

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 September 29, 2018

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 No. 0-02382



MTS SYSTEMS CORPORATION

(Exact name of registrant as specified in its charter)

Minnesota

(State or other jurisdiction
of incorporation or organization)

41-0908057

(I.R.S. Employer Identification No.)

**14000 Technology Drive
Eden Prairie, Minnesota**

(Address of principal executive offices)

55344

(Zip Code)

Registrant's telephone number, including area code: (952) 937-4000

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

Title of each class
Common Stock, \$0.25 par value

Name of each exchange on which registered
The Nasdaq Stock Market LLC

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 by 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 every Interactive Data File required to be submitted 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 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, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer Accelerated filer Non-accelerated filer
Smaller reporting company Emerging growth company

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

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

The aggregate market value of the voting and non-voting common stock held by non-affiliates of the registrant as of March 31, 2018 was approximately \$1.0 billion based on the closing price of \$51.65 as of March 29, 2018 as reported by Nasdaq.

As of November 21, 2018, there were 17,870,004 shares of common stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of MTS Systems Corporation's Definitive Proxy Statement (to be filed pursuant to Regulation 14A within 120 days after the end of the fiscal year ended September 29, 2018) for its annual shareholders' meeting to be held on February 13, 2019, are incorporated by reference into Part III of this Annual Report on Form 10-K to the extent described in such Part.

MTS Systems Corporation
Annual Report on Form 10-K
For the Year Ended September 29, 2018

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PART I

ITEM 1. BUSINESS

Business Overview

MTS Systems Corporation is a leading global supplier of high-performance test systems and sensors that was incorporated under Minnesota law in 1966. Our operations are organized and managed in two reportable segments, Test and Sensors, based on global similarities within their markets, products, operations and distribution. The Test and Sensors segments represented 60% and 40% of our revenue, respectively, for the fiscal year ended September 29, 2018.

Terms

The terms "MTS," "we," "us," the "Company" or "our" in this Annual Report on Form 10-K, unless the context otherwise requires, refer to MTS Systems Corporation and its wholly owned subsidiaries.

Fiscal year 2018 refers to the fiscal year ended September 29, 2018, fiscal year 2017 refers to the fiscal year ended September 30, 2017, and fiscal year 2016 refers to the fiscal year ended October 1, 2016. Fiscal years 2018, 2017 and 2016 all include 52 weeks. All dollar amounts and shares are in thousands unless otherwise noted.

Products and Markets

Test

Our Test segment (Test) provides testing solutions including hardware, software and services that are used by customers in product development to characterize a product's mechanical properties. Our solutions simulate forces and motions that customers expect their products to encounter in use. Mechanical simulation testing in a lab setting is an accepted method to accelerate product development compared to reliance on full physical prototypes in real-world settings, proving ground testing, and virtual testing because it provides more controlled simulation and accurate measurement. The need for mechanical simulation increases in proportion to the cost of a product, the range and complexity of the physical environment in which the product will be used, expected warranty or recall risk and expense, governmental regulation and potential legal liability. A significant portion of Test products are considered by our customers to be capital expenditures. We believe the timing of purchases of our products may be impacted by interest rates, general economic conditions, product development cycles and new product initiatives.

A typical Test system includes a reaction frame to hold the prototype specimen; a hydraulic pump or electro-mechanical power source; piston actuators to create the force or motion; and a computer controller with specialized software to coordinate the actuator movement, record and manipulate results. Lower force and less dynamic testing can usually be accomplished with electro-mechanical power sources, which are generally less expensive than hydraulic systems. In addition to these basic components, we sell a variety of accessories and spare parts.

We provide Test customers across all sectors with a spectrum of services to maximize product performance. Our service offerings include installation, product life cycle management, professional training, calibration and metrology, technical consulting and onsite and factory repair and maintenance.

Test serves a diverse spectrum of customers by industry and geography. Regionally, the Americas, Europe and Asia represented approximately 28%, 24% and 48% of revenue for fiscal year 2018, respectively, based on customer location.

Test products, service and customers are grouped into the following three global sectors:

- *Ground Vehicles (approximately 55% of Test revenue for fiscal year 2018)*
This sector consists of automobile, truck, motorcycle, motorsports vehicles, construction equipment, agricultural equipment, rail and off-road vehicle manufacturers and their suppliers. Customers include original equipment manufacturers (OEMs), universities, government research and development institutes, motorsports teams and contract test facilities. Our products are used to measure and simulate solutions to assess durability, vehicle dynamics and aerodynamics of vehicles, sub-systems and components. Our products include:
 - Road simulators and component test systems for durability testing;
 - Vehicle performance test systems that evaluate ride handling, ride comfort and noise;
 - Vehicle dynamics simulators to test conceptual vehicle designs in advance of physical prototypes;
 - High-performance electrical motors and energy recovery systems for high-end automotive and aerospace applications;
 - Tire performance and rolling resistance measurement systems; and
 - Moving ground-plane systems and balances for vehicle aerodynamic measurements in wind tunnels.

- *Materials (approximately 30% of Test revenue for fiscal year 2018)*
This sector covers diverse industries, including power generation, aerospace, vehicles and biomedical. Our products and services support customers in the research and development of products through the physical characterization of material properties, such as ceramics, composites and steel. Biomedical applications include systems to test durability and performance of implants, prostheses and other medical and dental materials and devices.
- *Structures (approximately 15% of Test revenue for fiscal year 2018)*
This sector serves the structural testing needs and services in the fields of aerospace, structural engineering, oil and gas, and wind energy, among others. The aerospace structural testing market consists of manufacturers of commercial, military and private aircraft and their suppliers that use our products, systems and software to perform static and fatigue testing of aircraft and space vehicles. Systems for structural engineering include high force static and dynamic testing, as well as seismic simulation tables used around the world to test the design of structures, such as bridges and buildings, and to help governments establish building codes. Structural engineering customers include construction companies, government agencies, universities and building materials manufacturers. The wind energy market consists of wind turbine manufacturers and their component suppliers that use our products to reduce cost and improve reliability of blades, bearings and entire wind turbines.

Sensors

Our Sensors segment (Sensors) is a global leader in sensing technologies and solutions used worldwide by design engineers and predictive maintenance professionals, serving customers with a focus on total customer satisfaction, and offering regional support to provide innovative and reliable sensing solutions. Our high-performance sensors provide measurements of vibration, pressure, position, force and sound in a variety of applications. Our products and solutions are used to enable automation, enhance precision and safety, and lower our customers' production costs by improving performance and reducing downtime. Revenue is partially fueled by our customers' spending on research and development activities and industrial capacity utilization. Sensors products and solutions serve the automotive, aerospace, industrial, defense, and research and development markets, as well as many other markets. Sensors manufactures products utilizing piezoelectric and magnetostriction technology, both of which provide an accurate and reliable sensor ideal for use in harsh operating environments.

During fiscal year 2016, we completed the acquisition of 100% of PCB Group, Inc. (PCB), a manufacturer of piezoelectric sensors and components used for vibration, pressure and force measurement. The acquisition of PCB expanded our market position in Sensors and our ability to deliver a wide variety of applications including acceleration, pressure, noise, force, load and torque to both enhance the performance of our customers' products and enable those products to enter the market more rapidly and reliably.

Sensors serves a diverse spectrum of customers by industry and geography. Regionally, the Americas, Europe and Asia represented approximately 46%, 35% and 19% of revenue for fiscal year 2018, respectively, based on customer location.

Sensors products and customers are grouped into the following four global sectors:

- *Position Sensors (approximately 40% of Sensors revenue for fiscal year 2018)*
This sector consists of a wide range of industrial machinery OEMs and their end use customers with applications in all areas of manufacturing including plastics, steel, construction, agriculture, wood and mining, as well as other factory automation applications. These sensors provide positional feedback for motion control systems, improve productivity by enabling high levels of automation, reduce maintenance costs and enhance safety of machine operations.
- *Test Sensors (approximately 35% of Sensors revenue for fiscal year 2018)*
This sector covers diverse industries, including test and measurement, automotive, rail, aerospace and defense. These sensors are used in a variety of applications including research and development; structural monitoring; ground testing of aircraft and vehicles; harsh environmental testing; impact sensors for shock and vibration testing; component and system performance; ride and handling; durability testing; and noise, vibration, and harshness testing. These sensors provide engineers and scientists with precise and accurate measurements to accelerate technology advancement and reduce new product development cycle time.
- *Industrial Sensors (approximately 15% of Sensors revenue for fiscal year 2018)*
This sector consists of sensors used in heavy industrial markets and energy and power generation. Sensors used in heavy industrial markets are primarily used to monitor the vibration and pressure in a wide spectrum of applications including motors, pumps, paper machines and steel rollers. These sensors provide valuable feedback on equipment performance, reducing downtime and maximizing safety and productivity. Sensors used in the energy and power generation markets are equipped to address hazardous and inaccessible locations and serve gas and wind turbines, oil and gas refineries, and nuclear power instrumentation, as well as other critical energy infrastructure providers.

- *Systems Sensors (approximately 10% of Sensors revenue for fiscal year 2018)*
This sector consists of dynamic test, measurement and sensing systems primarily used to test, model and monitor the behavior of structures and processes, as well as to ensure safety and compliance from exposure to noise and vibration. This sector also includes the calibration systems used with a variety of sensors, our comprehensive rental offering of both transactional sensor products, and consultative systems that serve a broad range of testing and industrial customers.

Financial and geographical information about our segments is included in Item 7 and Item 8 of Part II of this Annual Report on Form 10-K.

Sales and Service

Test

Test products are sold worldwide through a direct field sales and service organization, independent representatives and distributors and, to a much lesser extent, through other means (e.g., catalogs, internet, etc.) for standard products and accessories. Direct field sales and service personnel are compensated through salary and order incentive programs. Independent representatives and distributors are either compensated through commissions based upon orders or discounts off list prices.

In addition to direct field sales and service personnel throughout the U.S., we have sales and service subsidiaries in Toronto, Canada; Berlin, Germany; Paris, France; Guildford, United Kingdom; Turin, Italy; Gothenburg and Gislaved, Sweden; Chinchon, Spain; Tokyo and Nagoya, Japan; Seoul, South Korea; Moscow, Russia; Chennai and Bangalore, India; and Beijing, Shanghai and Shenzhen, China.

The timing and volume of large orders (valued at \$5,000 or greater on a U.S. dollar-equivalent basis) may produce volatility in backlog and quarterly operating results. Most customer orders are based on fixed-price quotations and typically have an average sales cycle of three to nine months due to the technical nature of the test systems and customer capital expenditure approval processes. The sales cycle for larger, more complex test systems may be two years or longer.

Sensors

Sensors products are sold worldwide through a direct sales and service organization as well as through independent distributors. The direct sales and service organization is compensated through salary and commissions based upon revenue. The independent distributors purchase our products at wholesale pricing and resell the products to their customers.

In addition to direct field sales and service personnel throughout the U.S., we have sales subsidiaries in Treviolo, Italy; Hitchin, United Kingdom; Aubervilliers, France; Huckelhoven and Dresden, Germany; Beijing and Shanghai, China; Vandreuil, Canada; and Zaventem, Belgium.

The average sales cycle for Sensors products ranges from approximately one week to one month for existing customers purchasing standard products. The average sales cycle for a new account can range from approximately two weeks to two years depending on customer testing and specification requirements.

Manufacturing and Engineering

Test

Test systems are largely built to order and primarily engineered and assembled at our headquarters in Eden Prairie, Minnesota. We also operate manufacturing facilities in Shenzhen and Shanghai, China, which manufacture materials test systems, and in Guilford, United Kingdom which manufactures certain ground vehicles test systems. We perform certain smaller system assembly at our locations in Berlin, Germany and Seoul, South Korea. During the fourth quarter of fiscal year 2017, we initiated a series of Test workforce reductions and facility closures intended to increase organizational effectiveness, gain manufacturing efficiencies and provide cost savings that can be reinvested in our growth initiatives. These actions included the transfer of certain production operations for materials test systems in China to a contract manufacturing partner throughout fiscal years 2018 and 2019.

Installation of systems, training and services are primarily delivered at customer sites. The engineering and assembly cycle for a typical test system ranges from one to 12 months, depending on the complexity of the system and the availability of components. The engineering and assembly cycle for larger, more complex systems may be up to three years.

Sensors

Sensors are engineered and assembled regionally at facilities located in Depew, New York; Halifax and Cary, North Carolina; Farmington Hills, Michigan; Provo, Utah; Cincinnati, Ohio; and Lüdenscheid, Germany. Assembly cycles generally vary from several days to several weeks, depending on the degree of product customization, the size of the order and manufacturing capacity.

Sources and Availability of Raw Materials and Components

Test

A significant portion of test systems consist of materials and component parts purchased from independent vendors. We are dependent, in certain situations, on a limited number of vendors to provide raw materials and components, such as mechanical and electronic components. As Test generally sells products and services based on fixed-price contracts, fluctuations in the cost of materials and components between the date of the order and the delivery date may impact the expected profitability. The material and component cost variability is considered in the estimation and customer negotiation process.

Sensors

A significant portion of Sensors products consists of materials and component parts purchased from independent vendors. We are dependent, in certain situations, on a limited number of vendors to provide raw materials and components, such as mechanical and electronic components. As Sensors generally sells products and services based on fixed-price contracts and the products are manufactured and delivered within days to months from the time of order, fluctuations in the cost of materials and components between the date of the order and the delivery date are not likely to materially impact the expected profitability.

Patents and Trademarks

We rely on a combination of patents, copyrights, trademarks and proprietary trade secrets to protect our proprietary technology, some of which are material to our segments. We have obtained numerous patents and trademarks worldwide and actively file and renew patents and trademarks on a global basis to establish and protect our proprietary technology. We are also party to exclusive and non-exclusive license and confidentiality agreements relating to our own and third-party technologies. We aggressively protect certain of our processes, products and strategies as proprietary trade secrets. Our efforts to protect intellectual property and avoid disputes over proprietary rights include ongoing review of third-party patents and patent applications.

Seasonality

There is no significant seasonality in Test or Sensors.

Working Capital

Test

Test does not have significant finished product inventory, but maintains inventories of materials and components to facilitate on-time product delivery. Test may have varying levels of work-in-process projects that are classified as inventories, net or unbilled accounts receivable, net in our Consolidated Balance Sheets, depending upon the manufacturing cycle, timing of orders, project revenue recognition and shipments to customers.

Payments are often received from Test customers upon order or at milestones during the fulfillment of the order depending on the size and customization of the system. These payments are recorded as advance payments from customers in our Consolidated Balance Sheets and reduced as revenue is recognized. Conversely, if revenue is recognized on a project prior to customer billing, this revenue is recorded as unbilled accounts receivable, net in our Consolidated Balance Sheets until the customer has been billed. Upon billing, it is recorded as accounts receivable, net in our Consolidated Balance Sheets. Changes in the average size, payment terms and revenue recognition for orders in Test may have a significant impact on accounts receivable, net; unbilled accounts receivable, net; advance payments from customers; and inventories, net. It has not been our practice to provide rights of return for our products. Payment terms vary and are subject to negotiation.

Sensors

Sensors has finished product inventory, as well as inventories of materials and components to facilitate rapid delivery of product to exceed customer expectations on delivery time. The type and amount of finished goods on hand are targeted based on historical and anticipated customer demands for high-volume products. Payment terms vary and are subject to negotiation. Revenue is primarily recognized when products are shipped.

Customers

We do not have a significant concentration of sales with any individual customer within Test, Sensors or total MTS. Therefore, the loss of any one customer would not have a material impact on our results.

Backlog

Most of our products are built to order. Our backlog of orders, defined as firm orders from customers that remain unfulfilled, totaled approximately \$415,155, \$360,016 and \$370,523 at September 29, 2018, September 30, 2017 and October 1, 2016, respectively. Test backlog was \$346,006, \$311,551 and \$331,044 at September 29, 2018, September 30, 2017 and October 1, 2016, respectively. Sensors backlog was \$69,149, \$48,465 and \$39,479 at September 29, 2018, September 30, 2017 and October 1, 2016, respectively. Based on anticipated manufacturing schedules, we expect approximately 87% of the backlog as of September 29, 2018 will be converted to revenue in fiscal year 2019. Delays may occur in the conversion of backlog into revenue as a result of export licensing compliance, technical difficulties, specification changes, manufacturing capacity, supplier issues or access to the customer site for installation. While certain contracts within backlog are subject to order cancellation, we have not historically experienced a significant number of order cancellations. Refer to Item 7 of Part II of this Annual Report on Form 10-K for further discussion of order cancellations.

Government Contracts

Revenue from U.S. government contracts varies by year. A portion of our government business is subject to renegotiation of profits or termination of contracts or subcontracts at the election of the U.S. government. In addition to contract terms, we must comply with procurement laws and regulations relating to the formation, administration and performance of U.S. government contracts. Failure to comply with these laws and regulations could lead to the termination of contracts at the election of the U.S. government or the suspension or debarment from U.S. government contracting or subcontracting. U.S. government revenue as a percentage of our total revenue was 4%, 4% and 3% for fiscal years 2018, 2017 and 2016, respectively, though it is anticipated to increase in fiscal year 2019.

Competition

Test

For relatively simple and inexpensive mechanical testing applications, customers may satisfy their needs internally by building their own test systems or using competitors who compete on price, performance, quality and service. For larger and more complex mechanical test systems, we compete directly with several companies worldwide based upon customer value including application knowledge, engineering capabilities, technical features, price, quality and service.

Sensors

We primarily compete on factors that include technical performance, price and customer service in new applications or in situations in which other sensing technologies have been used. Sensors competitors are typically larger companies that carry multiple sensors product lines; larger diverse companies with only a small portion of business in the sensors market; or smaller, privately held companies throughout the world.

Environmental Compliance

We believe our operations are in compliance with all applicable material environmental regulations within the jurisdictions in which we operate. Capital expenditures for environmental compliance were not material in fiscal year 2018, 2017 and 2016, and we do not expect such expenditures will be material in fiscal year 2019.

Employees

We had approximately 3,400 employees as of September 29, 2018, including approximately 1,250 employees located outside the U.S.

