *Financial Statements*. The following Consolidated Financial Statements are included under Item 8 of this Annual Report on Form 10-K.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Financial Statements:

Report of Independent Registered Public Accounting Firm	42
Consolidated Balance Sheets at December 31, 2013 and 2012	43
Consolidated Statements of Operations and Comprehensive Income for the years ended December 31, 2013, 2012 and 2011	44
Consolidated Statements of Stockholders' Equity for the years ended December 31, 2013, 2012 and 2011	45
Consolidated Statements of Cash Flows for the years ended December 31, 2013, 2012 and 2011	46
Notes to Consolidated Financial Statements	47

2. *Financial Statement Schedules*. The following consolidated financial statement schedule is included in this Annual Report on Form 10-K:

Schedule II — Valuation and Qualifying Accounts

Schedules other than those listed above have been omitted since they are either not required or information is otherwise included.

3. *Exhibits*. The following exhibits are filed as part of this Annual Report on Form 10-K.

<u>Exhibit No.</u>	<u>Title</u>
+3.1(1)	Restated Articles of Organization
+3.2(2)	Articles of Amendment to Articles of Organization, as filed with the Secretary of State of Massachusetts on May 18, 2001
+3.3(3)	Articles of Amendment to Articles of Organization, as filed with the Secretary of State of Massachusetts on May 16, 2002
+3.4(4)	Amended and Restated By-Laws
+4.1(4)	Specimen certificate representing the Common Stock
+10.1(5)*	Second Amended and Restated 1997 Director Stock Option Plan, and forms of option agreements thereto
+10.2(6)*	2004 Stock Incentive Plan, as amended (the "2004 Plan")
+10.3(7)*	Form of Nonstatutory Stock Option Agreement under the 2004 Plan
+10.4(8)*	Form of Restricted Stock Unit Agreement for Initial Grant to Non-Employee Directors under the 2004 Plan

Table of Contents

<u>Exhibit No.</u>	<u>Title</u>
+10.5(8)*	Form of Restricted Stock Unit Agreement for Annual Grant to Non-Employee Directors under the 2004 Plan
+10.6(8)*	Form of Performance-Based Restricted Stock Unit Agreement under the 2004 Plan (grants from 2007 to 2011)
+10.7(8)*	Form of Time-Based Restricted Stock Unit Agreement under the 2004 Plan (grants from 2007 to 2011)
+10.8(6)*	Form of Time-Based Restricted Stock Unit Agreement and Form of Performance-Based Restricted Stock Unit Agreement under the 2004 Plan (grants from 2011 to 2013)
+10.9(16)*	Form of Restricted Stock Unit Agreement under the 2004 Plan (grants in 2013)
10.10*	Form of Restricted Stock Unit Agreement under the 2004 Plan (grants in 2014)
+10.11(9)*	Second Restated 1995 Stock Incentive Plan (the “1995 Plan”)
+10.12(10)*	Form of Nonstatutory Stock Option Agreement under the 1995 Plan
+10.13(16)*	Form of 2013 Management Incentive Bonus Plan for Executive Officers
10.14*	Form of Management Incentive Bonus Plan for Executive Officers
+10.15(12)*	Employment Agreement, dated as of July 1, 2005, between John Bertucci and the Registrant
+10.16(13)*	Employment Agreement, dated July 1, 2005, between Leo Berlinghieri and the Registrant, as amended on November 13, 2007 (the “Berlinghieri Employment Agreement”)
+10.17(14)*	Amendment, dated November 10, 2008, to the Berlinghieri Employment Agreement
+10.18(15)*	Amendment, dated October 19, 2009, to the Berlinghieri Employment Agreement
+10.19(16)*	Amendment, dated December 21, 2012, to the Berlinghieri Employment Agreement
+10.20(17)*	Separation Agreement, dated October 22, 2013, between Leo Berlinghieri and the Registrant
+10.21(17)*	Employment Agreement, dated October 22, 2013, between Gerald G. Colella and the Registrant
10.22*	Employment Agreement, dated February 24, 2014, between Seth Bagshaw and the Registrant
10.23*	Employment Agreement, dated February 24, 2014, between John Abrams and the Registrant
10.24*	Employment Agreement, dated February 24, 2014, between Paul Eyeran and the Registrant
10.25*	Employment Agreement, dated February 24, 2014, between John T.C. Lee and the Registrant
10.26*	Employment Agreement, dated February 24, 2014, between Paul Loomis and the Registrant
10.27*	Employment Agreement, dated February 24, 2014, between Brian Quirk and the Registrant
+10.28(11)	Global Supply Agreement, dated April 21, 2005, by and between the Registrant and Applied Materials, Inc.
+10.29(16)	Amendment, dated October 25, 2012, to Applied Materials, Inc. Global Supply Agreement
10.30	Amendment, dated October 23, 2013, to Applied Materials, Inc. Global Supply Agreement
21.1	Subsidiaries of the Registrant
23.1	Consent of PricewaterhouseCoopers LLP
31.1	Certification of Principal Executive Officer pursuant to Rule 13a-14(a)/Rule 15d-14(a) of the Securities Exchange Act of 1934.

Table of Contents

<u>Exhibit No.</u>	<u>Title</u>
31.2	Certification of Principal Financial Officer pursuant to Rule 13a-14(a)/Rule 15d-14(a) of the Securities Exchange Act of 1934.
32.1	Certification of Chief Executive Officer and Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101.INS	XBRL Instance Document.
101.SCH	XBRL Taxonomy Extension Schema Document.
101.CAL	XBRL Taxonomy Calculation Linkbase.
101.LAB	XBRL Taxonomy Labels Linkbase Document.
101.PRE	XBRL Taxonomy Presentation Linkbase Document.
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document.

+ Previously filed

* Management contract or compensatory plan arrangement.

The following materials from MKS Instrument, Inc.'s Annual Report on Form 10-K for the year ended December 31, 2013, are formatted in XBRL (Extensible Business Reporting Language): (i) the Consolidated Balance Sheets, (ii) the Consolidated Statements of Operations and Comprehensive Income, (iii) the Consolidated Statements of Stockholders' Equity, (iv) the Consolidated Statements of Cash Flows, (v) Notes to the Consolidated Financial Statements.

- (1) Incorporated by reference to the Registration Statement on Form S-4 (File No. 333-49738) filed with the Securities and Exchange Commission on November 13, 2000.
- (2) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2001.
- (3) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended June 30, 2002.
- (4) Incorporated by reference to the Registration Statement on Form S-1 filed with the Securities and Exchange Commission on March 2, 1999.
- (5) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2004.
- (6) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010.
- (7) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2004.
- (8) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2006.
- (9) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2002.
- (10) Incorporated by reference to the Registrant's Quarterly Report on Form 10-Q filed with the Securities and Exchange Commission on June 30, 2004.

[Table of Contents](#)

- (11) Incorporated by reference to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on April 27, 2005.
- (12) Incorporated by reference to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on July 5, 2005.
- (13) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2007.
- (14) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2008.
- (15) Incorporated by reference to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on October 23, 2009.
- (16) Incorporated by reference to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2012.
- (17) Incorporated by reference to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on October 24, 2013.
- (b) Exhibits
MKS hereby files as exhibits to our Annual Report on Form 10-K those exhibits listed in Item 15(a) above.
- (c) Financial Statement Schedules

MKS INSTRUMENTS, INC.
SCHEDULE II—VALUATION AND QUALIFYING ACCOUNTS

<u>Description</u>	<u>Balance at Beginning of Year</u>	<u>Additions</u>		<u>Deductions & Write-offs</u>	<u>Balance at End of Year</u>
		<u>Charged to Costs and Expenses</u>	<u>Charged to Other Accounts</u>		
(Dollars in thousands)					
Accounts receivable allowance:					
Years ended December 31,					
2013	\$ 2,879	\$ 2,564	\$ (98)	\$ 2,594	\$ 2,751
2012	\$ 2,516	\$ 3,452	\$ —	\$ 3,089	\$ 2,879
2011	\$ 2,557	\$ 3,390	\$ —	\$ 3,431	\$ 2,516

<u>Description</u>	<u>Balance at Beginning of Year</u>	<u>Additions</u>		<u>Deductions</u>	<u>Balance at End of Year</u>
		<u>Charged to Costs and Expenses</u>	<u>Charged to Other Accounts</u>		
(Dollars in thousands)					
Valuation allowance on deferred tax asset:					
Years ended December 31,					
2013	\$ 27,497	\$ —	\$ —	\$ (395)	\$ 27,102
2012	\$ 26,475	\$ (44)	\$ 1,066	\$ —	\$ 27,497
2011	\$ 25,267	\$ —	\$ 1,208	\$ —	\$ 26,475

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this annual report on Form 10-K for the fiscal year ended December 31, 2013, to be signed on its behalf by the undersigned and the capacities indicated thereunto duly authorized in the town of Andover and State of Massachusetts on the 26th day of February 2014.

MKS INSTRUMENTS, INC.

By: /s/ Gerald G. Colella
Gerald G. Colella
Chief Executive Officer, President and Director
(Principal Executive Officer)

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

<u>SIGNATURES</u>	<u>TITLE</u>	<u>DATE</u>
<u>/s/ John R. Bertucci</u> John R. Bertucci	Chairman of the Board of Directors	February 18, 2014
<u>/s/ Gerald G. Colella</u> Gerald G. Colella	Chief Executive Officer, President and Director	February 26, 2014
<u>/s/ Seth H. Bagshaw</u> Seth H. Bagshaw	Vice President, Chief Financial Officer and Treasurer (Principal Financial and Accounting Officer)	February 26, 2014
<u>/s/ Cristina H. Amon</u> Cristina H. Amon	Director	February 14, 2014
<u>/s/ Robert R. Anderson</u> Robert R. Anderson	Director	February 18, 2014
<u>/s/ Gregory R. Beecher</u> Gregory R. Beecher	Director	February 15, 2014
<u>/s/ Richard S. Chute</u> Richard S. Chute	Director	February 18, 2014
<u>/s/ Peter R. Hanley</u> Peter R. Hanley	Director	February 15, 2014
<u>/s/ Elizabeth A. Mora</u> Elizabeth A. Mora	Director	February 18, 2014

MKS INSTRUMENTS, INC.

Restricted Stock Unit Agreement

Granted Under the 2004 Stock Incentive Plan

AGREEMENT made this day (the "Grant Date"), between MKS Instruments, Inc., a Massachusetts corporation (the "Company"), and «Participant Name» (the "Participant").

For valuable consideration, receipt of which is acknowledged, the parties hereto agree as follows:

1. General. The Company has granted to the Participant restricted stock units ("RSUs") with respect to the number of shares set forth in Exhibit A hereto (the "Shares") of common stock, no par value, of the Company ("Common Stock"), subject to the terms and conditions set forth in this Agreement and in the Company's 2004 Stock Incentive Plan (the "Plan"). The RSUs represent a promise by the Company to deliver Shares upon vesting.

(a) Definitions. "Forfeiture" shall mean any forfeiture of RSUs pursuant to Section 2. "Vesting Date" is defined on Exhibit A hereto. "Determination Date" (if applicable) is defined on Exhibit A hereto. For purposes of this Agreement, "employ" or "employment" with the Company shall include employment with a parent or subsidiary of the Company as defined in Sections 424(e) or (f) of the U.S. Internal Revenue Code of 1986, as amended (the "Code").

(b) Vesting Period. Subject to the terms and conditions of this Agreement (including the Forfeiture provisions described in Section 2 below), the RSUs shall vest according to the terms set forth in Exhibit A. As soon as practicable after each applicable Vesting Date, but no later than 30 days following the Vesting Date, the Company shall instruct its transfer agent to deposit the Shares subject to the RSUs into the Participant's existing equity account at Fidelity Stock Plan Services, LLC, or such other broker with which the Company has established a relationship ("Broker"), subject to payment in accordance with Section 6 of all applicable withholding taxes. Notwithstanding the above, the Shares may be distributed following the date contemplated in this Section 1(b) solely to the extent permitted or required under Section 409A of the Code ("Section 409A").

2. Forfeiture.

(a) Cessation of Employment. In the event that the Participant ceases to be employed by the Company for any reason or no reason (except for death, Disability or Retirement), with or without cause, prior to a Vesting Date, all of the Participant's unvested RSUs shall automatically be forfeited as of such cessation. For purposes hereof, employment shall not be considered as having ceased during any bona fide leave of absence if such leave of absence has been approved in writing by the Company. However, in the event of any leave of absence, the Company may, in its sole discretion, suspend vesting of the RSUs, subject to applicable law and in any event any leave of

absence and the vesting of RSUs during such shall be determined in accordance with Section 409A. The vesting of the RSUs shall not be affected by any change in the type of employment the Participant has with or among the Company so long as the Participant continuously maintains employment. In the event that the Participant ceases to be employed by the Company by reason of death, Disability or Retirement prior to a Vesting Date, then all of the Participant's unforfeited RSUs shall become immediately and fully vested (subject to any performance criteria in Exhibit A) and shall no longer be subject to the Forfeiture provisions under this Agreement and the Shares subject to such RSUs shall be delivered to the Participant as soon as practicable, but no later than 30 days following the Participant's termination date, provided that, if such death, Disability or Retirement occurs prior to the Determination Date, if any, then the number of RSUs to be so vested shall be determined, and become vested, on the Determination Date, and the Shares subject to such vested portion of the RSUs shall be delivered to the Participant as soon as practicable, but no later than 30 days following such Determination Date.

For the purpose of this Section 2, "Disability" shall mean disability as defined in Section 216(i)(1) of the U.S. Social Security Act.

"Retirement" means a voluntary termination of employment by the Participant after he or she is at least age sixty (60) and has a combination of years of age plus Years of Service with the Company equal to seventy (70) or more. "Years of Service" means the total number of years of employment since Participant's original hire with the Company (or subsidiary of the Company, provided that service with a subsidiary shall only be counted towards Years of Service during the time in which such subsidiary is owned (directly or indirectly) by the Company) and provided that in the event the employee left or was terminated and then rehired by the Company, the Company shall include previous employment period in the calculation of the Years of Service provided that the absence from the Company or subsidiary has been five (5) years or less and only if the total number of days employed by the Company (or its subsidiary, as provided above) exceeds the total number of days that the employee was not employed by the Company (or its subsidiary, as provided above).

(b) Change in Control. Notwithstanding the foregoing, if, prior to any Vesting Date, and within two years after the effectiveness of a Change in Control (as defined below), the Participant is (i) terminated by the Company without Cause (as defined below) or (ii) terminates his employment for Good Reason (as defined below), then, all (or, in the case of a performance-based RSU that is still subject to performance criteria per Exhibit A, the Target Number of RSUs (as defined on Exhibit A, if applicable) of the Participant's unforfeited RSUs shall become immediately and fully vested and shall no longer be subject to the Forfeiture provisions under this Agreement. For purposes of this section "Change in Control" means the first to occur of any of the following events: (I) any "person" (as that term is used in Section 13 and 14(d)(2) of the Securities Exchange Act of 1934 ("Exchange Act")) becomes the beneficial owner (as that term is used in Section 13(d) of the Exchange Act), directly or indirectly, of fifty percent (50%) or more of the Company's capital stock entitled to vote in the election of directors; (II) the shareholders of the Company approve any consolidation or merger of the Company, other than a consolidation or merger of the Company in which the holders of the common stock of the Company immediately prior to the consolidation or merger hold more than fifty percent (50%) of the common stock of the surviving corporation immediately after the consolidation or merger; or (III) the shareholders of the Company approve the sale or transfer of all or substantially all of the assets of the Company to parties that are not

within a “controlled group of corporations” (as defined in Code Section 1563) in which the Company is a member. For purposes of this Agreement, “Cause” shall mean conviction for the commission of a felony, willful failure by the Participant to perform his responsibilities to the Company, or willful misconduct by the Participant. For purposes of this section, “Good Reason” shall mean termination of the Participant’s employment by the Participant within 90 days following (I) a material diminution in the Participant’s positions, duties and responsibilities from those described in the Participant’s Employment Agreement, (II) a material reduction in the Participant’s base salary (other than a reduction which is part of a general salary reduction program affecting senior executives of the Company), (III) a material reduction in the aggregate value of the pension and welfare benefits provided to the Participant from those in effect prior to the Change in Control (other than a reduction which is proportionate to the reductions applicable to other senior executives pursuant to a cost-saving plan that includes all senior executives), (IV) a material breach of any provision of the Participant’s Employment Agreement by the Company or (V) the Company’s requiring the Participant to be based at a location that creates for the Participant a one way commute in excess of 60 miles from his primary residence, except for required travel on the Company’s business to an extent substantially consistent with the business travel obligations of the Participant under the Participant’s Employment Agreement. Notwithstanding the foregoing, a termination shall not be treated as a termination for Good Reason (I) if the Participant shall have consented in writing to the occurrence of the event giving rise to the claim of termination for Good Reason or (II) unless the Participant shall have delivered a written notice to the Company within 30 days of his having actual knowledge of the occurrence of one of such events stating that he intends to terminate his employment for Good Reason and specifying the factual basis for such termination, and such event, if capable of being cured, shall not have been cured within 30 days of the receipt of such notice.

(c) Clawback. In the event that (i) the Participant is, on the Grant Date an “executive officer” of the Company (as defined in Rule 3b-7 under the Securities Exchange Act of 1934, as amended) and (ii) the RSUs are (or were at any time) subject to performance criteria per Exhibit A, then the RSUs (and any Shares issued under the RSUs) shall be subject to potential cancellation, recoupment, rescission, payback or other action in accordance with the terms of any applicable Company clawback policy (the “Clawback Policy”) or any applicable law, as may be in effect from time to time. The Participant hereby acknowledges and consents to the Company’s application, implementation and enforcement of (i) any applicable Clawback Policy in effect as of the date of this Agreement and (ii) any provision of applicable law relating to cancellation, recoupment, rescission or payment of compensation and agrees that the Company may take such actions as may be necessary to effectuate the Clawback Policy without further consideration or action.

3. Restrictions on Transfer. The Participant shall not sell, assign, transfer, pledge, hypothecate or otherwise dispose of, by operation of law or otherwise (collectively “transfer”) any RSUs, or any interest therein; provided that the Participant may transfer the RSUs to the extent necessary to fulfill a domestic relations order (as defined in section 414(p)(1)(B) of the Code).

4. Provisions of the Plan. This Agreement is subject to the provisions of the Plan, a copy of which is furnished to the Participant with this Agreement.

5. Section 409A. To the extent Participant is or becomes subject to U.S. Federal income taxation, the RSUs and payments made pursuant to this Agreement are intended to comply

with or qualify for an exemption from the requirements of Section 409A and shall be construed consistently therewith and shall be interpreted in a manner consistent with that intention. Terms defined in the Agreement shall have the meanings given such terms under Section 409A if and to the extent required to comply with Section 409A. Notwithstanding any other provision of this Agreement, the Company reserves the right, to the extent the Company deems necessary or advisable, in its sole discretion, to unilaterally amend the Plan and/or this Agreement to ensure that all RSUs are awarded in a manner that qualifies for exemption from or complies with Section 409A, provided, however, that the Company makes no undertaking to preclude Section 409A from applying to this Award. Any payments described in this Section 5 that are due within the “short term deferral period” as defined in Section 409A shall not be treated as deferred compensation unless applicable law requires otherwise. If and to the extent any portion of any payment, compensation or other benefit provided to the Participant in connection with his or her employment termination is determined to constitute “nonqualified deferred compensation” within the meaning of Section 409A and the Participant is a specified employee as defined in Section 409A(2)(B)(i) of the Code, as determined by the Company in accordance with its procedures, by which determination the Participant hereby agrees that he or she is bound, such portion of the payment, compensation or other benefit shall not be paid before the day that is six months plus one day after the date of separation from service (as determined under Section 409A (the “New Payment Date”)), except as Section 409A may then permit. The aggregate of any payments that otherwise would have been paid to the Participant during the period between the date of separation from service and the New Payment Date shall be paid to the Participant in a lump sum on such New Payment Date, and any remaining payments will be paid on their original schedule. Notwithstanding the foregoing, the Company, its affiliates, directors, officers and agents shall have no liability to a Participant, or any other party, if the RSU that is intended to be exempt from, or compliant with, Section 409A is not so exempt or compliant, or for any action taken by the Company’s Board of Directors, a committee thereof or its delegates.

6. Withholding Taxes.

(a) The Company’s obligation to deliver Shares to the Participant upon the vesting of RSUs shall be subject to the satisfaction of all income tax (including federal, state and local taxes), social insurance, payroll tax, payment on account or other tax related withholding requirements (“Withholding Taxes”). In order to satisfy all Withholding Taxes due upon vesting of the Participant’s RSUs, the Participant agrees to the following:

(b) As a condition to receiving any Shares upon vesting of the RSUs, on the date of this Agreement, the Participant hereby irrevocably instructs the Company to take the actions described in this subsection 6(b). On each Vesting Date, the Participant hereby elects to satisfy all Withholding Taxes obligation then due through the retention by the Company of Shares. Accordingly, the Participant hereby instructs the Company, with no further action by the Participant, on each Vesting Date to deduct and retain from the number of Shares to which the Participant is entitled from the RSUs then scheduled to vest such number of Shares as is equal to the value of the Withholding Taxes. The Participant understands that the fair market value of the surrendered Shares will be based on the closing price of the Company’s Common Stock on the trading day preceding the Vesting Date.

(c) Participant has reviewed with the Participant's own tax advisors the federal, state, local and foreign tax consequences of this grant and the transactions contemplated by this Agreement. The Participant is relying solely on such advisors and not on any statements or representations of the Company or any of its agents. The Participant understands that the Participant (and not the Company) shall be responsible for the Participant's own tax liability that may arise as a result of this grant or the transactions contemplated by this Agreement.

(d) The Participant represents to the Company that, as of the date hereof, he/she is not aware of any material nonpublic information about the Company or the Common Stock. The Participant and the Company have structured this Agreement to constitute a "binding contract" relating to the retention by the Company of Common Stock pursuant to this Section 6, consistent with the affirmative defense to liability under Section 10(b) of the Securities Exchange Act of 1934 under Rule 10b5-1(c) promulgated under such Act.

7. Nature of the Grant. In signing this Agreement, the Participant acknowledges that:

(a) the Plan is established voluntarily by the Company, it is discretionary in nature and may be modified, amended, suspended or terminated by the Company at any time, unless otherwise provided in the Plan and this Agreement;

(b) the grant of RSUs is voluntary and occasional and does not create any contractual or other right to receive future awards of RSUs, or benefits in lieu of RSUs even if RSUs have been awarded repeatedly in the past;

(c) all decisions with respect to future grants of RSUs, if any, will be at the sole discretion of the Company;

(d) the Participant's participation in the Plan is voluntary;

(e) RSUs are an extraordinary item that do not constitute compensation of any kind for services of any kind rendered to the Company or to the Participant's employer, and RSUs are outside the scope of the Participant's employment contract, if any;

(f) RSUs are not part of normal or expected compensation or salary for any purpose, including, but not limited to, calculation of any severance, resignation, termination, redundancy, end of service payments, bonuses, long-service awards, pension or retirement benefits or similar payments and in no event should be considered as compensation for, or relating in any way to, past services for the Company or the Participant's employer;

(g) the future value of the underlying Shares is unknown and cannot be predicted with certainty;

(h) if the Participant receives Shares upon vesting, the value of such Shares acquired on vesting of RSUs may increase or decrease in value;

(i) in consideration of the grant of RSUs, no claim or entitlement to compensation or damages arises from termination of the RSUs or diminution in value of the RSUs or Shares received upon vesting of RSUs resulting from termination of the Participant's employment by the Company or the Participant's employer (for any reason whatsoever and whether or not in breach of local labor laws) and the Participant irrevocably releases the Company and his or her employer from any such claim that may arise; if, notwithstanding the foregoing, any such claim is found by a court of competent jurisdiction to have arisen, then, by signing this Agreement, the Participant shall be deemed irrevocably to have waived his or her entitlement to pursue such claim; and

(j) further, if the Participant ceases to be an employee (whether or not in breach of local labor laws), the Participant's right to receive RSUs and vest under the Plan, if any, will terminate effective as of the date that the Participant is no longer actively employed by the Company and will not be extended by any notice period mandated under local law (e.g., active employment would not include a period of "garden leave" or similar period pursuant to local law); the Committee shall have the exclusive discretion to determine when the Participant is no longer actively employed for purposes of the Plan.

8. Data Privacy Notice and Consent. The Participant hereby explicitly and unambiguously consents to the collection, use and transfer, in electronic or other form, of his or her personal data as described in this paragraph, by and among, as applicable, the Participant's employer and the Company and its subsidiaries and affiliates for, among other purposes, implementing, administering and managing the Participant's participation in the Plan. The Participant understands that the Company and its subsidiaries hold certain personal information about the Participant, including the Participant's name, home address and telephone number, date of birth, social security number or identification number, salary, nationality, job title, any Shares or directorships held in the Company, details of all options or any other entitlement to Shares awarded, canceled, exercised, vested, unvested or outstanding in the Participant's favor, for the purpose of managing and administering the Plan ("Data"). The Participant further understands that the Company and/or its subsidiaries will transfer Data amongst themselves as necessary for employment purposes, including implementation, administration and management of the Participant's participation in the Plan, and that the Company and/or any of its subsidiaries may each further transfer Data to Broker or such other stock plan service provider or other third parties assisting the Company with processing of Data. The Participant understands that these recipients may be located in the United States, and that the recipient's country may have different data privacy laws and protections than in the Participant's country. The Participant authorizes them to receive, possess, use, retain and transfer the Data, in electronic or other form, for the purposes described in this section, including any requisite transfer to Broker or such other stock plan service provider or other third party as may be required for the administration of the Plan and/or the subsequent holding of Shares of stock on the Participant's behalf. The Participant understands that he or she may, at any time, request access to the Data, request any necessary amendments to it or refuse or withdraw the consents herein, in any case without cost, by contacting in writing his or her local human resources representative. The Participant understands, however, that withdrawal of consent may affect the Participant's ability participate in or realize benefits from the Plan. For more information on the consequences of refusal to consent or withdrawal of consent, the Participant understands that he or she may contact his or her local human resources representative.

9. Miscellaneous.

(a) No Rights to Employment. The Participant acknowledges and agrees that the vesting of the RSUs pursuant to Section 1 and Exhibit A hereof is earned only in accordance with the terms of such sections. The Participant further acknowledges and agrees that the transactions contemplated hereunder and the vesting schedule set forth herein do not constitute an express or implied promise of continued engagement as an employee for the vesting period, for any period, or at all.

(b) Severability. The invalidity or unenforceability of any provision of this Agreement shall not affect the validity or enforceability of any other provision of this Agreement, and each other provision of this Agreement shall be severable and enforceable to the extent permitted by law.

(c) Waiver. Any provision for the benefit of the Company contained in this Agreement may be waived, either generally or in any particular instance, by the Board of Directors of the Company.

(d) Binding Effect. This Agreement shall be binding upon and inure to the benefit of the Company and the Participant and their respective heirs, executors, administrators, legal representatives, successors and assigns, subject to the restrictions on transfer set forth in Section 3 of this Agreement.

(e) Notice. All notices required or permitted hereunder shall be in writing and deemed effectively given upon personal delivery or five days after deposit in the United States Post Office, by registered or certified mail, postage prepaid, addressed to the other party hereto at the address shown beneath his or its respective signature to this Agreement, or at such other address or addresses as either party shall designate to the other in accordance with this Section 9(e).

(f) Pronouns. Whenever the context may require, any pronouns used in this Agreement shall include the corresponding masculine, feminine or neuter forms, and the singular form of nouns and pronouns shall include the plural, and vice versa.

(g) Language. If the Participant has received this Agreement or any other document related to the Plan translated into a language other than English and if the translated version is different than the English version, the English version will control.

(h) Electronic Delivery. The Company may, in its sole discretion, decide to deliver any documents related to participation in the Plan, RSUs granted under the Plan or future RSUs that may be granted under the Plan by electronic means or to request the Participant's consent to participate in the Plan by electronic means. The Participant hereby consents to receive such documents by electronic delivery and, if requested, to agree to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

(i) Entire Agreement. This Agreement and the Plan constitute the entire agreement between the parties, and supersedes all prior agreements and understandings, relating to the subject matter of this Agreement.

(j) Amendment. This Agreement may be amended or modified only by a written instrument executed by both the Company and the Participant.

(k) Governing Law. This Agreement shall be construed, interpreted and enforced in accordance with the internal laws of the Commonwealth of Massachusetts without regard to any applicable conflicts of laws.

(l) The Participant's Acknowledgments. The Participant acknowledges that he or she: (i) has read this Agreement; (ii) has been represented in the preparation, negotiation, and execution of this Agreement by legal counsel of the Participant's own choice or has voluntarily declined to seek such counsel; and (iii) understands the terms and consequences of this Agreement; and (iv) is fully aware of the legal and binding effect of this Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

MKS INSTRUMENTS, INC.

By: _____

Name: Gerald G. Colella

Title: Chief Executive Officer and President

2 Tech Drive

Andover, MA 01810

«Electronic Signature»

Participants Signature



MKS Instruments, Inc.
Annual Corporate Management/Key Employee Bonus Plan

Purpose:

The Annual Corporate Management/Key Employee Bonus Plan (the "Management Bonus Plan") provides key managers and employees ("Participants") of MKS Instruments, Inc. ("MKS" or the "Company") with the opportunity to benefit financially for improving MKS overall business performance. Eligible employees are those who work in positions that influence how well MKS performs.

The Management Bonus Plan is intended to encourage Participants to make prudent choices about how operations are conducted. The growth of MKS is dependent upon decision making that constantly focuses on achieving customer satisfaction while maintaining sound fiscal control. While one person alone cannot change the direction of any company, the combined decisions made by the Participants in the Management Bonus Plan play an important part in influencing MKS' overall business performance.

Determination of a Participant's Bonus Amount:

Each Participant's actual bonus payout under the Management Bonus Plan, if any, will be determined by multiplying the Participant's Target Bonus Amount by the Corporate Performance Multiplier, each as defined below. The Corporate Performance Multiplier may range from zero for achievement below the specified minimum annual corporate goal to a maximum of 200% for achievement of the maximum annual corporate goal. Therefore, the maximum payout possible for each Participant under the Management Bonus Plan is 200% of a Participant's Target Bonus Amount and the minimum payout possible is zero.

Participant's Target Bonus Amount:

Each Participant's target bonus amount, which will be communicated in writing to each Participant by the Company, is equal to a percentage of the Participant's Eligible Earnings for the fiscal year being measured under the Management Bonus Plan ("Target Bonus Amount"). Eligible Earnings are defined as eligible W-2 earnings received during the Management Bonus Plan period (i.e. base salary including regular, holiday, vacation, sick and retro pay, but not including bonus payments). A Participant's Target Bonus Amount will not exceed 100% of his or her Eligible Earnings.

Corporate Performance Multiplier:

MKS' Corporate Performance Multiplier under the Management Bonus Plan is measured by MKS' financial results. The financial metric used to calculate performance for bonus achievement is Corporate Adjusted Operating Income, which is defined under this Management Bonus Plan as GAAP Net Operating Income excluding any unanticipated charges or income not related to the operating performance of MKS. The Management Bonus Plan is based on MKS'

performance during the fiscal year (January through December). Performance measurements with respect to Corporate Adjusted Operating Income are set at the beginning of the fiscal year by the Compensation Committee of the Board of Directors of the Company. All of a Participant's bonus is tied to the achievement of this corporate financial goal.

Participation/Approval:

Participation in the Management Bonus Plan for employees who are not "executive officers" of the Company (as defined in Rule 3b-7 under the Securities Exchange Act of 1934, as amended) ("Executive Officers"), or whose participation is not otherwise approved by the Compensation Committee of the Board of Directors, requires the approval of the most senior individual in the applicable organization as well as Human Resources and the Chief Executive Officer. Participation in the Management Bonus Plan for Executive Officers requires the approval of the Compensation Committee of the Board of Directors. Participation in the Management Bonus Plan is reviewed on an annual basis. Past participation in this plan, as well as the Participant's percentage target, is not a guarantee of future participation or target levels.

Clawback:

In the event that a Participant is, on the date the Management Bonus Plan is provided to a Participant, an Executive Officer, then any bonus payment made hereunder shall be subject to potential cancellation, recoupment, rescission, payback or other action in accordance with the terms of any applicable Company clawback policy (the "Clawback Policy") or any applicable law, as may be in effect from time to time. The Participant hereby acknowledges and consents to the Company's application, implementation and enforcement of (i) any applicable Clawback Policy in effect at the time the Participant is notified of his or her eligibility to participate in the respective year's Management Bonus Plan and (ii) any provision of applicable law relating to cancellation, recoupment, rescission or payment of compensation and agrees that the Company may take such actions as may be necessary to effectuate the Clawback Policy without further consideration or action.

Administration:

Bonus payouts are made as soon as possible after the end of the fiscal year and the performance assessment has been completed, but in no event later than March 15 of the subsequent year.

Employment on Bonus Payout Date Required:

In order to receive any bonus payment under the Management Bonus Plan, the Participant must be actively employed as of the payout date.