Available Information

The U.S. Securities and Exchange Commission (SEC) maintains a website that contains reports, proxy and information statements and other information regarding issuers, including us, that file electronically with the SEC. The public can obtain any documents that we file with the SEC at <http://www.sec.gov>. We file annual reports, quarterly reports, current reports, proxy statements and other documents with the SEC under the Securities Exchange Act of 1934, as amended (the Exchange Act).

We also make available free of charge on or through the "Investor Relations" pages of our corporate website (www.mts.com) our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and, if applicable, amendments to those reports filed or furnished pursuant to the Exchange Act as soon as reasonably practicable after we electronically file such material with, or furnish it to, the SEC. Our Code of Conduct (the Code); any waivers from or amendments to the Code; our Corporate Governance Guidelines, Articles of Incorporation and Bylaws; and the Charters for the Audit, Compensation and Leadership Development, and Governance and Nominating Committees of our Board of Directors are also available free of charge on the "Investor Relations" pages of our corporate website (www.mts.com). We are not including the information on our corporate website as a part of or incorporating it by reference into this Annual Report on Form 10-K.

ITEM 1A. RISK FACTORS

Our business involves risks. The following summarizes what we believe to be the most important risks facing us that could adversely impact our business, financial condition or operating results. The information about these risks should be considered carefully together with the other information contained in this Annual Report on Form 10-K. Additional risks not currently known to us or that we currently deem to be immaterial may also adversely affect our business, financial condition or results of operations in future periods.

Market Risks

Our business is significantly international in scope.

We have manufacturing facilities in North America, Europe and Asia. Approximately 70% of our revenue has historically been derived from customers outside of the U.S. Although our financial results are reported in U.S. dollars, a large portion of our sales and operating costs are realized in Euros, Chinese yuan, Japanese yen and other foreign currencies.

Accordingly, our business is subject to the political, economic and other risks that are inherent in operating in foreign countries. These risks include, but are not limited to:

- exposure to the risk of currency value fluctuations, where payment for products is denominated in a currency other than U.S. dollars;
- variability in the U.S. dollar value of foreign currency-denominated assets, earnings and cash flows;
- difficulty enforcing agreements, including patent and trademarks, and collecting receivables through foreign legal systems;
- trade protection measures and import or export licensing requirements;
- tax rates in certain foreign countries that exceed those in the U.S., the imposition of withholding requirements on foreign earnings and restrictions on repatriation of foreign earnings;
- higher danger of terrorist activity, war or civil unrest compared to domestic operations;
- imposition of tariffs, exchange controls or other restrictions, including tariffs recently imposed by the U. S. and responsive tariffs imposed by China and the European Union;
- difficulty in staffing and managing global operations;
- required compliance with a variety of foreign laws and regulations and U.S. laws and regulations, such as the Foreign Corrupt Practices Act applicable to our international operations, and significant compliance costs and penalties for failure to comply with any of these laws and regulations; and
- changes in general economic and political conditions in countries where we operate, particularly in emerging markets, and including the continued volatility in currency exchange rates and uncertainties caused by the United Kingdom's pending exit from the European Union.

These risks could have an adverse effect on our financial position, results of operations or cash flows. In addition, exchange rate fluctuations could also make our products more expensive than competitors' products not subject to these fluctuations, which could adversely affect our revenues and profitability in international markets. As further described in Item 7 of Part II of this Annual Report on Form 10-K, revenue for fiscal year 2018 was favorably impacted by currency translation.

Our business is subject to strong competition.

Our products are sold in competitive markets throughout the world. Competition is based on application knowledge, product features and design, brand recognition, reliability, technology, breadth of product offerings, price, delivery, customer relationships and after-market support. If we are not perceived as competitive in overall value as measured by these criteria, our customers would likely choose solutions offered by our competitors or developed internally.

Our business is subject to customer demand cycles.

For many of our products, orders are subject to customers' procurement cycles and their willingness and ability to invest in capital, especially in the cyclical automotive, aircraft and machine tool industries. Any event that adversely impacts those customers' new product development activities may reduce their demand for our products.

We may experience difficulty obtaining materials or components for our products, or the cost of materials or components may increase.

We purchase materials and components from third-party suppliers, some of whom may be competitors. Other materials and components may be provided by a limited number of suppliers or by sole sources and could only be replaced with difficulty or at significant added cost. Additionally, some materials or components may become scarce or difficult to obtain in the market or they may increase in price. This could adversely affect the lead time within which we receive the materials or components, and in turn affect our commitments to our customers, or could adversely affect the cost or quality of materials.

Our level of indebtedness and interest rate fluctuations on that indebtedness could adversely affect our business and results of operations and may require the use of our available cash resources to meet repayment obligations, which could reduce the cash available for other purposes.

We have a senior secured credit facility that provides for a revolving credit facility and a tranche B term loan facility, both of which require that we pay a variable interest rate on outstanding borrowings. The debt under the tranche B term loan facility amortizes in equal quarterly installments in an aggregate annual amount equal to 1% of the original principal amount and matures on July 5, 2023. As of September 29, 2018, we did not have any borrowings under the revolving credit facility; however, we may, at times, use debt under the revolving credit facility to purchase shares of our common stock, finance working capital needs or continue to finance the growth of the business through acquisitions.

Our level of indebtedness may place us at a competitive disadvantage to our competitors that are not as highly leveraged. Fluctuations in interest rates can increase borrowing costs. We hedge against a portion of the risk on the tranche B term loan facility by swapping the variable rate for a fixed rate. Increases in interest rates may directly impact the amount of interest we are required to pay and reduce earnings accordingly. In addition, developments in tax policy, such as the disallowance of tax deductions for interest paid on outstanding indebtedness, could have a material adverse effect on our results of operations and liquidity. Further, our senior secured credit facility and the indenture governing our tangible equity units contain customary affirmative and negative covenants and certain restrictions on operations that could impose operating and financial limitations and restrictions on us, including restrictions on our ability to enter into particular transactions and to engage in other actions that we may believe are advisable or necessary for our business. The tranche B term loan facility is also subject to mandatory prepayments in certain circumstances and requires a prepayment of a certain percentage of our excess cash flow. Any future mandatory prepayments will reduce our cash available for other purposes and could impact our ability to reinvest in other areas of our business. Due to planned prepayments made during fiscal year 2018, we do not anticipate an excess cash flow payment will be required in the first quarter of fiscal year 2019 based on fiscal year 2018 results. For further information on our financing arrangements, see Note 5 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K.

Our outstanding 8.75% tangible equity units (TEUs) may adversely affect the market price of our common stock.

The market price of our common stock may be influenced by the outstanding TEUs sold in our June 2016 public offering. For example, additional shares of our common stock are currently and will continue to be issuable upon settlement of the purchase contract component of the TEUs through expiration on July 1, 2019. The settlement rates for such purchase contracts are subject to certain anti-dilution and make-whole adjustments that could increase, potentially significantly, the number of shares of our common stock issuable upon such settlement. As a result, the market price of our common stock could become more volatile and could be depressed by the following factors:

- investors' anticipation of the sale into the market of a substantial number of additional shares of common stock received upon settlement of the purchase contract component of the TEUs;
- possible sales of our common stock by investors who view the TEUs as a more attractive means of equity participation in the Company than owning shares of our common stock; and
- hedging or arbitrage trading activities that may develop involving the TEUs, the purchase contracts and our common stock.

In addition, our debt obligations under the senior amortizing note component of the TEUs may further influence the market price of our common stock, including but not limited to our ability to make timely payments to holders of the notes. For further information on our TEUs, see Note 9 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K.

Operational Risks

Transfer of certain Test production operations in China to our new contract manufacturing partner may be subject to delays, increased costs or other unanticipated consequences.

On March 13, 2018, we announced workforce reductions and manufacturing facility closures in our Test segment corresponding to the transfer of certain production operations in China to a contract manufacturing partner. These changes are designed to increase organizational effectiveness, gain manufacturing efficiencies and provide cost savings that can be reinvested in growth initiatives. We can make no assurances that our current estimates of costs and timing of this restructuring action will be accurate or that additional costs will not be incurred as we continue the restructuring action. Any differences from our current estimates could be material and could adversely impact our business, financial condition and results of operations through delays in our timeline or increased costs. For further information on restructuring initiatives, see Note 12 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K.

While we believe our China contract manufacturing partner to be qualified to manufacture our Test segment products, we may need to address short-term quality and delivery issues. We have not previously used contract manufacturing partners on a large scale. Significant quality or delivery schedule concerns and unforeseen costs may adversely affect our relationships with customers and our overall business, financial condition or results of operations.

Final impacts of the Tax Cuts and Jobs Act could be materially different from our current estimates.

The Tax Cuts and Jobs Act (the Tax Act) was signed into law on December 22, 2017. The new law made numerous changes to U.S. federal corporate tax law and reduced our effective tax rate for fiscal year 2018 and future periods. Effective January 1, 2018, the Tax Act lowers the U.S. corporate tax rate from 35% to 21% and prompts various other changes to U.S. federal corporate tax law, including the establishment of a territorial-style system for taxing foreign-source income of domestic multinational corporations. The tax benefit recorded in fiscal year 2018 involved significant judgment and assumptions as to the impact of the Tax Act. Our estimated impact of the new law is based on management's current knowledge and assumptions. The provisional amounts are based on information available at this time and may change due to a variety of factors, including, among others, anticipated guidance from the U.S. Department of Treasury about implementing the Tax Act and management's further assessment of the Tax Act and related regulatory guidance. Recognized impacts could be materially different from current estimates based on anticipated guidance from the U.S. Department of Treasury, Internal Revenue Service and other standard setting and regulatory bodies about implementing the Tax Act. We expect to record any adjustments within one year of the enactment of the Tax Act, or during our first quarter of fiscal year 2019, in accordance with the guidance provided in Accounting Standards Update No. 2018-05, *Income Taxes (Topic 740): Amendments to SEC Paragraphs Pursuant to SEC Staff Accounting Bulletin No. 118 (SAB 118)*, and these adjustments could be material. The full impact of the Tax Act on our business, operations and financial statements cannot be predicted at this time, and we make no assurances in this regard.

Our business operations may be affected by government contracting risks.

Government business is important to us and is expected to increase in the future. Revenue from U.S. government contracts varies by year. Such revenue as a percent of our total revenue was 4%, 4% and 3% for fiscal years 2018, 2017 and 2016, respectively.

We must comply with procurement laws and regulations relating to the formation, administration and performance of U.S. government contracts. Failure to comply with these laws and regulations could lead to suspension or debarment from U.S. government contracting or subcontracting and result in administrative, civil or criminal penalties. Failure to comply could also have a material adverse effect on our reputation, our ability to secure future U.S. government contracts and export control licenses, and our results of operations or financial condition. These laws and regulations also create compliance risks and affect how we do business with federal agency clients. U.S. government contracts, as well as contracts with certain foreign governments with which we do business, are also subject to modification or termination by the government, either for the convenience of the government or for default as a result of our failure to perform under the applicable contract. Further, any investigation relating to, or suspension or debarment from, U.S. government contracting could have a material impact on our results of operations as, during the duration of any suspension or debarment, we would be prohibited or otherwise limited in our ability to enter into prime contracts or subcontracts with U.S. government agencies, certain entities that receive U.S. government funds or that are otherwise subject to the Federal Acquisition Regulations, and certain state government or commercial customers who decline to contract with suspended or debarred entities. A federal suspension could also impact our ability to obtain export control licenses which are materially important to our business.

We are subject to risks because we design and manufacture first-of-a-kind products.

We design and build systems that are unique and innovative and, in some cases, the first created to address complex and unresolved issues. The design, manufacture and support of these systems may involve higher than planned costs. If we are unable to meet our customers' expectations, our reputation and ability to further utilize our expertise will likely be damaged.

Backlog, sales, delivery and acceptance cycle for many of our products is irregular and may not develop as anticipated.

Many of our products have long sales, delivery and acceptance cycles. In addition, certain contracts within our backlog are subject to order cancellations. If an order is canceled, we typically would only be entitled to receive reimbursement from the customer for actual costs incurred under the arrangement plus a reasonable margin. Events may cause recognition of orders, backlog and results of operations to be irregular over shorter periods of time. These factors include the timing of individual large orders which may be impacted by interest rates, customer capital spending and product development cycles, design and manufacturing problems, capacity constraints, delays in product readiness, damage or delays in transit, problems in achieving technical performance requirements, and various customer-initiated delays. Any such delay or any cancellations may cause fluctuations in our reported periodic financial results and may cause our stated backlog conversion to revenue to be inaccurate.

The business could be adversely affected by product liability and commercial litigation.

Our products or services may be claimed to cause or contribute to personal injury or property damage to our customers' facilities. Additionally, we are, at times, involved in commercial disputes with third parties, such as customers, vendors and others. The ensuing claims may arise singularly, in groups of related claims or in class actions involving multiple claimants. Such claims and litigation are frequently expensive and time consuming to resolve and may result in substantial liability to us, and any liability and related costs and expenses may not be recoverable through insurance or other forms of reimbursement.

We may experience difficulties obtaining and retaining the services of skilled employees.

We rely on knowledgeable, experienced and skilled technical personnel, particularly engineers, sales management and service personnel, to design, assemble, sell and service our products. We may be unable to attract, retain and motivate a sufficient number of such people which could adversely affect our business. The inability to transfer knowledge and transition between roles within these teams could also adversely affect our business.

We may fail to protect our intellectual property effectively or may infringe upon the intellectual property of others.

We have developed significant proprietary technology and other rights that are used in our businesses. We rely on trade secret, copyright, trademark and patent laws and contractual provisions to protect our intellectual property. While we take enforcement of these rights seriously, other companies such as competitors or others in markets in which we do not participate may attempt to copy or use our intellectual property for their own benefit.

In addition, the intellectual property of others also has an impact on our ability to offer some of our products and services for specific uses or at competitive prices. Competitors' patents or other intellectual property may limit our ability to offer products and services to our customers. Any infringement on the intellectual property rights of others could result in litigation and adversely affect our ability to continue to provide, or could increase the cost of providing, our products and services.

Intellectual property litigation can be very costly and could result in substantial expense and diversion of our resources, both of which could adversely affect our businesses, financial condition and results. In addition, there may be no effective legal recourse against infringement of our intellectual property by third parties, whether due to limitations on enforcement of rights in foreign jurisdictions or as a result of other factors.

If we are unable to protect our information systems against misappropriation of data or breaches of security, our business operations and financial results could be adversely impacted. Evolving regulations and legal obligations related to data privacy, data protection and information security and our actual or perceived failure to comply with such obligations could have an adverse effect on our business.

Information security risks have generally increased in recent years because of the proliferation of new technologies and the increased sophistication and activities of cyber-attacks. Although we strive to have appropriate security controls in place, prevention of security breaches cannot be assured, particularly as cyber threats continue to evolve. We may be required to expend additional resources to continue to enhance our security measures or to investigate and remediate any security vulnerabilities. The consequences of these risks could adversely impact our business operations and financial results.

In addition, our handling of certain data is subject to a variety of laws and regulations, which have been adopted by various federal, state and foreign governments to regulate the collection, distribution, use and storage of personal information of individuals. Several foreign countries in which we conduct business, including the European Economic Area (EEA), currently have in place, or have recently proposed, laws or regulations concerning privacy, data protection and information security, which are more restrictive than those imposed in the U.S. Some of these laws are in their early stages and we cannot yet determine the impact these revised laws and regulations, if implemented, may have on our business. However, any failure or perceived failure by us to comply with these privacy laws, regulations, policies or obligations or any security incident that results in the unauthorized release or transfer of personally identifiable information or other customer data in our possession, could result in government enforcement actions, litigation, fines and penalties and/or adverse publicity, all of which could have an adverse effect on our reputation and business. For example, the EEA-wide General Data Protection Regulation became effective on May 25, 2018 and replaced the data protection laws of each EEA member state. If our privacy or data security measures fail to comply with applicable current or future laws and regulations, we may be subject to litigation, regulatory investigations and enforcement notices requiring us to change the way we use personal data.

Government regulation and policy imposes costs and other constraints.

Our manufacturing operations and past and present ownership and operations of real property are subject to extensive and changing federal, state, local and foreign laws and regulations, including laws and regulations pertaining to health and safety matters, as well as the handling or discharge of hazardous materials into the environment. We expect to continue to incur costs to comply with these laws and may incur penalties for any failure to do so. We may also be identified as a responsible party and be subject to liability relating to any investigation and cleanup of properties used for industrial purposes or the generation or disposal of hazardous substances. In addition, some of our products contain hazardous substances and are subject to requirements that regulate their content, such as the European Union's Restriction of Hazardous Substances Directive and analogous regulations elsewhere. Capital expenditures for environmental compliance were immaterial in fiscal year 2018, and we do not expect such expenditures will be material in fiscal year 2019; however, the factors described above may cause our estimates to differ from our expectations.

Some of our export sales require approval from the U.S. government. Changes in political relations between the U.S. and foreign countries and/or specific potential customers for which export licenses may be required, may cause a license application to be delayed or denied, or a previously issued license withdrawn, rendering us unable to complete a sale or vulnerable to competitors who do not operate under such restrictions. In addition, the U.S. government has recently imposed tariffs on certain products imported from China as well as steel and aluminum imported from the European Union, Mexico and Canada. China and the European Union have imposed tariffs on U.S. products in retaliation. These tariffs could force our customers or us to consider various strategic options including, but not limited to, looking for different suppliers, shifting production to facilities in different geographic regions, absorbing the additional costs or passing the cost on to customers. Moreover, any retaliatory actions by other countries where we operate could also negatively impact our financial performance.

We are required to conduct a good faith reasonable country of origin analysis on our use of conflict minerals, which has imposed and may impose additional costs on us and could raise reputational and other risks.

The SEC has promulgated final rules in connection with the Dodd-Frank Wall Street Reform and Consumer Protection Act regarding disclosure of the use of certain minerals, known as conflict minerals, mined from the Democratic Republic of the Congo and adjoining countries. While there is pending litigation challenging these rules, we have incurred and will continue to incur costs associated with complying with these disclosure requirements, including costs to determine the source of any conflict minerals used in our products. We have adopted a policy relating to conflict minerals, incorporating the standards set forth in the Organisation for Economic Co-operation and Development Due Diligence Guidance, which affects the sourcing, supply, and pricing of materials used in our products. As we continue our due diligence, we may face reputational challenges if we are unable to verify the origins for all metals used in our products through the procedures we have and may continue to implement. We may also encounter challenges in our efforts to satisfy customers that may require all of the components of products purchased to be certified as conflict-free. If we are not able to meet customer requirements, customers may choose to disqualify us as a supplier.