No Right to Employment

MKS reserves the right to change The Management Bonus Plan at any time, subject to senior management discretion or Compensation Committee approval, as appropriate. In no way does the Management Bonus Plan create a contract of employment.

EMPLOYMENT AGREEMENT

EMPLOYMENT AGREEMENT dated February 24, 2014 (“Employment Agreement”), by and between MKS Instruments, Inc., a Massachusetts Corporation (the “Corporation”), and Seth Bagshaw of Boxford, MA (the “Employee”).

WHEREAS, the Corporation and Employee desire to provide for the employment of Employee by the Corporation:

NOW, THEREFORE, in consideration of the premises and the mutual promises contained herein, the Corporation and Employee hereby agree as follows:

(1) Term of Employment: (a) The Corporation hereby employs Employee, and Employee hereby accepts continued employment with the Corporation, for a period continuing from the first date above until terminated as provided in this Section (1) or Section (5).

(b) Either the Corporation or Employee may terminate Employee’s employment at any time for any reason, or no reason, by giving written notice to the other party stating its or his election to terminate the employment of Employee under this Employment Agreement and an effective date of termination which is at least thirty (30) days after the date of receipt by the other party of such notice; provided, however, that the employment of Employee under this Employment Agreement is subject to prior termination as hereinafter provided in Section (5)(b) and (c). Notwithstanding the above, the Corporation shall be entitled, at its sole discretion, to waive the obligation of Employee to continue to actively work during the 30 day notice period. In the event the Corporation elects at any time to waive the obligation of Employee to actively work during the 30 day notice period, the Corporation shall continue to pay Employee his customary Base Salary (as defined in Section (4)) and will reimburse Employee through the balance of the 30 day notice period for the premiums (if any) Employee pays for continuation of life insurance should Employee elect to exercise the conversion feature (if any) of the Corporation’s group life policy then in effect and for the premiums (if any) for such medical/dental insurance as Employee may then receive should Employee elect continuation under the federal COBRA program.

(c) Employee may terminate employment by delivering notice of resignation no later than thirty (30) days prior to the intended date of termination of employment (“Resignation Date”); provided, however, that the Corporation may at any time and for any reason, or no reason, accelerate the Resignation Date to any date prior thereto up to and including the date Employee delivers such notice of resignation, and such acceleration shall not, in any event, be deemed a termination by Corporation of Employee’s employment. Unless the employment is terminated pursuant to Section (5), the Corporation shall, if it terminates the employment prior to the Resignation Date, continue to pay Employee his customary Base Salary (as defined in Section (4)) and will reimburse Employee through the balance of the 30 day notice period for the premiums (if any) Employee pays for continuation of life insurance should Employee elect to exercise the conversion feature (if any) of the Corporation’s group life policy then in effect and for the premiums (if any) for such medical/dental insurance as Employee may then receive should the Employee elect continuation under the federal COBRA program.

(2) Capacity: Employee is being paid to perform such duties and exercise such powers, authorities and discretions in relation to the Corporation as are customary and incidental to Employee’s position and such other services that are delegated or assigned to Employee by the Chief Executive Officer of the Corporation or his designee, including any authorized manager or supervisor of Employee. It shall be a condition of Employee’s employment hereunder that Employee execute and deliver to the Corporation that Confidential Information Agreement of MKS Instruments, Inc. (“Confidential Information Agreement”) attached hereto as Attachment 1, and by execution of this Employment Agreement, Employee (i) acknowledges receipt of the Confidential Information Agreement and (ii) agrees to be bound by all of the terms of the Confidential Information Agreement.

(3) Extent of Services: During the term of employment of Employee under this Employment Agreement, Employee shall devote his full time to, and use his best efforts in the furtherance of, the business of the Corporation and shall not perform similar duties in any other capacity for any other person or engage in any other business activity which interferes in any way with Employee's performance of his duties to the Corporation, whether or not such business activity is pursued for gain or any other pecuniary advantage, without the prior written consent of the Chief Executive Officer of the Corporation. Notwithstanding the foregoing, Employee may manage his personal investments and be involved in charitable and unremunerated professional activities (including serving on charitable and professional boards), so long as such service is approved by the Chief Executive Officer and does not materially interfere with the performance of Employee's duties hereunder or violate Sections (7) through (11) of this Agreement. Employee agrees and understands that Employee owes the Corporation fidelity and loyalty during the term of employment with the Corporation.

(4) Compensation: In consideration of the services to be rendered by Employee under this Employment Agreement, the Corporation agrees to pay, and the Employee agrees to accept, the following compensation:

(a) Base Salary: A base salary at the rate of four hundred thousand dollars and zero cents (\$400,000.00) per year for the term of Employee's employment under this Employment Agreement. The base salary shall be payable in equal biweekly installments subject to usual withholding requirements. This salary will be reviewed regularly according to the practices of the Corporation and will be subject to any changes in pay policies implemented by the Corporation from time to time, becoming the Base Salary hereunder, as defined. As an exempt employee, Employee shall not be entitled to receive any overtime pay from the Corporation.

(b) MKS Instruments, Inc. Profit Sharing and 401(k) Plan: Employee shall be eligible to become a participant under the profit sharing plan of the Corporation on fulfilling the conditions set forth in the MKS Instruments, Inc. Profit Sharing and 401(k) Plan, in accordance with its terms.

(c) Vacation: Employee shall be entitled to an annual vacation leave of 20 days at full rate of Base Salary during each calendar year of this Employment Agreement, subject to Employee arranging such vacation so as not to affect adversely the ability of the Corporation to transact its business. Such vacation leave shall accrue and be administered according to the policies and practices of the Corporation.

(d) Life Insurance: The Corporation shall provide and pay such premiums for term life insurance for Employee during the term of Employee's employment under this Employment Agreement in accordance with the term life insurance plan of the Corporation.

(e) Medical/Dental Insurance: The Corporation shall provide group medical/dental insurance for Employee under the plans of the Corporation applicable to Employee during the term of Employee's employment under this Employment Agreement.

(f) Other Benefits: The Corporation shall provide other benefits for Employee under the Plans of the Corporation applicable to Employee during the term of Employee's employment under this Employment Agreement.

(g) Expenses: The Corporation shall reimburse Employee for all reasonable and necessary expenses incurred by Employee in connection with the performance of Employee's duties as an employee of the Corporation. Such reimbursement is subject to the timely submission to the Corporation by Employee of appropriate documentation and/or vouchers in accordance with the customary procedures of the Corporation for expense reimbursement, as such procedures may be revised by the Corporation from time to time, and to such caps on reimbursements as the Corporation may from time to time impose.

(5) Termination: The employment of Employee under this Employment Agreement shall terminate:

(a) On the expiration of the period of employment as provided in Section (1).

(b) Upon the death of Employee, or the Disability of Employee as defined in Section (6) (e) below.

(c) At the election of the Corporation: (i) if Employee shall fail, or refuse, to perform the other covenants and agreements required of him under this Employment Agreement other than as a result of Disability or death; or (ii) for "cause", which term shall mean: (1) Employee's willful or gross neglect of his duties, including the failure to carry out or comply with, in good faith, in any material respect, or the refusal to follow, any lawful and reasonable written directives of the Chief Executive Officer of the Corporation or his designee that are not inconsistent with Employee's position; (2) Employee's material breach of this Employment Agreement or of any of the rules, regulations, policies or procedures of the Corporation, or material violation of the Corporation's statement of corporate policy and/or code of conduct at any time after such statement and code have been adopted by the Board of Directors and have been set forth in writing and delivered to Employee; (3) Employee's commission of a felony or other act of material dishonesty, or plea of other than "not guilty" to any felony or serious misdemeanor charge including but not limited to any act of fraud, embezzlement, misappropriation of Corporation property, moral turpitude, or breach of fiduciary duty that could possibly have a material adverse effect on the Corporation; (4) Employee's unlawful use (including being under the influence) of controlled substances on the Corporation's premises or while performing Employee's duties and responsibilities or indictment related to the commission of any criminal act; (5) Employee's failure or refusal to reasonably cooperate with any Corporation investigation or governmental/regulator authority having jurisdiction over Employee and the Corporation; or (6) Employee's engaging in willful or gross misconduct which is materially injurious to the Corporation or any of its subsidiaries or affiliates or any of its directors or officers, financially or otherwise, or to its or their reputation; in each case determined in good faith by the Chief Executive Officer of the Corporation.

(6) Payment upon Termination: (a) If Employee's employment is terminated by the Corporation other than pursuant to Section (5)(c) the Corporation shall (subject to Employee's entering into and not revoking a General Release with the Corporation in such form as it may then require; and provided that Employee (i) remains in full compliance with the Corporation's Confidential Information Agreement; and (ii) performs such actions as the Corporation may reasonably request in transitioning Employee from his employment with the Corporation) continue to pay Employee the Base Salary (as defined in Section (4)) in effect immediately prior to the time of such termination (but without any bonus, commission or other similar amounts except as may have been earned and are due and payable prior to such termination) for six (6) months after the last full day Employee works under this Employment Agreement at its normal payroll payment dates, by direct deposit or regular mail at Employee's election, provided Employee is not in breach of any of the covenants herein; any unreimbursed expenses due to Employee pursuant the Corporation's policy for which he has submitted acceptable supporting documentation; and any accrued but unused vacation time. The form of General Release currently used by the Corporation is attached hereto as Appendix A, and the Release shall be in substantially similar form with such changes as the Corporation deems appropriate at the time of Employee's termination. Employee shall be entitled to such payment only as set forth herein, and the provisions of this Section (6) shall supersede in their entirety any severance payment provisions in any severance plan, policy, program or arrangement maintained by the Corporation. In addition to any rights or remedies the Corporation may otherwise have, upon any breach of any agreements herein by Employee, Employee's right to any continued payment of separation benefits shall immediately cease, and Employee shall be obligated to repay to the Corporation all amounts paid by the Corporation for the separation benefits except for the amount of \$1,000, which Employee shall be entitled to retain.

(b) In the event Employee's employment is terminated by death, the Corporation shall pay to Employee's estate the compensation which would otherwise be payable to Employee at the end of the month in which his death occurs and other unpaid amounts to which Employee would have been at that time entitled as an Employee under any applicable compensation or benefit plan or program.

(c) In the event Employee's employment is terminated by the Corporation for Cause pursuant to Section (5)(c) hereof, the Corporation shall have no obligation to pay Employee any amounts, except for Base Salary through the last full day of actual work for the Corporation, and any accrued but unused vacation time.

(d) In the event Employee voluntarily resigns, the Corporation shall have no obligation to pay Employee any amounts, except for Base Salary through the last full day of actual work for the Corporation, or, if applicable, amounts payable in accordance with Section (1)(c), and other unpaid amounts to which Employee is at that time entitled under any applicable compensation or benefit plan or program.

(e) If Employee is incapacitated by a physical or mental condition, illness, or injury that prevents Employee from being able to perform his duties under this Employment Agreement in a satisfactory manner for substantially all of a twelve (12) consecutive week period (or such longer period as may be required by law or that the Chief Executive Officer of the Corporation or his designee may, in his discretion, determine) with any reasonable accommodation that may be required by law, then Employee shall be deemed to be unable to perform his job (any such physical or mental condition, illness, or injury, a "Disability"). In such event, the Corporation may terminate Employee's employment, in which case Employee shall receive (i) any accrued but unpaid Base Salary and other unpaid amounts to which Employee is at that time entitled under any applicable compensation or benefit plan or program and (ii) all applicable disability benefits consistent with any applicable benefits program. The Corporation shall have no further obligations to Employee. Nothing in this paragraph is intended to or shall operate to excuse the Corporation from any legal obligations it may have under applicable laws.

(f) In the event Employee's employment terminates without "cause" and in the absence of the other events described in subsection (c) above, or if the Employee terminates for Good Reason (as defined below) within six (6) months of the Effective Date of a consummated Change in Control (as defined below), Employee shall be entitled, in addition to any amount payable under this Section (6)(a), to six (6) months of Base Salary (as defined in Section (4)) in effect immediately prior to the time of such termination (but without any bonus, commission or other similar amounts except as may have been earned and are due and payable prior to such termination). For purposes of this Employment Agreement, a Change in Control means the first to occur of any of the following events: (i) any "person" (as that term is used in Section 13 and 14(d)(2) of the Securities Exchange Act of 1934 ("Exchange Act")) becomes the beneficial owner (as that term is used in Section 13(d) of the Exchange Act), directly or indirectly, of fifty percent (50%) or more of the Corporation's capital stock entitled to vote in the election of directors; (ii) the shareholders of the Corporation approve any consolidation or merger of the Corporation, other than a consolidation or merger of the Corporation in which the holders of the common stock of the Corporation immediately prior to the consolidation or merger hold more than fifty percent (50%) of the common stock of the surviving corporation immediately after the consolidation or merger; (iii) the shareholders of the Corporation approve any plan or proposal for the liquidation or dissolution of the Corporation; or (iv) the shareholders of the Corporation approve the sale or transfer of all or substantially all of the assets of the Corporation to parties that are not within a "controlled group of corporations" (as defined in Code Section 1563) in which the Corporation is a member. For purposes of this Employment Agreement, "Good Reason" shall mean Employee's voluntary separation from service within 90 days following: (i) a material diminution in Employee's positions, duties and responsibilities from those described in this Employment Agreement; (ii) a reduction in Employee's Base Salary (other than a reduction which is part of a

general salary reduction program affecting senior executives of the Corporation); (iii) a material reduction in the aggregate value of the pension and welfare benefits provided to Employee from those in effect prior to the Change in Control (other than a reduction which is proportionate to the reductions applicable to other senior executives pursuant to a cost-saving plan that includes all senior executives); (iv) a material breach of any provision of this Employment Agreement by the Corporation; (v) the Corporation's requiring Employee to be based at a location that creates for Employee a one way commute in excess of 60 miles from his primary residence, except for required travel on the Corporation's business to an extent substantially consistent with the business travel obligations of Employee under this Employment Agreement. Notwithstanding the foregoing, a termination of employment shall not be treated as a termination for Good Reason (i) if Employee shall have consented in writing to the occurrence of the event giving rise to the claim of termination for Good Reason or (ii) unless Employee shall have delivered a written notice to the Corporation within 30 days of his having actual knowledge of the occurrence of one of such events stating that he intends to terminate his employment for Good Reason and specifying the factual basis for such termination, and such event, if capable of being cured, shall not have been cured within 30 days of the receipt of such notice.

In the event amounts payable hereunder are contingent on a Change in Control for the purposes of Internal Revenue Code Section 280G and it is determined by a public accounting firm or legal counsel authorized to practice before the Internal Revenue Service selected by the Corporation that any payment or benefit made or provided to Employee in connection with this Agreement or otherwise (collectively, a "Payment") would be subject to the excise tax imposed by Internal Revenue Code Section 4999 (the "Parachute Tax"), the Payments under this Agreement shall be payable in full or, if applicable, in such lesser amount which would result in no portion of such Payments being subject to the Parachute Tax, whichever of the foregoing amounts, taking into account the applicable federal, state and local income taxes and the Parachute Tax, results in receipt by Employee, on an after-tax basis, of the greatest amount of Payments under this Employment Agreement. If Payments are reduced pursuant to this paragraph, severance payments described above payable over time shall first be reduced (beginning with the last such payment), and the other benefits under this Employment Agreement shall thereafter be reduced, to the extent necessary so that no portion of the Payments is subject to the Parachute Tax. The reporting and payment of any Parachute Tax will be Employee's responsibility and the Corporation will not provide a gross-up or any other payment to compensate Employee for the payment of the Parachute Tax. The Corporation will withhold from the Payments any amounts it reasonably determines is required under Internal Revenue Code Section 4999(c) and the Treasury Regulations thereunder.

(g) The Corporation shall deduct from the amounts payable to Employee pursuant to this Agreement all required withholding amounts and deductions, including but not limited to federal, state, local or foreign withholding amounts in accordance with all applicable laws and regulations and deductions authorized by Employee. Employee shall be solely responsible for and shall pay all taxes associated with the amounts payable under this Agreement. The Corporation shall be entitled to rely on an opinion of counsel if any questions as to the amount or requirement of withholding shall arise.

(h) Employee shall have no obligation to mitigate any payments due hereunder. Any amounts earned by Employee from other employment shall not offset amounts due hereunder. The Corporation's obligation to pay Employee the amounts provided hereunder shall not be subject to set-off, counterclaim or recoupment of amounts owed by Employee to the Corporation or its affiliates, except for any specific, stated amounts owed by Employee to the Corporation, or as otherwise stated herein.

(7) Trade Secrets: Employee covenants and agrees that Employee will communicate to the Corporation, and will not divulge or communicate to any other person, partnership, corporation or other entity without the prior written consent of the Corporation, any trade secrets of the Corporation or confidential information relating to the business of the Corporation or anyone connected with the Corporation, and that such trade secrets and confidential information shall not be used by Employee either on his own behalf or for the benefit of others or disclosed by Employee to any one, except to the Corporation, during or after the term of Employee's employment under this Employment Agreement.

(8) **Inventions and Patents:** (a) Employee shall make prompt full disclosure in writing to the Corporation of all inventions, improvements and discoveries, whether or not patentable, which Employee conceives, devises, makes, discovers, develops, perfects or first reduces to practice, either alone or jointly with others, during the term of Employee's employment under this Employment Agreement, which relate in any way to the fields, products or business of the Corporation, including development and research, whether during or out of the usual hours of work or on or off the premises of the Corporation or by use of the facilities of the Corporation or otherwise and whether at the request or suggestion of the Corporation or otherwise (all such inventions, improvements and discoveries being hereinafter called the "Inventions"), including any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by Employee after the employment of Employee under this Employment Agreement is terminated if the Inventions were conceived by Employee during the term of Employee's employment under this Employment Agreement. Any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by Employee within six (6) months of the date of termination of the Employee's employment under this Employment Agreement shall be conclusively presumed to have been conceived during the term of Employee's employment under this Employment Agreement.

(b) Employee agrees that the Inventions shall be the sole and exclusive property of the Corporation.

(c) Employee agrees to assist the Corporation and its nominees in every reasonable way (entirely at its or their expense) to obtain for the benefit of the Corporation letters patent for the Inventions and trademarks, trade names and copyrights relating to the Inventions, and any renewals, extensions or reissues thereof, in any and all countries, and agrees to make, execute, acknowledge and deliver, at the request of the Corporation, all written applications for letters patent, trademarks, trade names and copyrights relating to the Inventions and any renewals, extensions or reissues thereof, in any and all countries, and all documents with respect thereto, and all powers of attorney relating thereto and, without further compensation, to assign to the Corporation or its nominee all the right, title and interest of Employee in and to such applications and to any patents, trademarks, trade names or copyrights which shall thereafter issue on any such applications, and to execute, acknowledge and deliver all other documents deemed necessary by the Corporation to transfer to or vest in the Corporation all of the right, title and interest of Employee in and to the Inventions, and to such trademarks, trade names, patents and copyrights together with exclusive rights to make, use, license and sell them throughout the world. If the Corporation is unable, after reasonable effort, to secure Employee's signature on any application for patent, copyright, trademark or other analogous registration or other documents regarding any legal protection relating to any Invention, whether because of Employee's physical or mental incapacity or for any other reason whatsoever, Employee hereby irrevocably designates and appoints the Corporation and its duly authorized officers and agents as Employee's agent and attorney-in-fact, to act for and on Employee's behalf and stead to execute and file any such application or applications or other documents and to do all other lawfully permitted acts to further the prosecution and issuance of patent, copyright or trademark registrations or any other legal protection thereon with the same legal force and effect as if executed by Employee.

(d) Employee agrees that even though his employment is terminated under this Employment Agreement Employee will, at any time after such termination of employment, carry out and perform all of the agreements of Subsections 8(a) and 8(c) above, and will at any time and at all times cooperate with the Corporation in the prosecution and/or defense of any investigation, litigation or legal process which may arise, including in connection with the Inventions, provided, however, that should such services be rendered after termination of Employee's employment under this Employment Agreement, Employee shall be paid reasonable compensation on a per diem basis. The Corporation agrees to provide Employee reasonable notice in the event his assistance is required.

(e) Employee agrees to make and maintain adequate and current written records of all Inventions in the form of notes, sketches, drawings, or reports relating thereto, which records shall be and remain the property of, and available to, the Corporation at all times.

(f) Employee agrees that he will, upon leaving the Corporation's employment, promptly deliver to the Corporation all originals and copies of disclosures, drawings, prints, letters, notes, and reports either typed, handwritten or otherwise memorialized, belonging to the Corporation which are in his possession or under his control and Employee agrees that he will not retain or give away or make copies of the originals or copies of any such disclosures, drawings, prints, letters, notes or reports.

(9) Property of Corporation: All files, records, reports, documents, drawings, specifications, equipment, and similar items relating to the business of the Corporation, whether prepared by e Employee or otherwise coming into his possession, shall remain the exclusive property of the Corporation and shall not be removed by Employee from the premises of the Corporation under any circumstances whatsoever without the prior written consent of the Corporation.

(10) Noncompetition Agreement: (a) Employee shall not, without the written consent of the Corporation, during the term of employment with the Corporation and for the period of one year thereafter (the "Non-Compete Period"), engage in or otherwise carry on, directly or indirectly anywhere in the world (either as principal, agent, employee, employer, investor, shareholder (except for holdings of no greater than 1% of the total outstanding shares in a publicly-traded company), consultant, partner, member, financier or in any other individual or representative capacity of any kind whatsoever), any business or activity competitive with the Corporation but solely to the extent such business or activity is related to, similar to or competitive with the activities of the business unit(s), division(s), laborator(y)(ies), facilit(y)(ies) and other operational unit(s) in or for which Employee performed work for the Corporation or about which Employee acquired Proprietary Information (as defined in the Confidential Information Agreement). The Non-Compete Period shall be extended for any period during which Employee is in breach of this Employment Agreement or the Confidential Information Agreement.

(b) The Corporation and Employee agree that the services of Employee are of a personal, special, unique and extraordinary character, and cannot be replaced by the Corporation without great difficulty, and that the violation by Employee of any of his agreements under this Section 10 would damage the goodwill of the Corporation and cause the Corporation irreparable harm that could not reasonably or adequately be compensated in damages in an action at law, and that the agreements of Employee under this Section 10 may be enforced by the Corporation in equity by an injunction, declaratory judgment tor restraining order in addition to being enforced by the Corporation at law.

(c) In the event that this Section 10 shall be determined by any court of competent jurisdiction to be unenforceable by reason of its extending for too long a period of time or over too great a range of activities or geographic scope, it shall be interpreted to extend only over the maximum period of time or range of activities or geographic scope as to which it may be enforceable.

(11) Non-Solicitation: Employee shall not, on his own behalf or in the service or on behalf of others, directly or indirectly:

(a) solicit, entice or induce any Customer (as defined below) to become a customer, distributor or supplier of any other person, firm or corporation with respect to products and/or services sold or under development by the Corporation during his employment at the Corporation, or to cease doing business with the Corporation, and Employee shall not contact or approach any such person, firm or corporation for such purpose or authorize or knowingly approve the taking of such actions by any other person for a period of twenty-four (24) months from the date of the termination of Employee's employment under this Employment Agreement; or

(b) solicit, recruit or hire (or attempt to solicit, recruit or hire) any employee, officer or agent of the Corporation or contractor engaged by the Corporation (whether or not such person is a full-time executive or whether or not such employment is pursuant to a written agreement or at-will) to terminate such person's

employment or engagement with the Corporation or work for a third party other than the Corporation for a period of twenty-four (24) months after the date of the termination of Employee's employment under this Employment Agreement, or engage in any activity that would cause such employee or contractor to violate any agreement with the Corporation, nor shall Employee form any partnership with, or establish any business venture in cooperation with, any such person.

(c) For the purposes of this Section 11, a "Customer" means any person or entity which as of the date of the termination of Employee's employment under this Employment Agreement was, within two (2) years prior to such time, a customer, distributor or supplier of the Corporation, and references to the Corporation shall be deemed to include any affiliate or subsidiary of the Corporation.

(12) Non-disparagement: Employee shall not disparage the Corporation, any of its products or practices, or any of its directors, officers, or employees, whether orally, in writing or otherwise, at any time. Notwithstanding the foregoing: nothing in this Section shall (i) limit the ability of Employee to provide truthful testimony as required by law or any judicial or administrative process, or (ii) prevent any Person from making any truthful statement to the extent necessary in any litigation, arbitration, or mediation proceeding involving this Employment Agreement, including, but not limited to, the enforcement of this Employment Agreement. In no event shall any termination of Employee's employment by the Corporation or Employee for any reason constitute disparagement for purposes of this Section.

(13) Notice: Any and all notices under this Employment Agreement shall be in writing and, if to the Corporation, shall be duly given if sent to the Corporation by registered or certified mail, postage prepaid, return receipt requested, at the address of the Corporation set forth under its name below or at such other address as the Corporation may hereafter designate to Employee in writing for the purpose, and if to Employee, shall be duly given if delivered to Employee by hand or if sent to Employee by registered or certified mail, postage prepaid, return receipt requested, at the address of Employee set forth under his name below or at such other address as Employee may hereafter designate to the Corporation in writing for the purpose.

(14) Assignment: The rights and obligations of the Corporation under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the successors and assigns of the Corporation. The rights and obligations of Employee under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the heirs, executors and legal representatives of Employee. Employee shall not delegate his employment or obligations under this Employment Agreement to any other person.

(15) Code Section 409A Compliance: Where Section (6) refers to Employee's termination of employment for purposes of receiving any payment, whether such a termination has occurred will be determined in accordance with Section 409A of the Internal Revenue Code and Treasury Regulation Section 1.409A-1(h) (or any successor provisions). Where the Employment Agreement requires the following payments to be made to Employee, the following rules shall apply, and any inconsistent provision is superseded:

To the extent that this Employment Agreement requires that a payment shall be made upon or as soon as reasonably practicable after an event (*e.g.*, termination of employment), such payment shall be made no later than sixty (60) days after the occurrence of such event (or, if earlier, within two-and-a-half (2 1/2) months following the end of the Employee's taxable year in which such event occurs). Employee may not designate the year of such payment. To the extent that benefits under Section (6) are contingent upon Employee providing a General Release, Employee shall sign and return the General Release within the reasonable time period designated by the Corporation, which shall be no less than twenty-one (21) days but no more than forty-five (45) days. If such designated time period for review and revocation of the General Release crosses calendar years, payments for the period for review and return of the Release shall be made in the later calendar year. Any payments that would otherwise be made during the period for review and revocation of the General Release will be made on the first scheduled payment date after such period ends. To the extent that the Employment Agreement provides for the reimbursement of specified expenses incurred by Employee, such

reimbursement shall be made in accordance with the provisions of the Employment Agreement, but in no event later than the last day of Employee's taxable year following the taxable year in which the expense was incurred. The amount of expenses eligible for reimbursement or in-kind benefits provided by the Corporation in any taxable year of Employee shall not affect the amount of expenses or in-kind benefits to be reimbursed or provided in any other year (except in the case of maximum benefits to be provided under a medical reimbursement arrangement, if applicable). Bonus otherwise payable under the Employment Agreement after the end of a bonus plan performance period shall be paid within two-and-a-half (2 ½) months after the end of the fiscal year of the Corporation to which such Bonus relates. Each payment in respect of Employee's termination of employment under Section 6 of the Employment Agreement is designated as a separate payment for purposes of the short-term deferral rules under Treasury Regulation Section 1.409A-1(b)(4)(i)(F) and the exemption for involuntary terminations under separation pay plans under Treasury Regulation Section 1.409A-1(b)(9)(iii).

If Employee is designated as a "specified Executive" within the meaning of Code Section 409A (while the Corporation is publicly traded on any securities market), any deferred compensation payment subject to Section 409A to be made during the six-month period following Employee's termination of employment shall be withheld and the amount of the payments withheld will be paid in a lump sum, without interest, during the seventh month after Employee's termination; provided, however, that if Employee dies prior to the expiration of such six month period, payment to Employee beneficiary shall be made as soon as reasonably practicable following Employee's death. The Corporation shall identify in writing delivered to Employee any payments it reasonably determines are subject to delay under this Section. In no event shall the Corporation have any liability or obligation with respect to taxes for which Employee may become liable as a result of the application of Code Section 409A.

(16) Entire Agreement and Severability: (a) This Employment Agreement and the Confidential Information Agreement supersede any and all other agreements, either oral or in writing, between the parties hereto with respect to the employment of Employee by the Corporation and contains all of the covenants and agreements between the parties with respect to such employment. In the event of any discrepancy between the terms of this Employment Agreement and the Confidential Information Agreement, this Employment Agreement controls. Each party to this Employment Agreement acknowledges that no representations, inducements, promises or agreements, oral or otherwise, have been made by any party, or any one acting on behalf of any party, which are not embodied herein, and that no other agreement, statement or promise not contained in this Employment Agreement shall be valid and binding. Any modification of this Employment Agreement will be effective only if it is in writing signed by both parties to this Employment Agreement.

(b) If any provision in this Employment Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions shall nevertheless continue in full force and effect without being impaired or invalidated in any way.

(c) All pronouns used herein shall include the masculine, feminine, and neuter gender as the context requires.

(17) Miscellaneous: This Employment Agreement and the rights and obligations of the parties hereunder shall be governed by, and construed in accordance with, the laws of the Commonwealth of Massachusetts, excluding (but only to the extent permitted by law) its conflict of laws and choice of law rules. The parties hereto further agree that service of any process, summons, notice or document by U.S. certified mail or overnight delivery by a generally recognized commercial courier service to Employee's last known address (or any mode of service recognized to be effective by applicable law) will be effective service of process for any action, suit or proceeding brought against Employee in any such court. This Employment Agreement may be executed in any number of counterparts, each of which, when executed by both parties to this Employment Agreement shall be deemed to be an original, and all of which counterparts together shall constitute one and the same instrument. The failure of either party hereto to enforce any right under this Employment Agreement shall not be construed to be a waiver of that right, or of damages caused thereby, or of any other rights under this Employment Agreement.

(18) **Arbitration:** Any dispute under this Employment Agreement shall be resolved by final and binding arbitration; provided, however, that the Corporation, in its sole discretion, may enforce the covenants set out above in Sections (7) through (11) of this Agreement by bringing a proceeding in any court of competent jurisdiction. In addition, any issues pertaining to the ability to arbitrate a dispute under this Agreement shall be determined by a court of competent jurisdiction and not by an arbitrator. The arbitration shall be held in the Commonwealth of Massachusetts and shall be conducted in accordance with the then-prevailing Commercial Arbitration Rules of the American Arbitration Association. Employee shall arbitrate individual claims only. The arbitrator shall be acceptable to both the Corporation and Employee. If the parties cannot agree on an acceptable arbitrator, the dispute shall be heard by a panel of three arbitrators, one appointed by the Corporation and one appointed by Employee, and the third selected by the other two arbitrators. Under no circumstances may the arbitrator(s) have the authority to require Employee's reinstatement to employment or continued employment, or award any lost wages or benefits (other than severance benefits as described above) as a result of Employee's termination of employment for any reason. The arbitrator(s) shall also have no authority to award punitive, liquidated or consequential damages or the payment of a prevailing party's costs and/or attorneys' fees. Each party shall bear its own costs and expenses and an equal share of the arbitrators' and administrative fees of arbitration. The Corporation, Employee and the arbitrator(s) shall treat all aspects of the arbitration proceedings, including without limitation, discovery, testimony and other evidence, briefs and the award, as strictly confidential; provided, however, that any award or order rendered by the arbitrator(s) under this Agreement may be entered as a judgment or order in a court of competent jurisdiction and may be disclosed by the Corporation as necessary to enforce the terms of the restrictive covenants in Sections (7) through (11) of this Agreement

[remainder of page left blank intentionally]

IN WITNESS WHEREOF, the parties hereto have executed, in the Commonwealth of Massachusetts, this Employment Agreement as a sealed instrument, all as of the day, month and year first written above.

MKS INSTRUMENTS, INC.

By: /s/ Gerald G. Colella
Gerald G. Colella
Chief Executive Officer and President
2 Tech Drive
Andover, MA 01810

/s/ Seth Bagshaw Legal Signature
Seth Bagshaw

Dated: February 24, 2014

APPENDIX A
FORM RELEASE

Introduction

("Executive") separated from MKS Instruments, Inc. (the "Corporation") as of _____, and Executive and the Corporation entered into a Separation Agreement (the "Agreement"), dated _____, pursuant to which, among other things, Executive agreed to release the Releasees from all waivable claims which Executive might have against the Releasees in exchange for the receipt of certain payments and benefits set forth therein upon this Release becoming effective.

Terms

1. As used in this Release, the following words shall mean the following:

(a) "Corporation" shall at all times mean MKS Instruments, Inc., its subsidiaries, divisions, successors and assigns, its affiliated and predecessor companies or corporations, and their successors and assigns.

(b) "Executive" means _____.

(c) "Releasees" shall mean the Corporation, its present or former directors, officers, shareholders, members, employees, attorneys and agents, whether in their individual or official capacities and the current and former trustees or administrators of any pension or other benefit plan applicable to the employees or former employees of the Corporation in their official and individual capacities.

2. After receiving this signed Release from Executive and upon the expiration of the waiting period described in Paragraph 5 (the "Effective Date"), The Corporation will provide Executive with the payments and benefits described in paragraphs _____ through _____ in Section _____ of the Agreement.

3. In exchange for receiving the payments and benefits described in paragraphs _____ and _____ in Section _____ of the Agreement, Executive hereby agrees that Executive is releasing the Releasees from, and waiving, any claim that Executive may have against them for any act, omission, incident or situation which may have occurred at any time up until the Effective Date of this Release. This includes RELEASING AND FOREVER DISCHARGING the Releasees from AND WAIVING:

(a) Any claims arising under Title VII of the Civil Rights Act of 1964, the Age Discrimination in Employment Act, the Americans with Disabilities Act, the Rehabilitation Act, the Equal Pay Act, 42 U.S.C. §§ 1981, 1982, 1983 and 1985, the Massachusetts Fair Employment Practices Act, M.G.L. c. 151B; the Fair Labor Standards Act; the Family and Medical Leave Act, 29 U.S.C. § 2601 et seq., the Massachusetts Civil Rights Act; the Massachusetts Equal Rights Law; the Massachusetts Minimum Fair Wages Statute (M.G.L. c. 151, §§ 1A and 1B); the Massachusetts Payment of Wages Statute (M.G.L. c. 149, § 148, et seq.); the Massachusetts "Blue Laws" (M.G.L. c. 136); and any other claims arising under Chapters 149 through 154 of the Massachusetts General Laws, and any amendments to these statutes;

(b) Any claims arising under the Family and Medical Leave Act, the National Labor Relations Act, the Sarbanes-Oxley Act of 2002, and all other federal, state, and local laws or ordinances relating to employment;

(c) Any claims arising under the Employee Retirement Income Security Act ("ERISA") (but not claims to vested ERISA benefits) or any other federal or state law pertaining to employee retirement or welfare benefits;

(d) Any claims arising under any other federal, state or local statutory or regulatory provision;

(e) Any claims arising under federal common law or under the common law of any state; and

(f) Any claims for attorneys' fees and/or costs.

Notwithstanding the above, this Release does not prevent Executive from pursuing any right or claim which cannot be waived by law. This means, among other things, that even if Executive signs this Release, Executive retains his right to file a charge of discrimination with the Equal Employment Opportunity Commission and to assist in Commission investigations. By signing this Release, however, Executive is waiving any right to recover any relief in federal or state court, in any administrative proceeding or in arbitration, whether such a claim for relief is brought by Executive or through the EEOC (or a comparable state or local agency) or as part of a class action proceeding. This Release also does not prevent Executive from pursuing any claim to enforce this Release or from asserting any future rights Executive may have to any vested benefits that Executive may be entitled to receive.

4. By signing this Release, Executive is hereby acknowledging and agreeing that: (a) Executive is competent to enter into this Release and is fully aware of his right to discuss any and all aspects of this Release with an attorney of his choice; (b) except for the promises contained in the Agreement, the Corporation has made no other promise of any kind to Executive to cause Executive to sign this Release; (c) what Executive is receiving under the Agreement and this Release is in addition to anything of value to which he already is entitled; (d) what Executive is receiving is adequate and satisfactory to him; and (e) the payments and benefits specified in the Agreement and this Release constitute full and final payment in settlement of all waivable claims of any kind, known or unknown, which Executive may have against the Releasees. Executive further acknowledges that he has carefully read and fully understand all of the provisions of this Release, that Executive has had the opportunity to discuss the provisions of this Release with an attorney, and that Executive is voluntarily entering into this Release.

5. **Executive acknowledges and agrees that he has been given a period of up to twenty-one (21) days in which to consider the terms of this Release and that this Release shall not become effective until seven (7) days following the date of his signature.** Prior to that time, Executive may elect to revoke this Release. If Executive chooses to revoke this Release, Executive agrees to notify the Chair of the Board of Directors of the Corporation in writing. **If Executive does not sign and return the Release within the specified period, or Executive revokes it, Executive will forfeit any payments contingent on the Release.** Unless revoked by the Executive, this Release shall become effective eight calendar days after the date that Executive signs this Release, as evidenced by the date adjacent to his signature at the end of this Release (the "Effective Date"). This Release shall not be effective and shall be deemed void as if never made if, prior to the Effective Date, Executive revokes his earlier acceptance of this Release. Payments contingent upon the Executive entering into the Agreement and this Release will not be made (or begin) prior to the expiration of the period specified for revoking this Release. If the period for signing and returning the Agreement or Release extends into a later taxable year, any payments contingent upon the Agreement and Release will be made (or begin) in the later taxable year.

6. By signing this Release, Executive is not waiving any claims against the Releasees for any act or omission that may occur after the signing of this Release.

7. By signing this Release, Executive is hereby acknowledging and agreeing that Executive has been paid all sums due and owing to him as of the date hereof including, but not limited to, all salary, bonus, business expenses, allowances, vacation pay and other benefits and perquisites as a result of Executive's employment with the Corporation, and has received any leaves (paid or unpaid) to which he was entitled during his employment and the Corporation has not denied or interfered with his ability to request or take such leave.

8. Executive hereby agrees that his employment relationship with the Corporation has been severed and that Executive forever waive any right to reinstatement, recall or future employment with the Corporation, unless waived by mutual agreement.

9. Paragraphs through of the Agreement are incorporated by this reference into this Release as if fully and independently set forth below.

10. The Agreement and this Release represent the full and complete understanding of the Executive and the Corporation. The Agreement and this Release shall supersede any inconsistent provisions in the . No prior or contemporaneous oral or written agreements may be offered to alter their terms. This Release shall be binding upon the Executive and the Corporation and upon their heirs, successors and assigns. This Release may not be modified except in a written document signed by both parties.

11. This Release shall be governed by and interpreted in accordance with the laws of the Commonwealth of Massachusetts, without regard to its conflict of law provisions and except to the extent federal law applies.

PLEASE READ CAREFULLY. EMPLOYEE SHOULD CONSULT WITH COUNSEL BEFORE SIGNING THIS DOCUMENT. THIS RELEASE INCLUDES A RELEASE OF KNOWN AND UNKNOWN CLAIMS.

WITNESS: _____
Date

Date
MKS INSTRUMENTS, INC.

ATTEST: _____
Date

By: _____
Chair, Board of Directors Date

EMPLOYMENT AGREEMENT

EMPLOYMENT AGREEMENT dated February 24, 2014 (“Employment Agreement”), by and between MKS Instruments, Inc., a Massachusetts Corporation (the “Corporation”), and John Abrams of Lowell, MA (the “Employee”).

WHEREAS, the Corporation and Employee desire to provide for the employment of Employee by the Corporation:

NOW, THEREFORE, in consideration of the premises and the mutual promises contained herein, the Corporation and Employee hereby agree as follows:

(1) Term of Employment: (a) The Corporation hereby employs Employee, and Employee hereby accepts continued employment with the Corporation, for a period continuing from the first date above until terminated as provided in this Section (1) or Section (5).

(b) Either the Corporation or Employee may terminate Employee’s employment at any time for any reason, or no reason, by giving written notice to the other party stating its or his election to terminate the employment of Employee under this Employment Agreement and an effective date of termination which is at least thirty (30) days after the date of receipt by the other party of such notice; provided, however, that the employment of Employee under this Employment Agreement is subject to prior termination as hereinafter provided in Section (5)(b) and (c). Notwithstanding the above, the Corporation shall be entitled, at its sole discretion, to waive the obligation of Employee to continue to actively work during the 30 day notice period. In the event the Corporation elects at any time to waive the obligation of Employee to actively work during the 30 day notice period, the Corporation shall continue to pay Employee his customary Base Salary (as defined in Section (4)) and will reimburse Employee through the balance of the 30 day notice period for the premiums (if any) Employee pays for continuation of life insurance should Employee elect to exercise the conversion feature (if any) of the Corporation’s group life policy then in effect and for the premiums (if any) for such medical/dental insurance as Employee may then receive should Employee elect continuation under the federal COBRA program.

(c) Employee may terminate employment by delivering notice of resignation no later than thirty (30) days prior to the intended date of termination of employment (“Resignation Date”); provided, however, that the Corporation may at any time and for any reason, or no reason, accelerate the Resignation Date to any date prior thereto up to and including the date Employee delivers such notice of resignation, and such acceleration shall not, in any event, be deemed a termination by Corporation of Employee’s employment. Unless the employment is terminated pursuant to Section (5), the Corporation shall, if it terminates the employment prior to the Resignation Date, continue to pay Employee his customary Base Salary (as defined in Section (4)) and will reimburse Employee through the balance of the 30 day notice period for the premiums (if any) Employee pays for continuation of life insurance should Employee elect to exercise the conversion feature (if any) of the Corporation’s group life policy then in effect and for the premiums (if any) for such medical/dental insurance as Employee may then receive should the Employee elect continuation under the federal COBRA program.

(2) Capacity: Employee is being paid to perform such duties and exercise such powers, authorities and discretions in relation to the Corporation as are customary and incidental to Employee’s position and such other services that are delegated or assigned to Employee by the Chief Executive Officer of the Corporation or his designee, including any authorized manager or supervisor of Employee. It shall be a condition of Employee’s employment hereunder that Employee execute and deliver to the Corporation that Confidential Information Agreement of MKS Instruments, Inc. (“Confidential Information Agreement”) attached hereto as Attachment 1, and by execution of this Employment Agreement, Employee (i) acknowledges receipt of the Confidential Information Agreement and (ii) agrees to be bound by all of the terms of the Confidential Information Agreement.

(3) Extent of Services: During the term of employment of Employee under this Employment Agreement, Employee shall devote his full time to, and use his best efforts in the furtherance of, the business of the Corporation and shall not perform similar duties in any other capacity for any other person or engage in any other business activity which interferes in any way with Employee's performance of his duties to the Corporation, whether or not such business activity is pursued for gain or any other pecuniary advantage, without the prior written consent of the Chief Executive Officer of the Corporation. Notwithstanding the foregoing, Employee may manage his personal investments and be involved in charitable and unremunerated professional activities (including serving on charitable and professional boards), so long as such service is approved by the Chief Executive Officer and does not materially interfere with the performance of Employee's duties hereunder or violate Sections (7) through (11) of this Agreement. Employee agrees and understands that Employee owes the Corporation fidelity and loyalty during the term of employment with the Corporation.

(4) Compensation: In consideration of the services to be rendered by Employee under this Employment Agreement, the Corporation agrees to pay, and the Employee agrees to accept, the following compensation:

(a) Base Salary: A base salary at the rate of two hundred seventy five thousand dollars and zero cents (\$275,000.00) per year for the term of Employee's employment under this Employment Agreement. The base salary shall be payable in equal biweekly installments subject to usual withholding requirements. This salary will be reviewed regularly according to the practices of the Corporation and will be subject to any changes in pay policies implemented by the Corporation from time to time, becoming the Base Salary hereunder, as defined. As an exempt employee, Employee shall not be entitled to receive any overtime pay from the Corporation.

(b) MKS Instruments, Inc. Profit Sharing and 401(k) Plan: Employee shall be eligible to become a participant under the profit sharing plan of the Corporation on fulfilling the conditions set forth in the MKS Instruments, Inc. Profit Sharing and 401(k) Plan, in accordance with its terms.

(c) Vacation: Employee shall be entitled to an annual vacation leave of 15 days at full rate of Base Salary during each calendar year of this Employment Agreement, subject to Employee arranging such vacation so as not to affect adversely the ability of the Corporation to transact its business. Such vacation leave shall accrue and be administered according to the policies and practices of the Corporation.

(d) Life Insurance: The Corporation shall provide and pay such premiums for term life insurance for Employee during the term of Employee's employment under this Employment Agreement in accordance with the term life insurance plan of the Corporation.

(e) Medical/Dental Insurance: The Corporation shall provide group medical/dental insurance for Employee under the plans of the Corporation applicable to Employee during the term of Employee's employment under this Employment Agreement.

(f) Other Benefits: The Corporation shall provide other benefits for Employee under the Plans of the Corporation applicable to Employee during the term of Employee's employment under this Employment Agreement.

(g) Expenses: The Corporation shall reimburse Employee for all reasonable and necessary expenses incurred by Employee in connection with the performance of Employee's duties as an employee of the Corporation. Such reimbursement is subject to the timely submission to the Corporation by Employee of appropriate documentation and/or vouchers in accordance with the customary procedures of the Corporation for expense reimbursement, as such procedures may be revised by the Corporation from time to time, and to such caps on reimbursements as the Corporation may from time to time impose.

(5) Termination: The employment of Employee under this Employment Agreement shall terminate:

(a) On the expiration of the period of employment as provided in Section (1).

(b) Upon the death of Employee, or the Disability of Employee as defined in Section (6) (e) below.

(c) At the election of the Corporation: (i) if Employee shall fail, or refuse, to perform the other covenants and agreements required of him under this Employment Agreement other than as a result of Disability or death; or (ii) for "cause", which term shall mean: (1) Employee's willful or gross neglect of his duties, including the failure to carry out or comply with, in good faith, in any material respect, or the refusal to follow, any lawful and reasonable written directives of the Chief Executive Officer of the Corporation or his designee that are not inconsistent with Employee's position; (2) Employee's material breach of this Employment Agreement or of any of the rules, regulations, policies or procedures of the Corporation, or material violation of the Corporation's statement of corporate policy and/or code of conduct at any time after such statement and code have been adopted by the Board of Directors and have been set forth in writing and delivered to Employee; (3) Employee's commission of a felony or other act of material dishonesty, or plea of other than "not guilty" to any felony or serious misdemeanor charge including but not limited to any act of fraud, embezzlement, misappropriation of Corporation property, moral turpitude, or breach of fiduciary duty that could possibly have a material adverse effect on the Corporation; (4) Employee's unlawful use (including being under the influence) of controlled substances on the Corporation's premises or while performing Employee's duties and responsibilities or indictment related to the commission of any criminal act; (5) Employee's failure or refusal to reasonably cooperate with any Corporation investigation or governmental/regulator authority having jurisdiction over Employee and the Corporation; or (6) Employee's engaging in willful or gross misconduct which is materially injurious to the Corporation or any of its subsidiaries or affiliates or any of its directors or officers, financially or otherwise, or to its or their reputation; in each case determined in good faith by the Chief Executive Officer of the Corporation.

(6) Payment upon Termination: (a) If Employee's employment is terminated by the Corporation other than pursuant to Section (5)(c) the Corporation shall (subject to Employee's entering into and not revoking a General Release with the Corporation in such form as it may then require; and provided that Employee (i) remains in full compliance with the Corporation's Confidential Information Agreement; and (ii) performs such actions as the Corporation may reasonably request in transitioning Employee from his employment with the Corporation) continue to pay Employee the Base Salary (as defined in Section (4)) in effect immediately prior to the time of such termination (but without any bonus, commission or other similar amounts except as may have been earned and are due and payable prior to such termination) for six (6) months after the last full day Employee works under this Employment Agreement at its normal payroll payment dates, by direct deposit or regular mail at Employee's election, provided Employee is not in breach of any of the covenants herein; any unreimbursed expenses due to Employee pursuant the Corporation's policy for which he has submitted acceptable supporting documentation; and any accrued but unused vacation time. The form of General Release currently used by the Corporation is attached hereto as Appendix A, and the Release shall be in substantially similar form with such changes as the Corporation deems appropriate at the time of Employee's termination. Employee shall be entitled to such payment only as set forth herein, and the provisions of this Section (6) shall supersede in their entirety any severance payment provisions in any severance plan, policy, program or arrangement maintained by the Corporation. In addition to any rights or remedies the Corporation may otherwise have, upon any breach of any agreements herein by Employee, Employee's right to any continued payment of separation benefits shall immediately cease, and Employee shall be obligated to repay to the Corporation all amounts paid by the Corporation for the separation benefits except for the amount of \$1,000, which Employee shall be entitled to retain.

(b) In the event Employee's employment is terminated by death, the Corporation shall pay to Employee's estate the compensation which would otherwise be payable to Employee at the end of the month in which his death occurs and other unpaid amounts to which Employee would have been at that time entitled as an Employee under any applicable compensation or benefit plan or program.

(c) In the event Employee's employment is terminated by the Corporation for Cause pursuant to Section (5)(c) hereof, the Corporation shall have no obligation to pay Employee any amounts, except for Base Salary through the last full day of actual work for the Corporation, and any accrued but unused vacation time.

(d) In the event Employee voluntarily resigns, the Corporation shall have no obligation to pay Employee any amounts, except for Base Salary through the last full day of actual work for the Corporation, or, if applicable, amounts payable in accordance with Section (1)(c), and other unpaid amounts to which Employee is at that time entitled under any applicable compensation or benefit plan or program.

(e) If Employee is incapacitated by a physical or mental condition, illness, or injury that prevents Employee from being able to perform his duties under this Employment Agreement in a satisfactory manner for substantially all of a twelve (12) consecutive week period (or such longer period as may be required by law or that the Chief Executive Officer of the Corporation or his designee may, in his discretion, determine) with any reasonable accommodation that may be required by law, then Employee shall be deemed to be unable to perform his job (any such physical or mental condition, illness, or injury, a "Disability"). In such event, the Corporation may terminate Employee's employment, in which case Employee shall receive (i) any accrued but unpaid Base Salary and other unpaid amounts to which Employee is at that time entitled under any applicable compensation or benefit plan or program and (ii) all applicable disability benefits consistent with any applicable benefits program. The Corporation shall have no further obligations to Employee. Nothing in this paragraph is intended to or shall operate to excuse the Corporation from any legal obligations it may have under applicable laws.

(f) In the event Employee's employment terminates without "cause" and in the absence of the other events described in subsection (c) above, or if the Employee terminates for Good Reason (as defined below) within six (6) months of the Effective Date of a consummated Change in Control (as defined below), Employee shall be entitled, in addition to any amount payable under this Section (6)(a), to six (6) months of Base Salary (as defined in Section (4)) in effect immediately prior to the time of such termination (but without any bonus, commission or other similar amounts except as may have been earned and are due and payable prior to such termination). For purposes of this Employment Agreement, a Change in Control means the first to occur of any of the following events: (i) any "person" (as that term is used in Section 13 and 14(d)(2) of the Securities Exchange Act of 1934 ("Exchange Act")) becomes the beneficial owner (as that term is used in Section 13(d) of the Exchange Act), directly or indirectly, of fifty percent (50%) or more of the Corporation's capital stock entitled to vote in the election of directors; (ii) the shareholders of the Corporation approve any consolidation or merger of the Corporation, other than a consolidation or merger of the Corporation in which the holders of the common stock of the Corporation immediately prior to the consolidation or merger hold more than fifty percent (50%) of the common stock of the surviving corporation immediately after the consolidation or merger; (iii) the shareholders of the Corporation approve any plan or proposal for the liquidation or dissolution of the Corporation; or (iv) the shareholders of the Corporation approve the sale or transfer of all or substantially all of the assets of the Corporation to parties that are not within a "controlled group of corporations" (as defined in Code Section 1563) in which the Corporation is a member. For purposes of this Employment Agreement, "Good Reason" shall mean Employee's voluntary separation from service within 90 days following: (i) a material diminution in Employee's positions, duties and responsibilities from those described in this Employment Agreement; (ii) a reduction in Employee's Base Salary (other than a reduction which is part of a

general salary reduction program affecting senior executives of the Corporation); (iii) a material reduction in the aggregate value of the pension and welfare benefits provided to Employee from those in effect prior to the Change in Control (other than a reduction which is proportionate to the reductions applicable to other senior executives pursuant to a cost-saving plan that includes all senior executives); (iv) a material breach of any provision of this Employment Agreement by the Corporation; (v) the Corporation's requiring Employee to be based at a location that creates for Employee a one way commute in excess of 60 miles from his primary residence, except for required travel on the Corporation's business to an extent substantially consistent with the business travel obligations of Employee under this Employment Agreement. Notwithstanding the foregoing, a termination of employment shall not be treated as a termination for Good Reason (i) if Employee shall have consented in writing to the occurrence of the event giving rise to the claim of termination for Good Reason or (ii) unless Employee shall have delivered a written notice to the Corporation within 30 days of his having actual knowledge of the occurrence of one of such events stating that he intends to terminate his employment for Good Reason and specifying the factual basis for such termination, and such event, if capable of being cured, shall not have been cured within 30 days of the receipt of such notice.

In the event amounts payable hereunder are contingent on a Change in Control for the purposes of Internal Revenue Code Section 280G and it is determined by a public accounting firm or legal counsel authorized to practice before the Internal Revenue Service selected by the Corporation that any payment or benefit made or provided to Employee in connection with this Agreement or otherwise (collectively, a "Payment") would be subject to the excise tax imposed by Internal Revenue Code Section 4999 (the "Parachute Tax"), the Payments under this Agreement shall be payable in full or, if applicable, in such lesser amount which would result in no portion of such Payments being subject to the Parachute Tax, whichever of the foregoing amounts, taking into account the applicable federal, state and local income taxes and the Parachute Tax, results in receipt by Employee, on an after-tax basis, of the greatest amount of Payments under this Employment Agreement. If Payments are reduced pursuant to this paragraph, severance payments described above payable over time shall first be reduced (beginning with the last such payment), and the other benefits under this Employment Agreement shall thereafter be reduced, to the extent necessary so that no portion of the Payments is subject to the Parachute Tax. The reporting and payment of any Parachute Tax will be Employee's responsibility and the Corporation will not provide a gross-up or any other payment to compensate Employee for the payment of the Parachute Tax. The Corporation will withhold from the Payments any amounts it reasonably determines is required under Internal Revenue Code Section 4999(c) and the Treasury Regulations thereunder.

(g) The Corporation shall deduct from the amounts payable to Employee pursuant to this Agreement all required withholding amounts and deductions, including but not limited to federal, state, local or foreign withholding amounts in accordance with all applicable laws and regulations and deductions authorized by Employee. Employee shall be solely responsible for and shall pay all taxes associated with the amounts payable under this Agreement. The Corporation shall be entitled to rely on an opinion of counsel if any questions as to the amount or requirement of withholding shall arise.

(h) Employee shall have no obligation to mitigate any payments due hereunder. Any amounts earned by Employee from other employment shall not offset amounts due hereunder. The Corporation's obligation to pay Employee the amounts provided hereunder shall not be subject to set-off, counterclaim or recoupment of amounts owed by Employee to the Corporation or its affiliates, except for any specific, stated amounts owed by Employee to the Corporation, or as otherwise stated herein.

(7) Trade Secrets: Employee covenants and agrees that Employee will communicate to the Corporation, and will not divulge or communicate to any other person, partnership, corporation or other entity without the prior written consent of the Corporation, any trade secrets of the Corporation or confidential information relating to the business of the Corporation or anyone connected with the Corporation, and that such trade secrets and confidential information shall not be used by Employee either on his own behalf or for the benefit of others or disclosed by Employee to any one, except to the Corporation, during or after the term of Employee's employment under this Employment Agreement.

(8) Inventions and Patents: (a) Employee shall make prompt full disclosure in writing to the Corporation of all inventions, improvements and discoveries, whether or not patentable, which Employee conceives, devises, makes, discovers, develops, perfects or first reduces to practice, either alone or jointly with others, during the term of Employee's employment under this Employment Agreement, which relate in any way to the fields, products or business of the Corporation, including development and research, whether during or out of the usual hours of work or on or off the premises of the Corporation or by use of the facilities of the Corporation or otherwise and whether at the request or suggestion of the Corporation or otherwise (all such inventions, improvements and discoveries being hereinafter called the "Inventions"), including any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by Employee after the employment of Employee under this Employment Agreement is terminated if the Inventions were conceived by Employee during the term of Employee's employment under this Employment Agreement. Any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by Employee within six (6) months of the date of termination of the Employee's employment under this Employment Agreement shall be conclusively presumed to have been conceived during the term of Employee's employment under this Employment Agreement.

(b) Employee agrees that the Inventions shall be the sole and exclusive property of the Corporation.

(c) Employee agrees to assist the Corporation and its nominees in every reasonable way (entirely at its or their expense) to obtain for the benefit of the Corporation letters patent for the Inventions and trademarks, trade names and copyrights relating to the Inventions, and any renewals, extensions or reissues thereof, in any and all countries, and agrees to make, execute, acknowledge and deliver, at the request of the Corporation, all written applications for letters patent, trademarks, trade names and copyrights relating to the Inventions and any renewals, extensions or reissues thereof, in any and all countries, and all documents with respect thereto, and all powers of attorney relating thereto and, without further compensation, to assign to the Corporation or its nominee all the right, title and interest of Employee in and to such applications and to any patents, trademarks, trade names or copyrights which shall thereafter issue on any such applications, and to execute, acknowledge and deliver all other documents deemed necessary by the Corporation to transfer to or vest in the Corporation all of the right, title and interest of Employee in and to the Inventions, and to such trademarks, trade names, patents and copyrights together with exclusive rights to make, use, license and sell them throughout the world. If the Corporation is unable, after reasonable effort, to secure Employee's signature on any application for patent, copyright, trademark or other analogous registration or other documents regarding any legal protection relating to any Invention, whether because of Employee's physical or mental incapacity or for any other reason whatsoever, Employee hereby irrevocably designates and appoints the Corporation and its duly authorized officers and agents as Employee's agent and attorney-in-fact, to act for and on Employee's behalf and stead to execute and file any such application or applications or other documents and to do all other lawfully permitted acts to further the prosecution and issuance of patent, copyright or trademark registrations or any other legal protection thereon with the same legal force and effect as if executed by Employee.

(d) Employee agrees that even though his employment is terminated under this Employment Agreement Employee will, at any time after such termination of employment, carry out and perform all of the agreements of Subsections 8(a) and 8(c) above, and will at any time and at all times cooperate with the Corporation in the prosecution and/or defense of any investigation, litigation or legal process which may arise, including in connection with the Inventions, provided, however, that should such services be rendered after termination of Employee's employment under this Employment Agreement, Employee shall be paid reasonable compensation on a per diem basis. The Corporation agrees to provide Employee reasonable notice in the event his assistance is required.

(e) Employee agrees to make and maintain adequate and current written records of all Inventions in the form of notes, sketches, drawings, or reports relating thereto, which records shall be and remain the property of, and available to, the Corporation at all times.

(f) Employee agrees that he will, upon leaving the Corporation's employment, promptly deliver to the Corporation all originals and copies of disclosures, drawings, prints, letters, notes, and reports either typed, handwritten or otherwise memorialized, belonging to the Corporation which are in his possession or under his control and Employee agrees that he will not retain or give away or make copies of the originals or copies of any such disclosures, drawings, prints, letters, notes or reports.

(9) Property of Corporation: All files, records, reports, documents, drawings, specifications, equipment, and similar items relating to the business of the Corporation, whether prepared by e Employee or otherwise coming into his possession, shall remain the exclusive property of the Corporation and shall not be removed by Employee from the premises of the Corporation under any circumstances whatsoever without the prior written consent of the Corporation.

(10) Noncompetition Agreement: (a) Employee shall not, without the written consent of the Corporation, during the term of employment with the Corporation and for the period of one year thereafter (the "Non-Compete Period"), engage in or otherwise carry on, directly or indirectly anywhere in the world (either as principal, agent, employee, employer, investor, shareholder (except for holdings of no greater than 1% of the total outstanding shares in a publicly-traded company), consultant, partner, member, financier or in any other individual or representative capacity of any kind whatsoever), any business or activity competitive with the Corporation but solely to the extent such business or activity is related to, similar to or competitive with the activities of the business unit(s), division(s), laborator(y)(ies), facilit(y)(ies) and other operational unit(s) in or for which Employee performed work for the Corporation or about which Employee acquired Proprietary Information (as defined in the Confidential Information Agreement). The Non-Compete Period shall be extended for any period during which Employee is in breach of this Employment Agreement or the Confidential Information Agreement.

(b) The Corporation and Employee agree that the services of Employee are of a personal, special, unique and extraordinary character, and cannot be replaced by the Corporation without great difficulty, and that the violation by Employee of any of his agreements under this Section 10 would damage the goodwill of the Corporation and cause the Corporation irreparable harm that could not reasonably or adequately be compensated in damages in an action at law, and that the agreements of Employee under this Section 10 may be enforced by the Corporation in equity by an injunction, declaratory judgment tor restraining order in addition to being enforced by the Corporation at law.

(c) In the event that this Section 10 shall be determined by any court of competent jurisdiction to be unenforceable by reason of its extending for too long a period of time or over too great a range of activities or geographic scope, it shall be interpreted to extend only over the maximum period of time or range of activities or geographic scope as to which it may be enforceable.

(11) Non-Solicitation: Employee shall not, on his own behalf or in the service or on behalf of others, directly or indirectly:

(a) solicit, entice or induce any Customer (as defined below) to become a customer, distributor or supplier of any other person, firm or corporation with respect to products and/or services sold or under development by the Corporation during his employment at the Corporation, or to cease doing business with the Corporation, and Employee shall not contact or approach any such person, firm or corporation for such purpose or authorize or knowingly approve the taking of such actions by any other person for a period of twenty-four (24) months from the date of the termination of Employee's employment under this Employment Agreement; or

(b) solicit, recruit or hire (or attempt to solicit, recruit or hire) any employee, officer or agent of the Corporation or contractor engaged by the Corporation (whether or not such person is a full-time executive or whether or not such employment is pursuant to a written agreement or at-will) to terminate such person's

employment or engagement with the Corporation or work for a third party other than the Corporation for a period of twenty-four (24) months after the date of the termination of Employee's employment under this Employment Agreement, or engage in any activity that would cause such employee or contractor to violate any agreement with the Corporation, nor shall Employee form any partnership with, or establish any business venture in cooperation with, any such person.

(c) For the purposes of this Section 11, a "Customer" means any person or entity which as of the date of the termination of Employee's employment under this Employment Agreement was, within two (2) years prior to such time, a customer, distributor or supplier of the Corporation, and references to the Corporation shall be deemed to include any affiliate or subsidiary of the Corporation.

(12) Non-disparagement: Employee shall not disparage the Corporation, any of its products or practices, or any of its directors, officers, or employees, whether orally, in writing or otherwise, at any time. Notwithstanding the foregoing: nothing in this Section shall (i) limit the ability of Employee to provide truthful testimony as required by law or any judicial or administrative process, or (ii) prevent any Person from making any truthful statement to the extent necessary in any litigation, arbitration, or mediation proceeding involving this Employment Agreement, including, but not limited to, the enforcement of this Employment Agreement. In no event shall any termination of Employee's employment by the Corporation or Employee for any reason constitute disparagement for purposes of this Section.

(13) Notice: Any and all notices under this Employment Agreement shall be in writing and, if to the Corporation, shall be duly given if sent to the Corporation by registered or certified mail, postage prepaid, return receipt requested, at the address of the Corporation set forth under its name below or at such other address as the Corporation may hereafter designate to Employee in writing for the purpose, and if to Employee, shall be duly given if delivered to Employee by hand or if sent to Employee by registered or certified mail, postage prepaid, return receipt requested, at the address of Employee set forth under his name below or at such other address as Employee may hereafter designate to the Corporation in writing for the purpose.

(14) Assignment: The rights and obligations of the Corporation under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the successors and assigns of the Corporation. The rights and obligations of Employee under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the heirs, executors and legal representatives of Employee. Employee shall not delegate his employment or obligations under this Employment Agreement to any other person.

(15) Code Section 409A Compliance: Where Section (6) refers to Employee's termination of employment for purposes of receiving any payment, whether such a termination has occurred will be determined in accordance with Section 409A of the Internal Revenue Code and Treasury Regulation Section 1.409A-1(h) (or any successor provisions). Where the Employment Agreement requires the following payments to be made to Employee, the following rules shall apply, and any inconsistent provision is superseded:

To the extent that this Employment Agreement requires that a payment shall be made upon or as soon as reasonably practicable after an event (*e.g.*, termination of employment), such payment shall be made no later than sixty (60) days after the occurrence of such event (or, if earlier, within two-and-a-half (2 1/2) months following the end of the Employee's taxable year in which such event occurs). Employee may not designate the year of such payment. To the extent that benefits under Section (6) are contingent upon Employee providing a General Release, Employee shall sign and return the General Release within the reasonable time period designated by the Corporation, which shall be no less than twenty-one (21) days but no more than forty-five (45) days. If such designated time period for review and revocation of the General Release crosses calendar years, payments for the period for review and return of the Release shall be made in the later calendar year. Any payments that would otherwise be made during the period for review and revocation of the General Release will be made on the first scheduled payment date after such period ends. To the extent that the Employment Agreement provides for the reimbursement of specified expenses incurred by Employee, such

reimbursement shall be made in accordance with the provisions of the Employment Agreement, but in no event later than the last day of Employee's taxable year following the taxable year in which the expense was incurred. The amount of expenses eligible for reimbursement or in-kind benefits provided by the Corporation in any taxable year of Employee shall not affect the amount of expenses or in-kind benefits to be reimbursed or provided in any other year (except in the case of maximum benefits to be provided under a medical reimbursement arrangement, if applicable). Bonus otherwise payable under the Employment Agreement after the end of a bonus plan performance period shall be paid within two-and-a-half (2 ½) months after the end of the fiscal year of the Corporation to which such Bonus relates. Each payment in respect of Employee's termination of employment under Section 6 of the Employment Agreement is designated as a separate payment for purposes of the short-term deferral rules under Treasury Regulation Section 1.409A-1(b)(4)(i)(F) and the exemption for involuntary terminations under separation pay plans under Treasury Regulation Section 1.409A-1(b)(9)(iii).