We may not achieve our growth plans for the expansion of the business.

In addition to market penetration, our long-term success depends on our ability to expand our business through (a) new product development and service offerings; (b) mergers and acquisitions; and/or (c) geographic expansion.

New product development and service offerings require that we maintain our ability to improve existing products, continue to bring innovative products and services to market in a timely fashion and adapt products and services to the needs and standards of current and potential customers. Our products and services may become less competitive or eclipsed by technologies to which we do not have access or which render our solutions obsolete.

Mergers and acquisitions will be accompanied by risks that may include:

- suitable candidates may not exist or may not be available at acceptable costs;
- failure to achieve, or delays in achieving, the financial and strategic goals, including growth opportunities and cost synergies, for the acquired and combined businesses;
- difficulty integrating the operations and personnel of the acquired businesses, including the inability to eliminate duplicative costs or the substantial expenses that may be incurred in connection with integration;
- disruption of ongoing business and acquired business and distraction of management from the operation of both businesses;
- dilution of existing shareholders and earnings per share;
- unanticipated, undisclosed or inaccurately assessed liabilities, legal risks and costs;
- legal and regulatory requirements of the acquired business was not formerly a public company; and
- difficulties retaining the key vendors, customers or employees of the acquired business.

Acquisitions of businesses having a significant presence outside the U.S. will increase our exposure to the risks of international operations discussed in the operational risk factors.

Geographic expansion may be outside of the U.S., and hence will be disproportionately subject to the risks of international operations discussed in the operational risk factors.

For further information on our business acquisitions, see Note 13 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K.

We may be required to recognize impairment charges for goodwill and long-lived assets.

As of September 29, 2018, the net carrying value of goodwill and long-lived assets (property and equipment, net and intangible assets, net) totaled \$705,682. We periodically assess the value of these assets for impairment in accordance with U.S. generally accepted accounting principles (GAAP). Significant negative industry or economic trends, disruptions to our businesses, significant unexpected or planned changes in use of the assets, divestitures and market capitalization declines may result in impairments to goodwill and other long-lived assets. Future impairment charges could significantly affect reported financial results.

If we fail to maintain effective processes and controls relative to adherence to our Code of Conduct, our business, financial condition or results of operations may be adversely affected.

Our Code of Conduct and other internal policies prohibit us and our employees from engaging in unethical business practices. However, there can be no assurance that all of our employees or agents will refrain from acting in violation of such policies and procedures or that our processes and controls will be sufficient to detect any such violations. The investigation into potential violations of these policies, or even allegations of such violations, and evaluation of our internal controls, could disrupt our operations, involve significant management distraction, and lead to significant costs and expenses, including legal and accounting fees, and such expenses may have a material adverse effect on our financial results. Further, if our employees or agents violate such policies and procedures, such actions could result in management override of internal controls over financial reporting. If we, or our employees or agents acting on our behalf, are found to have engaged in practices that violate these policies and/or applicable law, we could suffer severe fines and penalties, repayment of ill-gotten gains, injunctions on future conduct, securities litigation, material weaknesses in our financial reporting and other consequences that may have a material adverse effect on our business, financial condition or results of operations. In addition, our reputation, sales activities or stock price could be adversely affected if we become the subject of any negative publicity related to actual or potential violations of applicable laws and regulations.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

Shown below is a breakdown of the approximate square footage of our primary owned and leased facilities as of September 29, 2018. We consider our current facilities adequate to support our operations during fiscal year 2019.

Owned Property

Location	Use of Facility	Approximate Square Footage
Eden Prairie, Minnesota (U.S.)	Corporate headquarters and primary Test manufacturing and research	420,000
Depew, New York (U.S.)	Sensors manufacturing, sales and service administration	144,000
Cary, North Carolina (U.S.)	Sensors manufacturing, research and sales and service administration	65,000
Provo, Utah (U.S.)	Sensors manufacturing, sales and service administration	25,000
Farmington Hills, Michigan (U.S.)	Sensors manufacturing, sales and service administration	16,000
Lancaster, New York (U.S.)	Sensors sales and service administration	1,000
Berlin, Germany	Test manufacturing, sales and service administration	72,000
Shanghai, China	Test manufacturing, sales and service administration	129,000
Total		872,000

Leased Property

Location	Use of Facility	Lease Expires	Approximate Square Footage
Swartz Creek, Michigan (U.S.)	Test manufacturing and research	2022	8,000
Latham, New York (U.S.)	Sensors manufacturing, sales and service administration	2020	5,000
Cary, North Carolina (U.S.)	Sensors manufacturing	2020	8,000
Halifax, North Carolina (U.S.)	Sensors manufacturing, sales and service administration	2018	51,000
Cincinnati, Ohio (U.S.)	Sensors manufacturing, warehouse, sales and service administration	2019	16,000
	Sensors warehouse, sales and service administration	2019	9,000
San Clemente, California (U.S.)	Sensors warehouse, sales and service administration	2018	7,000
Beijing, China	Test sales and service administration	2019	6,000
	Sensors sales and service administration	2020	5,000
Shanghai, China	Test sales, service administration and assembly	2019	13,000
	Test sales and service administration	2019	7,000
	Test land under Shanghai facility	2056	161,000
Shenzhen, China	Test manufacturing and warehouse	2019	13,000
	Test manufacturing and warehouse	2019	16,000
	Test sales, service administration and warehouse	2021	14,000
	Test manufacturing, research, sales and service administration	2018	75,000
Creteil, France	Test sales and service administration	2027	16,000
Huckelhoven, Germany	Sensors sales and service administration	2021	12,000
Ludenscheid, Germany	Sensors manufacturing, research and sales and service administration	2019	48,000
	Sensors research, sales and service administration	2019	10,000
	Sensors manufacturing	2019	11,000
Tokyo, Japan	Test sales and service administration	2018	7,000
Sungnam, South Korea	Test sales, service administration and assembly	2019	17,000
Guildford, U.K.	Test sales, service and manufacturing	2025	8,000
Berlin, Germany	Test land under Berlin facility	2052	97,000
Torino, Italy	Test sales, service administration and warehouse	2024	8,000
Other Locations ¹	Test and Sensors other sales and service administration		89,000
Total			737,000

¹ We also lease space in the U.S., Europe and Asia for Test and Sensors sales and service administration, including locations in China, France, Germany, India, Italy, Japan, Russia, Spain, Sweden, Canada and the United Kingdom. Neither the amount of leased space nor the rental obligations in these locations is significant individually or in aggregate.

Additional information relative to lease obligations is included in Management's Discussion and Analysis of Financial Condition and Results of Operations included in Item 7 of Part II of this Annual Report on Form 10-K.

ITEM 3. LEGAL PROCEEDINGS

Discussion of legal matters is incorporated by reference from Note 14 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K and should be considered an integral part of Item 3 of Part I of this Annual Report on Form 10-K.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II**ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES**

Shares of our common stock are traded on the Nasdaq Global Select MarketSM under the trading symbol MTSC. The number of record holders of our common stock, par value \$0.25 per share, as of November 21, 2018 was 644. This number does not reflect shareholders who hold their shares in the name of broker-dealers or other nominees.

Issuer Purchases of Equity Securities

	Total Number of Shares Purchased	Average Price Paid per Share	Total Number of Shares Purchased As Part of Publicly Announced Plans or Programs	Maximum Number of Shares that May Yet be Purchased As Part of Publicly Announced Plans or Programs
July 1, 2018 – August 4, 2018	—	\$ —	—	438
August 5, 2018 – September 1, 2018	—	\$ —	—	438
September 2, 2018 – September 29, 2018	—	\$ —	—	438

We purchase common stock from time to time to mitigate dilution related to new shares issued as equity for employee compensation such as stock options, restricted stock units, performance restricted stock units and employee stock purchase plan activity, as well as to return capital to shareholders not immediately required to fund ongoing operations.

Share Purchase Plan

Our Board of Directors approved, and on February 11, 2011 announced, a purchase authorization of 2,000 shares. Authority over pricing and timing under this authorization has been delegated to management. The share purchase authorization has no expiration date. We made no purchases during the fourth quarter of fiscal year 2018. As of September 29, 2018, there were 438 shares available for purchase under the existing authorization.

Capped Calls

In connection with the pricing of the tangible equity units (TEUs) sold in our public offering in fiscal year 2016, we purchased capped calls from third party banking institutions (Capped Calls) for \$7,935. On June 13, 2018, we amended the agreements with third party banking institutions for the outstanding Capped Calls (Capped Call Agreements) to modify the timing of settlement to be only upon expiration for all outstanding Capped Calls. Per the Capped Call Agreements, the outstanding Capped Calls will automatically settle upon expiration on July 1, 2019. As of September 29, 2018 the range of shares of our common stock to be received for the outstanding Capped Calls was a minimum of 0 shares to a maximum of 268 shares, subject to market conditions. See Note 9 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K for additional information on our equity instruments.

Dividends

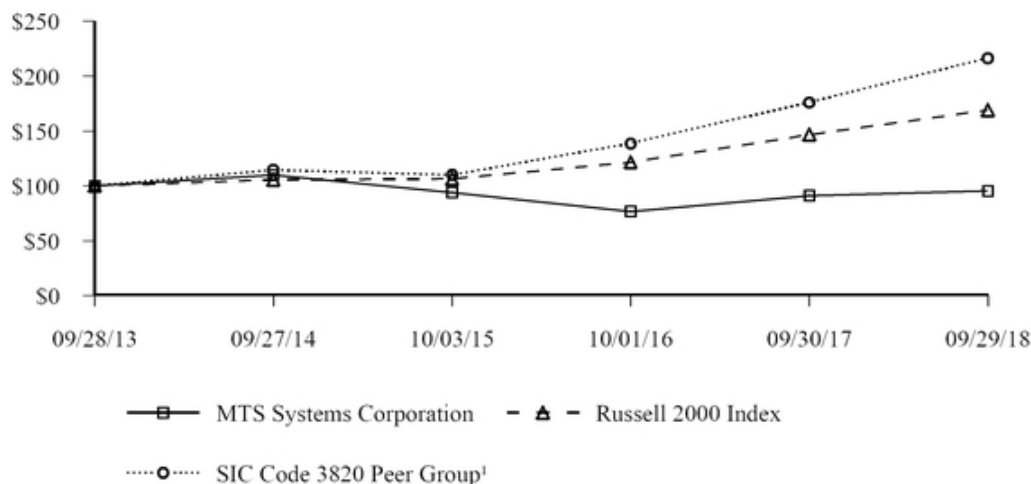
Our dividend policy is to maintain a payout ratio that allows dividends to increase in conjunction with the long-term growth of earnings per share, while sustaining dividends through economic cycles. Our dividend practice is to target, over time, a payout ratio of approximately 25% of net earnings per share. We have historically paid dividends to holders of our common stock on a quarterly basis. The declaration and payment of future dividends will depend on many factors, including, but not limited to, our earnings, financial condition, debt repayment obligations, business development needs and regulatory considerations and are at the discretion of our Board of Directors. During fiscal years 2018 and 2017, we declared quarterly cash dividends of \$0.30 per share to holders of our common stock, resulting in a payout ratio of 38% and 92% of net earnings per share, respectively. The decrease in the payout ratio in fiscal year 2018 resulted from increased earnings per share, primarily driven by a reduction in

the effective tax rate as a result of U.S. tax reform in the current year, as well as non-recurring expenses incurred in the prior year.

Shareholder Performance Graph

The following graph compares the cumulative total shareholder return of our common stock over the last five fiscal years with the cumulative total shareholder return of the Russell 2000 Index and a peer group of companies in the Laboratory Apparatus and Analytical, Optical, Measuring and Controlling Instruments Standard Industrial Code (SIC Code 3820 Peer Group) that are traded on the Nasdaq, NYSE and NYSE American exchanges. The graph assumes that \$100 (in actual dollars) was invested at market close on September 28, 2013 in our common stock, the Russell 2000 Index and the SIC Code 3820 Peer Group and that all dividends were reinvested. The graph is not necessarily indicative of future investment performance.

COMPARISON OF 5 YEAR CUMULATIVE TOTAL RETURN*
Among MTS Systems Corporation, the Russell 2000 Index, and SIC Code 3820 Peer Group



* \$100 invested on 9/28/2013 in stock or index, including reinvestment of dividends.

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(in actual dollars)	Fiscal Year					
	2013 ²	2014 ²	2015 ²	2016	2017	2018
MTS Systems Corporation	\$ 100.00	\$ 109.91	\$ 93.98	\$ 76.70	\$ 91.08	\$ 95.38
Russell 2000 Index	100.00	105.55	106.49	121.46	146.65	169.00
SIC Code 3820 Peer Group ¹	100.00	114.54	110.03	138.58	176.08	216.28

¹ Modified to remove non-exchange traded companies.

² Fiscal year 2015 refers to the fiscal year ended October 3, 2015, fiscal year 2014 refers to the fiscal year ended September 27, 2014 and fiscal year 2013 refers to the fiscal year ended September 28, 2013.

ITEM 6. SELECTED FINANCIAL DATA

The following selected financial data should be read in conjunction with Item 7 and Item 8 of Part II of this Annual Report on Form 10-K.

	Fiscal Year ¹				
	2018	2017	2016	2015	2014
Operating Results					
Revenue	\$ 778,032	\$ 787,955	\$ 650,147	\$ 563,934	\$ 564,328
Gross profit	305,529	302,278	231,404	219,613	223,643
Gross margin %	39.3 %	38.4 %	35.6%	38.9%	39.6%
Research and development expense	\$ 34,784	\$ 34,999	\$ 25,336	\$ 23,705	\$ 23,844
Research and development expense as a % of revenue	4.5 %	4.4 %	3.9%	4.2%	4.2%
Effective income tax rate	(38.7)%	(9.0)%	18.0%	23.2%	28.1%
Net income	\$ 61,328	\$ 25,084	\$ 27,494	\$ 45,462	\$ 42,009
Net income as a % of revenue	7.9 %	3.2 %	4.2%	8.1%	7.4%
Earnings per share					
Basic	\$ 3.20	\$ 1.32	\$ 1.72	\$ 3.03	\$ 2.76
Diluted	\$ 3.18	\$ 1.31	\$ 1.70	\$ 3.00	\$ 2.73
Weighted average shares outstanding ²					
Basic	19,163	19,040	16,027	14,984	15,218
Diluted	19,293	19,137	16,179	15,142	15,397
Depreciation and amortization	\$ 34,492	\$ 35,523	\$ 24,077	\$ 21,106	\$ 19,279
Financial Position					
Total assets	\$ 1,139,396	\$ 1,189,692	\$ 1,188,020	\$ 460,831	\$ 487,408
Interest-bearing debt ³	400,706	474,309	484,985	21,183	60,000
Total shareholders' equity	477,932	428,777	405,260	258,142	258,127
Interest-bearing debt as a % of shareholders' equity	83.8 %	110.6 %	119.7%	8.2%	23.2%
Return on equity ⁴	14.3 %	6.2 %	10.7%	17.6%	16.4%
Return on invested capital ⁵	9.3 %	7.3 %	8.6%	15.5%	15.4%
Other Statistics					
Backlog of orders at year end	\$ 415,155	\$ 360,016	\$ 370,523	\$ 353,013	\$ 326,473
Dividends declared per share	1.20	1.20	1.20	1.20	1.20
Capital Expenditures	12,321	17,798	20,806	18,445	20,038

¹ Fiscal years 2018, 2017, 2016, 2015 and 2014 include 52, 52, 52, 53 and 52 weeks, respectively.

² Assumes the conversion of potential common shares using the treasury stock method.

³ Interest-bearing debt consists of long-term debt for fiscal years 2018, 2017 and 2016 and short-term borrowings for fiscal years 2015 and 2014.

⁴ Calculated by dividing net income by beginning shareholders' equity.

⁵ The measure Return on Invested Capital (ROIC) is not a measure of performance presented in accordance with GAAP. ROIC is calculated by dividing adjusted net income by average invested capital. Adjusted net income is calculated by excluding after-tax interest expense from reported net income. In addition, adjusted net income also excludes acquisition-related expenses, net of tax; acquisition integration expense, net of tax; acquisition inventory fair value adjustment, net of tax; restructuring expense, net of tax; and China investigation expense, net of tax. Average invested capital is defined as the aggregate of average interest-bearing debt and average shareholders' equity and is calculated as the sum of current and prior year ending amounts divided by two. Because the ratio is not prescribed or authorized by GAAP, the ROIC percentage is a non-GAAP financial measure. We believe ROIC is useful to investors as a measure of operating performance and the effectiveness of the use of capital in our operations. We use ROIC as a measure to monitor and evaluate operating performance relative to our invested capital. This measure should not be construed as an alternative to, or substitute for, return on equity or any other measure determined in accordance with GAAP.

Presented below is the reconciliation of ROIC to average invested capital, the nearest GAAP measure, and a reconciliation of each non-GAAP financial measure used to its nearest GAAP measure:

	Fiscal Year				
	2018	2017	2016	2015	2014
Net income	\$ 61,328	\$ 25,084	\$ 27,494	\$ 45,462	\$ 42,009
Acquisition-related expenses, net of tax	—	(814)	7,322	—	—
Acquisition integration expense, net of tax	—	2,659	2,049	—	—
Acquisition inventory fair value adjustment, net of tax	—	5,909	5,692	—	—
Restructuring expense, net of tax	2,033	2,980	1,465	—	4,376
China investigation expense, net of tax	—	6,749	—	—	—
Interest expense, net of tax	19,636	23,133	6,065	767	637
Adjusted net income*	\$ 82,997	\$ 65,700	\$ 50,087	\$ 46,229	\$ 47,022
Total beginning shareholders' equity	\$ 428,777	\$ 405,260	\$ 258,142	\$ 258,127	\$ 256,537
Total ending shareholders' equity	477,932	428,777	405,260	258,142	258,127
Total beginning interest-bearing debt	474,309	484,985	21,183	60,000	35,000
Total ending interest-bearing debt	400,706	474,309	484,985	21,183	60,000
Sum of invested capital	\$ 1,781,724	\$ 1,793,331	\$ 1,169,570	\$ 597,452	\$ 609,664
Average invested capital*	\$ 890,862	\$ 896,666	\$ 584,785	\$ 298,726	\$ 304,832
Return on invested capital*	9.3%	7.3%	8.6%	15.5%	15.4%

* Denotes non-GAAP financial measures.

Presented below is a reconciliation of adjusted net income to net income, which reconciles the tax impact of the non-GAAP financial measure of adjusted net income presented in the table above:

	Fiscal Year								
	2018			2017			2016		
	Pre-tax	Tax	Net	Pre-tax	Tax	Net	Pre-tax	Tax	Net
Net income	\$ 44,223	\$ (17,105)	\$ 61,328	\$ 23,011	\$ (2,073)	\$ 25,084	\$ 33,512	\$ 6,018	\$ 27,494
Acquisition-related expenses ^a	—	—	—	—	814	(814)	10,170	2,848	7,322
Acquisition integration expense ^a	—	—	—	3,577	918	2,659	2,846	797	2,049
Acquisition inventory fair value adjustment ^a	—	—	—	7,975	2,066	5,909	7,916	2,224	5,692
Restructuring expense ^a	2,730	697	2,033	4,079	1,099	2,980	2,165	700	1,465
China investigation expense ^a	—	—	—	9,209	2,460	6,749	—	—	—
Interest expense [†]	26,464	6,828	19,636	31,218	8,085	23,133	8,424	2,359	6,065
Adjusted net income*	\$ 73,417	\$ (9,580)	\$ 82,997	\$ 79,069	\$ 13,369	\$ 65,700	\$ 65,033	\$ 14,946	\$ 50,087

	Fiscal Year					
	2015			2014		
	Pre-tax	Tax	Net	Pre-tax	Tax	Net
Net income	\$ 59,172	\$ 13,710	\$ 45,462	\$ 58,443	\$ 16,434	\$ 42,009
Restructuring expense [«]	—	—	—	6,336	1,960	4,376
Interest expense [†]	1,204	437	767	1,003	366	637
Adjusted net income [*]	\$ 60,376	\$ 14,147	\$ 46,229	\$ 65,782	\$ 18,760	\$ 47,022

^a In determining the tax impact of acquisition-related expenses, acquisition integration expense, acquisition inventory fair value adjustment and China investigation expense, we applied a U.S. effective income tax rate before discrete items.

[«] In determining the tax impact of restructuring expenses, we applied the statutory rate in effect for each jurisdiction where restructuring expenses were incurred.

[†] In determining the tax impact of interest expense, we applied a U.S. marginal income tax rate.

^{*} Denotes non-GAAP financial measures.

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

Management's Discussion and Analysis of Financial Condition and Results of Operations (MD&A) is designed to provide a reader of our financial statements with a narrative from the perspective of management on our financial condition, results of operations, liquidity and certain other factors that may affect our future results. Our MD&A is presented in nine sections:

- Overview
- Financial Results
- Cash Flow Comparison
- Liquidity and Capital Resources
- Off-balance Sheet Arrangements
- Critical Accounting Policies
- Recently Issued Accounting Pronouncements
- Quarterly Financial Information
- Forward-looking Statements

Our MD&A should be read in conjunction with the Consolidated Financial Statements and related Notes included in Item 8 of Part II of this Annual Report on Form 10-K. All dollar amounts are in thousands unless otherwise noted.

Overview

MTS Systems Corporation's testing hardware, software and service solutions help customers accelerate and improve their design, development and manufacturing processes and are used for determining the mechanical behavior of materials, products and structures. Our high-performance sensors provide measurements of vibration, pressure, position, force and sound in a variety of applications.

Further globalization and expansion of many industries along with growth in emerging markets, such as China and India, provide a strong and vibrant market base from which we can grow revenue. We have aligned our organizational structure to be more flexible to the demands of globalized and volatile markets by adjusting our structure to be more cost effective and nimble in responding to our customers' needs. We are looking ahead to delivering distinctive business performance through our commitment to sustain the differentiated competitive advantage that comes from offering an innovative portfolio of Test and Sensor solutions that create value for customers and are delivered with total customer satisfaction.

Fiscal Year

We have a 5-4-4 week, quarterly accounting cycle with the fiscal year ending on the Saturday closest to September 30. Fiscal years 2018, 2017 and 2016 ended September 29, 2018, September 30, 2017 and October 1, 2016, respectively. Fiscal years 2018, 2017 and 2016 all include 52 weeks.

Tax Cuts and Jobs Act

The Tax Cuts and Jobs Act (the Tax Act) was signed into law on December 22, 2017. The Tax Act made numerous changes to U.S. federal corporate tax law and reduced our effective tax rate for fiscal year 2018 and future periods. Effective January 1, 2018, the Tax Act lowers the U.S. corporate tax rate from 35% to 21% and prompts various other changes to U.S. federal corporate tax law, including the establishment of a territorial-style system for taxing foreign-source income of domestic multinational corporations. We have completed our initial analysis to quantify the tax impacts of the Tax Act and have recorded the estimated impact in our fiscal year 2018 results. See Note 8 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K for further discussion of the impact of the Tax Act.

Restructuring Initiatives

In fiscal year 2018, we initiated a Test workforce reduction intended to increase organizational effectiveness and provide cost savings. As a result, during the fourth quarter of fiscal year 2018, we recorded \$880 of pre-tax severance and related expense.

During the fourth quarter of fiscal year 2017, we initiated a series of Test workforce reductions and facility closures intended to increase organizational effectiveness, gain manufacturing efficiencies and provide cost savings that can be reinvested in our growth initiatives. These actions include the transfer of certain production operations in China to a contract manufacturing partner throughout fiscal years 2018 and 2019. As a result, in fiscal year 2018, we recorded \$1,550 of pre-tax severance and related expense, and \$269 of pre-tax facility closure costs. In fiscal year 2017, we recorded \$2,899 of pre-tax severance and related expense and \$23 of pre-tax facility closure costs.

See Note 12 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K for further discussion of restructuring initiatives.

Foreign Currency

Approximately 70% of our revenue has historically been derived from customers outside of the U.S. Our financial results are principally exposed to changes in exchange rates between the U.S. dollar and the Euro, the Japanese yen and the Chinese yuan. A change in foreign exchange rates could positively or negatively affect our reported financial results. The discussion below quantifies the impact of foreign currency translation on our financial results for the periods discussed.

Financial Results

Fiscal Year 2018 Compared to Fiscal Year 2017

Total Company

Results of Operations

The following table compares results of operations in fiscal years 2018 and 2017, separately identifying the estimated impact of currency translation and restructuring expenses incurred in fiscal year 2018.

	2018	Estimated			2017
		Business Change	Restructuring	Currency Translation	
Revenue	\$ 778,032	\$ (26,993)	\$ —	\$ 17,070	\$ 787,955
Cost of sales	472,503	(26,536)	1,622	11,740	485,677
Gross profit	305,529	(457)	(1,622)	5,330	302,278
Gross margin	39.3%				38.4%
Operating expenses					
Selling and marketing	126,333	(1,304)	267	2,458	124,912
General and administrative	79,240	(9,553)	317	937	87,539
Research and development	34,784	(988)	524	249	34,999
Total operating expenses	240,357	(11,845)	1,108	3,644	247,450
Income from operations	\$ 65,172	\$ 11,388	\$ (2,730)	\$ 1,686	\$ 54,828

See Note 12 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K for additional information on restructuring and related costs. In the fourth quarter of fiscal year 2016, we completed the acquisition of PCB Group, Inc. (PCB). As a result of the PCB acquisition, we incurred certain non-recurring costs during fiscal year 2017 including acquisition integration costs and a fair value adjustment on acquired PCB inventory (PCB acquisition inventory adjustment).

Revenue			Increased / (Decreased)	
	2018	2017	\$	%
Revenue	\$ 778,032	\$ 787,955	\$ (9,923)	(1.3)%

The decrease in revenue of 1.3% was primarily driven by lower Test revenue, partially offset by growth in our Sensors business and the favorable impact of currency translation. Test revenue decreased \$39,163 or 7.8% primarily driven by a decline in equipment volume resulting from weakness in the ground vehicles sector that continues to operate in a rapidly changing environment. Current year Test revenue was also impacted by custom project backlog which takes longer to convert to revenue and lower order volume in the first half of fiscal year 2018. This was partially offset by the favorable impact of currency translation, growth in Test service revenue and continued growth in the Test materials sector. Sensors revenue increased \$30,401 or 10.7% primarily driven by continued growth in the Sensors position sector and broad demand across the remaining Sensors sectors, along with continued momentum from new revenue opportunities in the Sensors test sector and the favorable impact of currency translation. Excluding the impact of currency translation, revenue decreased 3.4%.

Revenue by geography is as follows:

			Increased / (Decreased)	
			\$	%
	2018	2017		
Americas	\$ 275,422	\$ 278,776	\$ (3,354)	(1.2)%
Europe	223,236	192,491	30,745	16.0 %
Asia	279,374	316,688	(37,314)	(11.8)%
Total Revenue	\$ 778,032	\$ 787,955	\$ (9,923)	(1.3)%

Sales momentum in Europe was more than offset by decline in Asia primarily driven by weakness in the Test ground vehicles sector.

Gross Profit

			Increased / (Decreased)	
			\$	%
	2018	2017		
Gross profit	\$ 305,529	\$ 302,278	\$ 3,251	1.1%
Gross margin	39.3%	38.4%	0.9	ppts

Gross profit increased 1.1% primarily driven by increased Sensors revenue volume and the prior year PCB acquisition inventory adjustment of \$7,975, as well as the favorable impact of currency translation, partially offset by reduced Test revenue volume. Gross margin rate increased 0.9 percentage points primarily due to the prior year PCB acquisition inventory adjustment and leverage on increased Sensors revenue volume, partially offset by the lower contribution from product mix and unfavorable leverage on lower Test revenue volume. Excluding the impact of currency translation, the prior year PCB acquisition inventory adjustment, prior year PCB acquisition integration expenses and restructuring costs incurred in both fiscal years, gross profit declined 3.8% and the gross margin rate was flat.

Selling and Marketing Expense

			Increased / (Decreased)	
			\$	%
	2018	2017		
Selling and marketing	\$ 126,333	\$ 124,912	\$ 1,421	1.1%
% of Revenue	16.2%	15.9%		

Selling and marketing expenses increased 1.1% primarily driven by the unfavorable impact of currency translation and increased compensation and commission expense in Sensors, partially offset by lower commission expense and cost containment measures in Test. Excluding the impact of currency translation, prior year PCB acquisition integration expenses, prior year China investigation expenses, and restructuring costs incurred in both fiscal years, selling and marketing expense was flat.

General and Administrative Expense

			Increased / (Decreased)	
			\$	%
	2018	2017		
General and administrative	\$ 79,240	\$ 87,539	\$ (8,299)	(9.5)%
% of Revenue	10.2%	11.1%		

General and administrative expense decreased 9.5% primarily due to prior year China investigation expenses of \$8,451, prior year PCB acquisition integration expenses of \$3,039 and decreased compensation expense in Sensors, partially offset by an increase in professional fees and the unfavorable impact of currency translation. Excluding the impact of currency translation, prior year PCB acquisition integration expenses, prior year China investigation expenses and restructuring costs incurred in both fiscal years, general and administrative expense increased 3.4%.

Research and Development Expense

			Increased / (Decreased)	
			\$	%
	2018	2017		
Research and development	\$ 34,784	\$ 34,999	\$ (215)	(0.6)%
% of Revenue	4.5%	4.4%		

Research and development (R&D) expense decreased 0.6% primarily due to lower compensation expense in Test and prior year focused R&D spending to meet certain Test market needs, partially offset by continued investment in product development in Sensors. Excluding the impact of currency translation, prior year China investigation expenses and current year restructuring costs, R&D expense decreased 2.2%.

			Increased / (Decreased)	
	2018	2017	\$	%
Income from Operations				
Income from operations	\$ 65,172	\$ 54,828	\$ 10,344	18.9%
% of Revenue	8.4%	7.0%		

Income from operations increased 18.9% primarily driven by leverage on volume growth in Sensors, prior year China investigation expenses of \$9,209, the prior year PCB acquisition inventory adjustment of \$7,975 and prior year non-recurring PCB acquisition integration expenses of \$3,577. The increase was partially offset by the lower gross margin contribution from unfavorable leverage on lower Test revenue volume and overall product mix. Excluding the impact of currency translation, the prior year PCB acquisition inventory adjustment, prior year non-recurring PCB acquisition integration expenses, prior year China investigation expenses and restructuring costs incurred in both fiscal years, income from operations decreased 16.9%.

			Increased / (Decreased)	
	2018	2017	\$	%
Interest Expense, Net				
Interest expense, net	\$ 25,882	\$ 30,821	\$ (4,939)	(16.0)%

Interest expense decreased primarily due to reduced interest rates on the tranche B term loan facility as a result of the debt repricing completed in the fourth quarter of fiscal year 2017, lower current year average debt outstanding and current year gains on interest rate swaps.

			Increased / (Decreased)	
	2018	2017	\$	%
Other Income (Expense), Net				
Other income (expense), net	\$ 4,933	\$ (996)	\$ 5,929	595.3%

The increase in other income (expense), net was primarily driven by the gain on the sale of one of our China manufacturing facilities and a relative decrease in losses on foreign currency transactions.

			Increased / (Decreased)	
	2018	2017	\$	%
Income Tax Provision (Benefit)				
Income tax provision (benefit)	\$ (17,105)	\$ (2,073)	\$ (15,032)	(725.1)%
Effective rate	(38.7)%	(9.0)%	(29.7) ppts	

The effective tax rate decreased primarily due to certain discrete benefits of \$25,008 from the estimated impact of the Tax Act, including \$31,647 of estimated benefit from the remeasurement of our estimated net deferred tax liabilities, partially offset by \$6,639 of estimated expense associated with the mandatory deemed repatriation tax. Fiscal year 2017 included certain discrete benefits of \$2,801 which consisted of additional U.S. tax benefits for prior fiscal years associated with domestic manufacturing, deductible PCB acquisition-related expenses and U.S. R&D tax credit. Excluding the impact of these discrete benefits, the effective tax rate for fiscal years 2018 and 2017 would have been 17.9% and 3.2%, respectively. The increase in the effective tax rate was primarily due to higher earnings before taxes, partially offset by the lower U.S. corporate tax rate under the Tax Act.

			Increased / (Decreased)	
	2018	2017	\$	%
Net Income				
Net income	\$ 61,328	\$ 25,084	\$ 36,244	144.5%
Diluted earnings per share	\$ 3.18	\$ 1.31	\$ 1.87	142.7%

Net income increased due to a reduction in the effective tax rate driven by discrete benefits stemming from the Tax Act, as well as lower operating expenses and increased gross profit.

Backlog

Backlog of undelivered orders as of September 29, 2018 was \$415,155, an increase of \$55,139 or 15.3%, compared to backlog of \$360,016 as of September 30, 2017. Based on anticipated manufacturing schedules, we expect approximately 87% of the backlog as of September 29, 2018 will be converted into revenue during fiscal year 2019. The expected conversion rate is relatively flat compared to the prior year rate of 85%.

We believe backlog is not an absolute indicator of future revenue because a portion of the orders in backlog could be canceled at the customer's discretion. While certain contracts within backlog are subject to order cancellation, we have not historically

experienced a significant number of order cancellations. During fiscal year 2018, order cancellations did not have a material effect on backlog.

Test Segment

Results of Operations

The following table compares results of operations in fiscal years 2018 and 2017 for Test, separately identifying the estimated impact of currency translation and restructuring expenses incurred in fiscal year 2018. See Note 11 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K for additional information on our operating segments.

	2018	Estimated			2017
		Business Change	Restructuring	Currency Translation	
Revenue	\$ 464,924	\$ (48,566)	\$ —	\$ 9,403	\$ 504,087
Cost of sales	314,735	(29,239)	1,622	7,497	334,855
Gross profit	150,189	(19,327)	(1,622)	1,906	169,232
Gross margin	32.3%				33.6%
Operating expenses					
Selling and marketing	68,899	(2,379)	236	1,259	69,783
General and administrative	44,659	(7,623)	317	600	51,365
Research and development	17,406	(2,594)	524	14	19,462
Total operating expenses	130,964	(12,596)	1,077	1,873	140,610
Income from operations	\$ 19,225	\$ (6,731)	\$ (2,699)	\$ 33	\$ 28,622

Revenue	2018	2017	Increased / (Decreased)	
			\$	%
Revenue	\$ 464,924	\$ 504,087	\$ (39,163)	(7.8)%

Revenue decreased 7.8% primarily driven by a decline in equipment volume resulting from weakness in the ground vehicles sector that continues to operate in a rapidly changing environment. Current year Test revenue was also impacted by custom project backlog which takes longer to convert to revenue and lower order volume in the first half of fiscal year 2018. This was partially offset by the favorable impact of currency translation, growth in service revenue and continued growth in the materials sector. Excluding the impact of currency translation, revenue decreased 9.6%.

Revenue by geography is as follows:

	2018	2017	Increased / (Decreased)	
			\$	%
Americas	\$ 132,201	\$ 146,338	\$ (14,137)	(9.7)%
Europe	112,092	93,296	18,796	20.1 %
Asia	220,631	264,453	(43,822)	(16.6)%
Total Revenue	\$ 464,924	\$ 504,087	\$ (39,163)	(7.8)%

Sales momentum in Europe was more than offset by declines in Asia and the Americas primarily driven by weakness in the ground vehicles sector.

Gross Profit			Increased / (Decreased)	
	2018	2017	\$	%
Gross profit	\$ 150,189	\$ 169,232	\$ (19,043)	(11.3)%
Gross margin	32.3%	33.6%	(1.3) ppts	

Gross profit decreased 11.3% primarily due to lower equipment volume. The gross margin rate decreased by 1.3 percentage points primarily driven by unfavorable leverage on lower revenue volume and the lower contribution from product mix, partially offset by the impact of lower compensation expense and restructuring costs. Excluding the impact of currency translation and restructuring costs incurred in both fiscal years, gross profit declined 12.7% and gross margin rate declined 1.2 percentage points.