If Employee is designated as a "specified Executive" within the meaning of Code Section 409A (while the Corporation is publicly traded on any securities market), any deferred compensation payment subject to Section 409A to be made during the six-month period following Employee's termination of employment shall be withheld and the amount of the payments withheld will be paid in a lump sum, without interest, during the seventh month after Employee's termination; provided, however, that if Employee dies prior to the expiration of such six month period, payment to Employee beneficiary shall be made as soon as reasonably practicable following Employee's death. The Corporation shall identify in writing delivered to Employee any payments it reasonably determines are subject to delay under this Section. In no event shall the Corporation have any liability or obligation with respect to taxes for which Employee may become liable as a result of the application of Code Section 409A.

(16) Entire Agreement and Severability: (a) This Employment Agreement and the Confidential Information Agreement supersede any and all other agreements, either oral or in writing, between the parties hereto with respect to the employment of Employee by the Corporation and contains all of the covenants and agreements between the parties with respect to such employment. In the event of any discrepancy between the terms of this Employment Agreement and the Confidential Information Agreement, this Employment Agreement controls. Each party to this Employment Agreement acknowledges that no representations, inducements, promises or agreements, oral or otherwise, have been made by any party, or any one acting on behalf of any party, which are not embodied herein, and that no other agreement, statement or promise not contained in this Employment Agreement shall be valid and binding. Any modification of this Employment Agreement will be effective only if it is in writing signed by both parties to this Employment Agreement.

(b) If any provision in this Employment Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions shall nevertheless continue in full force and effect without being impaired or invalidated in any way.

(c) All pronouns used herein shall include the masculine, feminine, and neuter gender as the context requires.

(17) Miscellaneous: This Employment Agreement and the rights and obligations of the parties hereunder shall be governed by, and construed in accordance with, the laws of the Commonwealth of Massachusetts, excluding (but only to the extent permitted by law) its conflict of laws and choice of law rules. The parties hereto further agree that service of any process, summons, notice or document by U.S. certified mail or overnight delivery by a generally recognized commercial courier service to Employee's last known address (or any mode of service recognized to be effective by applicable law) will be effective service of process for any action, suit or proceeding brought against Employee in any such court. This Employment Agreement may be executed in any number of counterparts, each of which, when executed by both parties to this Employment Agreement shall be deemed to be an original, and all of which counterparts together shall constitute one and the same instrument. The failure of either party hereto to enforce any right under this Employment Agreement shall not be construed to be a waiver of that right, or of damages caused thereby, or of any other rights under this Employment Agreement.

(18) **Arbitration:** Any dispute under this Employment Agreement shall be resolved by final and binding arbitration; provided, however, that the Corporation, in its sole discretion, may enforce the covenants set out above in Sections (7) through (11) of this Agreement by bringing a proceeding in any court of competent jurisdiction. In addition, any issues pertaining to the ability to arbitrate a dispute under this Agreement shall be determined by a court of competent jurisdiction and not by an arbitrator. The arbitration shall be held in the Commonwealth of Massachusetts and shall be conducted in accordance with the then-prevailing Commercial Arbitration Rules of the American Arbitration Association. Employee shall arbitrate individual claims only. The arbitrator shall be acceptable to both the Corporation and Employee. If the parties cannot agree on an acceptable arbitrator, the dispute shall be heard by a panel of three arbitrators, one appointed by the Corporation and one appointed by Employee, and the third selected by the other two arbitrators. Under no circumstances may the arbitrator(s) have the authority to require Employee's reinstatement to employment or continued employment, or award any lost wages or benefits (other than severance benefits as described above) as a result of Employee's termination of employment for any reason. The arbitrator(s) shall also have no authority to award punitive, liquidated or consequential damages or the payment of a prevailing party's costs and/or attorneys' fees. Each party shall bear its own costs and expenses and an equal share of the arbitrators' and administrative fees of arbitration. The Corporation, Employee and the arbitrator(s) shall treat all aspects of the arbitration proceedings, including without limitation, discovery, testimony and other evidence, briefs and the award, as strictly confidential; provided, however, that any award or order rendered by the arbitrator(s) under this Agreement may be entered as a judgment or order in a court of competent jurisdiction and may be disclosed by the Corporation as necessary to enforce the terms of the restrictive covenants in Sections (7) through (11) of this Agreement

[remainder of page left blank intentionally]

IN WITNESS WHEREOF, the parties hereto have executed, in the Commonwealth of Massachusetts, this Employment Agreement as a sealed instrument, all as of the day, month and year first written above.

MKS INSTRUMENTS, INC.

By: /s/ Gerald G. Colella
Gerald G. Colella
Chief Executive Officer and President
2 Tech Drive
Andover, MA 01810

/s/ John Abrams Legal Signature
John Abrams

Dated: February 21, 2014

APPENDIX A
FORM RELEASE

Introduction

("Executive") separated from MKS Instruments, Inc. (the "Corporation") as of _____, and Executive and the Corporation entered into a Separation Agreement (the "Agreement"), dated _____, pursuant to which, among other things, Executive agreed to release the Releasees from all waivable claims which Executive might have against the Releasees in exchange for the receipt of certain payments and benefits set forth therein upon this Release becoming effective.

Terms

1. As used in this Release, the following words shall mean the following:

(a) "Corporation" shall at all times mean MKS Instruments, Inc., its subsidiaries, divisions, successors and assigns, its affiliated and predecessor companies or corporations, and their successors and assigns.

(b) "Executive" means _____.

(c) "Releasees" shall mean the Corporation, its present or former directors, officers, shareholders, members, employees, attorneys and agents, whether in their individual or official capacities and the current and former trustees or administrators of any pension or other benefit plan applicable to the employees or former employees of the Corporation in their official and individual capacities.

2. After receiving this signed Release from Executive and upon the expiration of the waiting period described in Paragraph 5 (the "Effective Date"), The Corporation will provide Executive with the payments and benefits described in paragraphs _____ through _____ in Section _____ of the Agreement.

3. In exchange for receiving the payments and benefits described in paragraphs _____ and _____ in Section _____ of the Agreement, Executive hereby agrees that Executive is releasing the Releasees from, and waiving, any claim that Executive may have against them for any act, omission, incident or situation which may have occurred at any time up until the Effective Date of this Release. This includes RELEASING AND FOREVER DISCHARGING the Releasees from AND WAIVING:

(a) Any claims arising under Title VII of the Civil Rights Act of 1964, the Age Discrimination in Employment Act, the Americans with Disabilities Act, the Rehabilitation Act, the Equal Pay Act, 42 U.S.C. §§ 1981, 1982, 1983 and 1985, the Massachusetts Fair Employment Practices Act, M.G.L. c. 151B; the Fair Labor Standards Act; the Family and Medical Leave Act, 29 U.S.C. § 2601 et seq., the Massachusetts Civil Rights Act; the Massachusetts Equal Rights Law; the Massachusetts Minimum Fair Wages Statute (M.G.L. c. 151, §§ 1A and 1B); the Massachusetts Payment of Wages Statute (M.G.L. c. 149, § 148, et seq.); the Massachusetts "Blue Laws" (M.G.L. c. 136); and any other claims arising under Chapters 149 through 154 of the Massachusetts General Laws, and any amendments to these statutes;

(b) Any claims arising under the Family and Medical Leave Act, the National Labor Relations Act, the Sarbanes-Oxley Act of 2002, and all other federal, state, and local laws or ordinances relating to employment;

(c) Any claims arising under the Employee Retirement Income Security Act ("ERISA") (but not claims to vested ERISA benefits) or any other federal or state law pertaining to employee retirement or welfare benefits;

(d) Any claims arising under any other federal, state or local statutory or regulatory provision;

(e) Any claims arising under federal common law or under the common law of any state; and

(f) Any claims for attorneys' fees and/or costs.

Notwithstanding the above, this Release does not prevent Executive from pursuing any right or claim which cannot be waived by law. This means, among other things, that even if Executive signs this Release, Executive retains his right to file a charge of discrimination with the Equal Employment Opportunity Commission and to assist in Commission investigations. By signing this Release, however, Executive is waiving any right to recover any relief in federal or state court, in any administrative proceeding or in arbitration, whether such a claim for relief is brought by Executive or through the EEOC (or a comparable state or local agency) or as part of a class action proceeding. This Release also does not prevent Executive from pursuing any claim to enforce this Release or from asserting any future rights Executive may have to any vested benefits that Executive may be entitled to receive.

4. By signing this Release, Executive is hereby acknowledging and agreeing that: (a) Executive is competent to enter into this Release and is fully aware of his right to discuss any and all aspects of this Release with an attorney of his choice; (b) except for the promises contained in the Agreement, the Corporation has made no other promise of any kind to Executive to cause Executive to sign this Release; (c) what Executive is receiving under the Agreement and this Release is in addition to anything of value to which he already is entitled; (d) what Executive is receiving is adequate and satisfactory to him; and (e) the payments and benefits specified in the Agreement and this Release constitute full and final payment in settlement of all waivable claims of any kind, known or unknown, which Executive may have against the Releasees. Executive further acknowledges that he has carefully read and fully understand all of the provisions of this Release, that Executive has had the opportunity to discuss the provisions of this Release with an attorney, and that Executive is voluntarily entering into this Release.

5. **Executive acknowledges and agrees that he has been given a period of up to twenty-one (21) days in which to consider the terms of this Release and that this Release shall not become effective until seven (7) days following the date of his signature.** Prior to that time, Executive may elect to revoke this Release. If Executive chooses to revoke this Release, Executive agrees to notify the Chair of the Board of Directors of the Corporation in writing. **If Executive does not sign and return the Release within the specified period, or Executive revokes it, Executive will forfeit any payments contingent on the Release.** Unless revoked by the Executive, this Release shall become effective eight calendar days after the date that Executive signs this Release, as evidenced by the date adjacent to his signature at the end of this Release (the "Effective Date"). This Release shall not be effective and shall be deemed void as if never made if, prior to the Effective Date, Executive revokes his earlier acceptance of this Release. Payments contingent upon the Executive entering into the Agreement and this Release will not be made (or begin) prior to the expiration of the period specified for revoking this Release. If the period for signing and returning the Agreement or Release extends into a later taxable year, any payments contingent upon the Agreement and Release will be made (or begin) in the later taxable year.

6. By signing this Release, Executive is not waiving any claims against the Releasees for any act or omission that may occur after the signing of this Release.

7. By signing this Release, Executive is hereby acknowledging and agreeing that Executive has been paid all sums due and owing to him as of the date hereof including, but not limited to, all salary, bonus, business expenses, allowances, vacation pay and other benefits and perquisites as a result of Executive's employment with the Corporation, and has received any leaves (paid or unpaid) to which he was entitled during his employment and the Corporation has not denied or interfered with his ability to request or take such leave.

8. Executive hereby agrees that his employment relationship with the Corporation has been severed and that Executive forever waive any right to reinstatement, recall or future employment with the Corporation, unless waived by mutual agreement.

9. Paragraphs through of the Agreement are incorporated by this reference into this Release as if fully and independently set forth below.

10. The Agreement and this Release represent the full and complete understanding of the Executive and the Corporation. The Agreement and this Release shall supersede any inconsistent provisions in the . No prior or contemporaneous oral or written agreements may be offered to alter their terms. This Release shall be binding upon the Executive and the Corporation and upon their heirs, successors and assigns. This Release may not be modified except in a written document signed by both parties.

11. This Release shall be governed by and interpreted in accordance with the laws of the Commonwealth of Massachusetts, without regard to its conflict of law provisions and except to the extent federal law applies.

PLEASE READ CAREFULLY. EMPLOYEE SHOULD CONSULT WITH COUNSEL BEFORE SIGNING THIS DOCUMENT. THIS RELEASE INCLUDES A RELEASE OF KNOWN AND UNKNOWN CLAIMS.

WITNESS: _____ Date
_____ Date

MKS INSTRUMENTS, INC.

ATTEST: _____ Date
By: _____ Date
Chair, Board of Directors

EMPLOYMENT AGREEMENT

EMPLOYMENT AGREEMENT dated February 24, 2014 (“Employment Agreement”), by and between MKS Instruments, Inc., a Massachusetts Corporation (the “Corporation”), and Paul Eyerman of Penfield, NY (the “Employee”).

WHEREAS, the Corporation and Employee desire to provide for the employment of Employee by the Corporation:

NOW, THEREFORE, in consideration of the premises and the mutual promises contained herein, the Corporation and Employee hereby agree as follows:

(1) Term of Employment: (a) The Corporation hereby employs Employee, and Employee hereby accepts continued employment with the Corporation, for a period continuing from the first date above until terminated as provided in this Section (1) or Section (5).

(b) Either the Corporation or Employee may terminate Employee’s employment at any time for any reason, or no reason, by giving written notice to the other party stating its or his election to terminate the employment of Employee under this Employment Agreement and an effective date of termination which is at least thirty (30) days after the date of receipt by the other party of such notice; provided, however, that the employment of Employee under this Employment Agreement is subject to prior termination as hereinafter provided in Section (5)(b) and (c). Notwithstanding the above, the Corporation shall be entitled, at its sole discretion, to waive the obligation of Employee to continue to actively work during the 30 day notice period. In the event the Corporation elects at any time to waive the obligation of Employee to actively work during the 30 day notice period, the Corporation shall continue to pay Employee his customary Base Salary (as defined in Section (4)) and will reimburse Employee through the balance of the 30 day notice period for the premiums (if any) Employee pays for continuation of life insurance should Employee elect to exercise the conversion feature (if any) of the Corporation’s group life policy then in effect and for the premiums (if any) for such medical/dental insurance as Employee may then receive should Employee elect continuation under the federal COBRA program.

(c) Employee may terminate employment by delivering notice of resignation no later than thirty (30) days prior to the intended date of termination of employment (“Resignation Date”); provided, however, that the Corporation may at any time and for any reason, or no reason, accelerate the Resignation Date to any date prior thereto up to and including the date Employee delivers such notice of resignation, and such acceleration shall not, in any event, be deemed a termination by Corporation of Employee’s employment. Unless the employment is terminated pursuant to Section (5), the Corporation shall, if it terminates the employment prior to the Resignation Date, continue to pay Employee his customary Base Salary (as defined in Section (4)) and will reimburse Employee through the balance of the 30 day notice period for the premiums (if any) Employee pays for continuation of life insurance should Employee elect to exercise the conversion feature (if any) of the Corporation’s group life policy then in effect and for the premiums (if any) for such medical/dental insurance as Employee may then receive should the Employee elect continuation under the federal COBRA program.

(2) Capacity: Employee is being paid to perform such duties and exercise such powers, authorities and discretions in relation to the Corporation as are customary and incidental to Employee’s position and such other services that are delegated or assigned to Employee by the Chief Executive Officer of the Corporation or his designee, including any authorized manager or supervisor of Employee. It shall be a condition of Employee’s employment hereunder that Employee execute and deliver to the Corporation that Confidential Information Agreement of MKS Instruments, Inc. (“Confidential Information Agreement”) attached hereto as Attachment 1, and by execution of this Employment Agreement, Employee (i) acknowledges receipt of the Confidential Information Agreement and (ii) agrees to be bound by all of the terms of the Confidential Information Agreement.

(3) **Extent of Services:** During the term of employment of Employee under this Employment Agreement, Employee shall devote his full time to, and use his best efforts in the furtherance of, the business of the Corporation and shall not perform similar duties in any other capacity for any other person or engage in any other business activity which interferes in any way with Employee's performance of his duties to the Corporation, whether or not such business activity is pursued for gain or any other pecuniary advantage, without the prior written consent of the Chief Executive Officer of the Corporation. Notwithstanding the foregoing, Employee may manage his personal investments and be involved in charitable and unremunerated professional activities (including serving on charitable and professional boards), so long as such service is approved by the Chief Executive Officer and does not materially interfere with the performance of Employee's duties hereunder or violate Sections (7) through (11) of this Agreement. Employee agrees and understands that Employee owes the Corporation fidelity and loyalty during the term of employment with the Corporation.

(4) **Compensation:** In consideration of the services to be rendered by Employee under this Employment Agreement, the Corporation agrees to pay, and the Employee agrees to accept, the following compensation:

(a) **Base Salary:** A base salary at the rate of two hundred seventy thousand three hundred dollars and zero cents (\$270,300) per year for the term of Employee's employment under this Employment Agreement. The base salary shall be payable in equal biweekly installments subject to usual withholding requirements. This salary will be reviewed regularly according to the practices of the Corporation and will be subject to any changes in pay policies implemented by the Corporation from time to time, becoming the Base Salary hereunder, as defined. As an exempt employee, Employee shall not be entitled to receive any overtime pay from the Corporation.

(b) **MKS Instruments, Inc. Profit Sharing and 401(k) Plan:** Employee shall be eligible to become a participant under the profit sharing plan of the Corporation on fulfilling the conditions set forth in the MKS Instruments, Inc. Profit Sharing and 401(k) Plan, in accordance with its terms.

(c) **Vacation:** Employee shall be entitled to an annual vacation leave of 20 days at full rate of Base Salary during each calendar year of this Employment Agreement, subject to Employee arranging such vacation so as not to affect adversely the ability of the Corporation to transact its business. Such vacation leave shall accrue and be administered according to the policies and practices of the Corporation.

(d) **Life Insurance:** The Corporation shall provide and pay such premiums for term life insurance for Employee during the term of Employee's employment under this Employment Agreement in accordance with the term life insurance plan of the Corporation.

(e) **Medical/Dental Insurance:** The Corporation shall provide group medical/dental insurance for Employee under the plans of the Corporation applicable to Employee during the term of Employee's employment under this Employment Agreement.

(f) **Other Benefits:** The Corporation shall provide other benefits for Employee under the Plans of the Corporation applicable to Employee during the term of Employee's employment under this Employment Agreement.

(g) **Expenses:** The Corporation shall reimburse Employee for all reasonable and necessary expenses incurred by Employee in connection with the performance of Employee's duties as an employee of the Corporation. Such reimbursement is subject to the timely submission to the Corporation by Employee of appropriate documentation and/or vouchers in accordance with the customary procedures of the Corporation for expense reimbursement, as such procedures may be revised by the Corporation from time to time, and to such caps on reimbursements as the Corporation may from time to time impose.

(5) Termination: The employment of Employee under this Employment Agreement shall terminate:

(a) On the expiration of the period of employment as provided in Section (1).

(b) Upon the death of Employee, or the Disability of Employee as defined in Section (6)(e) below.

(c) At the election of the Corporation: (i) if Employee shall fail, or refuse, to perform the other covenants and agreements required of him under this Employment Agreement other than as a result of Disability or death; or (ii) for "cause", which term shall mean: (1) Employee's willful or gross neglect of his duties, including the failure to carry out or comply with, in good faith, in any material respect, or the refusal to follow, any lawful and reasonable written directives of the Chief Executive Officer of the Corporation or his designee that are not inconsistent with Employee's position; (2) Employee's material breach of this Employment Agreement or of any of the rules, regulations, policies or procedures of the Corporation, or material violation of the Corporation's statement of corporate policy and/or code of conduct at any time after such statement and code have been adopted by the Board of Directors and have been set forth in writing and delivered to Employee; (3) Employee's commission of a felony or other act of material dishonesty, or plea of other than "not guilty" to any felony or serious misdemeanor charge including but not limited to any act of fraud, embezzlement, misappropriation of Corporation property, moral turpitude, or breach of fiduciary duty that could possibly have a material adverse effect on the Corporation; (4) Employee's unlawful use (including being under the influence) of controlled substances on the Corporation's premises or while performing Employee's duties and responsibilities or indictment related to the commission of any criminal act; (5) Employee's failure or refusal to reasonably cooperate with any Corporation investigation or governmental/regulator authority having jurisdiction over Employee and the Corporation; or (6) Employee's engaging in willful or gross misconduct which is materially injurious to the Corporation or any of its subsidiaries or affiliates or any of its directors or officers, financially or otherwise, or to its or their reputation; in each case determined in good faith by the Chief Executive Officer of the Corporation.

(6) Payment upon Termination: (a) If Employee's employment is terminated by the Corporation other than pursuant to Section (5)(c) the Corporation shall (subject to Employee's entering into and not revoking a General Release with the Corporation in such form as it may then require; and provided that Employee (i) remains in full compliance with the Corporation's Confidential Information Agreement; and (ii) performs such actions as the Corporation may reasonably request in transitioning Employee from his employment with the Corporation) continue to pay Employee the Base Salary (as defined in Section (4)) in effect immediately prior to the time of such termination (but without any bonus, commission or other similar amounts except as may have been earned and are due and payable prior to such termination) for three (3) months after the last full day Employee works under this Employment Agreement at its normal payroll payment dates, by direct deposit or regular mail at Employee's election, provided Employee is not in breach of any of the covenants herein; any unreimbursed expenses due to Employee pursuant the Corporation's policy for which he has submitted acceptable supporting documentation; and any accrued but unused vacation time. The form of General Release currently used by the Corporation is attached hereto as Appendix A, and the Release shall be in substantially similar form with such changes as the Corporation deems appropriate at the time of Employee's termination. Employee shall be entitled to such payment only as set forth herein, and the provisions of this Section (6) shall supersede in their entirety any severance payment provisions in any severance plan, policy, program or arrangement maintained by the Corporation. In addition to any rights or remedies the Corporation may otherwise have, upon any breach of any agreements herein by Employee, Employee's right to any continued

payment of separation benefits shall immediately cease, and Employee shall be obligated to repay to the Corporation all amounts paid by the Corporation for the separation benefits except for the amount of \$1,000, which Employee shall be entitled to retain.

(b) In the event Employee's employment is terminated by death, the Corporation shall pay to Employee's estate the compensation which would otherwise be payable to Employee at the end of the month in which his death occurs and other unpaid amounts to which Employee would have been at that time entitled as an Employee under any applicable compensation or benefit plan or program.

(c) In the event Employee's employment is terminated by the Corporation for Cause pursuant to Section (5)(c) hereof, the Corporation shall have no obligation to pay Employee any amounts, except for Base Salary through the last full day of actual work for the Corporation, and any accrued but unused vacation time.

(d) In the event Employee voluntarily resigns, the Corporation shall have no obligation to pay Employee any amounts, except for Base Salary through the last full day of actual work for the Corporation, or, if applicable, amounts payable in accordance with Section (1)(c), and other unpaid amounts to which Employee is at that time entitled under any applicable compensation or benefit plan or program.

(e) If Employee is incapacitated by a physical or mental condition, illness, or injury that prevents Employee from being able to perform his duties under this Employment Agreement in a satisfactory manner for substantially all of a twelve (12) consecutive week period (or such longer period as may be required by law or that the Chief Executive Officer of the Corporation or his designee may, in his discretion, determine) with any reasonable accommodation that may be required by law, then Employee shall be deemed to be unable to perform his job (any such physical or mental condition, illness, or injury, a "Disability"). In such event, the Corporation may terminate Employee's employment, in which case Employee shall receive (i) any accrued but unpaid Base Salary and other unpaid amounts to which Employee is at that time entitled under any applicable compensation or benefit plan or program and (ii) all applicable disability benefits consistent with any applicable benefits program. The Corporation shall have no further obligations to Employee. Nothing in this paragraph is intended to or shall operate to excuse the Corporation from any legal obligations it may have under applicable laws.

(f) The Corporation shall deduct from the amounts payable to Employee pursuant to this Agreement all required withholding amounts and deductions, including but not limited to federal, state, local or foreign withholding amounts in accordance with all applicable laws and regulations and deductions authorized by Employee. Employee shall be solely responsible for and shall pay all taxes associated with the amounts payable under this Agreement. The Corporation shall be entitled to rely on an opinion of counsel if any questions as to the amount or requirement of withholding shall arise.

(g) Employee shall have no obligation to mitigate any payments due hereunder. Any amounts earned by Employee from other employment shall not offset amounts due hereunder. The Corporation's obligation to pay Employee the amounts provided hereunder shall not be subject to set-off, counterclaim or recoupment of amounts owed by Employee to the Corporation or its affiliates, except for any specific, stated amounts owed by Employee to the Corporation, or as otherwise stated herein.

(7) Trade Secrets: Employee covenants and agrees that Employee will communicate to the Corporation, and will not divulge or communicate to any other person, partnership, corporation or other entity without the prior written consent of the Corporation, any trade secrets of the Corporation or confidential information relating to the business of the Corporation or anyone connected with the Corporation, and that such trade secrets and confidential information shall not be used by Employee either on his own behalf or for the benefit of others or disclosed by Employee to any one, except to the Corporation, during or after the term of Employee's employment under this Employment Agreement.

(8) Inventions and Patents: (a) Employee shall make prompt full disclosure in writing to the Corporation of all inventions, improvements and discoveries, whether or not patentable, which Employee conceives, devises, makes, discovers, develops, perfects or first reduces to practice, either alone or jointly with others, during the term of Employee's employment under this Employment Agreement, which relate in any way to the fields, products or business of the Corporation, including development and research, whether during or out of the usual hours of work or on or off the premises of the Corporation or by use of the facilities of the Corporation or otherwise and whether at the request or suggestion of the Corporation or otherwise (all such inventions, improvements and discoveries being hereinafter called the "Inventions"), including any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by Employee after the employment of Employee under this Employment Agreement is terminated if the Inventions were conceived by Employee during the term of Employee's employment under this Employment Agreement. Any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by Employee within six (6) months of the date of termination of the Employee's employment under this Employment Agreement shall be conclusively presumed to have been conceived during the term of Employee's employment under this Employment Agreement.

(b) Employee agrees that the Inventions shall be the sole and exclusive property of the Corporation.

(c) Employee agrees to assist the Corporation and its nominees in every reasonable way (entirely at its or their expense) to obtain for the benefit of the Corporation letters patent for the Inventions and trademarks, trade names and copyrights relating to the Inventions, and any renewals, extensions or reissues thereof, in any and all countries, and agrees to make, execute, acknowledge and deliver, at the request of the Corporation, all written applications for letters patent, trademarks, trade names and copyrights relating to the Inventions and any renewals, extensions or reissues thereof, in any and all countries, and all documents with respect thereto, and all powers of attorney relating thereto and, without further compensation, to assign to the Corporation or its nominee all the right, title and interest of Employee in and to such applications and to any patents, trademarks, trade names or copyrights which shall thereafter issue on any such applications, and to execute, acknowledge and deliver all other documents deemed necessary by the Corporation to transfer to or vest in the Corporation all of the right, title and interest of Employee in and to the Inventions, and to such trademarks, trade names, patents and copyrights together with exclusive rights to make, use, license and sell them throughout the world. If the Corporation is unable, after reasonable effort, to secure Employee's signature on any application for patent, copyright, trademark or other analogous registration or other documents regarding any legal protection relating to any Invention, whether because of Employee's physical or mental incapacity or for any other reason whatsoever, Employee hereby irrevocably designates and appoints the Corporation and its duly authorized officers and agents as Employee's agent and attorney-in-fact, to act for and on Employee's behalf and stand to execute and file any such application or applications or other documents and to do all other lawfully permitted acts to further the prosecution and issuance of patent, copyright or trademark registrations or any other legal protection thereon with the same legal force and effect as if executed by Employee.

(d) Employee agrees that even though his employment is terminated under this Employment Agreement Employee will, at any time after such termination of employment, carry out and perform all of the agreements of Subsections 8(a) and 8(c) above, and will at any time and at all times cooperate with the Corporation in the prosecution and/or defense of any investigation, litigation or legal process which may arise, including in connection with the Inventions, provided, however, that should such services be rendered after termination of Employee's employment under this Employment Agreement, Employee shall be paid reasonable compensation on a per diem basis. The Corporation agrees to provide Employee reasonable notice in the event his assistance is required.

(e) Employee agrees to make and maintain adequate and current written records of all Inventions in the form of notes, sketches, drawings, or reports relating thereto, which records shall be and remain the property of, and available to, the Corporation at all times.

(f) Employee agrees that he will, upon leaving the Corporation's employment, promptly deliver to the Corporation all originals and copies of disclosures, drawings, prints, letters, notes, and reports either typed, handwritten or otherwise memorialized, belonging to the Corporation which are in his possession or under his control and Employee agrees that he will not retain or give away or make copies of the originals or copies of any such disclosures, drawings, prints, letters, notes or reports.

(9) Property of Corporation: All files, records, reports, documents, drawings, specifications, equipment, and similar items relating to the business of the Corporation, whether prepared by Employee or otherwise coming into his possession, shall remain the exclusive property of the Corporation and shall not be removed by Employee from the premises of the Corporation under any circumstances whatsoever without the prior written consent of the Corporation.

(10) Noncompetition Agreement: (a) Employee shall not, without the written consent of the Corporation, during the term of employment with the Corporation and for the period of one year thereafter (the "Non-Compete Period"), engage in or otherwise carry on, directly or indirectly anywhere in the world (either as principal, agent, employee, employer, investor, shareholder (except for holdings of no greater than 1% of the total outstanding shares in a publicly-traded company), consultant, partner, member, financier or in any other individual or representative capacity of any kind whatsoever), any business or activity competitive with the Corporation but solely to the extent such business or activity is related to, similar to or competitive with the activities of the business unit(s), division(s), laborator(y)(ies), facilit(y)(ies) and other operational unit(s) in or for which Employee performed work for the Corporation or about which Employee acquired Proprietary Information (as defined in the Confidential Information Agreement). The Non-Compete Period shall be extended for any period during which Employee is in breach of this Employment Agreement or the Confidential Information Agreement.

(b) The Corporation and Employee agree that the services of Employee are of a personal, special, unique and extraordinary character, and cannot be replaced by the Corporation without great difficulty, and that the violation by Employee of any of his agreements under this Section 10 would damage the goodwill of the Corporation and cause the Corporation irreparable harm that could not reasonably or adequately be compensated in damages in an action at law, and that the agreements of Employee under this Section 10 may be enforced by the Corporation in equity by an injunction, declaratory judgment or restraining order in addition to being enforced by the Corporation at law.

(c) In the event that this Section 10 shall be determined by any court of competent jurisdiction to be unenforceable by reason of its extending for too long a period of time or over too great a range of activities or geographic scope, it shall be interpreted to extend only over the maximum period of time or range of activities or geographic scope as to which it may be enforceable.

(11) Non-Solicitation: Employee shall not, on his own behalf or in the service or on behalf of others, directly or indirectly:

(a) solicit, entice or induce any Customer (as defined below) to become a customer, distributor or supplier of any other person, firm or corporation with respect to products and/or services sold or under development by the Corporation during his employment at the Corporation, or to cease doing business with the Corporation, and Employee shall not contact or approach any such person, firm or corporation for such purpose or authorize or knowingly approve the taking of such actions by any other person for a period of twenty-four (24) months from the date of the termination of Employee's employment under this Employment Agreement; or

(b) solicit, recruit or hire (or attempt to solicit, recruit or hire) any employee, officer or agent of the Corporation or contractor engaged by the Corporation (whether or not such person is a full-time executive or whether or not such employment is pursuant to a written agreement or at-will) to terminate such person's

employment or engagement with the Corporation or work for a third party other than the Corporation for a period of twenty-four (24) months after the date of the termination of Employee's employment under this Employment Agreement, or engage in any activity that would cause such employee or contractor to violate any agreement with the Corporation, nor shall Employee form any partnership with, or establish any business venture in cooperation with, any such person.

(c) For the purposes of this Section 11, a "Customer" means any person or entity which as of the date of the termination of Employee's employment under this Employment Agreement was, within two (2) years prior to such time, a customer, distributor or supplier of the Corporation, and references to the Corporation shall be deemed to include any affiliate or subsidiary of the Corporation.

(12) Non-disparagement: Employee shall not disparage the Corporation, any of its products or practices, or any of its directors, officers, or employees, whether orally, in writing or otherwise, at any time. Notwithstanding the foregoing: nothing in this Section shall (i) limit the ability of Employee to provide truthful testimony as required by law or any judicial or administrative process, or (ii) prevent any Person from making any truthful statement to the extent necessary in any litigation, arbitration, or mediation proceeding involving this Employment Agreement, including, but not limited to, the enforcement of this Employment Agreement. In no event shall any termination of Employee's employment by the Corporation or Employee for any reason constitute disparagement for purposes of this Section.

(13) Notice: Any and all notices under this Employment Agreement shall be in writing and, if to the Corporation, shall be duly given if sent to the Corporation by registered or certified mail, postage prepaid, return receipt requested, at the address of the Corporation set forth under its name below or at such other address as the Corporation may hereafter designate to Employee in writing for the purpose, and if to Employee, shall be duly given if delivered to Employee by hand or if sent to Employee by registered or certified mail, postage prepaid, return receipt requested, at the address of Employee set forth under his name below or at such other address as Employee may hereafter designate to the Corporation in writing for the purpose.

(14) Assignment: The rights and obligations of the Corporation under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the successors and assigns of the Corporation. The rights and obligations of Employee under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the heirs, executors and legal representatives of Employee. Employee shall not delegate his employment or obligations under this Employment Agreement to any other person.

(15) Code Section 409A Compliance: Where Section (6) refers to Employee's termination of employment for purposes of receiving any payment, whether such a termination has occurred will be determined in accordance with Section 409A of the Internal Revenue Code and Treasury Regulation Section 1.409A-1(h) (or any successor provisions). Where the Employment Agreement requires the following payments to be made to Employee, the following rules shall apply, and any inconsistent provision is superseded:

To the extent that this Employment Agreement requires that a payment shall be made upon or as soon as reasonably practicable after an event (*e.g.*, termination of employment), such payment shall be made no later than sixty (60) days after the occurrence of such event (or, if earlier, within two-and-a-half (2 1/2) months following the end of the Employee's taxable year in which such event occurs). Employee may not designate the year of such payment. To the extent that benefits under Section (6) are contingent upon Employee providing a General Release, Employee shall sign and return the General Release within the reasonable time period designated by the Corporation, which shall be no less than twenty-one (21) days but no more than forty-five (45) days. If such designated time period for review and revocation of the General Release crosses calendar years, payments for the period for review and return of the Release shall be made in the later calendar year. Any payments that would otherwise be made during the period for review and revocation of the General Release will be made on the first scheduled payment date after such period ends. To the extent that the Employment Agreement provides for the reimbursement of specified expenses incurred by Employee, such

reimbursement shall be made in accordance with the provisions of the Employment Agreement, but in no event later than the last day of Employee's taxable year following the taxable year in which the expense was incurred. The amount of expenses eligible for reimbursement or in-kind benefits provided by the Corporation in any taxable year of Employee shall not affect the amount of expenses or in-kind benefits to be reimbursed or provided in any other year (except in the case of maximum benefits to be provided under a medical reimbursement arrangement, if applicable). Bonus otherwise payable under the Employment Agreement after the end of a bonus plan performance period shall be paid within two-and-a-half (2 1/2) months after the end of the fiscal year of the Corporation to which such Bonus relates. Each payment in respect of Employee's termination of employment under Section 6 of the Employment Agreement is designated as a separate payment for purposes of the short-term deferral rules under Treasury Regulation Section 1.409A-1(b)(4)(i)(F) and the exemption for involuntary terminations under separation pay plans under Treasury Regulation Section 1.409A-1(b)(9)(iii).

If Employee is designated as a "specified Executive" within the meaning of Code Section 409A (while the Corporation is publicly traded on any securities market), any deferred compensation payment subject to Section 409A to be made during the six-month period following Employee's termination of employment shall be withheld and the amount of the payments withheld will be paid in a lump sum, without interest, during the seventh month after Employee's termination; provided, however, that if Employee dies prior to the expiration of such six month period, payment to Employee beneficiary shall be made as soon as reasonably practicable following Employee's death. The Corporation shall identify in writing delivered to Employee any payments it reasonably determines are subject to delay under this Section. In no event shall the Corporation have any liability or obligation with respect to taxes for which Employee may become liable as a result of the application of Code Section 409A.

(16) Entire Agreement and Severability: (a) This Employment Agreement and the Confidential Information Agreement supersede any and all other agreements, either oral or in writing, between the parties hereto with respect to the employment of Employee by the Corporation and contains all of the covenants and agreements between the parties with respect to such employment. In the event of any discrepancy between the terms of this Employment Agreement and the Confidential Information Agreement, this Employment Agreement controls. Each party to this Employment Agreement acknowledges that no representations, inducements, promises or agreements, oral or otherwise, have been made by any party, or any one acting on behalf of any party, which are not embodied herein, and that no other agreement, statement or promise not contained in this Employment Agreement shall be valid and binding. Any modification of this Employment Agreement will be effective only if it is in writing signed by both parties to this Employment Agreement.

(b) If any provision in this Employment Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions shall nevertheless continue in full force and effect without being impaired or invalidated in any way.

(c) All pronouns used herein shall include the masculine, feminine, and neuter gender as the context requires.

(17) Miscellaneous: This Employment Agreement and the rights and obligations of the parties hereunder shall be governed by, and construed in accordance with, the laws of the Commonwealth of Massachusetts, excluding (but only to the extent permitted by law) its conflict of laws and choice of law rules. The parties hereto further agree that service of any process, summons, notice or document by U.S. certified mail or overnight delivery by a generally recognized commercial courier service to Employee's last known address (or any mode of service recognized to be effective by applicable law) will be effective service of process for any action, suit or proceeding brought against Employee in any such court. This Employment Agreement may be executed in any number of counterparts, each of which, when executed by both parties to this Employment Agreement shall be deemed to be an original, and all of which counterparts together shall constitute one and the same instrument. The failure of either party hereto to enforce any right under this Employment Agreement shall not be construed to be a waiver of that right, or of damages caused thereby, or of any other rights under this Employment Agreement.

(18) Arbitration: Any dispute under this Employment Agreement shall be resolved by final and binding arbitration; provided, however, that the Corporation, in its sole discretion, may enforce the covenants set out above in Sections (7) through (11) of this Agreement by bringing a proceeding in any court of competent jurisdiction. In addition, any issues pertaining to the ability to arbitrate a dispute under this Agreement shall be determined by a court of competent jurisdiction and not by an arbitrator. The arbitration shall be held in the Commonwealth of Massachusetts and shall be conducted in accordance with the then-prevailing Commercial Arbitration Rules of the American Arbitration Association. Employee shall arbitrate individual claims only. The arbitrator shall be acceptable to both the Corporation and Employee. If the parties cannot agree on an acceptable arbitrator, the dispute shall be heard by a panel of three arbitrators, one appointed by the Corporation and one appointed by Employee, and the third selected by the other two arbitrators. Under no circumstances may the arbitrator(s) have the authority to require Employee's reinstatement to employment or continued employment, or award any lost wages or benefits (other than severance benefits as described above) as a result of Employee's termination of employment for any reason. The arbitrator(s) shall also have no authority to award punitive, liquidated or consequential damages or the payment of a prevailing party's costs and/or attorneys' fees. Each party shall bear its own costs and expenses and an equal share of the arbitrators' and administrative fees of arbitration. The Corporation, Employee and the arbitrator(s) shall treat all aspects of the arbitration proceedings, including without limitation, discovery, testimony and other evidence, briefs and the award, as strictly confidential; provided, however, that any award or order rendered by the arbitrator(s) under this Agreement may be entered as a judgment or order in a court of competent jurisdiction and may be disclosed by the Corporation as necessary to enforce the terms of the restrictive covenants in Sections (7) through (11) of this Agreement

[remainder of page left blank intentionally]

IN WITNESS WHEREOF, the parties hereto have executed, in the Commonwealth of Massachusetts, this Employment Agreement as a sealed instrument, all as of the day, month and year first written above.

MKS INSTRUMENTS, INC.

By: /s/ Gerald G. Colella

Gerald G. Colella
Chief Executive Officer and President
2 Tech Drive
Andover, MA 01810

/s/ Paul Eyerman

Legal Signature

Paul Eyerman

Dated: February 23, 2014

APPENDIX A
FORM RELEASE

Introduction

(“Executive”) separated from MKS Instruments, Inc. (the “Corporation”) as of _____, and Executive and the Corporation entered into a Separation Agreement (the “Agreement”), dated _____, pursuant to which, among other things, Executive agreed to release the Releasees from all waivable claims which Executive might have against the Releasees in exchange for the receipt of certain payments and benefits set forth therein upon this Release becoming effective.

Terms

1. As used in this Release, the following words shall mean the following:

(a) “Corporation” shall at all times mean MKS Instruments, Inc., its subsidiaries, divisions, successors and assigns, its affiliated and predecessor companies or corporations, and their successors and assigns.

(b) “Executive” means _____.

(c) “Releasees” shall mean the Corporation, its present or former directors, officers, shareholders, members, employees, attorneys and agents, whether in their individual or official capacities and the current and former trustees or administrators of any pension or other benefit plan applicable to the employees or former employees of the Corporation in their official and individual capacities.

2. After receiving this signed Release from Executive and upon the expiration of the waiting period described in Paragraph 5 (the “Effective Date”), The Corporation will provide Executive with the payments and benefits described in paragraphs _____ through _____ in Section _____ of the Agreement.

3. In exchange for receiving the payments and benefits described in paragraphs _____ and _____ in Section _____ of the Agreement, Executive hereby agrees that Executive is releasing the Releasees from, and waiving, any claim that Executive may have against them for any act, omission, incident or situation which may have occurred at any time up until the Effective Date of this Release. This includes RELEASING AND FOREVER DISCHARGING the Releasees from AND WAIVING:

(a) Any claims arising under Title VII of the Civil Rights Act of 1964, the Age Discrimination in Employment Act, the Americans with Disabilities Act, the Rehabilitation Act, the Equal Pay Act, 42 U.S.C. §§ 1981, 1982, 1983 and 1985, the Massachusetts Fair Employment Practices Act, M.G.L. c. 151B; the Fair Labor Standards Act; the Family and Medical Leave Act, 29 U.S.C. § 2601 et seq., the Massachusetts Civil Rights Act; the Massachusetts Equal Rights Law; the Massachusetts Minimum Fair Wages Statute (M.G.L. c. 151, §§ 1A and 1B); the Massachusetts Payment of Wages Statute (M.G.L. c. 149, § 148, et seq.); the Massachusetts “Blue Laws” (M.G.L. c. 136); and any other claims arising under Chapters 149 through 154 of the Massachusetts General Laws, and any amendments to these statutes;

(b) Any claims arising under the Family and Medical Leave Act, the National Labor Relations Act, the Sarbanes-Oxley Act of 2002, and all other federal, state, and local laws or ordinances relating to employment;

(c) Any claims arising under the Employee Retirement Income Security Act ("ERISA") (but not claims to vested ERISA benefits) or any other federal or state law pertaining to employee retirement or welfare benefits;

(d) Any claims arising under any other federal, state or local statutory or regulatory provision;

(e) Any claims arising under federal common law or under the common law of any state; and

(f) Any claims for attorneys' fees and/or costs.

Notwithstanding the above, this Release does not prevent Executive from pursuing any right or claim which cannot be waived by law. This means, among other things, that even if Executive signs this Release, Executive retains his right to file a charge of discrimination with the Equal Employment Opportunity Commission and to assist in Commission investigations. By signing this Release, however, Executive is waiving any right to recover any relief in federal or state court, in any administrative proceeding or in arbitration, whether such a claim for relief is brought by Executive or through the EEOC (or a comparable state or local agency) or as part of a class action proceeding. This Release also does not prevent Executive from pursuing any claim to enforce this Release or from asserting any future rights Executive may have to any vested benefits that Executive may be entitled to receive.

4. By signing this Release, Executive is hereby acknowledging and agreeing that: (a) Executive is competent to enter into this Release and is fully aware of his right to discuss any and all aspects of this Release with an attorney of his choice; (b) except for the promises contained in the Agreement, the Corporation has made no other promise of any kind to Executive to cause Executive to sign this Release; (c) what Executive is receiving under the Agreement and this Release is in addition to anything of value to which he already is entitled; (d) what Executive is receiving is adequate and satisfactory to him; and (e) the payments and benefits specified in the Agreement and this Release constitute full and final payment in settlement of all waivable claims of any kind, known or unknown, which Executive may have against the Releasees. Executive further acknowledges that he has carefully read and fully understand all of the provisions of this Release, that Executive has had the opportunity to discuss the provisions of this Release with an attorney, and that Executive is voluntarily entering into this Release.

5. **Executive acknowledges and agrees that he has been given a period of up to twenty-one (21) days in which to consider the terms of this Release and that this Release shall not become effective until seven (7) days following the date of his signature.** Prior to that time, Executive may elect to revoke this Release. If Executive chooses to revoke this Release, Executive agrees to notify the Chair of the Board of Directors of the Corporation in writing. **If Executive does not sign and return the Release within the specified period, or Executive revokes it, Executive will forfeit any payments contingent on the Release.** Unless revoked by the Executive, this Release shall become effective eight calendar days after the date that Executive signs this Release, as evidenced by the date adjacent to his signature at the end of this Release (the "Effective Date"). This Release shall not be effective and shall be deemed void as if never made if, prior to the Effective Date, Executive revokes his earlier acceptance of this Release. Payments contingent upon the Executive entering into the Agreement and this Release will not be made (or begin) prior to the expiration of the period specified for revoking this Release. If the period for signing and returning the Agreement or Release extends into a later taxable year, any payments contingent upon the Agreement and Release will be made (or begin) in the later taxable year.

6. By signing this Release, Executive is not waiving any claims against the Releasees for any act or omission that may occur after the signing of this Release.

7. By signing this Release, Executive is hereby acknowledging and agreeing that Executive has been paid all sums due and owing to him as of the date hereof including, but not limited to, all salary, bonus, business expenses, allowances, vacation pay and other benefits and perquisites as a result of Executive's employment with the Corporation, and has received any leaves (paid or unpaid) to which he was entitled during his employment and the Corporation has not denied or interfered with his ability to request or take such leave.

8. Executive hereby agrees that his employment relationship with the Corporation has been severed and that Executive forever waive any right to reinstatement, recall or future employment with the Corporation, unless waived by mutual agreement.

9. Paragraphs through of the Agreement are incorporated by this reference into this Release as if fully and independently set forth below.

10. The Agreement and this Release represent the full and complete understanding of the Executive and the Corporation. The Agreement and this Release shall supersede any inconsistent provisions in the . No prior or contemporaneous oral or written agreements may be offered to alter their terms. This Release shall be binding upon the Executive and the Corporation and upon their heirs, successors and assigns. This Release may not be modified except in a written document signed by both parties.

11. This Release shall be governed by and interpreted in accordance with the laws of the Commonwealth of Massachusetts, without regard to its conflict of law provisions and except to the extent federal law applies.

PLEASE READ CAREFULLY. EMPLOYEE SHOULD CONSULT WITH COUNSEL BEFORE SIGNING THIS DOCUMENT. THIS RELEASE INCLUDES A RELEASE OF KNOWN AND UNKNOWN CLAIMS.

WITNESS: _____
Date

Date
MKS INSTRUMENTS, INC.

ATTEST: _____
Date

By: _____
Chair, Board of Directors Date

EMPLOYMENT AGREEMENT

EMPLOYMENT AGREEMENT dated February 24, 2014 (“Employment Agreement”), by and between MKS Instruments, Inc., a Massachusetts Corporation (the “Corporation”), and John T.C. Lee of Lexington, MA (the “Employee”).

WHEREAS, the Corporation and Employee desire to provide for the employment of Employee by the Corporation:

NOW, THEREFORE, in consideration of the premises and the mutual promises contained herein, the Corporation and Employee hereby agree as follows:

(1) Term of Employment: (a) The Corporation hereby employs Employee, and Employee hereby accepts continued employment with the Corporation, for a period continuing from the first date above until terminated as provided in this Section (1) or Section (5).

(b) Either the Corporation or Employee may terminate Employee’s employment at any time for any reason, or no reason, by giving written notice to the other party stating its or his election to terminate the employment of Employee under this Employment Agreement and an effective date of termination which is at least thirty (30) days after the date of receipt by the other party of such notice; provided, however, that the employment of Employee under this Employment Agreement is subject to prior termination as hereinafter provided in Section (5)(b) and (c). Notwithstanding the above, the Corporation shall be entitled, at its sole discretion, to waive the obligation of Employee to continue to actively work during the 30 day notice period. In the event the Corporation elects at any time to waive the obligation of Employee to actively work during the 30 day notice period, the Corporation shall continue to pay Employee his customary Base Salary (as defined in Section (4)) and will reimburse Employee through the balance of the 30 day notice period for the premiums (if any) Employee pays for continuation of life insurance should Employee elect to exercise the conversion feature (if any) of the Corporation’s group life policy then in effect and for the premiums (if any) for such medical/dental insurance as Employee may then receive should Employee elect continuation under the federal COBRA program.

(c) Employee may terminate employment by delivering notice of resignation no later than thirty (30) days prior to the intended date of termination of employment (“Resignation Date”); provided, however, that the Corporation may at any time and for any reason, or no reason, accelerate the Resignation Date to any date prior thereto up to and including the date Employee delivers such notice of resignation, and such acceleration shall not, in any event, be deemed a termination by Corporation of Employee’s employment. Unless the employment is terminated pursuant to Section (5), the Corporation shall, if it terminates the employment prior to the Resignation Date, continue to pay Employee his customary Base Salary (as defined in Section (4)) and will reimburse Employee through the balance of the 30 day notice period for the premiums (if any) Employee pays for continuation of life insurance should Employee elect to exercise the conversion feature (if any) of the Corporation’s group life policy then in effect and for the premiums (if any) for such medical/dental insurance as Employee may then receive should the Employee elect continuation under the federal COBRA program.

(2) Capacity: Employee is being paid to perform such duties and exercise such powers, authorities and discretions in relation to the Corporation as are customary and incidental to Employee’s position and such other services that are delegated or assigned to Employee by the Chief Executive Officer of the Corporation or his designee, including any authorized manager or supervisor of Employee. It shall be a condition of Employee’s employment hereunder that Employee execute and deliver to the Corporation that Confidential Information Agreement of MKS Instruments, Inc. (“Confidential Information Agreement”) attached hereto as Attachment 1, and by execution of this Employment Agreement, Employee (i) acknowledges receipt of the Confidential Information Agreement and (ii) agrees to be bound by all of the terms of the Confidential Information Agreement.

(3) **Extent of Services:** During the term of employment of Employee under this Employment Agreement, Employee shall devote his full time to, and use his best efforts in the furtherance of, the business of the Corporation and shall not perform similar duties in any other capacity for any other person or engage in any other business activity which interferes in any way with Employee's performance of his duties to the Corporation, whether or not such business activity is pursued for gain or any other pecuniary advantage, without the prior written consent of the Chief Executive Officer of the Corporation. Notwithstanding the foregoing, Employee may manage his personal investments and be involved in charitable and unremunerated professional activities (including serving on charitable and professional boards), so long as such service is approved by the Chief Executive Officer and does not materially interfere with the performance of Employee's duties hereunder or violate Sections (7) through (11) of this Agreement. Employee agrees and understands that Employee owes the Corporation fidelity and loyalty during the term of employment with the Corporation.

(4) **Compensation:** In consideration of the services to be rendered by Employee under this Employment Agreement, the Corporation agrees to pay, and the Employee agrees to accept, the following compensation:

(a) **Base Salary:** A base salary at the rate of four hundred thousand dollars and zero cents (\$400,000.00) per year for the term of Employee's employment under this Employment Agreement. The base salary shall be payable in equal biweekly installments subject to usual withholding requirements. This salary will be reviewed regularly according to the practices of the Corporation and will be subject to any changes in pay policies implemented by the Corporation from time to time, becoming the Base Salary hereunder, as defined. As an exempt employee, Employee shall not be entitled to receive any overtime pay from the Corporation.

(b) **MKS Instruments, Inc. Profit Sharing and 401(k) Plan:** Employee shall be eligible to become a participant under the profit sharing plan of the Corporation on fulfilling the conditions set forth in the MKS Instruments, Inc. Profit Sharing and 401(k) Plan, in accordance with its terms.

(c) **Vacation:** Employee shall be entitled to an annual vacation leave of 18 days at full rate of Base Salary during each calendar year of this Employment Agreement, subject to Employee arranging such vacation so as not to affect adversely the ability of the Corporation to transact its business. Such vacation leave shall accrue and be administered according to the policies and practices of the Corporation.

(d) **Life Insurance:** The Corporation shall provide and pay such premiums for term life insurance for Employee during the term of Employee's employment under this Employment Agreement in accordance with the term life insurance plan of the Corporation.

(e) **Medical/Dental Insurance:** The Corporation shall provide group medical/dental insurance for Employee under the plans of the Corporation applicable to Employee during the term of Employee's employment under this Employment Agreement.

(f) **Other Benefits:** The Corporation shall provide other benefits for Employee under the Plans of the Corporation applicable to Employee during the term of Employee's employment under this Employment Agreement.

(g) **Expenses:** The Corporation shall reimburse Employee for all reasonable and necessary expenses incurred by Employee in connection with the performance of Employee's duties as an employee of the Corporation. Such reimbursement is subject to the timely submission to the Corporation by Employee of appropriate documentation and/or vouchers in accordance with the customary procedures of the Corporation for expense reimbursement, as such procedures may be revised by the Corporation from time to time, and to such caps on reimbursements as the Corporation may from time to time impose.

(5) Termination: The employment of Employee under this Employment Agreement shall terminate:

(a) On the expiration of the period of employment as provided in Section (1).

(b) Upon the death of Employee, or the Disability of Employee as defined in Section (6) (e) below.

(c) At the election of the Corporation: (i) if Employee shall fail, or refuse, to perform the other covenants and agreements required of him under this Employment Agreement other than as a result of Disability or death; or (ii) for "cause", which term shall mean: (1) Employee's willful or gross neglect of his duties, including the failure to carry out or comply with, in good faith, in any material respect, or the refusal to follow, any lawful and reasonable written directives of the Chief Executive Officer of the Corporation or his designee that are not inconsistent with Employee's position; (2) Employee's material breach of this Employment Agreement or of any of the rules, regulations, policies or procedures of the Corporation, or material violation of the Corporation's statement of corporate policy and/or code of conduct at any time after such statement and code have been adopted by the Board of Directors and have been set forth in writing and delivered to Employee; (3) Employee's commission of a felony or other act of material dishonesty, or plea of other than "not guilty" to any felony or serious misdemeanor charge including but not limited to any act of fraud, embezzlement, misappropriation of Corporation property, moral turpitude, or breach of fiduciary duty that could possibly have a material adverse effect on the Corporation; (4) Employee's unlawful use (including being under the influence) of controlled substances on the Corporation's premises or while performing Employee's duties and responsibilities or indictment related to the commission of any criminal act; (5) Employee's failure or refusal to reasonably cooperate with any Corporation investigation or governmental/regulator authority having jurisdiction over Employee and the Corporation; or (6) Employee's engaging in willful or gross misconduct which is materially injurious to the Corporation or any of its subsidiaries or affiliates or any of its directors or officers, financially or otherwise, or to its or their reputation; in each case determined in good faith by the Chief Executive Officer of the Corporation.

(6) Payment upon Termination: (a) If Employee's employment is terminated by the Corporation other than pursuant to Section (5)(c) the Corporation shall (subject to Employee's entering into and not revoking a General Release with the Corporation in such form as it may then require; and provided that Employee (i) remains in full compliance with the Corporation's Confidential Information Agreement; and (ii) performs such actions as the Corporation may reasonably request in transitioning Employee from his employment with the Corporation) continue to pay Employee the Base Salary (as defined in Section (4)) in effect immediately prior to the time of such termination (but without any bonus, commission or other similar amounts except as may have been earned and are due and payable prior to such termination) for six (6) months after the last full day Employee works under this Employment Agreement at its normal payroll payment dates, by direct deposit or regular mail at Employee's election, provided Employee is not in breach of any of the covenants herein; any unreimbursed expenses due to Employee pursuant the Corporation's policy for which he has submitted acceptable supporting documentation; and any accrued but unused vacation time. The form of General Release currently used by the Corporation is attached hereto as Appendix A, and the Release shall be in substantially similar form with such changes as the Corporation deems appropriate at the time of Employee's termination. Employee shall be entitled to such payment only as set forth herein, and the provisions of this Section (6) shall supersede in their entirety any severance payment provisions in any severance plan, policy, program or arrangement maintained by the Corporation. In addition to any rights or remedies the Corporation may otherwise have, upon any breach of any agreements herein by Employee, Employee's right to any continued payment of separation benefits shall immediately cease, and Employee shall be obligated to repay to the Corporation all amounts paid by the Corporation for the separation benefits except for the amount of \$1,000, which Employee shall be entitled to retain.

(b) In the event Employee's employment is terminated by death, the Corporation shall pay to Employee's estate the compensation which would otherwise be payable to Employee at the end of the month in which his death occurs and other unpaid amounts to which Employee would have been at that time entitled as an Employee under any applicable compensation or benefit plan or program.

(c) In the event Employee's employment is terminated by the Corporation for Cause pursuant to Section (5)(c) hereof, the Corporation shall have no obligation to pay Employee any amounts, except for Base Salary through the last full day of actual work for the Corporation, and any accrued but unused vacation time.

(d) In the event Employee voluntarily resigns, the Corporation shall have no obligation to pay Employee any amounts, except for Base Salary through the last full day of actual work for the Corporation, or, if applicable, amounts payable in accordance with Section (1)(c), and other unpaid amounts to which Employee is at that time entitled under any applicable compensation or benefit plan or program.

(e) If Employee is incapacitated by a physical or mental condition, illness, or injury that prevents Employee from being able to perform his duties under this Employment Agreement in a satisfactory manner for substantially all of a twelve (12) consecutive week period (or such longer period as may be required by law or that the Chief Executive Officer of the Corporation or his designee may, in his discretion, determine) with any reasonable accommodation that may be required by law, then Employee shall be deemed to be unable to perform his job (any such physical or mental condition, illness, or injury, a "Disability"). In such event, the Corporation may terminate Employee's employment, in which case Employee shall receive (i) any accrued but unpaid Base Salary and other unpaid amounts to which Employee is at that time entitled under any applicable compensation or benefit plan or program and (ii) all applicable disability benefits consistent with any applicable benefits program. The Corporation shall have no further obligations to Employee. Nothing in this paragraph is intended to or shall operate to excuse the Corporation from any legal obligations it may have under applicable laws.

(f) In the event Employee's employment terminates without "cause" and in the absence of the other events described in subsection (c) above, or if the Employee terminates for Good Reason (as defined below) within six (6) months of the Effective Date of a consummated Change in Control (as defined below), Employee shall be entitled, in addition to any amount payable under this Section (6)(a), to six (6) months of Base Salary (as defined in Section (4)) in effect immediately prior to the time of such termination (but without any bonus, commission or other similar amounts except as may have been earned and are due and payable prior to such termination). For purposes of this Employment Agreement, a Change in Control means the first to occur of any of the following events: (i) any "person" (as that term is used in Section 13 and 14(d)(2) of the Securities Exchange Act of 1934 ("Exchange Act")) becomes the beneficial owner (as that term is used in Section 13(d) of the Exchange Act), directly or indirectly, of fifty percent (50%) or more of the Corporation's capital stock entitled to vote in the election of directors; (ii) the shareholders of the Corporation approve any consolidation or merger of the Corporation, other than a consolidation or merger of the Corporation in which the holders of the common stock of the Corporation immediately prior to the consolidation or merger hold more than fifty percent (50%) of the common stock of the surviving corporation immediately after the consolidation or merger; (iii) the shareholders of the Corporation approve any plan or proposal for the liquidation or dissolution of the Corporation; or (iv) the shareholders of the Corporation approve the sale or transfer of all or substantially all of the assets of the Corporation to parties that are not within a "controlled group of corporations" (as defined in Code Section 1563) in which the Corporation is a member. For purposes of this Employment Agreement, "Good Reason" shall mean Employee's voluntary separation from service within 90 days following: (i) a material diminution in Employee's positions, duties and responsibilities from those described in this Employment Agreement; (ii) a reduction in Employee's Base Salary (other than a reduction which is part of a

general salary reduction program affecting senior executives of the Corporation); (iii) a material reduction in the aggregate value of the pension and welfare benefits provided to Employee from those in effect prior to the Change in Control (other than a reduction which is proportionate to the reductions applicable to other senior executives pursuant to a cost-saving plan that includes all senior executives); (iv) a material breach of any provision of this Employment Agreement by the Corporation; (v) the Corporation's requiring Employee to be based at a location that creates for Employee a one way commute in excess of 60 miles from his primary residence, except for required travel on the Corporation's business to an extent substantially consistent with the business travel obligations of Employee under this Employment Agreement. Notwithstanding the foregoing, a termination of employment shall not be treated as a termination for Good Reason (i) if Employee shall have consented in writing to the occurrence of the event giving rise to the claim of termination for Good Reason or (ii) unless Employee shall have delivered a written notice to the Corporation within 30 days of his having actual knowledge of the occurrence of one of such events stating that he intends to terminate his employment for Good Reason and specifying the factual basis for such termination, and such event, if capable of being cured, shall not have been cured within 30 days of the receipt of such notice.

In the event amounts payable hereunder are contingent on a Change in Control for the purposes of Internal Revenue Code Section 280G and it is determined by a public accounting firm or legal counsel authorized to practice before the Internal Revenue Service selected by the Corporation that any payment or benefit made or provided to Employee in connection with this Agreement or otherwise (collectively, a "Payment") would be subject to the excise tax imposed by Internal Revenue Code Section 4999 (the "Parachute Tax"), the Payments under this Agreement shall be payable in full or, if applicable, in such lesser amount which would result in no portion of such Payments being subject to the Parachute Tax, whichever of the foregoing amounts, taking into account the applicable federal, state and local income taxes and the Parachute Tax, results in receipt by Employee, on an after-tax basis, of the greatest amount of Payments under this Employment Agreement. If Payments are reduced pursuant to this paragraph, severance payments described above payable over time shall first be reduced (beginning with the last such payment), and the other benefits under this Employment Agreement shall thereafter be reduced, to the extent necessary so that no portion of the Payments is subject to the Parachute Tax. The reporting and payment of any Parachute Tax will be Employee's responsibility and the Corporation will not provide a gross-up or any other payment to compensate Employee for the payment of the Parachute Tax. The Corporation will withhold from the Payments any amounts it reasonably determines is required under Internal Revenue Code Section 4999(c) and the Treasury Regulations thereunder.

(g) The Corporation shall deduct from the amounts payable to Employee pursuant to this Agreement all required withholding amounts and deductions, including but not limited to federal, state, local or foreign withholding amounts in accordance with all applicable laws and regulations and deductions authorized by Employee. Employee shall be solely responsible for and shall pay all taxes associated with the amounts payable under this Agreement. The Corporation shall be entitled to rely on an opinion of counsel if any questions as to the amount or requirement of withholding shall arise.

(h) Employee shall have no obligation to mitigate any payments due hereunder. Any amounts earned by Employee from other employment shall not offset amounts due hereunder. The Corporation's obligation to pay Employee the amounts provided hereunder shall not be subject to set-off, counterclaim or recoupment of amounts owed by Employee to the Corporation or its affiliates, except for any specific, stated amounts owed by Employee to the Corporation, or as otherwise stated herein.

(7) Trade Secrets: Employee covenants and agrees that Employee will communicate to the Corporation, and will not divulge or communicate to any other person, partnership, corporation or other entity without the prior written consent of the Corporation, any trade secrets of the Corporation or confidential information relating to the business of the Corporation or anyone connected with the Corporation, and that such trade secrets and confidential information shall not be used by Employee either on his own behalf or for the benefit of others or disclosed by Employee to any one, except to the Corporation, during or after the term of Employee's employment under this Employment Agreement.

(8) Inventions and Patents: (a) Employee shall make prompt full disclosure in writing to the Corporation of all inventions, improvements and discoveries, whether or not patentable, which Employee conceives, devises, makes, discovers, develops, perfects or first reduces to practice, either alone or jointly with others, during the term of Employee's employment under this Employment Agreement, which relate in any way to the fields, products or business of the Corporation, including development and research, whether during or out of the usual hours of work or on or off the premises of the Corporation or by use of the facilities of the Corporation or otherwise and whether at the request or suggestion of the Corporation or otherwise (all such inventions, improvements and discoveries being hereinafter called the "Inventions"), including any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by Employee after the employment of Employee under this Employment Agreement is terminated if the Inventions were conceived by Employee during the term of Employee's employment under this Employment Agreement. Any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by Employee within six (6) months of the date of termination of the Employee's employment under this Employment Agreement shall be conclusively presumed to have been conceived during the term of Employee's employment under this Employment Agreement.

(b) Employee agrees that the Inventions shall be the sole and exclusive property of the Corporation.

(c) Employee agrees to assist the Corporation and its nominees in every reasonable way (entirely at its or their expense) to obtain for the benefit of the Corporation letters patent for the Inventions and trademarks, trade names and copyrights relating to the Inventions, and any renewals, extensions or reissues thereof, in any and all countries, and agrees to make, execute, acknowledge and deliver, at the request of the Corporation, all written applications for letters patent, trademarks, trade names and copyrights relating to the Inventions and any renewals, extensions or reissues thereof, in any and all countries, and all documents with respect thereto, and all powers of attorney relating thereto and, without further compensation, to assign to the Corporation or its nominee all the right, title and interest of Employee in and to such applications and to any patents, trademarks, trade names or copyrights which shall thereafter issue on any such applications, and to execute, acknowledge and deliver all other documents deemed necessary by the Corporation to transfer to or vest in the Corporation all of the right, title and interest of Employee in and to the Inventions, and to such trademarks, trade names, patents and copyrights together with exclusive rights to make, use, license and sell them throughout the world. If the Corporation is unable, after reasonable effort, to secure Employee's signature on any application for patent, copyright, trademark or other analogous registration or other documents regarding any legal protection relating to any Invention, whether because of Employee's physical or mental incapacity or for any other reason whatsoever, Employee hereby irrevocably designates and appoints the Corporation and its duly authorized officers and agents as Employee's agent and attorney-in-fact, to act for and on Employee's behalf and stand to execute and file any such application or applications or other documents and to do all other lawfully permitted acts to further the prosecution and issuance of patent, copyright or trademark registrations or any other legal protection thereon with the same legal force and effect as if executed by Employee.