Selling and Marketing Expense			Increased / (Decreased)	
	2018	2017	\$	%
Selling and marketing	\$ 68,899	\$ 69,783	\$ (884)	(1.3)%
% of Revenue	14.8%	13.8%		

Selling and marketing expense decreased 1.3% primarily due to a decrease in commission expense and cost containment measures, partially offset by the unfavorable impact of currency translation. Excluding the impact of currency translation, prior year China investigation expenses and restructuring costs incurred in both fiscal years, selling and marketing expense decreased 2.5%.

General and Administrative Expense			Increased / (Decreased)	
	2018	2017	\$	%
General and administrative	\$ 44,659	\$ 51,365	\$ (6,706)	(13.1)%
% of Revenue	9.6%	10.2%		

General and administrative expense decreased 13.1% primarily due to prior year China investigation expenses of \$8,451, partially offset by the unfavorable impact of currency translation. Excluding the impact of currency translation, prior year China investigation expenses and restructuring costs incurred in both fiscal years, general and administrative expense increased 2.8%.

Research and Development Expense			Increased / (Decreased)	
	2018	2017	\$	%
Research and development	\$ 17,406	\$ 19,462	\$ (2,056)	(10.6)%
% of Revenue	3.7%	3.9%		

R&D expense decreased 10.6% primarily due to prior year focused R&D spending to meet certain Test market needs and lower compensation expense. Excluding the impact of currency translation, prior year China investigation expenses and current year restructuring costs, R&D expense decreased 12.4%.

Income from Operations			Increased / (Decreased)	
	2018	2017	\$	%
Income from operations	\$ 19,225	\$ 28,622	\$ (9,397)	(32.8)%
% of Revenue	4.1%	5.7%		

Income from operations decreased 32.8% primarily due to the decrease in gross profit driven by the decline in equipment volume resulting from weakness in the ground vehicles sector and the lower contribution from product mix. The decrease was partially offset by prior year China investigation expenses of \$9,209, lower compensation expense and prior year focused R&D spending to meet certain Test market needs. Excluding the impact of currency translation, prior year China investigation expenses and restructuring costs incurred in both fiscal years, income from operations decreased 46.3%.

Backlog

Backlog of undelivered orders at September 29, 2018 was \$346,006, an increase of 11.1% from backlog of \$311,551 at September 30, 2017. Based on anticipated manufacturing schedules, we expect approximately 85% of the backlog as of September 29, 2018 will be converted into revenue during fiscal year 2019. The expected conversion rate is relatively flat compared to the prior year rate of 83%. Order cancellations in fiscal year 2018 did not have a material effect on backlog.

Sensors Segment

Results of Operations

The following table compares results of operations in fiscal years 2018 and 2017 for Sensors, separately identifying the estimated impact of currency translation and restructuring expenses incurred in fiscal year 2018. See Note 11 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K for additional information on our operating segments.

	2018	Estimated			2017
		Business Change	Restructuring	Currency Translation	
Revenue	\$ 314,269	\$ 22,734	\$ —	\$ 7,667	\$ 283,868
Cost of sales	158,896	3,831	—	4,243	150,822
Gross profit	155,373	18,903	—	3,424	133,046
Gross margin	49.4%				46.9%
Operating expenses					
Selling and marketing	57,434	1,075	31	1,199	55,129
General and administrative	34,581	(1,930)	—	337	36,174
Research and development	17,378	1,606	—	235	15,537
Total operating expenses	109,393	751	31	1,771	106,840
Income from operations	\$ 45,980	\$ 18,152	\$ (31)	\$ 1,653	\$ 26,206

Revenue	2018	2017	Increased / (Decreased)	
			\$	%
Revenue	\$ 314,269	\$ 283,868	\$ 30,401	10.7%

Revenue increased 10.7% primarily driven by continued growth in the Sensors position sector and broad demand across the remaining Sensors sectors, along with continued momentum from new revenue opportunities in the Sensors test sector and the favorable impact of currency translation. Strong demand in the Sensors position sector, particularly in the heavy industrial markets, and new revenue opportunities in the Sensors test sector from advanced technology sensors to be used in systems for the U.S. Department of Defense drove revenue growth. Excluding the impact of currency translation, revenue growth was 8.0%.

Revenue by geography is as follows:

	2018	2017	Increased / (Decreased)	
			\$	%
Americas	\$ 144,382	\$ 132,438	\$ 11,944	9.0%
Europe	111,144	99,195	11,949	12.0%
Asia	58,743	52,235	6,508	12.5%
Total Revenue	\$ 314,269	\$ 283,868	\$ 30,401	10.7%

Gross Profit	2018	2017	Increased / (Decreased)	
			\$	%
Gross profit	\$ 155,373	\$ 133,046	\$ 22,327	16.8%
Gross margin	49.4%	46.9%	2.5	ppts

Gross profit increased 16.8% primarily due to increased revenue volume, the prior year PCB acquisition inventory adjustment of \$7,975 and the favorable impact of currency translation, partially offset by an increase in compensation expense. The gross margin rate increased 2.5 percentage points primarily driven by the prior year PCB acquisition inventory adjustment and favorable leverage on increased revenue volume, partially offset by the lower gross margin contribution from product mix. Excluding the impact of currency translation, the prior year PCB acquisition inventory adjustment, prior year non-recurring PCB acquisition integration expenses and prior year restructuring costs, gross profit increased 7.0% and the gross margin rate declined 0.4 percentage points.

Selling and Marketing Expense

			Increased / (Decreased)	
	2018	2017	\$	%
Selling and marketing	\$ 57,434	\$ 55,129	\$ 2,305	4.2%
% of Revenue	18.3%	19.4%		

Selling and marketing expense increased 4.2% primarily driven by the unfavorable impact of currency translation, increased compensation expense and increased commission expense on higher revenue volume. Excluding the impact of currency translation, prior year PCB acquisition integration expenses and restructuring costs incurred in both fiscal years, selling and marketing expense increased 2.8%.

General and Administrative Expense

			Increased / (Decreased)	
	2018	2017	\$	%
General and administrative	\$ 34,581	\$ 36,174	\$ (1,593)	(4.4)%
% of Revenue	11.0%	12.7%		

General and administrative expense declined 4.4% primarily driven by prior year PCB acquisition integration expenses of \$3,039 and decreased compensation expense, partially offset by an increase in professional fees. Excluding the impact of currency translation, prior year PCB acquisition integration expenses and prior year restructuring costs, general and administrative expense increased 4.1%.

Research and Development Expense

			Increased / (Decreased)	
	2018	2017	\$	%
Research and development	\$ 17,378	\$ 15,537	\$ 1,841	11.8%
% of Revenue	5.5%	5.5%		

R&D expense increased 11.8% primarily driven by continued investment in product development. Excluding the impact of currency translation, R&D expense increased 10.3%.

Income from Operations

			Increased / (Decreased)	
	2018	2017	\$	%
Income from operations	\$ 45,980	\$ 26,206	\$ 19,774	75.5%
% of Revenue	14.6%	9.2%		

Income from operations increased 75.5% primarily driven by leverage on increased revenue volume, the prior year PCB acquisition inventory adjustment of \$7,975, prior year PCB acquisition integration expenses of \$3,577 and the favorable impact of currency translation. The increase was partially offset by an increase in professional fees, higher compensation and commission expense and investments in product development. Excluding the impact of currency translation, the prior year PCB acquisition inventory adjustment, prior year PCB acquisition integration expenses and restructuring costs incurred in both fiscal years, income from operations increased 14.0%.

Backlog

Backlog of undelivered orders at September 29, 2018 was \$69,149, an increase of 42.7% compared to backlog of \$48,465 at September 30, 2017. We generally expect Sensors backlog to convert to revenue in less than one year.

Fiscal Year 2017 Compared to Fiscal Year 2016
Total Company
Results of Operations

The following table compares results of operations in fiscal years 2017 and 2016, separately identifying the estimated impact of currency translation, the acquisition of PCB for the first three quarters of fiscal year 2017 for comparability, and restructuring expenses incurred in fiscal year 2017.

	2017	Estimated			2016
		Business Change	Acquisition / Restructuring ¹	Currency Translation	
Revenue	\$ 787,955	\$ 11,926	\$ 129,197	\$ (3,315)	\$ 650,147
Cost of sales	485,677	(6,722)	76,786	(3,130)	418,743
Gross profit	302,278	18,648	52,411	(185)	231,404
Gross margin	38.4%				35.6%
Operating expenses					
Selling and marketing	124,912	926	29,133	(139)	94,992
General and administrative	87,539	(2,356)	20,969	(387)	69,313
Research and development	34,999	2,482	7,192	(11)	25,336
Total operating expenses	247,450	1,052	57,294	(537)	189,641
Income from operations	\$ 54,828	\$ 17,596	\$ (4,883)	\$ 352	\$ 41,763

¹ The Acquisition / Restructuring column includes revenues and costs from the acquisition of PCB for the first three quarters of fiscal year 2017, including the PCB acquisition inventory adjustment, costs incurred as part of the acquisition of PCB, and restructuring expenses incurred in fiscal year 2017. The first three quarters of fiscal year 2016 did not include PCB results since the acquisition closed in the fourth quarter of fiscal year 2016; therefore, the estimated impact of PCB for the first three quarters of fiscal year 2017 is separately identified herein for comparability.

Revenue			Increased / (Decreased)	
	2017	2016	\$	%
Revenue	\$ 787,955	\$ 650,147	\$ 137,808	21.2%

The increase in revenue of 21.2% was driven by the PCB acquisition and overall growth in our Sensors business, partially offset by a decrease in Test primarily due to the unfavorable impact of currency translation. Test revenue decreased \$8,178 or 1.6% primarily driven by lower orders in the last half of fiscal year 2016 and the first half of fiscal year 2017. Sensors revenue increased \$145,986 or 105.9% primarily driven by the PCB acquisition and overall growth in our Sensors business. Excluding the impact of currency translation and the contribution of PCB for the first three quarters of fiscal year 2017, revenue increased 1.8%.

Revenue by geography was as follows:

			Increased / (Decreased)	
	2017	2016	\$	%
Americas	\$ 278,776	\$ 185,883	\$ 92,893	50.0%
Europe	192,491	163,944	28,547	17.4%
Asia	316,688	300,320	16,368	5.5%
Total Revenue	\$ 787,955	\$ 650,147	\$ 137,808	21.2%

Although selective product price changes were implemented during each of these fiscal years, the overall impact of pricing changes did not have a material effect on revenue.

Gross Profit			Increased / (Decreased)	
	2017	2016	\$	%
Gross profit	\$ 302,278	\$ 231,404	\$ 70,874	30.6%
Gross margin	38.4%	35.6%	2.8	ppts

Gross profit increased 30.6% primarily due to the gross profit contribution from the PCB acquisition, higher revenue volume in Sensors, and a continued focus on Test project execution, partially offset by reduced Test revenue volume. Gross margin rate increased 2.8 percentage points primarily due to the gross profit contribution from the PCB acquisition, the PCB acquisition inventory adjustment in the fourth quarter of fiscal year 2016 of \$7,916, and a continued focus on Test project execution, partially offset by the PCB acquisition inventory adjustment in the first quarter of fiscal year 2017 of \$7,975, nonrecurring restructuring costs incurred in the current year of \$3,140, and higher compensation expenses. Excluding the impact of currency translation, the contribution of PCB for the first three quarters of fiscal year 2017, nonrecurring restructuring costs incurred in both fiscal years, and the PCB acquisition inventory adjustment recorded in both fiscal years, gross profit increased 3.9% and the gross margin rate increased 0.8 percentage points.

Selling and Marketing Expense			Increased / (Decreased)	
	2017	2016	\$	%
Selling and marketing	\$ 124,912	\$ 94,992	\$ 29,920	31.5%
% of Revenue	15.9%	14.6%		

Selling and marketing expenses increased 31.5% primarily due to the addition of PCB expenses, higher commission and compensation expenses, and China investigation expenses. Excluding the impact of currency translation, the contribution of PCB for the first three quarters of fiscal year 2017, nonrecurring restructuring costs incurred in both fiscal years, and China investigation expenses, selling and marketing expense increased 1.0%.

General and Administrative Expense			Increased / (Decreased)	
	2017	2016	\$	%
General and administrative	\$ 87,539	\$ 69,313	\$ 18,226	26.3%
% of Revenue	11.1%	10.7%		

General and administrative expense increased 26.3% primarily due to the addition of PCB expenses, China investigation expenses of \$8,451, higher professional and legal fees, and increased compensation expenses, partially offset by nonrecurring PCB acquisition-related expenses of \$11,867 incurred in fiscal year 2016. Excluding the impact of currency translation, the contribution of PCB for the first three quarters of fiscal year 2017, nonrecurring restructuring costs incurred in both years, and China investigation expenses, general and administrative expense increased 3.3%.

Research and Development Expense			Increased / (Decreased)	
	2017	2016	\$	%
Research and development	\$ 34,999	\$ 25,336	\$ 9,663	38.1%
% of Revenue	4.4%	3.9%		

R&D expense increased 38.1% primarily due to the addition of PCB expenses, focused R&D spending to meet certain Test market needs, and continued investments in Sensors product development. Excluding the impact of currency translation, the contribution of PCB for the first three quarters of fiscal year 2017, and China investigation expenses, R&D expenses increased 9.1%.

Income from Operations

			Increased / (Decreased)	
			\$	%
	2017	2016		
Income from operations	\$ 54,828	\$ 41,763	\$ 13,065	31.3%
% of Revenue	7.0%	6.4%		

Income from operations increased 31.3% primarily due to the contribution of PCB to income from operations, nonrecurring PCB acquisition-related expenses of \$12,514 incurred in fiscal year 2016, leverage on higher revenue volume in our Sensors business, improved Test gross margin driven by a continued focus on project execution, and nonrecurring restructuring costs of \$2,165 incurred in fiscal year 2016, partially offset by China investigation expenses of \$9,209 and nonrecurring restructuring costs of \$4,079 incurred in fiscal year 2017. Excluding the impact of currency translation, the contribution of PCB for the first three quarters of fiscal year 2017, nonrecurring restructuring costs and acquisition-related expenses incurred in both years, the PCB acquisition inventory adjustment recorded in both fiscal years, and China investigation expenses, income from operations increased 6.5%.

Interest Expense, Net

			Increased / (Decreased)	
			\$	%
	2017	2016		
Interest expense, net	\$ 30,821	\$ 8,489	\$ 22,332	263.1%

The increase in interest expense is due to a full year of interest expense recognized in fiscal year 2017 on the debt incurred to finance the acquisition of PCB. Fiscal year 2017 interest expense, net included \$23,643 interest expense for the tranche B term loan facility, \$3,863 amortization of capitalized debt issuance costs, and \$1,521 interest expense for TEU debt. As a result of the repricing of the tranche B term loan facility in the fourth quarter of fiscal year 2017, fiscal year 2017 interest expense, net also included \$1,147 repricing costs and \$503 in non-cash charges for the loss on debt extinguishment resulting from the write-off of existing unamortized debt financing costs.

Fiscal year 2016 interest expense, net included \$5,750 interest expense for the tranche B term loan facility, \$1,389 amortization of capitalized debt issuance costs, \$562 interest expense for TEU debt, \$502 in non-cash charges for the loss on debt extinguishment from the write-off of existing capitalized debt issuance costs related to the revolving credit facility, and \$323 of interest expense on the revolving credit facility.

Other Income (Expense), Net

			Increased / (Decreased)	
			\$	%
	2017	2016		
Other income (expense), net	\$ (996)	\$ 238	\$ (1,234)	(518.5)%

The decrease in other income (expense), net was primarily driven by fiscal year 2017 losses on foreign currency transactions.

Income Tax Provision (Benefit)

			Increased / (Decreased)	
			\$	%
	2017	2016		
Income tax provision (benefit)	\$ (2,073)	\$ 6,018	\$ (8,091)	(134.4)%
Effective rate	(9.0)%	18.0%	(27.0)	ppts

The provision for income taxes declined during fiscal year 2017 primarily due to a decrease in income before taxes.

The effective tax rate was lower during fiscal year 2017 primarily due to certain discrete benefits of \$2,801 recognized during the third quarter of fiscal year 2017, which consisted of additional U.S. tax benefits for prior fiscal years associated with domestic manufacturing, deductible PCB acquisition-related expenses, and the U.S. R&D tax credit. Excluding the impact of these discrete benefits, the effective tax rate for fiscal year 2017 was 3.2%, and declined compared to fiscal year 2016 due to lower income before taxes and a more favorable geographic mix of earnings.

The effective tax rate of 18.0% during fiscal year 2016 included a \$2,283 discrete tax benefit for retroactive reinstatement of the U.S. R&D tax credit, which was partially offset by a one-time tax cost of \$1,834 associated with nondeductible PCB acquisition-related expenses. Excluding the impact of these items, the effective tax rate for fiscal year 2016 was 19.3%.

Net Income			Increased / (Decreased)	
	2017	2016	\$	%
Net income	\$ 25,084	\$ 27,494	\$ (2,410)	(8.8)%
Diluted earnings per share	\$ 1.31	\$ 1.70	\$ (0.39)	(22.9)%

Net income declined due to higher operating expenses and increased interest expense, partially offset by higher gross profit and the fiscal year 2017 tax benefit resulting primarily from nonrecurring discrete items. Diluted earnings per share was negatively impacted by increased interest expense, higher amortization expense related to the PCB acquisition, and the issuance of common stock and TEUs in fiscal year 2016, partially offset by increased income from operations and the fiscal year 2017 tax benefit.

Backlog

Backlog of undelivered orders at September 30, 2017 was \$360,016, a decrease of \$10,507 or 2.8%, compared to backlog of \$370,523 at October 1, 2016. Based on anticipated manufacturing schedules as of September 30, 2017, we estimated approximately 85% of the backlog as of September 30, 2017 would be converted into revenue during fiscal year 2018. The estimated conversion rate was up from the prior year rate of 80% due to a shift in Test backlog composition from larger custom orders to shorter cycle, more rapidly turning orders and the completion of certain custom orders.

We believe backlog is not an absolute indicator of future revenue because a portion of the orders in backlog could be canceled at the customer's discretion. While certain contracts within backlog are subject to order cancellation, we have not historically experienced a significant number of order cancellations. During fiscal year 2017, order cancellations did not have a material effect on backlog. During fiscal year 2016, one custom order in Test totaling \$8,567 was canceled. This canceled order was booked in a fiscal year prior to the year in which it was canceled.