(d) Employee agrees that even though his employment is terminated under this Employment Agreement Employee will, at any time after such termination of employment, carry out and perform all of the agreements of Subsections 8(a) and 8(c) above, and will at any time and at all times cooperate with the Corporation in the prosecution and/or defense of any investigation, litigation or legal process which may arise, including in connection with the Inventions, provided, however, that should such services be rendered after termination of Employee's employment under this Employment Agreement, Employee shall be paid reasonable compensation on a per diem basis. The Corporation agrees to provide Employee reasonable notice in the event his assistance is required.

(e) Employee agrees to make and maintain adequate and current written records of all Inventions in the form of notes, sketches, drawings, or reports relating thereto, which records shall be and remain the property of, and available to, the Corporation at all times.

(f) Employee agrees that he will, upon leaving the Corporation's employment, promptly deliver to the Corporation all originals and copies of disclosures, drawings, prints, letters, notes, and reports either typed, handwritten or otherwise memorialized, belonging to the Corporation which are in his possession or under his control and Employee agrees that he will not retain or give away or make copies of the originals or copies of any such disclosures, drawings, prints, letters, notes or reports.

(9) Property of Corporation: All files, records, reports, documents, drawings, specifications, equipment, and similar items relating to the business of the Corporation, whether prepared by e Employee or otherwise coming into his possession, shall remain the exclusive property of the Corporation and shall not be removed by Employee from the premises of the Corporation under any circumstances whatsoever without the prior written consent of the Corporation.

(10) Noncompetition Agreement: (a) Employee shall not, without the written consent of the Corporation, during the term of employment with the Corporation and for the period of one year thereafter (the "Non-Compete Period"), engage in or otherwise carry on, directly or indirectly anywhere in the world (either as principal, agent, employee, employer, investor, shareholder (except for holdings of no greater than 1% of the total outstanding shares in a publicly-traded company), consultant, partner, member, financier or in any other individual or representative capacity of any kind whatsoever), any business or activity competitive with the Corporation but solely to the extent such business or activity is related to, similar to or competitive with the activities of the business unit(s), division(s), laborator(y)(ies), facilit(y)(ies) and other operational unit(s) in or for which Employee performed work for the Corporation or about which Employee acquired Proprietary Information (as defined in the Confidential Information Agreement). The Non-Compete Period shall be extended for any period during which Employee is in breach of this Employment Agreement or the Confidential Information Agreement.

(b) The Corporation and Employee agree that the services of Employee are of a personal, special, unique and extraordinary character, and cannot be replaced by the Corporation without great difficulty, and that the violation by Employee of any of his agreements under this Section 10 would damage the goodwill of the Corporation and cause the Corporation irreparable harm that could not reasonably or adequately be compensated in damages in an action at law, and that the agreements of Employee under this Section 10 may be enforced by the Corporation in equity by an injunction, declaratory judgment tor restraining order in addition to being enforced by the Corporation at law.

(c) In the event that this Section 10 shall be determined by any court of competent jurisdiction to be unenforceable by reason of its extending for too long a period of time or over too great a range of activities or geographic scope, it shall be interpreted to extend only over the maximum period of time or range of activities or geographic scope as to which it may be enforceable.

(11) Non-Solicitation: Employee shall not, on his own behalf or in the service or on behalf of others, directly or indirectly:

(a) solicit, entice or induce any Customer (as defined below) to become a customer, distributor or supplier of any other person, firm or corporation with respect to products and/or services sold or under development by the Corporation during his employment at the Corporation, or to cease doing business with the Corporation, and Employee shall not contact or approach any such person, firm or corporation for such purpose or authorize or knowingly approve the taking of such actions by any other person for a period of twenty-four (24) months from the date of the termination of Employee's employment under this Employment Agreement; or

(b) solicit, recruit or hire (or attempt to solicit, recruit or hire) any employee, officer or agent of the Corporation or contractor engaged by the Corporation (whether or not such person is a full-time executive or whether or not such employment is pursuant to a written agreement or at-will) to terminate such person's

employment or engagement with the Corporation or work for a third party other than the Corporation for a period of twenty-four (24) months after the date of the termination of Employee's employment under this Employment Agreement, or engage in any activity that would cause such employee or contractor to violate any agreement with the Corporation, nor shall Employee form any partnership with, or establish any business venture in cooperation with, any such person.

(c) For the purposes of this Section 11, a "Customer" means any person or entity which as of the date of the termination of Employee's employment under this Employment Agreement was, within two (2) years prior to such time, a customer, distributor or supplier of the Corporation, and references to the Corporation shall be deemed to include any affiliate or subsidiary of the Corporation.

(12) Non-disparagement: Employee shall not disparage the Corporation, any of its products or practices, or any of its directors, officers, or employees, whether orally, in writing or otherwise, at any time. Notwithstanding the foregoing: nothing in this Section shall (i) limit the ability of Employee to provide truthful testimony as required by law or any judicial or administrative process, or (ii) prevent any Person from making any truthful statement to the extent necessary in any litigation, arbitration, or mediation proceeding involving this Employment Agreement, including, but not limited to, the enforcement of this Employment Agreement. In no event shall any termination of Employee's employment by the Corporation or Employee for any reason constitute disparagement for purposes of this Section.

(13) Notice: Any and all notices under this Employment Agreement shall be in writing and, if to the Corporation, shall be duly given if sent to the Corporation by registered or certified mail, postage prepaid, return receipt requested, at the address of the Corporation set forth under its name below or at such other address as the Corporation may hereafter designate to Employee in writing for the purpose, and if to Employee, shall be duly given if delivered to Employee by hand or if sent to Employee by registered or certified mail, postage prepaid, return receipt requested, at the address of Employee set forth under his name below or at such other address as Employee may hereafter designate to the Corporation in writing for the purpose.

(14) Assignment: The rights and obligations of the Corporation under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the successors and assigns of the Corporation. The rights and obligations of Employee under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the heirs, executors and legal representatives of Employee. Employee shall not delegate his employment or obligations under this Employment Agreement to any other person.

(15) Code Section 409A Compliance: Where Section (6) refers to Employee's termination of employment for purposes of receiving any payment, whether such a termination has occurred will be determined in accordance with Section 409A of the Internal Revenue Code and Treasury Regulation Section 1.409A-1(h) (or any successor provisions). Where the Employment Agreement requires the following payments to be made to Employee, the following rules shall apply, and any inconsistent provision is superseded:

To the extent that this Employment Agreement requires that a payment shall be made upon or as soon as reasonably practicable after an event (*e.g.*, termination of employment), such payment shall be made no later than sixty (60) days after the occurrence of such event (or, if earlier, within two-and-a-half (2 1/2) months following the end of the Employee's taxable year in which such event occurs). Employee may not designate the year of such payment. To the extent that benefits under Section (6) are contingent upon Employee providing a General Release, Employee shall sign and return the General Release within the reasonable time period designated by the Corporation, which shall be no less than twenty-one (21) days but no more than forty-five (45) days. If such designated time period for review and revocation of the General Release crosses calendar years, payments for the period for review and return of the Release shall be made in the later calendar year. Any payments that would otherwise be made during the period for review and revocation of the General Release will be made on the first scheduled payment date after such period ends. To the extent that the Employment Agreement provides for the reimbursement of specified expenses incurred by Employee, such

reimbursement shall be made in accordance with the provisions of the Employment Agreement, but in no event later than the last day of Employee's taxable year following the taxable year in which the expense was incurred. The amount of expenses eligible for reimbursement or in-kind benefits provided by the Corporation in any taxable year of Employee shall not affect the amount of expenses or in-kind benefits to be reimbursed or provided in any other year (except in the case of maximum benefits to be provided under a medical reimbursement arrangement, if applicable). Bonus otherwise payable under the Employment Agreement after the end of a bonus plan performance period shall be paid within two-and-a-half (2 1/2) months after the end of the fiscal year of the Corporation to which such Bonus relates. Each payment in respect of Employee's termination of employment under Section 6 of the Employment Agreement is designated as a separate payment for purposes of the short-term deferral rules under Treasury Regulation Section 1.409A-1(b)(4)(i)(F) and the exemption for involuntary terminations under separation pay plans under Treasury Regulation Section 1.409A-1(b)(9)(iii).

If Employee is designated as a "specified Executive" within the meaning of Code Section 409A (while the Corporation is publicly traded on any securities market), any deferred compensation payment subject to Section 409A to be made during the six-month period following Employee's termination of employment shall be withheld and the amount of the payments withheld will be paid in a lump sum, without interest, during the seventh month after Employee's termination; provided, however, that if Employee dies prior to the expiration of such six month period, payment to Employee beneficiary shall be made as soon as reasonably practicable following Employee's death. The Corporation shall identify in writing delivered to Employee any payments it reasonably determines are subject to delay under this Section. In no event shall the Corporation have any liability or obligation with respect to taxes for which Employee may become liable as a result of the application of Code Section 409A.

(16) Entire Agreement and Severability: (a) This Employment Agreement and the Confidential Information Agreement supersede any and all other agreements, either oral or in writing, between the parties hereto with respect to the employment of Employee by the Corporation and contains all of the covenants and agreements between the parties with respect to such employment. In the event of any discrepancy between the terms of this Employment Agreement and the Confidential Information Agreement, this Employment Agreement controls. Each party to this Employment Agreement acknowledges that no representations, inducements, promises or agreements, oral or otherwise, have been made by any party, or any one acting on behalf of any party, which are not embodied herein, and that no other agreement, statement or promise not contained in this Employment Agreement shall be valid and binding. Any modification of this Employment Agreement will be effective only if it is in writing signed by both parties to this Employment Agreement.

(b) If any provision in this Employment Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions shall nevertheless continue in full force and effect without being impaired or invalidated in any way.

(c) All pronouns used herein shall include the masculine, feminine, and neuter gender as the context requires.

(17) Miscellaneous: This Employment Agreement and the rights and obligations of the parties hereunder shall be governed by, and construed in accordance with, the laws of the Commonwealth of Massachusetts, excluding (but only to the extent permitted by law) its conflict of laws and choice of law rules. The parties hereto further agree that service of any process, summons, notice or document by U.S. certified mail or overnight delivery by a generally recognized commercial courier service to Employee's last known address (or any mode of service recognized to be effective by applicable law) will be effective service of process for any action, suit or proceeding brought against Employee in any such court. This Employment Agreement may be executed in any number of counterparts, each of which, when executed by both parties to this Employment Agreement shall be deemed to be an original, and all of which counterparts together shall constitute one and the same instrument. The failure of either party hereto to enforce any right under this Employment Agreement shall not be construed to be a waiver of that right, or of damages caused thereby, or of any other rights under this Employment Agreement.

(18) Arbitration: Any dispute under this Employment Agreement shall be resolved by final and binding arbitration; provided, however, that the Corporation, in its sole discretion, may enforce the covenants set out above in Sections (7) through (11) of this Agreement by bringing a proceeding in any court of competent jurisdiction. In addition, any issues pertaining to the ability to arbitrate a dispute under this Agreement shall be determined by a court of competent jurisdiction and not by an arbitrator. The arbitration shall be held in the Commonwealth of Massachusetts and shall be conducted in accordance with the then-prevailing Commercial Arbitration Rules of the American Arbitration Association. Employee shall arbitrate individual claims only. The arbitrator shall be acceptable to both the Corporation and Employee. If the parties cannot agree on an acceptable arbitrator, the dispute shall be heard by a panel of three arbitrators, one appointed by the Corporation and one appointed by Employee, and the third selected by the other two arbitrators. Under no circumstances may the arbitrator(s) have the authority to require Employee's reinstatement to employment or continued employment, or award any lost wages or benefits (other than severance benefits as described above) as a result of Employee's termination of employment for any reason. The arbitrator(s) shall also have no authority to award punitive, liquidated or consequential damages or the payment of a prevailing party's costs and/or attorneys' fees. Each party shall bear its own costs and expenses and an equal share of the arbitrators' and administrative fees of arbitration. The Corporation, Employee and the arbitrator(s) shall treat all aspects of the arbitration proceedings, including without limitation, discovery, testimony and other evidence, briefs and the award, as strictly confidential; provided, however, that any award or order rendered by the arbitrator(s) under this Agreement may be entered as a judgment or order in a court of competent jurisdiction and may be disclosed by the Corporation as necessary to enforce the terms of the restrictive covenants in Sections (7) through (11) of this Agreement

[remainder of page left blank intentionally]

IN WITNESS WHEREOF, the parties hereto have executed, in the Commonwealth of Massachusetts, this Employment Agreement as a sealed instrument, all as of the day, month and year first written above.

MKS INSTRUMENTS, INC.

BY: /s/ Gerald G. Colella
Gerald G. Colella
Chief Executive Officer and President
2 Tech Drive
Andover, MA 01810

/s/ John T. C. Lee Legal Signature
John T. C. Lee

Dated: February 24, 2014

APPENDIX A
FORM RELEASE

Introduction

(“Executive”) separated from MKS Instruments, Inc. (the “Corporation”) as of _____, and Executive and the Corporation entered into a Separation Agreement (the “Agreement”), dated _____, pursuant to which, among other things, Executive agreed to release the Releasees from all waivable claims which Executive might have against the Releasees in exchange for the receipt of certain payments and benefits set forth therein upon this Release becoming effective.

Terms

1. As used in this Release, the following words shall mean the following:

(a) “Corporation” shall at all times mean MKS Instruments, Inc., its subsidiaries, divisions, successors and assigns, its affiliated and predecessor companies or corporations, and their successors and assigns.

(b) “Executive” means _____.

(c) “Releasees” shall mean the Corporation, its present or former directors, officers, shareholders, members, employees, attorneys and agents, whether in their individual or official capacities and the current and former trustees or administrators of any pension or other benefit plan applicable to the employees or former employees of the Corporation in their official and individual capacities.

2. After receiving this signed Release from Executive and upon the expiration of the waiting period described in Paragraph 5 (the “Effective Date”), The Corporation will provide Executive with the payments and benefits described in paragraphs _____ through _____ in Section _____ of the Agreement.

3. In exchange for receiving the payments and benefits described in paragraphs _____ and _____ in Section _____ of the Agreement, Executive hereby agrees that Executive is releasing the Releasees from, and waiving, any claim that Executive may have against them for any act, omission, incident or situation which may have occurred at any time up until the Effective Date of this Release. This includes RELEASING AND FOREVER DISCHARGING the Releasees from AND WAIVING:

(a) Any claims arising under Title VII of the Civil Rights Act of 1964, the Age Discrimination in Employment Act, the Americans with Disabilities Act, the Rehabilitation Act, the Equal Pay Act, 42 U.S.C. §§ 1981, 1982, 1983 and 1985, the Massachusetts Fair Employment Practices Act, M.G.L. c. 151B; the Fair Labor Standards Act; the Family and Medical Leave Act, 29 U.S.C. § 2601 et seq., the Massachusetts Civil Rights Act; the Massachusetts Equal Rights Law; the Massachusetts Minimum Fair Wages Statute (M.G.L. c. 151, §§ 1A and 1B); the Massachusetts Payment of Wages Statute (M.G.L. c. 149, § 148, et seq.); the Massachusetts “Blue Laws” (M.G.L. c. 136); and any other claims arising under Chapters 149 through 154 of the Massachusetts General Laws, and any amendments to these statutes;

(b) Any claims arising under the Family and Medical Leave Act, the National Labor Relations Act, the Sarbanes-Oxley Act of 2002, and all other federal, state, and local laws or ordinances relating to employment;

(c) Any claims arising under the Employee Retirement Income Security Act ("ERISA") (but not claims to vested ERISA benefits) or any other federal or state law pertaining to employee retirement or welfare benefits;

(d) Any claims arising under any other federal, state or local statutory or regulatory provision;

(e) Any claims arising under federal common law or under the common law of any state; and

(f) Any claims for attorneys' fees and/or costs.

Notwithstanding the above, this Release does not prevent Executive from pursuing any right or claim which cannot be waived by law. This means, among other things, that even if Executive signs this Release, Executive retains his right to file a charge of discrimination with the Equal Employment Opportunity Commission and to assist in Commission investigations. By signing this Release, however, Executive is waiving any right to recover any relief in federal or state court, in any administrative proceeding or in arbitration, whether such a claim for relief is brought by Executive or through the EEOC (or a comparable state or local agency) or as part of a class action proceeding. This Release also does not prevent Executive from pursuing any claim to enforce this Release or from asserting any future rights Executive may have to any vested benefits that Executive may be entitled to receive.

4. By signing this Release, Executive is hereby acknowledging and agreeing that: (a) Executive is competent to enter into this Release and is fully aware of his right to discuss any and all aspects of this Release with an attorney of his choice; (b) except for the promises contained in the Agreement, the Corporation has made no other promise of any kind to Executive to cause Executive to sign this Release; (c) what Executive is receiving under the Agreement and this Release is in addition to anything of value to which he already is entitled; (d) what Executive is receiving is adequate and satisfactory to him; and (e) the payments and benefits specified in the Agreement and this Release constitute full and final payment in settlement of all waivable claims of any kind, known or unknown, which Executive may have against the Releasees. Executive further acknowledges that he has carefully read and fully understand all of the provisions of this Release, that Executive has had the opportunity to discuss the provisions of this Release with an attorney, and that Executive is voluntarily entering into this Release.

5. **Executive acknowledges and agrees that he has been given a period of up to twenty-one (21) days in which to consider the terms of this Release and that this Release shall not become effective until seven (7) days following the date of his signature.** Prior to that time, Executive may elect to revoke this Release. If Executive chooses to revoke this Release, Executive agrees to notify the Chair of the Board of Directors of the Corporation in writing. **If Executive does not sign and return the Release within the specified period, or Executive revokes it, Executive will forfeit any payments contingent on the Release.** Unless revoked by the Executive, this Release shall become effective eight calendar days after the date that Executive signs this Release, as evidenced by the date adjacent to his signature at the end of this Release (the "Effective Date"). This Release shall not be effective and shall be deemed void as if never made if, prior to the Effective Date, Executive revokes his earlier acceptance of this Release. Payments contingent upon the Executive entering into the Agreement and this Release will not be made (or begin) prior to the expiration of the period specified for revoking this Release. If the period for signing and returning the Agreement or Release extends into a later taxable year, any payments contingent upon the Agreement and Release will be made (or begin) in the later taxable year.

6. By signing this Release, Executive is not waiving any claims against the Releasees for any act or omission that may occur after the signing of this Release.

7. By signing this Release, Executive is hereby acknowledging and agreeing that Executive has been paid all sums due and owing to him as of the date hereof including, but not limited to, all salary, bonus, business expenses, allowances, vacation pay and other benefits and perquisites as a result of Executive's employment with the Corporation, and has received any leaves (paid or unpaid) to which he was entitled during his employment and the Corporation has not denied or interfered with his ability to request or take such leave.

8. Executive hereby agrees that his employment relationship with the Corporation has been severed and that Executive forever waive any right to reinstatement, recall or future employment with the Corporation, unless waived by mutual agreement.

9. Paragraphs through of the Agreement are incorporated by this reference into this Release as if fully and independently set forth below.

10. The Agreement and this Release represent the full and complete understanding of the Executive and the Corporation. The Agreement and this Release shall supersede any inconsistent provisions in the . No prior or contemporaneous oral or written agreements may be offered to alter their terms. This Release shall be binding upon the Executive and the Corporation and upon their heirs, successors and assigns. This Release may not be modified except in a written document signed by both parties.

11. This Release shall be governed by and interpreted in accordance with the laws of the Commonwealth of Massachusetts, without regard to its conflict of law provisions and except to the extent federal law applies.

PLEASE READ CAREFULLY. EMPLOYEE SHOULD CONSULT WITH COUNSEL BEFORE SIGNING THIS DOCUMENT. THIS RELEASE INCLUDES A RELEASE OF KNOWN AND UNKNOWN CLAIMS.

WITNESS: _____
Date

Date
MKS INSTRUMENTS, INC.

ATTEST: _____
Date

By: _____
Chair, Board of Directors Date

EMPLOYMENT AGREEMENT

EMPLOYMENT AGREEMENT dated February 24, 2014 (“Employment Agreement”), by and between MKS Instruments, Inc., a Massachusetts Corporation (the “Corporation”), and Paul Loomis of Newburyport, MA (the “Employee”).

WHEREAS, the Corporation and Employee desire to provide for the employment of Employee by the Corporation:

NOW, THEREFORE, in consideration of the premises and the mutual promises contained herein, the Corporation and Employee hereby agree as follows:

(1) Term of Employment: (a) The Corporation hereby employs Employee, and Employee hereby accepts continued employment with the Corporation, for a period continuing from the first date above until terminated as provided in this Section (1) or Section (5).

(b) Either the Corporation or Employee may terminate Employee’s employment at any time for any reason, or no reason, by giving written notice to the other party stating its or his election to terminate the employment of Employee under this Employment Agreement and an effective date of termination which is at least thirty (30) days after the date of receipt by the other party of such notice; provided, however, that the employment of Employee under this Employment Agreement is subject to prior termination as hereinafter provided in Section (5)(b) and (c). Notwithstanding the above, the Corporation shall be entitled, at its sole discretion, to waive the obligation of Employee to continue to actively work during the 30 day notice period. In the event the Corporation elects at any time to waive the obligation of Employee to actively work during the 30 day notice period, the Corporation shall continue to pay Employee his customary Base Salary (as defined in Section (4)) and will reimburse Employee through the balance of the 30 day notice period for the premiums (if any) Employee pays for continuation of life insurance should Employee elect to exercise the conversion feature (if any) of the Corporation’s group life policy then in effect and for the premiums (if any) for such medical/dental insurance as Employee may then receive should Employee elect continuation under the federal COBRA program.

(c) Employee may terminate employment by delivering notice of resignation no later than thirty (30) days prior to the intended date of termination of employment (“Resignation Date”); provided, however, that the Corporation may at any time and for any reason, or no reason, accelerate the Resignation Date to any date prior thereto up to and including the date Employee delivers such notice of resignation, and such acceleration shall not, in any event, be deemed a termination by Corporation of Employee’s employment. Unless the employment is terminated pursuant to Section (5), the Corporation shall, if it terminates the employment prior to the Resignation Date, continue to pay Employee his customary Base Salary (as defined in Section (4)) and will reimburse Employee through the balance of the 30 day notice period for the premiums (if any) Employee pays for continuation of life insurance should Employee elect to exercise the conversion feature (if any) of the Corporation’s group life policy then in effect and for the premiums (if any) for such medical/dental insurance as Employee may then receive should the Employee elect continuation under the federal COBRA program.

(2) Capacity: Employee is being paid to perform such duties and exercise such powers, authorities and discretions in relation to the Corporation as are customary and incidental to Employee’s position and such other services that are delegated or assigned to Employee by the Chief Executive Officer of the Corporation or his designee, including any authorized manager or supervisor of Employee. It shall be a condition of Employee’s employment hereunder that Employee execute and deliver to the Corporation that Confidential Information Agreement of MKS Instruments, Inc. (“Confidential Information Agreement”) attached hereto as Attachment 1, and by execution of this Employment Agreement, Employee (i) acknowledges receipt of the Confidential Information Agreement and (ii) agrees to be bound by all of the terms of the Confidential Information Agreement.

(3) **Extent of Services:** During the term of employment of Employee under this Employment Agreement, Employee shall devote his full time to, and use his best efforts in the furtherance of, the business of the Corporation and shall not perform similar duties in any other capacity for any other person or engage in any other business activity which interferes in any way with Employee's performance of his duties to the Corporation, whether or not such business activity is pursued for gain or any other pecuniary advantage, without the prior written consent of the Chief Executive Officer of the Corporation. Notwithstanding the foregoing, Employee may manage his personal investments and be involved in charitable and unremunerated professional activities (including serving on charitable and professional boards), so long as such service is approved by the Chief Executive Officer and does not materially interfere with the performance of Employee's duties hereunder or violate Sections (7) through (11) of this Agreement. Employee agrees and understands that Employee owes the Corporation fidelity and loyalty during the term of employment with the Corporation.

(4) **Compensation:** In consideration of the services to be rendered by Employee under this Employment Agreement, the Corporation agrees to pay, and the Employee agrees to accept, the following compensation:

(a) **Base Salary:** A base salary at the rate of two hundred seventy eight thousand one hundred dollars and zero cents (\$278,100.00) per year for the term of Employee's employment under this Employment Agreement. The base salary shall be payable in equal biweekly installments subject to usual withholding requirements. This salary will be reviewed regularly according to the practices of the Corporation and will be subject to any changes in pay policies implemented by the Corporation from time to time, becoming the Base Salary hereunder, as defined. As an exempt employee, Employee shall not be entitled to receive any overtime pay from the Corporation.

(b) **MKS Instruments, Inc. Profit Sharing and 401(k) Plan:** Employee shall be eligible to become a participant under the profit sharing plan of the Corporation on fulfilling the conditions set forth in the MKS Instruments, Inc. Profit Sharing and 401(k) Plan, in accordance with its terms.

(c) **Vacation:** Employee shall be entitled to an annual vacation leave of 20 days at full rate of Base Salary during each calendar year of this Employment Agreement, subject to Employee arranging such vacation so as not to affect adversely the ability of the Corporation to transact its business. Such vacation leave shall accrue and be administered according to the policies and practices of the Corporation.

(d) **Life Insurance:** The Corporation shall provide and pay such premiums for term life insurance for Employee during the term of Employee's employment under this Employment Agreement in accordance with the term life insurance plan of the Corporation.

(e) **Medical/Dental Insurance:** The Corporation shall provide group medical/dental insurance for Employee under the plans of the Corporation applicable to Employee during the term of Employee's employment under this Employment Agreement.

(f) **Other Benefits:** The Corporation shall provide other benefits for Employee under the Plans of the Corporation applicable to Employee during the term of Employee's employment under this Employment Agreement.

(g) **Expenses:** The Corporation shall reimburse Employee for all reasonable and necessary expenses incurred by Employee in connection with the performance of Employee's duties as an employee of the Corporation. Such reimbursement is subject to the timely submission to the Corporation by Employee of appropriate documentation and/or vouchers in accordance with the customary procedures of the Corporation for expense reimbursement, as such procedures may be revised by the Corporation from time to time, and to such caps on reimbursements as the Corporation may from time to time impose.

(5) Termination: The employment of Employee under this Employment Agreement shall terminate:

(a) On the expiration of the period of employment as provided in Section (1).

(b) Upon the death of Employee, or the Disability of Employee as defined in Section (6)(e) below.

(c) At the election of the Corporation: (i) if Employee shall fail, or refuse, to perform the other covenants and agreements required of him under this Employment Agreement other than as a result of Disability or death; or (ii) for "cause", which term shall mean: (1) Employee's willful or gross neglect of his duties, including the failure to carry out or comply with, in good faith, in any material respect, or the refusal to follow, any lawful and reasonable written directives of the Chief Executive Officer of the Corporation or his designee that are not inconsistent with Employee's position; (2) Employee's material breach of this Employment Agreement or of any of the rules, regulations, policies or procedures of the Corporation, or material violation of the Corporation's statement of corporate policy and/or code of conduct at any time after such statement and code have been adopted by the Board of Directors and have been set forth in writing and delivered to Employee; (3) Employee's commission of a felony or other act of material dishonesty, or plea of other than "not guilty" to any felony or serious misdemeanor charge including but not limited to any act of fraud, embezzlement, misappropriation of Corporation property, moral turpitude, or breach of fiduciary duty that could possibly have a material adverse effect on the Corporation; (4) Employee's unlawful use (including being under the influence) of controlled substances on the Corporation's premises or while performing Employee's duties and responsibilities or indictment related to the commission of any criminal act; (5) Employee's failure or refusal to reasonably cooperate with any Corporation investigation or governmental/regulator authority having jurisdiction over Employee and the Corporation; or (6) Employee's engaging in willful or gross misconduct which is materially injurious to the Corporation or any of its subsidiaries or affiliates or any of its directors or officers, financially or otherwise, or to its or their reputation; in each case determined in good faith by the Chief Executive Officer of the Corporation.

(6) Payment upon Termination: (a) If Employee's employment is terminated by the Corporation other than pursuant to Section (5)(c) the Corporation shall (subject to Employee's entering into and not revoking a General Release with the Corporation in such form as it may then require; and provided that Employee (i) remains in full compliance with the Corporation's Confidential Information Agreement; and (ii) performs such actions as the Corporation may reasonably request in transitioning Employee from his employment with the Corporation) continue to pay Employee the Base Salary (as defined in Section (4)) in effect immediately prior to the time of such termination (but without any bonus, commission or other similar amounts except as may have been earned and are due and payable prior to such termination) for three (3) months after the last full day Employee works under this Employment Agreement at its normal payroll payment dates, by direct deposit or regular mail at Employee's election, provided Employee is not in breach of any of the covenants herein; any unreimbursed expenses due to Employee pursuant the Corporation's policy for which he has submitted acceptable supporting documentation; and any accrued but unused vacation time. The form of General Release currently used by the Corporation is attached hereto as Appendix A, and the Release shall be in substantially similar form with such changes as the Corporation deems appropriate at the time of Employee's termination. Employee shall be entitled to such payment only as set forth herein, and the provisions of this Section (6) shall supersede in their entirety any severance payment provisions in any severance plan, policy, program or arrangement maintained by the Corporation. In addition to any rights or remedies the Corporation may otherwise have, upon any breach of any agreements herein by Employee, Employee's right to any continued

payment of separation benefits shall immediately cease, and Employee shall be obligated to repay to the Corporation all amounts paid by the Corporation for the separation benefits except for the amount of \$1,000, which Employee shall be entitled to retain.

(b) In the event Employee's employment is terminated by death, the Corporation shall pay to Employee's estate the compensation which would otherwise be payable to Employee at the end of the month in which his death occurs and other unpaid amounts to which Employee would have been at that time entitled as an Employee under any applicable compensation or benefit plan or program.

(c) In the event Employee's employment is terminated by the Corporation for Cause pursuant to Section (5)(c) hereof, the Corporation shall have no obligation to pay Employee any amounts, except for Base Salary through the last full day of actual work for the Corporation, and any accrued but unused vacation time.

(d) In the event Employee voluntarily resigns, the Corporation shall have no obligation to pay Employee any amounts, except for Base Salary through the last full day of actual work for the Corporation, or, if applicable, amounts payable in accordance with Section (1)(c), and other unpaid amounts to which Employee is at that time entitled under any applicable compensation or benefit plan or program.

(e) If Employee is incapacitated by a physical or mental condition, illness, or injury that prevents Employee from being able to perform his duties under this Employment Agreement in a satisfactory manner for substantially all of a twelve (12) consecutive week period (or such longer period as may be required by law or that the Chief Executive Officer of the Corporation or his designee may, in his discretion, determine) with any reasonable accommodation that may be required by law, then Employee shall be deemed to be unable to perform his job (any such physical or mental condition, illness, or injury, a "Disability"). In such event, the Corporation may terminate Employee's employment, in which case Employee shall receive (i) any accrued but unpaid Base Salary and other unpaid amounts to which Employee is at that time entitled under any applicable compensation or benefit plan or program and (ii) all applicable disability benefits consistent with any applicable benefits program. The Corporation shall have no further obligations to Employee. Nothing in this paragraph is intended to or shall operate to excuse the Corporation from any legal obligations it may have under applicable laws.

(f) The Corporation shall deduct from the amounts payable to Employee pursuant to this Agreement all required withholding amounts and deductions, including but not limited to federal, state, local or foreign withholding amounts in accordance with all applicable laws and regulations and deductions authorized by Employee. Employee shall be solely responsible for and shall pay all taxes associated with the amounts payable under this Agreement. The Corporation shall be entitled to rely on an opinion of counsel if any questions as to the amount or requirement of withholding shall arise.

(g) Employee shall have no obligation to mitigate any payments due hereunder. Any amounts earned by Employee from other employment shall not offset amounts due hereunder. The Corporation's obligation to pay Employee the amounts provided hereunder shall not be subject to set-off, counterclaim or recoupment of amounts owed by Employee to the Corporation or its affiliates, except for any specific, stated amounts owed by Employee to the Corporation, or as otherwise stated herein.

(7) Trade Secrets: Employee covenants and agrees that Employee will communicate to the Corporation, and will not divulge or communicate to any other person, partnership, corporation or other entity without the prior written consent of the Corporation, any trade secrets of the Corporation or confidential information relating to the business of the Corporation or anyone connected with the Corporation, and that such trade secrets and confidential information shall not be used by Employee either on his own behalf or for the benefit of others or disclosed by Employee to any one, except to the Corporation, during or after the term of Employee's employment under this Employment Agreement.

(8) Inventions and Patents: (a) Employee shall make prompt full disclosure in writing to the Corporation of all inventions, improvements and discoveries, whether or not patentable, which Employee conceives, devises, makes, discovers, develops, perfects or first reduces to practice, either alone or jointly with others, during the term of Employee's employment under this Employment Agreement, which relate in any way to the fields, products or business of the Corporation, including development and research, whether during or out of the usual hours of work or on or off the premises of the Corporation or by use of the facilities of the Corporation or otherwise and whether at the request or suggestion of the Corporation or otherwise (all such inventions, improvements and discoveries being hereinafter called the "Inventions"), including any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by Employee after the employment of Employee under this Employment Agreement is terminated if the Inventions were conceived by Employee during the term of Employee's employment under this Employment Agreement. Any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by Employee within six (6) months of the date of termination of the Employee's employment under this Employment Agreement shall be conclusively presumed to have been conceived during the term of Employee's employment under this Employment Agreement.