Test Segment

Results of Operations

The following table compares results of operations in fiscal years 2017 and 2016 for Test, separately identifying the estimated impact of currency translation and restructuring expenses incurred in fiscal year 2017.

	2017	Estimated			2016
		Business Change	Acquisition / Restructuring ¹	Currency Translation	
Revenue	\$ 504,087	\$ (4,151)	\$ —	\$ (4,027)	\$ 512,265
Cost of sales	334,855	(6,304)	2,439	(3,520)	342,240
Gross profit	169,232	2,153	(2,439)	(507)	170,025
Gross margin	33.6%				33.2%
Operating expenses					
Selling and marketing	69,783	377	112	(356)	69,650
General and administrative	51,365	9,190	371	(406)	42,210
Research and development	19,462	1,962	—	(5)	17,505
Total operating expenses	140,610	11,529	483	(767)	129,365
Income from operations	\$ 28,622	\$ (9,376)	\$ (2,922)	\$ 260	\$ 40,660

¹ The Acquisition / Restructuring column includes restructuring expenses incurred in fiscal year 2017. The acquisition of PCB did not have an impact on Test results of operations during fiscal year 2017.

Revenue			Increased / (Decreased)	
	2017	2016	\$	%
Revenue	\$ 504,087	\$ 512,265	\$ (8,178)	(1.6)%

Revenue decreased 1.6% primarily due to lower orders in the last half of fiscal year 2016 and the first half of fiscal year 2017 and the unfavorable impact of currency translation, partially offset by a continued focus on project execution and growth in service revenue. Excluding the impact of currency translation, revenue decreased 0.8%. Sales momentum in the Americas was offset by declines in Europe and Asia primarily driven by automotive manufacturers.

Revenue by geography was as follows:

			Increased / (Decreased)	
			\$	%
	2017	2016		
Americas	\$ 146,338	\$ 131,273	\$ 15,065	11.5 %
Europe	93,296	106,941	(13,645)	(12.8)%
Asia	264,453	274,051	(9,598)	(3.5)%
Total Revenue	\$ 504,087	\$ 512,265	\$ (8,178)	(1.6)%

Gross Profit

			Increased / (Decreased)	
			\$	%
	2017	2016		
Gross profit	\$ 169,232	\$ 170,025	\$ (793)	(0.5)%
Gross margin	33.6%	33.2%	0.4	ppts

Gross profit decreased 0.5%. The gross margin rate increased by 0.4 percentage points primarily due a continued focus on project execution and effective cost containment, partially offset by higher compensation expenses, nonrecurring restructuring costs incurred in fiscal year 2017, and investment in product performance. Excluding the impact of currency translation and nonrecurring restructuring costs incurred in both years, gross profit increased 1.1% and gross margin rate increased 0.7 percentage points.

Selling and Marketing Expense

			Increased / (Decreased)	
			\$	%
	2017	2016		
Selling and marketing	\$ 69,783	\$ 69,650	\$ 133	0.2%
% of Revenue	13.8%	13.6%		

Selling and marketing expense increased 0.2% primarily due to increased compensation expenses and China investigation expenses, partially offset by lower commission expense commensurate with lower revenue, cost containment measures, and the favorable impact of currency translation. Excluding the impact of currency translation, nonrecurring restructuring costs incurred in both fiscal years, and China investigation expenses, selling and marketing expense decreased 0.1%.

General and Administrative Expense

			Increased / (Decreased)	
			\$	%
	2017	2016		
General and administrative	\$ 51,365	\$ 42,210	\$ 9,155	21.7%
% of Revenue	10.2%	8.2%		

General and administrative expense increased 21.7% primarily due to China investigation expenses of \$8,451 and increased professional and legal fees, partially offset by the favorable impact of currency translation. Excluding the impact of currency translation, nonrecurring restructuring costs incurred in both years, and China investigation expenses, general and administrative expense increased 2.8%.

Research and Development Expense

			Increased / (Decreased)	
			\$	%
	2017	2016		
Research and development	\$ 19,462	\$ 17,505	\$ 1,957	11.2%
% of Revenue	3.9%	3.4%		

R&D expense increased 11.2% primarily due to additional focused R&D spending to meet certain market needs, higher compensation expenses and China investigation expenses. Excluding the impact of currency translation and China investigation expenses, R&D expense increased 10.0%.

Income from Operations

	2017		2016		Increased / (Decreased)		
					\$	%	
Income from operations	\$	28,622	\$	40,660	\$	(12,038)	(29.6)%
% of Revenue		5.7%		7.9%			

Income from operations decreased 29.6% primarily due to higher operating expenses which included \$9,209 of China investigation expenses and \$2,922 of nonrecurring restructuring costs incurred in fiscal year 2017, partially offset by \$847 of nonrecurring restructuring costs incurred in fiscal year 2016. Excluding the impact of currency translation, nonrecurring restructuring costs incurred in both fiscal years, and China investigation expenses, income from operations decreased 2.4%.

Backlog

Backlog of undelivered orders at September 30, 2017 was \$311,551, a decrease of 5.9% from backlog of \$331,044 at October 1, 2016. Based on anticipated manufacturing schedules as of September 30, 2017, we estimated approximately 83% of the backlog as of September 30, 2017 would be converted into revenue during fiscal year 2018. The estimated conversion rate was up from the prior year rate of 78% due to a shift from larger custom orders to shorter cycle, more rapidly turning orders and a push to complete custom orders. Order cancellations in fiscal year 2017 did not have a material effect on backlog. At the end of fiscal year 2016, backlog was negatively impacted by cancellations of custom orders in Test totaling \$8,567.

Sensors Segment
Results of Operations

The following table compares results of operations in fiscal years 2017 and 2016 for Sensors, separately identifying the estimated impact of currency translation, the acquisition of PCB for the first three quarters of fiscal year 2017 for comparability, and restructuring expense incurred in fiscal year 2017.

	2017	Estimated			2016
		Business Change	Acquisition / Restructuring ¹	Currency Translation	
Revenue	\$ 283,868	\$ 16,077	\$ 129,197	\$ 712	\$ 137,882
Cost of sales	150,822	(418)	74,347	390	76,503
Gross profit	133,046	16,495	54,850	322	61,379
Gross margin	46.9%				44.5%
Operating expenses					
Selling and marketing	55,129	549	29,021	217	25,342
General and administrative	36,174	(11,546)	20,598	19	27,103
Research and development	15,537	520	7,192	(6)	7,831
Total operating expenses	106,840	(10,477)	56,811	230	60,276
Income from operations	\$ 26,206	\$ 26,972	\$ (1,961)	\$ 92	\$ 1,103

¹ The Acquisition / Restructuring column includes revenues and costs from the acquisition of PCB for the first three quarters of fiscal year 2017, including the PCB acquisition inventory adjustment, costs incurred as part of the acquisition of PCB, and restructuring expenses incurred in fiscal year 2017. The first three quarters of fiscal year 2016 did not include PCB results since the acquisition closed in the fourth quarter of fiscal year 2016; therefore, the estimated impact of PCB for the first three quarters of fiscal year 2017 is separately identified herein for comparability.

Revenue

	2017		2016		Increased / (Decreased)		
					\$	%	
Revenue	\$	283,868	\$	137,882	\$	145,986	105.9%

Revenue increased 105.9% primarily due to increased volume as a result of the PCB acquisition. Excluding the impact of currency translation and PCB revenue for the first three quarters of fiscal year 2017, revenue growth was 11.7%. Strong demand in the Sensors position sector, particularly in the heavy industrial markets, and new revenue opportunities in the Sensors test sector drove revenue growth.

Revenue by geography was as follows:

			Increased / (Decreased)	
			\$	%
	2017	2016		
Americas	\$ 132,438	\$ 54,610	\$ 77,828	142.5%
Europe	99,195	57,003	42,192	74.0%
Asia	52,235	26,269	25,966	98.8%
Total Revenue	\$ 283,868	\$ 137,882	\$ 145,986	105.9%

Gross Profit

			Increased / (Decreased)	
			\$	%
	2017	2016		
Gross profit	\$ 133,046	\$ 61,379	\$ 71,667	116.8%
Gross margin	46.9%	44.5%	2.4	ppts

Gross profit increased 116.8% primarily due to gross profit contribution from the PCB acquisition and growth in our position and test Sensors sectors. The gross margin rate increased 2.4 percentage points primarily due to the \$7,916 PCB acquisition inventory adjustment in the fourth quarter of fiscal year 2016 and leverage on increased revenue volume. The increase was partially offset by the gross margin contribution from the PCB acquisition in the first three quarters of fiscal year 2017, which included the \$7,975 PCB acquisition inventory adjustment recognized in the first quarter of fiscal year 2017, and additional labor costs from the movement of production in Machida, Japan to the U.S. due to the closure of the Machida manufacturing facility. Excluding the impact of currency translation, the contribution of PCB for the first three quarters of fiscal year 2017, nonrecurring restructuring costs incurred in both fiscal years, and the PCB acquisition inventory adjustment recorded in both fiscal years, gross profit increased 10.7% and the gross margin rate declined 0.4 percentage points.

Selling and Marketing Expense

			Increased / (Decreased)	
			\$	%
	2017	2016		
Selling and marketing	\$ 55,129	\$ 25,342	\$ 29,787	117.5%
% of Revenue	19.4%	18.4%		

Selling and marketing expense increased 117.5% primarily driven by the addition of PCB expenses and higher commission and compensation expenses. Excluding the impact of currency translation, PCB expenses for the first three quarters of fiscal year 2017, and nonrecurring restructuring costs incurred in both fiscal years, selling and marketing expense increased 4.1%.

General and Administrative Expense

			Increased / (Decreased)	
			\$	%
	2017	2016		
General and administrative	\$ 36,174	\$ 27,103	\$ 9,071	33.5%
% of Revenue	12.7%	19.7%		

General and administrative expense increased 33.5% primarily driven by the addition of PCB expenses and investments in infrastructure, partially offset by nonrecurring PCB acquisition-related expenses of \$11,867 incurred in fiscal year 2016. Excluding the impact of currency translation, PCB expenses for the first three quarters of fiscal year 2017, nonrecurring restructuring costs incurred in both fiscal years, and prior year nonrecurring PCB acquisition-related expenses, general and administrative expense increased 4.9%.

Research and Development Expense

			Increased / (Decreased)	
			\$	%
	2017	2016		
Research and development	\$ 15,537	\$ 7,831	\$ 7,706	98.4%
% of Revenue	5.5%	5.7%		

R&D expense increased 98.4% primarily driven by the addition of PCB expenses and continued investments in product development. Excluding the impact of currency translation and PCB expenses for the first three quarters of fiscal year 2017, R&D expense increased 7.0%.

<i>Income from Operations</i>			Increased / (Decreased)	
	2017	2016	\$	%
Income from operations	\$ 26,206	\$ 1,103	\$ 25,103	2,275.9%
% of Revenue	9.2%	0.8%		

Income from operations increased \$25,103 primarily due to PCB acquisition-related expenses of \$12,514 incurred in the prior year, the contribution of PCB to income from operations, and leverage on increased revenue volume. Excluding the impact of currency translation, PCB expenses for the first three quarters of fiscal year 2017, nonrecurring restructuring costs and acquisition-related expenses incurred in both years, and the PCB acquisition inventory adjustment recorded in both fiscal years, income from operations increased \$5,224.

Backlog

Backlog of undelivered orders at September 30, 2017 was \$48,465, an increase of 22.8% compared to backlog of \$39,479 at October 1, 2016.

Cash Flow Comparison

The following table summarizes our cash flows from total operations:

	Fiscal Year		
	2018	2017	2016
Total cash provided by (used in):			
Operating activities	\$ 63,247	\$ 71,860	68,068
Investing activities	(4,705)	(18,606)	(600,212)
Financing activities	(94,566)	(30,689)	564,292
Effect of exchange rate changes on cash	(905)	1,388	864
Increase (decrease) during the period	(36,929)	23,953	33,012
Cash and cash equivalents balance, beginning of period	108,733	84,780	51,768
Cash and cash equivalents balance, end of period	\$ 71,804	\$ 108,733	84,780

Fiscal Year 2018 Compared to Fiscal Year 2017

Operating Activities

The decrease in cash provided by operating activities was primarily due to an increase in cash used by working capital associated with timing fluctuations from inventory purchases, accounts payable payments, accounts receivable payments received, unbilled accounts receivable accruals and billings and advanced payments from customers. Timing of payroll-related payments also contributed to the decrease in cash provided by operating activities. This decrease in cash provided by operating activities was partially offset by a decrease in cash used by other assets and liabilities primarily driven by an increase in income taxes payable, as well as an increase in net income offset by a decrease in deferred income taxes due to the remeasurement of our estimated deferred tax liabilities as a result of the Tax Act.

Investing Activities

The decrease in cash used in investing activities was primarily due to an increase in proceeds from sale of property and equipment as a result of the sale of one of our China manufacturing facilities as well as timing of investments in property and equipment in the current year.

Financing Activities

The increase in cash used in financing activities was primarily due to the annual required excess cash flow payment and planned prepayments on the tranche B term loan made in fiscal year 2018.

Fiscal Year 2017 Compared to Fiscal Year 2016

Operating Activities

The increase in cash provided by operating activities was primarily due to an increase in cash provided from working capital associated with timing fluctuations mainly from accounts receivable payments received and unbilled accounts receivable accruals and billings, partially offset by an increase in cash used for inventory purchases and a decrease in cash provided from accounts payable payments and advance payments from customers. Also contributing to the increase was an increase in net income offset by a decrease in deferred income taxes. This increase in cash provided by operating activities was partially offset

by an increase in cash used by other assets and liabilities primarily driven by a decrease in accrued interest payable, as well as a decrease in cash provided due to timing of payments of accrued payroll and related costs.

Investing Activities

The decrease in cash used in investing activities was primarily due to the acquisition of PCB in fiscal year 2016 and lower investments in property and equipment in fiscal year 2017.

Financing Activities

The increase in cash used in financing activities was primarily due to the acquisition of PCB in fiscal year 2016, including the net proceeds from issuance of long-term debt, issuance of TEUs and issuance of common stock, as well as the timing of dividends paid in fiscal year 2016. This increase in cash used in financing activities was partially offset by higher payments of debt issuance costs related to the PCB acquisition, higher stock repurchases and retirements and the fiscal year 2016 purchase of capped calls associated with the issuance of the TEUs.

Liquidity and Capital Resources

We had cash and cash equivalents of \$71,804 as of September 29, 2018. Of this amount, \$16,236 was located in North America, \$17,209 in Europe and \$38,359 in Asia. Repatriation of certain foreign earnings is restricted by local law. The North American cash balance was primarily invested in bank deposits. The cash balances in Europe and Asia were primarily invested in money market funds and bank deposits. In accordance with our investment policy, we place cash equivalent investments with issuers who have high-quality investment credit ratings. In addition, we limit the amount of investment exposure we have with any particular issuer. Our investment objectives are to preserve principal, maintain liquidity and achieve the best available return consistent with our primary objectives of safety and liquidity. As of September 29, 2018, we held no short-term investments.

As a result of the transition tax related to the enactment of the Tax Act, we repatriated a significant amount of the cash held in our foreign subsidiaries without such funds being subject to additional U.S. federal income tax liability during fiscal year 2018. Due to the Tax Act, we plan to continue to repatriate certain amounts of our existing offshore cash and future earnings back to the U.S.

As of September 29, 2018, our capital structure was comprised of \$36,443 in short-term debt, \$364,263 in long-term debt and \$477,932 in shareholders' equity. The Consolidated Balance Sheets also included \$12,328 of unamortized debt issuance costs as of September 29, 2018. Total interest-bearing debt as of September 29, 2018 was \$400,706. We have a credit agreement with a consortium of financial institutions (the Credit Agreement) which provides for senior secured credit facilities consisting of a Revolving Credit Facility and a Term Facility. The maturity date of the Revolving Credit Facility is July 5, 2021 and the maturity date of the loans under the Term Facility is July 5, 2023, unless a term loan lender agrees to extend the maturity date pursuant to a loan modification agreement made in accordance with the terms of the Credit Agreement. On November 21, 2018, the maturity date of the Revolving Credit Facility was extended to June 5, 2022. The Credit Agreement also requires mandatory prepayments on our Term Facility in certain circumstances, including the potential for an annual required prepayment of a certain percentage of our excess cash flow.

Under the Credit Agreement, we are subject to customary affirmative and negative covenants, including, among others, restrictions on our ability to incur debt, create liens, dispose of assets, make investments, loans, advances, guarantees and acquisitions, enter into transactions with affiliates and enter into any restrictive agreements and customary events of default (including payment defaults, covenant defaults, change of control defaults and bankruptcy defaults). The Credit Agreement also contains financial covenants, including the ratio of consolidated total indebtedness to adjusted consolidated earnings before income, taxes, depreciation and amortization (Adjusted EBITDA), as defined in the Credit Agreement, as well as the ratio of Adjusted EBITDA to consolidated interest expense. These covenants restrict our ability to pay dividends and purchase outstanding shares of common stock. As of September 29, 2018 and September 30, 2017, we were in compliance with these financial covenants. See Note 5 and Note 15 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K for additional information on our financing arrangements.

Shareholders' equity increased by \$49,155 during fiscal year 2018 primarily due to net income of \$61,328, stock-based compensation of \$7,243 and other comprehensive income of \$1,389. This increase was partially offset by \$21,394 in dividends declared and \$1,403 in purchases of our common stock.

As of September 29, 2018, we believe our current capital resources will be sufficient to fund working capital requirements, capital expenditures and operations for the foreseeable future, including at least the next twelve months.

Contractual Obligations

As of September 29, 2018, our contractual obligations are as follows:

	Total	Less than 1 year	1 - 3 years	3 - 5 years	More than 5 years
Long-term debt ¹	\$ 398,706	\$ 11,890	\$ 9,200	\$ 377,616	\$ —
Interest payable on long-term debt ²	96,328	19,691	39,850	36,787	—
Capital lease obligations ³	2,000	553	1,168	279	—
Operating lease obligations ⁴	13,690	4,827	4,856	1,999	2,008
Other long-term obligations ⁵	15,450	1,822	2,061	2,260	9,307
Total contractual obligations ⁶	\$ 526,174	\$ 38,783	\$ 57,135	\$ 418,941	\$ 11,315

¹ Long-term debt includes the tranche B term loan facility (Term Facility) and the debt component of the TEUs. For the above period of less than one year, no excess cash flow prepayment is required under the provisions of the Term Facility based on fiscal year 2018 results due to the planned prepayments made during fiscal year 2018. The Term Facility amounts for periods subsequent to less than one year exclude excess cash flow prepayments, which may be required under the provisions of the Term Facility based on fiscal year 2019 and subsequent fiscal year results as future prepayment amounts, if any, are not reasonably estimable as of September 29, 2018. Refer to Note 5 and Note 9 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K for additional information regarding our financing arrangements and our TEUs, respectively.

² Interest payable on long-term debt includes interest on the Term Facility, the debt component of TEUs and capital lease obligations.

³ Capital lease obligations represent contractual vehicle leases. Refer to Note 1 and Note 5 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K for additional information regarding our capital lease obligations.

⁴ Operating leases are primarily for office space, as well as vehicles and equipment. Refer to Note 14 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K for additional lease information.

⁵ Other long-term obligations include liabilities under pension and other retirement plans and warehouse fee obligations.

⁶ Long-term income tax liabilities for uncertain tax positions have been excluded from the contractual obligations table as we are unable to make a reasonably reliable estimate of the amount and period of related future payments. As of September 29, 2018, our long-term liability for uncertain tax positions was \$6,158. Refer to Note 8 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K for additional income tax information.

As of September 29, 2018, we had letters of credit and guarantees outstanding totaling \$26,753 and \$17,572, respectively, primarily to bond advance payments and performance guarantees related to customer contracts in Test.

Off-balance Sheet Arrangements

As of September 29, 2018, we did not have any off-balance sheet arrangements that have, or are reasonably likely to have, a current or future material effect on our financial condition, changes in financial condition, revenues or expenses, results of operations, liquidity, capital expenditures or capital resources that are material to investors.

Critical Accounting Policies

The Consolidated Financial Statements have been prepared in accordance with GAAP, which require us to make estimates and assumptions in certain circumstances that affect amounts reported. The preparation of these financial statements requires us to make estimates and assumptions, giving due consideration to materiality, that affect the reported amounts of assets and liabilities, revenues and expenses and related disclosures of any contingent assets and liabilities at the date of the financial statements. We regularly review our estimates and assumptions, which are based 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 that of our significant accounting policies, the following are particularly important to the portrayal of our results of operations and financial position and are subject to an inherent degree of uncertainty as they may require the application of a higher level of judgment by us. Our significant accounting policies are fully described in Note 1 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K.

Revenue Recognition

We are required to comply with a variety of technical accounting requirements in order to achieve consistent and accurate revenue recognition. The most significant area of judgment and estimation is percentage-of-completion contract accounting. We develop cost estimates that include materials, component parts, labor and overhead costs. Detailed costs plans are developed for all aspects of the contracts during the bidding phase. Cost estimates are largely based on actual historical performance of similar projects combined with current knowledge of the projects in progress. Significant factors that impact the cost estimates include technical risk, inflationary cost of materials and labor, changes in scope, and schedule and internal and subcontractor performance. Actual costs incurred during the project phase are monitored and compared to the estimates on a monthly basis. Cost estimates are revised based on changes in circumstances. Anticipated losses on long-term contracts are recognized when such losses become evident. See Note 1 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K.

Goodwill

Goodwill represents the excess of cost over the fair value of the identifiable net assets of businesses acquired and allocated to our reporting units at the time of acquisition. Goodwill is tested for impairment annually and when an event occurs or circumstances change that indicate the carrying value of the reporting unit may not be recoverable.

Evaluating goodwill for impairment involves the determination of the fair value of each reporting unit in which goodwill is recorded using a qualitative or quantitative analysis. A reporting unit is an operating segment or a component of an operating segment for which discrete financial information is available and reviewed by management on a regular basis.

Prior to completing the quantitative analysis described below, we have the option to perform a qualitative assessment of goodwill for impairment to determine whether it is more likely than not (i.e. a likelihood of more than 50%) that the fair value of a reporting unit is less than its carrying amount, including goodwill and other intangible assets. If we conclude the fair value is more likely than not less than the carrying value, we perform the quantitative analysis. Otherwise, no further analysis is needed.

If the quantitative analysis is required, the impairment test is used to compare the calculated fair value of each reporting unit to its carrying value, including goodwill. We estimate the fair value of a reporting unit using both the income approach and the market approach. The income approach uses a discounted cash flow model that requires input of certain estimates and assumptions requiring judgment, including projections of economic conditions and customer demand, revenue and margins, changes in competition, operating costs and new product introductions. The market approach uses a multiple of earnings and revenue based on guidelines for publicly traded companies. Fair value calculations contain significant judgments and estimates. If the fair value exceeds the carrying value, no further work is required and no impairment loss is recognized. If the carrying value exceeds the fair value, an impairment loss shall be recognized in an amount equal to that excess, limited to the total amount of goodwill allocated to that reporting unit.

We performed our annual test of goodwill impairment during the fourth quarter of fiscal year 2018. As of September 29, 2018, we determined there was no impairment of our goodwill. While we believe the estimates and assumptions used in determining the fair value of our reporting units are reasonable, significant changes in estimates of future cash flows, such as those caused by unforeseen events or changes in market conditions, could materially impact the fair value of a reporting unit which could result in the recognition of a goodwill impairment charge. See Note 1 and Note 2 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K.

Income Taxes

We record a tax provision for the anticipated tax consequences of the reported results of operations. Deferred tax assets and liabilities are measured using the currently enacted tax rates that apply to taxable income in effect for the years in which those deferred tax assets and liabilities are expected to be realized or settled. We record a valuation allowance to reduce deferred tax assets to the amount that is believed more likely than not to be realized. We believe it is more likely than not that forecasted income, including income that may be generated as a result of certain tax planning strategies, together with the tax effects of the deferred tax liabilities, will be sufficient to fully recover the remaining net realizable value of our deferred tax assets. In the event that all or part of the net deferred tax assets are determined not to be realizable in the future, an adjustment to the valuation allowance would be charged to earnings in the period such determination is made. In addition, the calculation of tax liabilities involves significant judgment in estimating the impact of uncertainties in the application of complex tax laws. Resolution of these uncertainties in a manner inconsistent with our expectations could have a material impact on our financial condition and operating results. See Note 8 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K.

Recently Issued Accounting Pronouncements

Information regarding new accounting pronouncements is included in "Recently Issued Accounting Pronouncements" under Note 1 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K.

Quarterly Financial Information

Revenue and operating results reported on a quarterly basis do not necessarily reflect trends in demand for our products or our operating efficiency. Revenue and operating results in any quarter may be significantly affected by customer shipments, installation timing or the timing of the completion of one or more contracts where revenue is recognized upon shipment or customer acceptance rather than on the percentage-of-completion method of revenue recognition. Our use of the percentage-of-completion revenue recognition method for large, long-term projects generally has the effect of minimizing significant fluctuations quarter-over-quarter. See Note 1 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K for additional information on our revenue recognition policy. Quarterly earnings also vary as a result of the use of estimates including, but not limited to, the rates used in recording federal, state and foreign income tax expense. See Note 1 and Note 8 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K for additional information on our use of estimates and income tax related matters, respectively.

Selected quarterly financial information is as follows:

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Full Year ¹
	(unaudited)	(unaudited)	(unaudited)	(unaudited)	
Fiscal Year 2018					
Revenue	\$ 194,162	\$ 191,323	\$ 194,668	\$ 197,879	\$ 778,032
Gross profit	77,928	74,825	76,284	76,492	305,529
Income before income taxes	9,470	10,176	10,045	14,532	44,223
Net income	\$ 33,151	\$ 8,438	\$ 8,979	\$ 10,760	\$ 61,328
Earnings per share					
Basic	\$ 1.73	\$ 0.44	\$ 0.47	\$ 0.56	\$ 3.20
Diluted	\$ 1.72	\$ 0.44	\$ 0.47	\$ 0.56	\$ 3.18
Fiscal Year 2017					
Revenue	\$ 199,279	\$ 193,424	\$ 193,764	\$ 201,488	\$ 787,955
Gross profit	73,464	78,856	75,556	74,402	302,278
Income before income taxes	2,181	8,660	7,983	4,187	23,011
Net income	\$ 1,705	\$ 7,199	\$ 10,610	\$ 5,570	\$ 25,084
Earnings per share					
Basic	\$ 0.09	\$ 0.38	\$ 0.56	\$ 0.29	\$ 1.32
Diluted	\$ 0.09	\$ 0.38	\$ 0.55	\$ 0.29	\$ 1.31

¹ The earnings per share amounts for each quarter may not sum to the fiscal year amounts due to rounding and the effect of weighting.

Forward-looking Statements

Statements contained in this Annual Report on Form 10-K including, but not limited to, the discussion under Item 7 of Part II, Management's Discussion and Analysis of Financial Condition and Results of Operations, that are not statements of historical fact are forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995 (the Act). In addition, certain statements in our future filings with the SEC, in press releases and in oral and written statements made by us or with our approval that are not statements of historical fact constitute forward-looking statements within the meaning of the Act. Examples of forward-looking statements include, but are not limited to: (i) projections of revenue, ROIC, Adjusted EBITDA, net income or loss, earnings or loss per share, the payment or nonpayment of dividends, our capital structure, the adequacy of our liquidity and reserves, the anticipated level of expenditures required and other statements concerning future financial performance; (ii) statements of our plans and objectives by our management or Board of Directors, including those relating to products or services, our restructuring initiatives, merger or acquisition activity and the potential impact of newly acquired businesses; (iii) statements of assumptions underlying such statements; (iv) statements regarding business relationships with vendors, customers or collaborators or statements relating to our order cancellation history, our ability to convert our backlog of undelivered orders into revenue, the timing of purchases, competitive advantages and growth in end markets; (v) statements regarding our products and their characteristics, fluctuations in the costs of raw materials for products,

our geographic footprint, performance, sales potential or effect in the hands of customers; and (vi) statements regarding the estimated tax benefits we may receive under the Tax Act and our expectations concerning recorded adjustments. Words such as "believes," "anticipates," "expects," "intends," "targeted," "should," "potential," "goals," "strategy" and similar expressions are intended to identify forward-looking statements, but are not the exclusive means of identifying such statements.

Forward-looking statements involve risks and uncertainties that may cause actual results to differ materially from those in such statements. Factors that could cause actual results to differ from those discussed in the forward-looking statements include, but are not limited to, those described in Item 1A of Part I, Risk Factors, of this Annual Report on Form 10-K. The performance of our business and our securities may be adversely affected by these factors and by other factors common to other businesses and investments, or to the general economy. Forward-looking statements are qualified by some or all of these risk factors. Therefore, you should consider these forward-looking statements with caution and form your own critical and independent conclusions about the likely effect of these risk factors on our future performance. Forward-looking statements speak only as of the date on which statements are made, and we undertake no obligation to update any forward-looking statement to reflect events or circumstances after the date on which such statement is made to reflect the occurrence of unanticipated events or circumstances. You should carefully review the disclosures and the risk factors described in this Annual Report on Form 10-K and in other documents we file from time to time with the SEC, including our Quarterly Reports on Form 10-Q and Current Reports on Form 8-K.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Foreign Currency Exchange Risk

Approximately 70% of our revenue has historically been derived from customers outside of the U.S. Our international subsidiaries have functional currencies other than our U.S. dollar reporting currency and occasionally transact business in currencies other than their functional currencies. These non-functional currency transactions expose us to market risk on assets, liabilities and cash flows recognized on these transactions.

The strengthening of the U.S. dollar relative to foreign currencies decreases the value of foreign currency-denominated revenue and earnings when translated into U.S. dollars resulting in an unfavorable currency translation impact on revenue and earnings. Conversely, a weakening of the U.S. dollar increases the value of foreign currency-denominated revenue and earnings resulting in a favorable currency translation impact on revenue and earnings. The following table illustrates financial results utilizing currency exchange rates from the applicable prior years to estimate the impact of currency on the following financial items.

Foreign Currency Exchange Rates

	2018	2017	2016
(Unfavorable) favorable impact from currency translation on			
Revenue	\$ 17,070	\$ (3,746)	\$ (33,118)
Net income	\$ 933	\$ (78)	\$ (2,193)

The estimated net effect of currency translation on revenue was favorable in fiscal year 2018, primarily driven by the favorable translation impact associated with the relative weakening in the value of the U.S. dollar against the Euro, Chinese yuan, British pound and Japanese yen during fiscal year 2018.

A hypothetical 10% appreciation or depreciation in foreign currencies against the U.S. dollar, assuming all other variables are held constant, would result in an increase or decrease in fiscal year 2018 revenue of approximately \$30,657.

We have operational procedures to mitigate these non-functional currency exposures. We also utilize foreign currency exchange contracts to exchange currencies at set exchange rates on future dates to offset expected gains or losses on specifically identified exposures.

Mark-to-market gains and losses on derivatives designated as cash flow hedges in our currency hedging program are recorded within accumulated other comprehensive income (loss) in the Consolidated Balance Sheets. We recognize gains and losses associated with the fair value of cash flow hedges at the time a gain or loss is recognized on the hedged exposure in the Consolidated Statements of Income or at the time the cash flow hedge is determined to be ineffective. The associated mark-to-market gains and losses are reclassified from accumulated other comprehensive income (loss) to the same line item in the Consolidated Statements of Income in which the underlying hedged transaction is reported. Net gains and losses on foreign currency transactions included in the accompanying Consolidated Statements of Income were a net gain of \$104 in fiscal year 2018 and net losses of \$2,499 and \$1,567 in fiscal years 2017 and 2016, respectively. See Note 4 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K for additional information on our cash flow hedge currency exchange contracts.

Interest Rates

We are directly exposed to changes in market interest rates on cash, cash equivalents, short-term investments and long-term debt, and are indirectly exposed to the impact of market interest rates on overall business activity.

On floating-rate investments, increases and decreases in market interest rates will increase or decrease future interest income, respectively. On floating-rate debt, increases or decreases in market interest rates will increase or decrease future interest expense, respectively. On fixed-rate investments, increases or decreases in market interest rates do not impact future interest income but may decrease or increase the fair market value of the investments, respectively. On fixed-rate debt, increases or decreases in market interest rates do not impact future interest expense but may decrease or increase the fair market value of the debt, respectively.

As of September 29, 2018, we had cash and cash equivalents of \$71,804, some of which was invested in interest-bearing bank deposits or money market funds. The interest-bearing bank deposits and money market funds have interest rates that reset every 1 to 89 days and generate interest income that will vary based on changes in short-term interest rates. A hypothetical decrease of 100 basis points in market interest rates, assuming all other variables were held constant, would decrease interest income by approximately \$190 for fiscal year 2018.

Secured floating-rate credit facilities require interest payments to be calculated at a floating rate and are therefore impacted by increases or decreases in market interest rates. We have swapped a portion of our floating-rate debt to a fixed rate such that the interest expense on this debt will not vary with changes in short-term interest rates. See Note 4 to the Consolidated Financial Statements included in Item 8 of Part II of this Annual Report on Form 10-K for additional information on our interest rate swaps. A hypothetical increase of 100 basis points in floating interest rates, assuming all other variables were held constant, would result in a \$2,002 increase in future annual interest expense.

As of September 29, 2018, a discount rate of 1.9% and an expected rate increase in future compensation levels of 3.0% was used in the calculation of the pension liability related to the non-contributory, defined benefit pension plan of one of our international subsidiaries.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Our audited financial statements and notes thereto included in Item 15 of Part IV of this Annual Report on Form 10-K, and appearing on pages F-1 through F-44 of this Annual Report on Form 10-K, are incorporated by reference herein. See also "Quarterly Financial Data" in Item 7 of Part II, Management's Discussion and Analysis of Financial Condition and Results of Operations, of this Annual Report on Form 10-K, which is incorporated by reference herein.

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, including our Chief Executive Officer and Chief Financial Officer, has conducted an evaluation of the effectiveness of the design and operation of our disclosure controls and procedures (as defined in Rule 13a-15(e) under the Securities Exchange Act of 1934, as amended (the Exchange Act)), as of September 29, 2018. Based on that evaluation, our Chief Executive Officer and Chief Financial Officer concluded that, as of September 29, 2018, our disclosure controls and procedures were effective.

For purposes of Rule 13a-15(e) under the Exchange Act, the term disclosure controls and procedures 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 Chief Executive Officer and Chief Financial Officer, or persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

Management's Annual Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rule 13a-15(f) under the Exchange Act.

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 also includes those policies and procedures that:

- (a) Pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company;
- (b) 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
- (c) 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.

Under the supervision of the Audit Committee of the Board of Directors and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting using the criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on our assessment and those criteria, our Chief Executive Officer and Chief Financial Officer concluded that our internal control over financial reporting was effective as of September 29, 2018.

KPMG, LLP, an independent registered public accounting firm, has audited the effectiveness of our internal control over financial reporting as of September 29, 2018, and has issued a report that appears on page 42 of this Annual Report on Form 10-K.

Changes in Internal Control Over Financial Reporting

There were no changes in our internal control over financial reporting during the fourth quarter of fiscal year 2018 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Report of Independent Registered Public Accounting Firm

The Board of Directors and Shareholders
MTS Systems Corporation:

Opinion on Internal Control Over Financial Reporting

We have audited MTS Systems Corporation and subsidiaries' (the Company) internal control over financial reporting as of September 29, 2018, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of September 29, 2018, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of September 29, 2018 and September 30, 2017, the related consolidated statements of income, comprehensive income, shareholders' equity, and cash flows for each of the fiscal years in the three-year period ended September 29, 2018, and the related notes and financial statement Schedule II (collectively, the consolidated financial statements), and our report dated November 26, 2018 expressed an unqualified opinion on those consolidated financial statements.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Annual Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. 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 audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

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 (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) 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 (3) 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.

/s/ KPMG LLP

Minneapolis, Minnesota
November 26, 2018

ITEM 9B. OTHER INFORMATION

None.

PART III**ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE**

The required information by this Item 10 with respect to our directors, our Code of Conduct, compliance with Section 16(a) of the Exchange Act and our Audit Committee, including our Audit Committee financial experts, is incorporated by reference to the information set forth under the headings "Election of Directors" and "Other Information – Section 16(a) Beneficial Ownership Reporting Compliance" in our Definitive Proxy Statement for the Annual Meeting of Shareholders scheduled to be held on February 13, 2019.