(b) Employee agrees that the Inventions shall be the sole and exclusive property of the Corporation.

(c) Employee agrees to assist the Corporation and its nominees in every reasonable way (entirely at its or their expense) to obtain for the benefit of the Corporation letters patent for the Inventions and trademarks, trade names and copyrights relating to the Inventions, and any renewals, extensions or reissues thereof, in any and all countries, and agrees to make, execute, acknowledge and deliver, at the request of the Corporation, all written applications for letters patent, trademarks, trade names and copyrights relating to the Inventions and any renewals, extensions or reissues thereof, in any and all countries, and all documents with respect thereto, and all powers of attorney relating thereto and, without further compensation, to assign to the Corporation or its nominee all the right, title and interest of Employee in and to such applications and to any patents, trademarks, trade names or copyrights which shall thereafter issue on any such applications, and to execute, acknowledge and deliver all other documents deemed necessary by the Corporation to transfer to or vest in the Corporation all of the right, title and interest of Employee in and to the Inventions, and to such trademarks, trade names, patents and copyrights together with exclusive rights to make, use, license and sell them throughout the world. If the Corporation is unable, after reasonable effort, to secure Employee's signature on any application for patent, copyright, trademark or other analogous registration or other documents regarding any legal protection relating to any Invention, whether because of Employee's physical or mental incapacity or for any other reason whatsoever, Employee hereby irrevocably designates and appoints the Corporation and its duly authorized officers and agents as Employee's agent and attorney-in-fact, to act for and on Employee's behalf and stand to execute and file any such application or applications or other documents and to do all other lawfully permitted acts to further the prosecution and issuance of patent, copyright or trademark registrations or any other legal protection thereon with the same legal force and effect as if executed by Employee.

(d) Employee agrees that even though his employment is terminated under this Employment Agreement Employee will, at any time after such termination of employment, carry out and perform all of the agreements of Subsections 8(a) and 8(c) above, and will at any time and at all times cooperate with the Corporation in the prosecution and/or defense of any investigation, litigation or legal process which may arise, including in connection with the Inventions, provided, however, that should such services be rendered after termination of Employee's employment under this Employment Agreement, Employee shall be paid reasonable compensation on a per diem basis. The Corporation agrees to provide Employee reasonable notice in the event his assistance is required.

(e) Employee agrees to make and maintain adequate and current written records of all Inventions in the form of notes, sketches, drawings, or reports relating thereto, which records shall be and remain the property of, and available to, the Corporation at all times.

(f) Employee agrees that he will, upon leaving the Corporation's employment, promptly deliver to the Corporation all originals and copies of disclosures, drawings, prints, letters, notes, and reports either typed, handwritten or otherwise memorialized, belonging to the Corporation which are in his possession or under his control and Employee agrees that he will not retain or give away or make copies of the originals or copies of any such disclosures, drawings, prints, letters, notes or reports.

(9) Property of Corporation: All files, records, reports, documents, drawings, specifications, equipment, and similar items relating to the business of the Corporation, whether prepared by Employee or otherwise coming into his possession, shall remain the exclusive property of the Corporation and shall not be removed by Employee from the premises of the Corporation under any circumstances whatsoever without the prior written consent of the Corporation.

(10) Noncompetition Agreement: (a) Employee shall not, without the written consent of the Corporation, during the term of employment with the Corporation and for the period of one year thereafter (the "Non-Compete Period"), engage in or otherwise carry on, directly or indirectly anywhere in the world (either as principal, agent, employee, employer, investor, shareholder (except for holdings of no greater than 1% of the total outstanding shares in a publicly-traded company), consultant, partner, member, financier or in any other individual or representative capacity of any kind whatsoever), any business or activity competitive with the Corporation but solely to the extent such business or activity is related to, similar to or competitive with the activities of the business unit(s), division(s), laborator(y)(ies), facilit(y)(ies) and other operational unit(s) in or for which Employee performed work for the Corporation or about which Employee acquired Proprietary Information (as defined in the Confidential Information Agreement). The Non-Compete Period shall be extended for any period during which Employee is in breach of this Employment Agreement or the Confidential Information Agreement.

(b) The Corporation and Employee agree that the services of Employee are of a personal, special, unique and extraordinary character, and cannot be replaced by the Corporation without great difficulty, and that the violation by Employee of any of his agreements under this Section 10 would damage the goodwill of the Corporation and cause the Corporation irreparable harm that could not reasonably or adequately be compensated in damages in an action at law, and that the agreements of Employee under this Section 10 may be enforced by the Corporation in equity by an injunction, declaratory judgment or restraining order in addition to being enforced by the Corporation at law.

(c) In the event that this Section 10 shall be determined by any court of competent jurisdiction to be unenforceable by reason of its extending for too long a period of time or over too great a range of activities or geographic scope, it shall be interpreted to extend only over the maximum period of time or range of activities or geographic scope as to which it may be enforceable.

(11) Non-Solicitation: Employee shall not, on his own behalf or in the service or on behalf of others, directly or indirectly:

(a) solicit, entice or induce any Customer (as defined below) to become a customer, distributor or supplier of any other person, firm or corporation with respect to products and/or services sold or under development by the Corporation during his employment at the Corporation, or to cease doing business with the Corporation, and Employee shall not contact or approach any such person, firm or corporation for such purpose or authorize or knowingly approve the taking of such actions by any other person for a period of twenty-four (24) months from the date of the termination of Employee's employment under this Employment Agreement; or

(b) solicit, recruit or hire (or attempt to solicit, recruit or hire) any employee, officer or agent of the Corporation or contractor engaged by the Corporation (whether or not such person is a full-time executive or whether or not such employment is pursuant to a written agreement or at-will) to terminate such person's

employment or engagement with the Corporation or work for a third party other than the Corporation for a period of twenty-four (24) months after the date of the termination of Employee's employment under this Employment Agreement, or engage in any activity that would cause such employee or contractor to violate any agreement with the Corporation, nor shall Employee form any partnership with, or establish any business venture in cooperation with, any such person.

(c) For the purposes of this Section 11, a "Customer" means any person or entity which as of the date of the termination of Employee's employment under this Employment Agreement was, within two (2) years prior to such time, a customer, distributor or supplier of the Corporation, and references to the Corporation shall be deemed to include any affiliate or subsidiary of the Corporation.

(12) Non-disparagement: Employee shall not disparage the Corporation, any of its products or practices, or any of its directors, officers, or employees, whether orally, in writing or otherwise, at any time. Notwithstanding the foregoing: nothing in this Section shall (i) limit the ability of Employee to provide truthful testimony as required by law or any judicial or administrative process, or (ii) prevent any Person from making any truthful statement to the extent necessary in any litigation, arbitration, or mediation proceeding involving this Employment Agreement, including, but not limited to, the enforcement of this Employment Agreement. In no event shall any termination of Employee's employment by the Corporation or Employee for any reason constitute disparagement for purposes of this Section.

(13) Notice: Any and all notices under this Employment Agreement shall be in writing and, if to the Corporation, shall be duly given if sent to the Corporation by registered or certified mail, postage prepaid, return receipt requested, at the address of the Corporation set forth under its name below or at such other address as the Corporation may hereafter designate to Employee in writing for the purpose, and if to Employee, shall be duly given if delivered to Employee by hand or if sent to Employee by registered or certified mail, postage prepaid, return receipt requested, at the address of Employee set forth under his name below or at such other address as Employee may hereafter designate to the Corporation in writing for the purpose.

(14) Assignment: The rights and obligations of the Corporation under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the successors and assigns of the Corporation. The rights and obligations of Employee under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the heirs, executors and legal representatives of Employee. Employee shall not delegate his employment or obligations under this Employment Agreement to any other person.

(15) Code Section 409A Compliance: Where Section (6) refers to Employee's termination of employment for purposes of receiving any payment, whether such a termination has occurred will be determined in accordance with Section 409A of the Internal Revenue Code and Treasury Regulation Section 1.409A-1(h) (or any successor provisions). Where the Employment Agreement requires the following payments to be made to Employee, the following rules shall apply, and any inconsistent provision is superseded:

To the extent that this Employment Agreement requires that a payment shall be made upon or as soon as reasonably practicable after an event (*e.g.*, termination of employment), such payment shall be made no later than sixty (60) days after the occurrence of such event (or, if earlier, within two-and-a-half (2 1/2) months following the end of the Employee's taxable year in which such event occurs). Employee may not designate the year of such payment. To the extent that benefits under Section (6) are contingent upon Employee providing a General Release, Employee shall sign and return the General Release within the reasonable time period designated by the Corporation, which shall be no less than twenty-one (21) days but no more than forty-five (45) days. If such designated time period for review and revocation of the General Release crosses calendar years, payments for the period for review and return of the Release shall be made in the later calendar year. Any payments that would otherwise be made during the period for review and revocation of the General Release will be made on the first scheduled payment date after such period ends. To the extent that the Employment Agreement provides for the reimbursement of specified expenses incurred by Employee, such

reimbursement shall be made in accordance with the provisions of the Employment Agreement, but in no event later than the last day of Employee's taxable year following the taxable year in which the expense was incurred. The amount of expenses eligible for reimbursement or in-kind benefits provided by the Corporation in any taxable year of Employee shall not affect the amount of expenses or in-kind benefits to be reimbursed or provided in any other year (except in the case of maximum benefits to be provided under a medical reimbursement arrangement, if applicable). Bonus otherwise payable under the Employment Agreement after the end of a bonus plan performance period shall be paid within two-and-a-half (2 1/2) months after the end of the fiscal year of the Corporation to which such Bonus relates. Each payment in respect of Employee's termination of employment under Section 6 of the Employment Agreement is designated as a separate payment for purposes of the short-term deferral rules under Treasury Regulation Section 1.409A-1(b)(4)(i)(F) and the exemption for involuntary terminations under separation pay plans under Treasury Regulation Section 1.409A-1(b)(9)(iii).

If Employee is designated as a "specified Executive" within the meaning of Code Section 409A (while the Corporation is publicly traded on any securities market), any deferred compensation payment subject to Section 409A to be made during the six-month period following Employee's termination of employment shall be withheld and the amount of the payments withheld will be paid in a lump sum, without interest, during the seventh month after Employee's termination; provided, however, that if Employee dies prior to the expiration of such six month period, payment to Employee beneficiary shall be made as soon as reasonably practicable following Employee's death. The Corporation shall identify in writing delivered to Employee any payments it reasonably determines are subject to delay under this Section. In no event shall the Corporation have any liability or obligation with respect to taxes for which Employee may become liable as a result of the application of Code Section 409A.

(16) Entire Agreement and Severability: (a) This Employment Agreement and the Confidential Information Agreement supersede any and all other agreements, either oral or in writing, between the parties hereto with respect to the employment of Employee by the Corporation and contains all of the covenants and agreements between the parties with respect to such employment. In the event of any discrepancy between the terms of this Employment Agreement and the Confidential Information Agreement, this Employment Agreement controls. Each party to this Employment Agreement acknowledges that no representations, inducements, promises or agreements, oral or otherwise, have been made by any party, or any one acting on behalf of any party, which are not embodied herein, and that no other agreement, statement or promise not contained in this Employment Agreement shall be valid and binding. Any modification of this Employment Agreement will be effective only if it is in writing signed by both parties to this Employment Agreement.

(b) If any provision in this Employment Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions shall nevertheless continue in full force and effect without being impaired or invalidated in any way.

(c) All pronouns used herein shall include the masculine, feminine, and neuter gender as the context requires.

(17) Miscellaneous: This Employment Agreement and the rights and obligations of the parties hereunder shall be governed by, and construed in accordance with, the laws of the Commonwealth of Massachusetts, excluding (but only to the extent permitted by law) its conflict of laws and choice of law rules. The parties hereto further agree that service of any process, summons, notice or document by U.S. certified mail or overnight delivery by a generally recognized commercial courier service to Employee's last known address (or any mode of service recognized to be effective by applicable law) will be effective service of process for any action, suit or proceeding brought against Employee in any such court. This Employment Agreement may be executed in any number of counterparts, each of which, when executed by both parties to this Employment Agreement shall be deemed to be an original, and all of which counterparts together shall constitute one and the same instrument. The failure of either party hereto to enforce any right under this Employment Agreement shall not be construed to be a waiver of that right, or of damages caused thereby, or of any other rights under this Employment Agreement.

(18) Arbitration: Any dispute under this Employment Agreement shall be resolved by final and binding arbitration; provided, however, that the Corporation, in its sole discretion, may enforce the covenants set out above in Sections (7) through (11) of this Agreement by bringing a proceeding in any court of competent jurisdiction. In addition, any issues pertaining to the ability to arbitrate a dispute under this Agreement shall be determined by a court of competent jurisdiction and not by an arbitrator. The arbitration shall be held in the Commonwealth of Massachusetts and shall be conducted in accordance with the then-prevailing Commercial Arbitration Rules of the American Arbitration Association. Employee shall arbitrate individual claims only. The arbitrator shall be acceptable to both the Corporation and Employee. If the parties cannot agree on an acceptable arbitrator, the dispute shall be heard by a panel of three arbitrators, one appointed by the Corporation and one appointed by Employee, and the third selected by the other two arbitrators. Under no circumstances may the arbitrator(s) have the authority to require Employee's reinstatement to employment or continued employment, or award any lost wages or benefits (other than severance benefits as described above) as a result of Employee's termination of employment for any reason. The arbitrator(s) shall also have no authority to award punitive, liquidated or consequential damages or the payment of a prevailing party's costs and/or attorneys' fees. Each party shall bear its own costs and expenses and an equal share of the arbitrators' and administrative fees of arbitration. The Corporation, Employee and the arbitrator(s) shall treat all aspects of the arbitration proceedings, including without limitation, discovery, testimony and other evidence, briefs and the award, as strictly confidential; provided, however, that any award or order rendered by the arbitrator(s) under this Agreement may be entered as a judgment or order in a court of competent jurisdiction and may be disclosed by the Corporation as necessary to enforce the terms of the restrictive covenants in Sections (7) through (11) of this Agreement

[remainder of page left blank intentionally]

IN WITNESS WHEREOF, the parties hereto have executed, in the Commonwealth of Massachusetts, this Employment Agreement as a sealed instrument, all as of the day, month and year first written above.

MKS INSTRUMENTS, INC.

By: /s/ Gerald G. Colella

Gerald G. Colella
Chief Executive Officer and President
2 Tech Drive
Andover, MA 01810

/s/ Paul Loomis

Legal Signature

Paul Loomis

Dated: February 24, 2014

APPENDIX A
FORM RELEASE

Introduction

(“Executive”) separated from MKS Instruments, Inc. (the “Corporation”) as of _____, and Executive and the Corporation entered into a Separation Agreement (the “Agreement”), dated _____, pursuant to which, among other things, Executive agreed to release the Releasees from all waivable claims which Executive might have against the Releasees in exchange for the receipt of certain payments and benefits set forth therein upon this Release becoming effective.

Terms

1. As used in this Release, the following words shall mean the following:

(a) “Corporation” shall at all times mean MKS Instruments, Inc., its subsidiaries, divisions, successors and assigns, its affiliated and predecessor companies or corporations, and their successors and assigns.

(b) “Executive” means _____.

(c) “Releasees” shall mean the Corporation, its present or former directors, officers, shareholders, members, employees, attorneys and agents, whether in their individual or official capacities and the current and former trustees or administrators of any pension or other benefit plan applicable to the employees or former employees of the Corporation in their official and individual capacities.

2. After receiving this signed Release from Executive and upon the expiration of the waiting period described in Paragraph 5 (the “Effective Date”), The Corporation will provide Executive with the payments and benefits described in paragraphs _____ through _____ in Section _____ of the Agreement.

3. In exchange for receiving the payments and benefits described in paragraphs _____ and _____ in Section _____ of the Agreement, Executive hereby agrees that Executive is releasing the Releasees from, and waiving, any claim that Executive may have against them for any act, omission, incident or situation which may have occurred at any time up until the Effective Date of this Release. This includes RELEASING AND FOREVER DISCHARGING the Releasees from AND WAIVING:

(a) Any claims arising under Title VII of the Civil Rights Act of 1964, the Age Discrimination in Employment Act, the Americans with Disabilities Act, the Rehabilitation Act, the Equal Pay Act, 42 U.S.C. §§ 1981, 1982, 1983 and 1985, the Massachusetts Fair Employment Practices Act, M.G.L. c. 151B; the Fair Labor Standards Act; the Family and Medical Leave Act, 29 U.S.C. § 2601 et seq., the Massachusetts Civil Rights Act; the Massachusetts Equal Rights Law; the Massachusetts Minimum Fair Wages Statute (M.G.L. c. 151, §§ 1A and 1B); the Massachusetts Payment of Wages Statute (M.G.L. c. 149, § 148, et seq.); the Massachusetts “Blue Laws” (M.G.L. c. 136); and any other claims arising under Chapters 149 through 154 of the Massachusetts General Laws, and any amendments to these statutes;

(b) Any claims arising under the Family and Medical Leave Act, the National Labor Relations Act, the Sarbanes-Oxley Act of 2002, and all other federal, state, and local laws or ordinances relating to employment;

(c) Any claims arising under the Employee Retirement Income Security Act ("ERISA") (but not claims to vested ERISA benefits) or any other federal or state law pertaining to employee retirement or welfare benefits;

(d) Any claims arising under any other federal, state or local statutory or regulatory provision;

(e) Any claims arising under federal common law or under the common law of any state; and

(f) Any claims for attorneys' fees and/or costs.

Notwithstanding the above, this Release does not prevent Executive from pursuing any right or claim which cannot be waived by law. This means, among other things, that even if Executive signs this Release, Executive retains his right to file a charge of discrimination with the Equal Employment Opportunity Commission and to assist in Commission investigations. By signing this Release, however, Executive is waiving any right to recover any relief in federal or state court, in any administrative proceeding or in arbitration, whether such a claim for relief is brought by Executive or through the EEOC (or a comparable state or local agency) or as part of a class action proceeding. This Release also does not prevent Executive from pursuing any claim to enforce this Release or from asserting any future rights Executive may have to any vested benefits that Executive may be entitled to receive.

4. By signing this Release, Executive is hereby acknowledging and agreeing that: (a) Executive is competent to enter into this Release and is fully aware of his right to discuss any and all aspects of this Release with an attorney of his choice; (b) except for the promises contained in the Agreement, the Corporation has made no other promise of any kind to Executive to cause Executive to sign this Release; (c) what Executive is receiving under the Agreement and this Release is in addition to anything of value to which he already is entitled; (d) what Executive is receiving is adequate and satisfactory to him; and (e) the payments and benefits specified in the Agreement and this Release constitute full and final payment in settlement of all waivable claims of any kind, known or unknown, which Executive may have against the Releasees. Executive further acknowledges that he has carefully read and fully understand all of the provisions of this Release, that Executive has had the opportunity to discuss the provisions of this Release with an attorney, and that Executive is voluntarily entering into this Release.

5. **Executive acknowledges and agrees that he has been given a period of up to twenty-one (21) days in which to consider the terms of this Release and that this Release shall not become effective until seven (7) days following the date of his signature.** Prior to that time, Executive may elect to revoke this Release. If Executive chooses to revoke this Release, Executive agrees to notify the Chair of the Board of Directors of the Corporation in writing. **If Executive does not sign and return the Release within the specified period, or Executive revokes it, Executive will forfeit any payments contingent on the Release.** Unless revoked by the Executive, this Release shall become effective eight calendar days after the date that Executive signs this Release, as evidenced by the date adjacent to his signature at the end of this Release (the "Effective Date"). This Release shall not be effective and shall be deemed void as if never made if, prior to the Effective Date, Executive revokes his earlier acceptance of this Release. Payments contingent upon the Executive entering into the Agreement and this Release will not be made (or begin) prior to the expiration of the period specified for revoking this Release. If the period for signing and returning the Agreement or Release extends into a later taxable year, any payments contingent upon the Agreement and Release will be made (or begin) in the later taxable year.

6. By signing this Release, Executive is not waiving any claims against the Releasees for any act or omission that may occur after the signing of this Release.

7. By signing this Release, Executive is hereby acknowledging and agreeing that Executive has been paid all sums due and owing to him as of the date hereof including, but not limited to, all salary, bonus, business expenses, allowances, vacation pay and other benefits and perquisites as a result of Executive's employment with the Corporation, and has received any leaves (paid or unpaid) to which he was entitled during his employment and the Corporation has not denied or interfered with his ability to request or take such leave.

8. Executive hereby agrees that his employment relationship with the Corporation has been severed and that Executive forever waive any right to reinstatement, recall or future employment with the Corporation, unless waived by mutual agreement.

9. Paragraphs through of the Agreement are incorporated by this reference into this Release as if fully and independently set forth below.

10. The Agreement and this Release represent the full and complete understanding of the Executive and the Corporation. The Agreement and this Release shall supersede any inconsistent provisions in the . No prior or contemporaneous oral or written agreements may be offered to alter their terms. This Release shall be binding upon the Executive and the Corporation and upon their heirs, successors and assigns. This Release may not be modified except in a written document signed by both parties.

11. This Release shall be governed by and interpreted in accordance with the laws of the Commonwealth of Massachusetts, without regard to its conflict of law provisions and except to the extent federal law applies.

PLEASE READ CAREFULLY. EMPLOYEE SHOULD CONSULT WITH COUNSEL BEFORE SIGNING THIS DOCUMENT. THIS RELEASE INCLUDES A RELEASE OF KNOWN AND UNKNOWN CLAIMS.

WITNESS:	_____	_____
	Date	Date
		MKS INSTRUMENTS, INC.
ATTEST:	_____	By: _____
	Date	Chair, Board of Directors Date

EMPLOYMENT AGREEMENT

EMPLOYMENT AGREEMENT dated February 24, 2014 (“Employment Agreement”), by and between MKS Instruments, Inc., a Massachusetts Corporation (the “Corporation”), and Brian Quirk of Belmont, MA (the “Employee”).

WHEREAS, the Corporation and Employee desire to provide for the employment of Employee by the Corporation:

NOW, THEREFORE, in consideration of the premises and the mutual promises contained herein, the Corporation and Employee hereby agree as follows:

(1) Term of Employment: (a) The Corporation hereby employs Employee, and Employee hereby accepts continued employment with the Corporation, for a period continuing from the first date above until terminated as provided in this Section (1) or Section (5).

(b) Either the Corporation or Employee may terminate Employee’s employment at any time for any reason, or no reason, by giving written notice to the other party stating its or his election to terminate the employment of Employee under this Employment Agreement and an effective date of termination which is at least thirty (30) days after the date of receipt by the other party of such notice; provided, however, that the employment of Employee under this Employment Agreement is subject to prior termination as hereinafter provided in Section (5)(b) and (c). Notwithstanding the above, the Corporation shall be entitled, at its sole discretion, to waive the obligation of Employee to continue to actively work during the 30 day notice period. In the event the Corporation elects at any time to waive the obligation of Employee to actively work during the 30 day notice period, the Corporation shall continue to pay Employee his customary Base Salary (as defined in Section (4)) and will reimburse Employee through the balance of the 30 day notice period for the premiums (if any) Employee pays for continuation of life insurance should Employee elect to exercise the conversion feature (if any) of the Corporation’s group life policy then in effect and for the premiums (if any) for such medical/dental insurance as Employee may then receive should Employee elect continuation under the federal COBRA program.

(c) Employee may terminate employment by delivering notice of resignation no later than thirty (30) days prior to the intended date of termination of employment (“Resignation Date”); provided, however, that the Corporation may at any time and for any reason, or no reason, accelerate the Resignation Date to any date prior thereto up to and including the date Employee delivers such notice of resignation, and such acceleration shall not, in any event, be deemed a termination by Corporation of Employee’s employment. Unless the employment is terminated pursuant to Section (5), the Corporation shall, if it terminates the employment prior to the Resignation Date, continue to pay Employee his customary Base Salary (as defined in Section (4)) and will reimburse Employee through the balance of the 30 day notice period for the premiums (if any) Employee pays for continuation of life insurance should Employee elect to exercise the conversion feature (if any) of the Corporation’s group life policy then in effect and for the premiums (if any) for such medical/dental insurance as Employee may then receive should the Employee elect continuation under the federal COBRA program.

(2) Capacity: Employee is being paid to perform such duties and exercise such powers, authorities and discretions in relation to the Corporation as are customary and incidental to Employee’s position and such other services that are delegated or assigned to Employee by the Chief Executive Officer of the Corporation or his designee, including any authorized manager or supervisor of Employee. It shall be a condition of Employee’s employment hereunder that Employee execute and deliver to the Corporation that Confidential Information Agreement of MKS Instruments, Inc. (“Confidential Information Agreement”) attached hereto as Attachment 1, and by execution of this Employment Agreement, Employee (i) acknowledges receipt of the Confidential Information Agreement and (ii) agrees to be bound by all of the terms of the Confidential Information Agreement.

(3) Extent of Services: During the term of employment of Employee under this Employment Agreement, Employee shall devote his full time to, and use his best efforts in the furtherance of, the business of the Corporation and shall not perform similar duties in any other capacity for any other person or engage in any other business activity which interferes in any way with Employee's performance of his duties to the Corporation, whether or not such business activity is pursued for gain or any other pecuniary advantage, without the prior written consent of the Chief Executive Officer of the Corporation. Notwithstanding the foregoing, Employee may manage his personal investments and be involved in charitable and unremunerated professional activities (including serving on charitable and professional boards), so long as such service is approved by the Chief Executive Officer and does not materially interfere with the performance of Employee's duties hereunder or violate Sections (7) through (11) of this Agreement. Employee agrees and understands that Employee owes the Corporation fidelity and loyalty during the term of employment with the Corporation.

(4) Compensation: In consideration of the services to be rendered by Employee under this Employment Agreement, the Corporation agrees to pay, and the Employee agrees to accept, the following compensation:

(a) Base Salary: A base salary at the rate of three hundred and twenty five thousand dollars and zero cents (\$325,000.00) per year for the term of Employee's employment under this Employment Agreement. The base salary shall be payable in equal biweekly installments subject to usual withholding requirements. This salary will be reviewed regularly according to the practices of the Corporation and will be subject to any changes in pay policies implemented by the Corporation from time to time, becoming the Base Salary hereunder, as defined. As an exempt employee, Employee shall not be entitled to receive any overtime pay from the Corporation.

(b) MKS Instruments, Inc. Profit Sharing and 401(k) Plan: Employee shall be eligible to become a participant under the profit sharing plan of the Corporation on fulfilling the conditions set forth in the MKS Instruments, Inc. Profit Sharing and 401(k) Plan, in accordance with its terms.

(c) Vacation: Employee shall be entitled to an annual vacation leave of 18 days at full rate of Base Salary during each calendar year of this Employment Agreement, subject to Employee arranging such vacation so as not to affect adversely the ability of the Corporation to transact its business. Such vacation leave shall accrue and be administered according to the policies and practices of the Corporation.

(d) Life Insurance: The Corporation shall provide and pay such premiums for term life insurance for Employee during the term of Employee's employment under this Employment Agreement in accordance with the term life insurance plan of the Corporation.

(e) Medical/Dental Insurance: The Corporation shall provide group medical/dental insurance for Employee under the plans of the Corporation applicable to Employee during the term of Employee's employment under this Employment Agreement.

(f) Other Benefits: The Corporation shall provide other benefits for Employee under the Plans of the Corporation applicable to Employee during the term of Employee's employment under this Employment Agreement.

(g) Expenses: The Corporation shall reimburse Employee for all reasonable and necessary expenses incurred by Employee in connection with the performance of Employee's duties as an employee of the Corporation. Such reimbursement is subject to the timely submission to the Corporation by Employee of appropriate documentation and/or vouchers in accordance with the customary procedures of the Corporation for expense reimbursement, as such procedures may be revised by the Corporation from time to time, and to such caps on reimbursements as the Corporation may from time to time impose.

(5) Termination: The employment of Employee under this Employment Agreement shall terminate:

(a) On the expiration of the period of employment as provided in Section (1).

(b) Upon the death of Employee, or the Disability of Employee as defined in Section (6) (e) below.

(c) At the election of the Corporation: (i) if Employee shall fail, or refuse, to perform the other covenants and agreements required of him under this Employment Agreement other than as a result of Disability or death; or (ii) for "cause", which term shall mean: (1) Employee's willful or gross neglect of his duties, including the failure to carry out or comply with, in good faith, in any material respect, or the refusal to follow, any lawful and reasonable written directives of the Chief Executive Officer of the Corporation or his designee that are not inconsistent with Employee's position; (2) Employee's material breach of this Employment Agreement or of any of the rules, regulations, policies or procedures of the Corporation, or material violation of the Corporation's statement of corporate policy and/or code of conduct at any time after such statement and code have been adopted by the Board of Directors and have been set forth in writing and delivered to Employee; (3) Employee's commission of a felony or other act of material dishonesty, or plea of other than "not guilty" to any felony or serious misdemeanor charge including but not limited to any act of fraud, embezzlement, misappropriation of Corporation property, moral turpitude, or breach of fiduciary duty that could possibly have a material adverse effect on the Corporation; (4) Employee's unlawful use (including being under the influence) of controlled substances on the Corporation's premises or while performing Employee's duties and responsibilities or indictment related to the commission of any criminal act; (5) Employee's failure or refusal to reasonably cooperate with any Corporation investigation or governmental/regulator authority having jurisdiction over Employee and the Corporation; or (6) Employee's engaging in willful or gross misconduct which is materially injurious to the Corporation or any of its subsidiaries or affiliates or any of its directors or officers, financially or otherwise, or to its or their reputation; in each case determined in good faith by the Chief Executive Officer of the Corporation.

(6) Payment upon Termination: (a) If Employee's employment is terminated by the Corporation other than pursuant to Section (5)(c) the Corporation shall (subject to Employee's entering into and not revoking a General Release with the Corporation in such form as it may then require; and provided that Employee (i) remains in full compliance with the Corporation's Confidential Information Agreement; and (ii) performs such actions as the Corporation may reasonably request in transitioning Employee from his employment with the Corporation) continue to pay Employee the Base Salary (as defined in Section (4)) in effect immediately prior to the time of such termination (but without any bonus, commission or other similar amounts except as may have been earned and are due and payable prior to such termination) for six (6) months after the last full day Employee works under this Employment Agreement at its normal payroll payment dates, by direct deposit or regular mail at Employee's election, provided Employee is not in breach of any of the covenants herein; any unreimbursed expenses due to Employee pursuant the Corporation's policy for which he has submitted acceptable supporting documentation; and any accrued but unused vacation time. The form of General Release currently used by the Corporation is attached hereto as Appendix A, and the Release shall be in substantially similar form with such changes as the Corporation deems appropriate at the time of Employee's termination. Employee shall be entitled to such payment only as set forth herein, and the provisions of this Section (6) shall supersede in their entirety any severance payment provisions in any severance plan, policy, program or arrangement maintained by the Corporation. In addition to any rights or remedies the Corporation may otherwise have, upon any breach of any agreements herein by Employee, Employee's right to any continued payment of separation benefits shall immediately cease, and Employee shall be obligated to repay to the Corporation all amounts paid by the Corporation for the separation benefits except for the amount of \$1,000, which Employee shall be entitled to retain.

(b) In the event Employee's employment is terminated by death, the Corporation shall pay to Employee's estate the compensation which would otherwise be payable to Employee at the end of the month in which his death occurs and other unpaid amounts to which Employee would have been at that time entitled as an Employee under any applicable compensation or benefit plan or program.

(c) In the event Employee's employment is terminated by the Corporation for Cause pursuant to Section (5)(c) hereof, the Corporation shall have no obligation to pay Employee any amounts, except for Base Salary through the last full day of actual work for the Corporation, and any accrued but unused vacation time.

(d) In the event Employee voluntarily resigns, the Corporation shall have no obligation to pay Employee any amounts, except for Base Salary through the last full day of actual work for the Corporation, or, if applicable, amounts payable in accordance with Section (1)(c), and other unpaid amounts to which Employee is at that time entitled under any applicable compensation or benefit plan or program.

(e) If Employee is incapacitated by a physical or mental condition, illness, or injury that prevents Employee from being able to perform his duties under this Employment Agreement in a satisfactory manner for substantially all of a twelve (12) consecutive week period (or such longer period as may be required by law or that the Chief Executive Officer of the Corporation or his designee may, in his discretion, determine) with any reasonable accommodation that may be required by law, then Employee shall be deemed to be unable to perform his job (any such physical or mental condition, illness, or injury, a "Disability"). In such event, the Corporation may terminate Employee's employment, in which case Employee shall receive (i) any accrued but unpaid Base Salary and other unpaid amounts to which Employee is at that time entitled under any applicable compensation or benefit plan or program and (ii) all applicable disability benefits consistent with any applicable benefits program. The Corporation shall have no further obligations to Employee. Nothing in this paragraph is intended to or shall operate to excuse the Corporation from any legal obligations it may have under applicable laws.

(f) In the event Employee's employment terminates without "cause" and in the absence of the other events described in subsection (c) above, or if the Employee terminates for Good Reason (as defined below) within six (6) months of the Effective Date of a consummated Change in Control (as defined below), Employee shall be entitled, in addition to any amount payable under this Section (6)(a), to six (6) months of Base Salary (as defined in Section (4)) in effect immediately prior to the time of such termination (but without any bonus, commission or other similar amounts except as may have been earned and are due and payable prior to such termination). For purposes of this Employment Agreement, a Change in Control means the first to occur of any of the following events: (i) any "person" (as that term is used in Section 13 and 14(d)(2) of the Securities Exchange Act of 1934 ("Exchange Act")) becomes the beneficial owner (as that term is used in Section 13(d) of the Exchange Act), directly or indirectly, of fifty percent (50%) or more of the Corporation's capital stock entitled to vote in the election of directors; (ii) the shareholders of the Corporation approve any consolidation or merger of the Corporation, other than a consolidation or merger of the Corporation in which the holders of the common stock of the Corporation immediately prior to the consolidation or merger hold more than fifty percent (50%) of the common stock of the surviving corporation immediately after the consolidation or merger; (iii) the shareholders of the Corporation approve any plan or proposal for the liquidation or dissolution of the Corporation; or (iv) the shareholders of the Corporation approve the sale or transfer of all or substantially all of the assets of the Corporation to parties that are not within a "controlled group of corporations" (as defined in Code Section 1563) in which the Corporation is a member. For purposes of this Employment Agreement, "Good Reason" shall mean Employee's voluntary separation from service within 90 days following: (i) a material diminution in Employee's positions, duties and responsibilities from those described in this Employment Agreement; (ii) a reduction in Employee's Base Salary (other than a reduction which is part of a

general salary reduction program affecting senior executives of the Corporation); (iii) a material reduction in the aggregate value of the pension and welfare benefits provided to Employee from those in effect prior to the Change in Control (other than a reduction which is proportionate to the reductions applicable to other senior executives pursuant to a cost-saving plan that includes all senior executives); (iv) a material breach of any provision of this Employment Agreement by the Corporation; (v) the Corporation's requiring Employee to be based at a location that creates for Employee a one way commute in excess of 60 miles from his primary residence, except for required travel on the Corporation's business to an extent substantially consistent with the business travel obligations of Employee under this Employment Agreement. Notwithstanding the foregoing, a termination of employment shall not be treated as a termination for Good Reason (i) if Employee shall have consented in writing to the occurrence of the event giving rise to the claim of termination for Good Reason or (ii) unless Employee shall have delivered a written notice to the Corporation within 30 days of his having actual knowledge of the occurrence of one of such events stating that he intends to terminate his employment for Good Reason and specifying the factual basis for such termination, and such event, if capable of being cured, shall not have been cured within 30 days of the receipt of such notice.

In the event amounts payable hereunder are contingent on a Change in Control for the purposes of Internal Revenue Code Section 280G and it is determined by a public accounting firm or legal counsel authorized to practice before the Internal Revenue Service selected by the Corporation that any payment or benefit made or provided to Employee in connection with this Agreement or otherwise (collectively, a "Payment") would be subject to the excise tax imposed by Internal Revenue Code Section 4999 (the "Parachute Tax"), the Payments under this Agreement shall be payable in full or, if applicable, in such lesser amount which would result in no portion of such Payments being subject to the Parachute Tax, whichever of the foregoing amounts, taking into account the applicable federal, state and local income taxes and the Parachute Tax, results in receipt by Employee, on an after-tax basis, of the greatest amount of Payments under this Employment Agreement. If Payments are reduced pursuant to this paragraph, severance payments described above payable over time shall first be reduced (beginning with the last such payment), and the other benefits under this Employment Agreement shall thereafter be reduced, to the extent necessary so that no portion of the Payments is subject to the Parachute Tax. The reporting and payment of any Parachute Tax will be Employee's responsibility and the Corporation will not provide a gross-up or any other payment to compensate Employee for the payment of the Parachute Tax. The Corporation will withhold from the Payments any amounts it reasonably determines is required under Internal Revenue Code Section 4999(c) and the Treasury Regulations thereunder.

(g) The Corporation shall deduct from the amounts payable to Employee pursuant to this Agreement all required withholding amounts and deductions, including but not limited to federal, state, local or foreign withholding amounts in accordance with all applicable laws and regulations and deductions authorized by Employee. Employee shall be solely responsible for and shall pay all taxes associated with the amounts payable under this Agreement. The Corporation shall be entitled to rely on an opinion of counsel if any questions as to the amount or requirement of withholding shall arise.

(h) Employee shall have no obligation to mitigate any payments due hereunder. Any amounts earned by Employee from other employment shall not offset amounts due hereunder. The Corporation's obligation to pay Employee the amounts provided hereunder shall not be subject to set-off, counterclaim or recoupment of amounts owed by Employee to the Corporation or its affiliates, except for any specific, stated amounts owed by Employee to the Corporation, or as otherwise stated herein.

(7) Trade Secrets: Employee covenants and agrees that Employee will communicate to the Corporation, and will not divulge or communicate to any other person, partnership, corporation or other entity without the prior written consent of the Corporation, any trade secrets of the Corporation or confidential information relating to the business of the Corporation or anyone connected with the Corporation, and that such trade secrets and confidential information shall not be used by Employee either on his own behalf or for the benefit of others or disclosed by Employee to any one, except to the Corporation, during or after the term of Employee's employment under this Employment Agreement.

(8) Inventions and Patents: (a) Employee shall make prompt full disclosure in writing to the Corporation of all inventions, improvements and discoveries, whether or not patentable, which Employee conceives, devises, makes, discovers, develops, perfects or first reduces to practice, either alone or jointly with others, during the term of Employee's employment under this Employment Agreement, which relate in any way to the fields, products or business of the Corporation, including development and research, whether during or out of the usual hours of work or on or off the premises of the Corporation or by use of the facilities of the Corporation or otherwise and whether at the request or suggestion of the Corporation or otherwise (all such inventions, improvements and discoveries being hereinafter called the "Inventions"), including any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by Employee after the employment of Employee under this Employment Agreement is terminated if the Inventions were conceived by Employee during the term of Employee's employment under this Employment Agreement. Any Inventions, whether or not patentable, conceived, devised, made, discovered, developed, perfected or first reduced to practice by Employee within six (6) months of the date of termination of the Employee's employment under this Employment Agreement shall be conclusively presumed to have been conceived during the term of Employee's employment under this Employment Agreement.

(b) Employee agrees that the Inventions shall be the sole and exclusive property of the Corporation.

(c) Employee agrees to assist the Corporation and its nominees in every reasonable way (entirely at its or their expense) to obtain for the benefit of the Corporation letters patent for the Inventions and trademarks, trade names and copyrights relating to the Inventions, and any renewals, extensions or reissues thereof, in any and all countries, and agrees to make, execute, acknowledge and deliver, at the request of the Corporation, all written applications for letters patent, trademarks, trade names and copyrights relating to the Inventions and any renewals, extensions or reissues thereof, in any and all countries, and all documents with respect thereto, and all powers of attorney relating thereto and, without further compensation, to assign to the Corporation or its nominee all the right, title and interest of Employee in and to such applications and to any patents, trademarks, trade names or copyrights which shall thereafter issue on any such applications, and to execute, acknowledge and deliver all other documents deemed necessary by the Corporation to transfer to or vest in the Corporation all of the right, title and interest of Employee in and to the Inventions, and to such trademarks, trade names, patents and copyrights together with exclusive rights to make, use, license and sell them throughout the world. If the Corporation is unable, after reasonable effort, to secure Employee's signature on any application for patent, copyright, trademark or other analogous registration or other documents regarding any legal protection relating to any Invention, whether because of Employee's physical or mental incapacity or for any other reason whatsoever, Employee hereby irrevocably designates and appoints the Corporation and its duly authorized officers and agents as Employee's agent and attorney-in-fact, to act for and on Employee's behalf and stand to execute and file any such application or applications or other documents and to do all other lawfully permitted acts to further the prosecution and issuance of patent, copyright or trademark registrations or any other legal protection thereon with the same legal force and effect as if executed by Employee.

(d) Employee agrees that even though his employment is terminated under this Employment Agreement Employee will, at any time after such termination of employment, carry out and perform all of the agreements of Subsections 8(a) and 8(c) above, and will at any time and at all times cooperate with the Corporation in the prosecution and/or defense of any investigation, litigation or legal process which may arise, including in connection with the Inventions, provided, however, that should such services be rendered after termination of Employee's employment under this Employment Agreement, Employee shall be paid reasonable compensation on a per diem basis. The Corporation agrees to provide Employee reasonable notice in the event his assistance is required.

(e) Employee agrees to make and maintain adequate and current written records of all Inventions in the form of notes, sketches, drawings, or reports relating thereto, which records shall be and remain the property of, and available to, the Corporation at all times.

(f) Employee agrees that he will, upon leaving the Corporation's employment, promptly deliver to the Corporation all originals and copies of disclosures, drawings, prints, letters, notes, and reports either typed, handwritten or otherwise memorialized, belonging to the Corporation which are in his possession or under his control and Employee agrees that he will not retain or give away or make copies of the originals or copies of any such disclosures, drawings, prints, letters, notes or reports.

(9) Property of Corporation: All files, records, reports, documents, drawings, specifications, equipment, and similar items relating to the business of the Corporation, whether prepared by e Employee or otherwise coming into his possession, shall remain the exclusive property of the Corporation and shall not be removed by Employee from the premises of the Corporation under any circumstances whatsoever without the prior written consent of the Corporation.

(10) Noncompetition Agreement: (a) Employee shall not, without the written consent of the Corporation, during the term of employment with the Corporation and for the period of one year thereafter (the "Non-Compete Period"), engage in or otherwise carry on, directly or indirectly anywhere in the world (either as principal, agent, employee, employer, investor, shareholder (except for holdings of no greater than 1% of the total outstanding shares in a publicly-traded company), consultant, partner, member, financier or in any other individual or representative capacity of any kind whatsoever), any business or activity competitive with the Corporation but solely to the extent such business or activity is related to, similar to or competitive with the activities of the business unit(s), division(s), laborator(y)(ies), facilit(y)(ies) and other operational unit(s) in or for which Employee performed work for the Corporation or about which Employee acquired Proprietary Information (as defined in the Confidential Information Agreement). The Non-Compete Period shall be extended for any period during which Employee is in breach of this Employment Agreement or the Confidential Information Agreement.

(b) The Corporation and Employee agree that the services of Employee are of a personal, special, unique and extraordinary character, and cannot be replaced by the Corporation without great difficulty, and that the violation by Employee of any of his agreements under this Section 10 would damage the goodwill of the Corporation and cause the Corporation irreparable harm that could not reasonably or adequately be compensated in damages in an action at law, and that the agreements of Employee under this Section 10 may be enforced by the Corporation in equity by an injunction, declaratory judgment tor restraining order in addition to being enforced by the Corporation at law.

(c) In the event that this Section 10 shall be determined by any court of competent jurisdiction to be unenforceable by reason of its extending for too long a period of time or over too great a range of activities or geographic scope, it shall be interpreted to extend only over the maximum period of time or range of activities or geographic scope as to which it may be enforceable.

(11) Non-Solicitation: Employee shall not, on his own behalf or in the service or on behalf of others, directly or indirectly:

(a) solicit, entice or induce any Customer (as defined below) to become a customer, distributor or supplier of any other person, firm or corporation with respect to products and/or services sold or under development by the Corporation during his employment at the Corporation, or to cease doing business with the Corporation, and Employee shall not contact or approach any such person, firm or corporation for such purpose or authorize or knowingly approve the taking of such actions by any other person for a period of twenty-four (24) months from the date of the termination of Employee's employment under this Employment Agreement; or

(b) solicit, recruit or hire (or attempt to solicit, recruit or hire) any employee, officer or agent of the Corporation or contractor engaged by the Corporation (whether or not such person is a full-time executive or whether or not such employment is pursuant to a written agreement or at-will) to terminate such person's

employment or engagement with the Corporation or work for a third party other than the Corporation for a period of twenty-four (24) months after the date of the termination of Employee's employment under this Employment Agreement, or engage in any activity that would cause such employee or contractor to violate any agreement with the Corporation, nor shall Employee form any partnership with, or establish any business venture in cooperation with, any such person.

(c) For the purposes of this Section 11, a "Customer" means any person or entity which as of the date of the termination of Employee's employment under this Employment Agreement was, within two (2) years prior to such time, a customer, distributor or supplier of the Corporation, and references to the Corporation shall be deemed to include any affiliate or subsidiary of the Corporation.

(12) Non-disparagement: Employee shall not disparage the Corporation, any of its products or practices, or any of its directors, officers, or employees, whether orally, in writing or otherwise, at any time. Notwithstanding the foregoing: nothing in this Section shall (i) limit the ability of Employee to provide truthful testimony as required by law or any judicial or administrative process, or (ii) prevent any Person from making any truthful statement to the extent necessary in any litigation, arbitration, or mediation proceeding involving this Employment Agreement, including, but not limited to, the enforcement of this Employment Agreement. In no event shall any termination of Employee's employment by the Corporation or Employee for any reason constitute disparagement for purposes of this Section.

(13) Notice: Any and all notices under this Employment Agreement shall be in writing and, if to the Corporation, shall be duly given if sent to the Corporation by registered or certified mail, postage prepaid, return receipt requested, at the address of the Corporation set forth under its name below or at such other address as the Corporation may hereafter designate to Employee in writing for the purpose, and if to Employee, shall be duly given if delivered to Employee by hand or if sent to Employee by registered or certified mail, postage prepaid, return receipt requested, at the address of Employee set forth under his name below or at such other address as Employee may hereafter designate to the Corporation in writing for the purpose.

(14) Assignment: The rights and obligations of the Corporation under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the successors and assigns of the Corporation. The rights and obligations of Employee under this Employment Agreement shall inure to the benefit of, and shall be binding upon, the heirs, executors and legal representatives of Employee. Employee shall not delegate his employment or obligations under this Employment Agreement to any other person.

(15) Code Section 409A Compliance: Where Section (6) refers to Employee's termination of employment for purposes of receiving any payment, whether such a termination has occurred will be determined in accordance with Section 409A of the Internal Revenue Code and Treasury Regulation Section 1.409A-1(h) (or any successor provisions). Where the Employment Agreement requires the following payments to be made to Employee, the following rules shall apply, and any inconsistent provision is superseded:

To the extent that this Employment Agreement requires that a payment shall be made upon or as soon as reasonably practicable after an event (*e.g.*, termination of employment), such payment shall be made no later than sixty (60) days after the occurrence of such event (or, if earlier, within two-and-a-half (2 1/2) months following the end of the Employee's taxable year in which such event occurs). Employee may not designate the year of such payment. To the extent that benefits under Section (6) are contingent upon Employee providing a General Release, Employee shall sign and return the General Release within the reasonable time period designated by the Corporation, which shall be no less than twenty-one (21) days but no more than forty-five (45) days. If such designated time period for review and revocation of the General Release crosses calendar years, payments for the period for review and return of the Release shall be made in the later calendar year. Any payments that would otherwise be made during the period for review and revocation of the General Release will be made on the first scheduled payment date after such period ends. To the extent that the Employment Agreement provides for the reimbursement of specified expenses incurred by Employee, such

reimbursement shall be made in accordance with the provisions of the Employment Agreement, but in no event later than the last day of Employee's taxable year following the taxable year in which the expense was incurred. The amount of expenses eligible for reimbursement or in-kind benefits provided by the Corporation in any taxable year of Employee shall not affect the amount of expenses or in-kind benefits to be reimbursed or provided in any other year (except in the case of maximum benefits to be provided under a medical reimbursement arrangement, if applicable). Bonus otherwise payable under the Employment Agreement after the end of a bonus plan performance period shall be paid within two-and-a-half (2 1/2) months after the end of the fiscal year of the Corporation to which such Bonus relates. Each payment in respect of Employee's termination of employment under Section 6 of the Employment Agreement is designated as a separate payment for purposes of the short-term deferral rules under Treasury Regulation Section 1.409A-1(b)(4)(i)(F) and the exemption for involuntary terminations under separation pay plans under Treasury Regulation Section 1.409A-1(b)(9)(iii).

If Employee is designated as a "specified Executive" within the meaning of Code Section 409A (while the Corporation is publicly traded on any securities market), any deferred compensation payment subject to Section 409A to be made during the six-month period following Employee's termination of employment shall be withheld and the amount of the payments withheld will be paid in a lump sum, without interest, during the seventh month after Employee's termination; provided, however, that if Employee dies prior to the expiration of such six month period, payment to Employee beneficiary shall be made as soon as reasonably practicable following Employee's death. The Corporation shall identify in writing delivered to Employee any payments it reasonably determines are subject to delay under this Section. In no event shall the Corporation have any liability or obligation with respect to taxes for which Employee may become liable as a result of the application of Code Section 409A.

(16) Entire Agreement and Severability: (a) This Employment Agreement and the Confidential Information Agreement supersede any and all other agreements, either oral or in writing, between the parties hereto with respect to the employment of Employee by the Corporation and contains all of the covenants and agreements between the parties with respect to such employment. In the event of any discrepancy between the terms of this Employment Agreement and the Confidential Information Agreement, this Employment Agreement controls. Each party to this Employment Agreement acknowledges that no representations, inducements, promises or agreements, oral or otherwise, have been made by any party, or any one acting on behalf of any party, which are not embodied herein, and that no other agreement, statement or promise not contained in this Employment Agreement shall be valid and binding. Any modification of this Employment Agreement will be effective only if it is in writing signed by both parties to this Employment Agreement.

(b) If any provision in this Employment Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions shall nevertheless continue in full force and effect without being impaired or invalidated in any way.

(c) All pronouns used herein shall include the masculine, feminine, and neuter gender as the context requires.

(17) Miscellaneous: This Employment Agreement and the rights and obligations of the parties hereunder shall be governed by, and construed in accordance with, the laws of the Commonwealth of Massachusetts, excluding (but only to the extent permitted by law) its conflict of laws and choice of law rules. The parties hereto further agree that service of any process, summons, notice or document by U.S. certified mail or overnight delivery by a generally recognized commercial courier service to Employee's last known address (or any mode of service recognized to be effective by applicable law) will be effective service of process for any action, suit or proceeding brought against Employee in any such court. This Employment Agreement may be executed in any number of counterparts, each of which, when executed by both parties to this Employment Agreement shall be deemed to be an original, and all of which counterparts together shall constitute one and the same instrument. The failure of either party hereto to enforce any right under this Employment Agreement shall not be construed to be a waiver of that right, or of damages caused thereby, or of any other rights under this Employment Agreement.

(18) Arbitration: Any dispute under this Employment Agreement shall be resolved by final and binding arbitration; provided, however, that the Corporation, in its sole discretion, may enforce the covenants set out above in Sections (7) through (11) of this Agreement by bringing a proceeding in any court of competent jurisdiction. In addition, any issues pertaining to the ability to arbitrate a dispute under this Agreement shall be determined by a court of competent jurisdiction and not by an arbitrator. The arbitration shall be held in the Commonwealth of Massachusetts and shall be conducted in accordance with the then-prevailing Commercial Arbitration Rules of the American Arbitration Association. Employee shall arbitrate individual claims only. The arbitrator shall be acceptable to both the Corporation and Employee. If the parties cannot agree on an acceptable arbitrator, the dispute shall be heard by a panel of three arbitrators, one appointed by the Corporation and one appointed by Employee, and the third selected by the other two arbitrators. Under no circumstances may the arbitrator(s) have the authority to require Employee's reinstatement to employment or continued employment, or award any lost wages or benefits (other than severance benefits as described above) as a result of Employee's termination of employment for any reason. The arbitrator(s) shall also have no authority to award punitive, liquidated or consequential damages or the payment of a prevailing party's costs and/or attorneys' fees. Each party shall bear its own costs and expenses and an equal share of the arbitrators' and administrative fees of arbitration. The Corporation, Employee and the arbitrator(s) shall treat all aspects of the arbitration proceedings, including without limitation, discovery, testimony and other evidence, briefs and the award, as strictly confidential; provided, however, that any award or order rendered by the arbitrator(s) under this Agreement may be entered as a judgment or order in a court of competent jurisdiction and may be disclosed by the Corporation as necessary to enforce the terms of the restrictive covenants in Sections (7) through (11) of this Agreement

[remainder of page left blank intentionally]

IN WITNESS WHEREOF, the parties hereto have executed, in the Commonwealth of Massachusetts, this Employment Agreement as a sealed instrument, all as of the day, month and year first written above.

MKS INSTRUMENTS, INC.

By: /s/ Gerald G. Colella

Gerald G. Colella
Chief Executive Officer and President
2 Tech Drive
Andover, MA 01810

/s/ Brian Quirk
Brian Quirk

Legal Signature

Dated: February 24, 2014

APPENDIX A
FORM RELEASE

Introduction

(“Executive”) separated from MKS Instruments, Inc. (the “Corporation”) as of _____, and Executive and the Corporation entered into a Separation Agreement (the “Agreement”), dated _____, pursuant to which, among other things, Executive agreed to release the Releasees from all waivable claims which Executive might have against the Releasees in exchange for the receipt of certain payments and benefits set forth therein upon this Release becoming effective.

Terms

1. As used in this Release, the following words shall mean the following:

(a) “Corporation” shall at all times mean MKS Instruments, Inc., its subsidiaries, divisions, successors and assigns, its affiliated and predecessor companies or corporations, and their successors and assigns.

(b) “Executive” means _____.

(c) “Releasees” shall mean the Corporation, its present or former directors, officers, shareholders, members, employees, attorneys and agents, whether in their individual or official capacities and the current and former trustees or administrators of any pension or other benefit plan applicable to the employees or former employees of the Corporation in their official and individual capacities.

2. After receiving this signed Release from Executive and upon the expiration of the waiting period described in Paragraph 5 (the “Effective Date”), The Corporation will provide Executive with the payments and benefits described in paragraphs _____ through _____ in Section _____ of the Agreement.

3. In exchange for receiving the payments and benefits described in paragraphs _____ and _____ in Section _____ of the Agreement, Executive hereby agrees that Executive is releasing the Releasees from, and waiving, any claim that Executive may have against them for any act, omission, incident or situation which may have occurred at any time up until the Effective Date of this Release. This includes RELEASING AND FOREVER DISCHARGING the Releasees from AND WAIVING:

(a) Any claims arising under Title VII of the Civil Rights Act of 1964, the Age Discrimination in Employment Act, the Americans with Disabilities Act, the Rehabilitation Act, the Equal Pay Act, 42 U.S.C. §§ 1981, 1982, 1983 and 1985, the Massachusetts Fair Employment Practices Act, M.G.L. c. 151B; the Fair Labor Standards Act; the Family and Medical Leave Act, 29 U.S.C. § 2601 et seq., the Massachusetts Civil Rights Act; the Massachusetts Equal Rights Law; the Massachusetts Minimum Fair Wages Statute (M.G.L. c. 151, §§ 1A and 1B); the Massachusetts Payment of Wages Statute (M.G.L. c. 149, § 148, et seq.); the Massachusetts “Blue Laws” (M.G.L. c. 136); and any other claims arising under Chapters 149 through 154 of the Massachusetts General Laws, and any amendments to these statutes;

(b) Any claims arising under the Family and Medical Leave Act, the National Labor Relations Act, the Sarbanes-Oxley Act of 2002, and all other federal, state, and local laws or ordinances relating to employment;

(c) Any claims arising under the Employee Retirement Income Security Act ("ERISA") (but not claims to vested ERISA benefits) or any other federal or state law pertaining to employee retirement or welfare benefits;

(d) Any claims arising under any other federal, state or local statutory or regulatory provision;

(e) Any claims arising under federal common law or under the common law of any state; and

(f) Any claims for attorneys' fees and/or costs.

Notwithstanding the above, this Release does not prevent Executive from pursuing any right or claim which cannot be waived by law. This means, among other things, that even if Executive signs this Release, Executive retains his right to file a charge of discrimination with the Equal Employment Opportunity Commission and to assist in Commission investigations. By signing this Release, however, Executive is waiving any right to recover any relief in federal or state court, in any administrative proceeding or in arbitration, whether such a claim for relief is brought by Executive or through the EEOC (or a comparable state or local agency) or as part of a class action proceeding. This Release also does not prevent Executive from pursuing any claim to enforce this Release or from asserting any future rights Executive may have to any vested benefits that Executive may be entitled to receive.

4. By signing this Release, Executive is hereby acknowledging and agreeing that: (a) Executive is competent to enter into this Release and is fully aware of his right to discuss any and all aspects of this Release with an attorney of his choice; (b) except for the promises contained in the Agreement, the Corporation has made no other promise of any kind to Executive to cause Executive to sign this Release; (c) what Executive is receiving under the Agreement and this Release is in addition to anything of value to which he already is entitled; (d) what Executive is receiving is adequate and satisfactory to him; and (e) the payments and benefits specified in the Agreement and this Release constitute full and final payment in settlement of all waivable claims of any kind, known or unknown, which Executive may have against the Releasees. Executive further acknowledges that he has carefully read and fully understand all of the provisions of this Release, that Executive has had the opportunity to discuss the provisions of this Release with an attorney, and that Executive is voluntarily entering into this Release.

5. **Executive acknowledges and agrees that he has been given a period of up to twenty-one (21) days in which to consider the terms of this Release and that this Release shall not become effective until seven (7) days following the date of his signature.** Prior to that time, Executive may elect to revoke this Release. If Executive chooses to revoke this Release, Executive agrees to notify the Chair of the Board of Directors of the Corporation in writing. **If Executive does not sign and return the Release within the specified period, or Executive revokes it, Executive will forfeit any payments contingent on the Release.** Unless revoked by the Executive, this Release shall become effective eight calendar days after the date that Executive signs this Release, as evidenced by the date adjacent to his signature at the end of this Release (the "Effective Date"). This Release shall not be effective and shall be deemed void as if never made if, prior to the Effective Date, Executive revokes his earlier acceptance of this Release. Payments contingent upon the Executive entering into the Agreement and this Release will not be made (or begin) prior to the expiration of the period specified for revoking this Release. If the period for signing and returning the Agreement or Release extends into a later taxable year, any payments contingent upon the Agreement and Release will be made (or begin) in the later taxable year.

6. By signing this Release, Executive is not waiving any claims against the Releasees for any act or omission that may occur after the signing of this Release.

7. By signing this Release, Executive is hereby acknowledging and agreeing that Executive has been paid all sums due and owing to him as of the date hereof including, but not limited to, all salary, bonus, business expenses, allowances, vacation pay and other benefits and perquisites as a result of Executive's employment with the Corporation, and has received any leaves (paid or unpaid) to which he was entitled during his employment and the Corporation has not denied or interfered with his ability to request or take such leave.

8. Executive hereby agrees that his employment relationship with the Corporation has been severed and that Executive forever waive any right to reinstatement, recall or future employment with the Corporation, unless waived by mutual agreement.

9. Paragraphs through of the Agreement are incorporated by this reference into this Release as if fully and independently set forth below.

10. The Agreement and this Release represent the full and complete understanding of the Executive and the Corporation. The Agreement and this Release shall supersede any inconsistent provisions in the . No prior or contemporaneous oral or written agreements may be offered to alter their terms. This Release shall be binding upon the Executive and the Corporation and upon their heirs, successors and assigns. This Release may not be modified except in a written document signed by both parties.

11. This Release shall be governed by and interpreted in accordance with the laws of the Commonwealth of Massachusetts, without regard to its conflict of law provisions and except to the extent federal law applies.

PLEASE READ CAREFULLY. EMPLOYEE SHOULD CONSULT WITH COUNSEL BEFORE SIGNING THIS DOCUMENT. THIS RELEASE INCLUDES A RELEASE OF KNOWN AND UNKNOWN CLAIMS.

WITNESS:	_____	_____
	Date	Date
		MKS INSTRUMENTS, INC.
ATTEST:	_____	By: _____
	Date	Chair, Board of Directors Date



3050 Bowers Avenue | P.O. Box 58039
Santa Clara, California 95054, U.S.A.
Telephone: 408 727 5555
www.appliedmaterials.com

October 4th, 2013

Ms. Holly Bonner
Account Director
134 Rio Robles Drive
San Jose, CA 95134

Reference: Global Supply Agreement, dated April 21, 2005

Ms. Bonner:

To allow for adequate time to complete negotiations of our existing GSA document, we are amending the Global Supply Agreement between Applied Materials and MKS Instruments to extend the existing term. We will in good faith work on an evergreen agreement within anticipated completion in the next six (6) months. Unless the GSA is terminated sooner, the term of the GSA will now expire on April 30th, 2014. During that time, either Applied Materials or MKS Instruments may provide the other company six (6) months written notice terminating the GSA.

All other Terms and Conditions of the Global Supply Agreement remain unchanged. Additionally, any Addendums that expire upon the expiry or termination of the GSA shall also be extended for this additional period, unless terminated earlier as provided in the Addendum or this letter.

Sincerely,

John A. Casey
Sr. Commodity Business Manager

/s/ John A. Casey
Applied Materials

10/23/2013
Date

/s/ John Abrams
MKS Instruments

10/23/2013
Date

SUBSIDIARIES OF THE REGISTRANT

SUBSIDIARY	JURISDICTION OF INCORPORATION
Alter S.r.l.	Italy
ASTeX GmbH	Germany
MKS (Bermuda) Ltd.	Bermuda
MKS Denmark APS	Denmark
MKS German Holding GmbH	Germany
MKS Instruments (Asia) Ltd.	Bermuda
MKS Instruments (China) Company Ltd.	China
MKS Instruments Deutschland GmbH	Germany
MKS Instruments France S.A.S.	France
MKS Instruments Holdings Ltd.	United Kingdom
MKS Instruments (Hong Kong) Ltd.	Hong Kong
MKS Instruments (Shanghai) Ltd.	Shanghai
MKS Instruments (Singapore) Pte. Ltd.	Singapore
MKS Instruments U.K. Limited	United Kingdom
MKS Japan, Inc.	Japan
MKS Korea Ltd.	Korea
MKS Luxembourg S.A.R.L.	Luxembourg
MKS Spectra Holdings Ltd.	United Kingdom
MKS Taiwan Technology Ltd.	Taiwan
MKS Technology Limited	United Kingdom
MKS Tega Ltd.	Israel
MKS Tenta Products Ltd.	Israel
MKS Umetrics AB	Sweden
Orion Metrology, Inc.	California
Plasmart, Inc.	Korea
Telvac Engineering Limited	United Kingdom
Umetrics, Inc.	New Jersey
Umetrics (UK) Ltd.	United Kingdom
Yield Dynamics, LLC	California

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statement on Form S-8 (No. 333-78069, 333-78071, 333-78073, 333-31224, 333-54486, 333-54488, 333-54490, 333-90498, 333-90500, 333-90502, 333-116385, 333-116387, 333-116389, 333-127221, and 333-161211) and Form S-3 (No. 333-34450 and 333-109753) of MKS Instruments, Inc. of our report dated February 26, 2014 relating to the financial statements, financial statement schedule and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP
Boston, Massachusetts
February 26, 2014

CERTIFICATION OF PRINCIPAL EXECUTIVE OFFICER
PURSUANT TO RULE 13a-14(a)/RULE 15d-14(a) OF THE
SECURITIES EXCHANGE ACT OF 1934, AS AMENDED

I, Gerald G. Colella, certify that:

1. I have reviewed this annual report on Form 10-K of MKS Instruments, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this annual report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any changes in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Dated: February 26, 2014

/s/ Gerald G. Colella

Gerald G. Colella
Chief Executive Officer and President
(Principal Executive Officer)

CERTIFICATION OF PRINCIPAL FINANCIAL OFFICER
PURSUANT TO RULE 13a-14(a)/RULE 15d-14(a) OF THE
SECURITIES EXCHANGE ACT OF 1934, AS AMENDED

I, Seth H. Bagshaw, certify that:

1. I have reviewed this annual report on Form 10-K of MKS Instruments, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this annual report is being prepared;
 - b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - d) Disclosed in this report any changes in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Dated: February 26, 2014

/s/ Seth H. Bagshaw

Seth H. Bagshaw

Vice President, Chief Financial Officer and Treasurer
(Principal Financial Officer)

CERTIFICATION OF CHIEF EXECUTIVE OFFICER AND CHIEF FINANCIAL OFFICER

PURSUANT TO 18 U.S.C. SECTION 1350,

AS ADOPTED PURSUANT TO

SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report on Form 10-K of MKS Instruments, Inc. (the "Company") for the period ended December 31, 2013 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Gerald G. Colella, Chief Executive Officer and President of the Company, and Seth H. Bagshaw, Vice President, Chief Financial Officer and Treasurer of the Company, each hereby certifies, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, based on his knowledge:

- (1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated: February 26, 2014

/s/ Gerald G. ColellaGerald G. Colella
Chief Executive Officer and President

Dated: February 26, 2014

/s/ Seth H. BagshawSeth H. Bagshaw
Vice President, Chief Financial Officer and Treasurer