Executive Officers serve at the discretion of and are elected by our Board of Directors. There are no family relationships amongst any of the executive officers named, nor is there any undisclosed arrangement or understanding pursuant to which any person was selected as an officer. The business experience of the executive officers over the last five years, their present position, their age and the year in which such person became an executive officer are presented below.

Name	Age	Position
Jeffrey A. Graves	57	Director, President and Chief Executive Officer
William C. Becker	65	President, MTS Test Sales, Service and Marketing
Steven B. Harrison	52	President, MTS Test Engineering, Operations and Order Fulfillment
David T. Hore	53	President, MTS Sensors
Brian T. Ross	42	Senior Vice President and Chief Financial Officer
Todd J. Klemmensen	45	Senior Vice President, General Counsel and Secretary

Jeffrey A. Graves, a director since 2012, is President and CEO of the Company, a role he has served in since May 2012. Prior to joining the Company, Dr. Graves was President, CEO and a director of C&D Technologies, Inc. (a manufacturer, marketer and distributor of electrical power storage systems for the standby power storage market) from July 2005 until May 2012. Prior to that time, Dr. Graves held various executive positions at Kemet Electronics Corporation from 2001 to 2005, including CEO; various leadership positions with General Electric Company's Power Systems Division and Corporate Research & Development Center from 1995 to 2001; and prior to 1995, various positions of increasing responsibility at Rockwell International Corporation and Howmet Corporation. Dr. Graves has served as a director of Teleflex Incorporated and Hexcel Corporation since 2007.

William C. Becker is President, MTS Test Sales, Service and Marketing. Mr. Becker has served as President since October 2016. Prior to rejoining the Company, Mr. Becker was Managing Director at Zwick, USA (a subsidiary of Zwick/Roell AG and a manufacturer of material testing products) from 2010 to August 2016. Mr. Becker had roles of increasing responsibility with the Company from 1978 to 2009.

Steven B. Harrison is President, MTS Test Engineering, Operations and Order Fulfillment. Mr. Harrison has served as President since February 2017. Prior to joining the Company, Mr. Harrison served as President from August 2015 to December 2016 and Chief Commercial Officer from August 2012 to August 2015 of AAR Airlift Group, Inc. (a wholly owned subsidiary of AAR CORP and a provider of aviation services to the worldwide commercial aerospace and governmental/defense industries). Prior to AAR, Mr. Harrison served as the President and CEO of National Airlines (an international provider of on demand cargo and passenger services) from September 2010 through July 2012.

David T. Hore is President, MTS Sensors, a role he has served in since July 2016 when he joined the Company through the acquisition of PCB, where he served as its President since 2004.

Brian T. Ross is Senior Vice President and Chief Financial Officer, a role he has served in since May 2017. Prior to this role, Mr. Ross was Corporate Controller of the Company from December 2014 to May 2017. Prior to joining the Company, Mr. Ross was Director of Financial Planning and Analysis with Digi International, Inc. (a leading provider of machine-to-machine networking solutions) from September 2008 to December 2014. Mr. Ross also served as Controller at Restore Medical (a medical device manufacturer) from July 2006 to August 2008, following a seven year tenure at PricewaterhouseCoopers (a registered public accounting firm).

Todd J. Klemmensen is Senior Vice President, General Counsel and Secretary, a role he has served in since August 2018. Prior to this role, Mr. Klemmensen was Acting General Counsel from April 2017 to August 2018, Associate General Counsel from November 2015 to April 2017, and Director of Contracts and Senior Counsel from January 2012 to November 2015. Prior to joining the Company, Mr. Klemmensen served in various roles with Alliant Techsystems, Inc. (an aerospace, defense and sporting goods company), including Senior Manager – Contracts and providing legal counsel within its Armament Group from 2005 to 2012.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this Item 11 is incorporated by reference to the information set forth under the headings "Executive Compensation," "Election of Directors – Non-Employee Director Compensation," and "Other Information – Compensation Committee Interlocks and Insider Participation" in our Definitive Proxy Statement for the Annual Meeting of Shareholders scheduled to be held on February 13, 2019.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The information required by this Item 12 is incorporated by reference to the information set forth under the headings "Other Information – Security Ownership of Principal Shareholders and Management" and "Other Information – Information Regarding Equity Compensation Plans" in our Definitive Proxy Statement for the Annual Meeting of Shareholders scheduled to be held on February 13, 2019.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

The information required by this Item 13 is incorporated by reference to the information set forth under the headings "Election of Directors – Other Information Regarding the Board" and "Other Information – Related Party Transactions" in our Definitive Proxy Statement for the Annual Meeting of Shareholders scheduled to be held February 13, 2019.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by this Item 14 is incorporated by reference to the information set forth under the heading "Ratification of Appointment of Independent Registered Public Accounting Firm" in our Definitive Proxy Statement for the Annual Meeting of Shareholders scheduled to be held on February 13, 2019.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES

(a) The following documents are filed as part of this Annual Report on Form 10-K:

(1) Consolidated Financial Statements

Report of Independent Registered Public Accounting Firm

Consolidated Balance Sheets as of September 29, 2018 and September 30, 2017

Consolidated Statements of Income for the Fiscal Years Ended September 29, 2018, September 30, 2017 and October 1, 2016

Consolidated Statements of Comprehensive Income for the Fiscal Years Ended September 29, 2018, September 30, 2017 and October 1, 2016

Consolidated Statements of Shareholders' Equity for the Fiscal Years Ended September 29, 2018, September 30, 2017 and October 1, 2016

Consolidated Statements of Cash Flows for the Fiscal Years Ended September 29, 2018, September 30, 2017 and October 1, 2016

Notes to Consolidated Financial Statements

(2) Financial Statement Schedules

See accompanying Index to Financial Statements on page F-1

(3) Exhibits

Exhibit Number	Description
2.1	Agreement and Plan of Merger, dated April 5, 2016, by and among the Company, Nickel Merger Sub Inc., PCB Group, Inc., and David T. Hore, John A. Lally and David M. Lally as the Shareholder Representative Group thereto (excluding schedules and exhibits, which the registrant agrees to furnish supplementally to the Securities and Exchange Commission upon request), incorporated by reference to Exhibit 2.1 of the Company's Current Report on Form 8-K filed April 6, 2016.
3.1	Restated and Amended Articles of Incorporation, incorporated by reference to Exhibit 3.a of the Company's Form 10-K for the fiscal year ended September 29, 2012.
3.2	Amended and Restated Bylaws, incorporated by reference to Exhibit 3.b of the Company's Current Report on Form 8-K filed November 28, 2011.
4.1	Indenture, dated as of June 15, 2016, by and between the Company and U.S. Bank National Association, as trustee, incorporated by reference to Exhibit 4.1 to the Company's Current Report on Form 8-K filed June 15, 2016.
4.2	First Supplemental Indenture, dated as of June 15, 2016, by and between the Company and U.S. Bank National Association, as trustee, incorporated by reference to Exhibit 4.2 to the Company's Current Report on Form 8-K filed June 15, 2016.
4.3	Purchase Contract Agreement, dated as of June 15, 2016, by and among the Company, U.S. Bank National Association, as purchase contract agent and as attorney-in-fact for the holders of the purchase contracts from time to time, and U.S. Bank National Association, as trustee under the Indenture, incorporated by reference to Exhibit 4.3 to the Company's Current Report on Form 8-K filed June 15, 2016.
4.4	Form of Tangible Equity Unit (included in Exhibit 4.3 above).
4.5	Form of Purchase Contract (included in Exhibit 4.3 above).
4.6	Form of Amortizing Note (included in Exhibit 4.2 above).
4.7	Form of Common Stock Certificate, incorporated by reference to Exhibit 4.1 to the Company's Registration Statement on Form S-3 filed June 7, 2016.
4.8	Form of Senior Indenture, incorporated by reference to Exhibit 4.2 to the Company's Registration Statement on Form S-3 filed June 7, 2016.
4.9	Form of Subordinated Indenture, incorporated by reference to Exhibit 4.3 to the Company's Registration Statement on Form S-3 filed June 7, 2016.
10.1 *	Executive Variable Compensation Plan, incorporated by reference to Appendix A of the Company's Proxy Statement filed December 30, 2014.
10.2 *	Amended and Restated 2012 Employee Stock Purchase Plan, incorporated by reference to Exhibit 10.2 of the Company's Form 10-K for the fiscal year ended October 1, 2016.

- 10.3 * [Restated Executive Deferred Compensation Plan \(2005\), incorporated by reference to Exhibit 10.3 of the Company's Current Report on Form 8-K filed October 28, 2008.](#)
- 10.4 * [MTS Systems Corporation 2011 Stock Incentive Plan, conformed copy including all amendments through February 9, 2016, incorporated by reference to Annex B of the Company's Definitive Proxy Statement on Schedule 14A filed December 30, 2015.](#)
- 10.5 * [Form of Notice of Grant and Terms and Conditions of Employee Options under 2011 Stock Incentive Plan, incorporated by reference to Exhibit 99.1 of the Company's Registration Statement on Form S-8 filed February 9, 2011.](#)
- 10.6 * [Form of Notice of Grant and Terms and Conditions of Employee Restricted Stock Units under 2011 Stock Incentive Plan, incorporated by reference to Exhibit 99.2 of the Company's Registration Statement on Form S-8 filed February 9, 2011.](#)
- 10.7 * [Form of Notice of Grant and Terms and Conditions of Employee Restricted Stock under 2011 Stock Incentive Plan, incorporated by reference to Exhibit 99.3 of the Company's Registration Statement on Form S-8 filed February 9, 2011.](#)
- 10.8 * [Form of Notice of Grant and Terms and Conditions of Restricted Stock for Directors under 2011 Stock Incentive Plan, incorporated by reference to Exhibit 99.4 of the Company's Registration Statement on Form S-8 filed February 9, 2011.](#)
- 10.9 * [Form of Notice of Grant of Restricted Stock and Restricted Stock Agreement – Director under the 2011 Stock Incentive Plan, incorporated by reference to Exhibit 10.1 of the Company's Form 10-Q for the fiscal quarter ended December 28, 2013.](#)
- 10.10 * [Form of Notice of Grant of Restricted Stock Units and Restricted Stock Agreement – Non-Employee Director under the 2011 Stock Incentive Plan, incorporated by reference to Exhibit 10.2 of the Company's Form 10-Q for the fiscal quarter ended December 28, 2013.](#)
- 10.11 * [Uniform Terms and Conditions Applicable to Non-Employee Director Restricted Stock Unit Grants under the 2011 Stock Incentive Plan, incorporated by reference to Exhibit 10.3 of the Company's Form 10-Q for the fiscal quarter ended December 28, 2013.](#)
- 10.12 * [Form of Notice of Grant of Restricted Stock Units and Restricted Stock Unit Agreement – Employee under the 2011 Stock Incentive Plan, incorporated by reference to Exhibit 10.4 of the Company's Form 10-Q for the fiscal quarter ended December 28, 2013.](#)
- 10.13 * [Uniform Terms and Conditions Applicable to Employee Restricted Stock Unit Grants under the 2011 Stock Incentive Plan, incorporated by reference to Exhibit 10.5 of the Company's Form 10-Q for the fiscal quarter ended December 28, 2013.](#)
- 10.14 * [Form of Notice of Grant of Non-Qualified Stock Options and Option Agreement – Employee under the 2011 Stock Incentive Plan, incorporated by reference to Exhibit 10.6 of the Company's Form 10-Q for the fiscal quarter ended December 28, 2013.](#)
- 10.15 * [Uniform Terms and Conditions Applicable to Employee Option Grants under the 2011 Stock Incentive Plan, incorporated by reference to Exhibit 10.7 of the Company's Form 10-Q for the fiscal quarter ended December 28, 2013.](#)
- 10.16 * [Uniform Terms and Conditions Applicable to Employee Performance Restricted Stock Unit Agreements under the 2011 Stock Incentive Plan, incorporated by reference to Exhibit 10.16 of the Company's Form 10-K for the fiscal year ended October 3, 2015.](#)

- 10.17 * [Form of Notice of Grant Performance Restricted Stock Units and Performance Restricted Stock Unit Agreement - Employee under the 2011 Stock Incentive Plan, incorporated by reference to Exhibit 10.17 of the Company's Form 10-K for the fiscal year ended October 3, 2015.](#)
- 10.18 * [MTS Systems Corporation 2017 Stock Incentive Plan, incorporated by reference to Annex A of the Company's Definitive Proxy Statement on Schedule 14A filed April 25, 2017.](#)
- 10.19 * [Form of Restricted Stock Unit Agreement - Employee under 2017 Stock Incentive Plan, incorporated by reference to Exhibit 99.2 of the Company's Registration Statement on Form S-8 filed June 7, 2017.](#)
- 10.20 * [Form of Non-Qualified Stock Option Agreement - Employee under 2017 Stock Incentive Plan, incorporated by reference to Exhibit 99.3 of the Company's Registration Statement on Form S-8 filed June 7, 2017.](#)
- 10.21 * [Form of Performance Restricted Stock Agreement - Employee under 2017 Stock Incentive Plan, incorporated by reference to Exhibit 99.4 of the Company's Registration Statement on Form S-8 filed June 7, 2017.](#)
- 10.22 * [Form of Restricted Stock Unit Agreement - Non-employee Director under 2017 Stock Incentive Plan, incorporated by reference to Exhibit 99.5 of the Company's Registration Statement on Form S-8 filed June 7, 2017.](#)
- 10.23 * [Letter Agreement, dated as of March 31, 2012, by and between the Company and Jeffrey A. Graves, incorporated by reference to Exhibit 10.1 of the Company's Current Report on Form 8-K filed April 9, 2012.](#)
- 10.24 * [Employment Agreement, dated as of April 1, 2016, by and between PCB Group, Inc. and David T. Hore, incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed July 7, 2016.](#)
- 10.25 * [First Amendment to Employment Agreement, dated as of November 8, 2016, by and between PCB Group, Inc. and David T. Hore, incorporated by reference to Exhibit 10.22 of the Company's Form 10-K for the fiscal year ended October 1, 2016.](#)
- 10.26 * [Letter Agreement, dated August 24, 2016, by and between the Company and William C. Becker, incorporated by reference to Exhibit 10.1 of the Company's Current Report on Form 8-K filed January 5, 2017.](#)
- 10.27 * [Letter Agreement, dated December 30, 2016, by and between the Company and Steven B. Harrison, incorporated by reference to Exhibit 10.2 of the Company's Current Report on Form 8-K filed January 5, 2017.](#)
- 10.28 * [Mutual Separation and Release Agreement, dated April 18, 2017, by and between the Company and Catherine L. Powell, incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed April 18, 2017.](#)
- 10.29 * [Form of Indemnification Agreement between the Company and each of its directors and executive officers, incorporated by reference to Exhibit 10.1 of the Company's Current Report on Form 8-K filed September 1, 2006.](#)
- 10.30 * [Amended and Restated Executive Severance Plan, incorporated by reference to Exhibit 10.26 of the Company's Form 10-K for the fiscal year ended October 1, 2016.](#)

- 10.31 * [Amended and Restated Executive Change in Control Severance Plan, incorporated by reference to Exhibit 10.27 of the Company's Form 10-K for the fiscal year ended October 1, 2016.](#)

- 10.32 [Credit Agreement, dated as of July 5, 2016, among the Company; the foreign subsidiaries of the Company party thereto, the lenders party thereto and JPMorgan Chase Bank N.A., as administrative agent, incorporated by reference to Exhibit 10.1 of the Company's Current Report on Form 8-K filed July 7, 2016.](#)

- 10.33 [Amendment No. 1 to Credit Agreement, dated as of July 29, 2016, by and among the Company, JPMorgan Chase Bank, N.A., as Administrative Agent and Swingline Lender, JPMorgan Chase Bank, N.A. and U.S. Bank National Association, as Issuing Banks, the Revolving Lenders party thereto and Bank of America, N.A., as an Additional Lender, incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed August 1, 2016.](#)

- 10.34 [Form of Consent Memorandum, effective as of January 24, 2017, executed by the lenders party thereto and JPMorgan Chase Bank, N.A. as administrative agent, and acknowledged and agreed to by the Company, incorporated by reference to Exhibit 10.1 of the Company's Current Report on Form 8-K filed January 24, 2017.](#)

- 10.35 [Amendment No. 2 to Credit Agreement, dated as of July 6, 2017, by and among the Company, JPMorgan Chase Bank, N.A., as Administrative Agent and Swingline Lender, JPMorgan Chase Bank, N.A. and U.S. Bank National Association, as Issuing Banks, the Revolving Lenders party thereto and Bank of America, N.A., as an Additional Lender, incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed July 6, 2017.](#)

- 10.36 [Capped Call Transaction Confirmation, dated as of June 9, 2016, by and between the Company and JPMorgan Chase Bank, National Association, incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed June 15, 2016.](#)

- 10.37 [Capped Call Transaction Confirmation, dated as of June 9, 2016, by and between the Company and Wells Fargo Bank, National Association, incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed June 15, 2016.](#)

- 10.38 [Additional Capped Call Transaction Confirmation, dated as of June 16, 2016, by and between the Company and JPMorgan Chase Bank, National Association, incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed June 21, 2016.](#)

- 10.39 [Additional Capped Call Transaction Confirmation, dated as of June 16, 2016, by and between the Company and Wells Fargo Bank, National Association, incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed June 21, 2016.](#)

- 10.40 [Amended and Restated Capped Call Transaction Confirmation, dated as of June 13, 2018, by and between MTS Systems Corporation and JPMorgan Chase Bank, National Association, incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed June 13, 2018.](#)

- 10.41 [Amended and Restated Capped Call Transaction Confirmation, dated as of June 13, 2018, by and between MTS Systems Corporation and Wells Fargo Bank, National Association, incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed June 13, 2018.](#)

- 21.1 [Subsidiaries of the Registrant \(filed herewith\).](#)

- 23.1 [Consent of Independent Registered Public Accounting Firm \(filed herewith\).](#)

- 31.1 [Certification of the Chief Executive Officer Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 \(filed herewith\).](#)

31.2	Certification of the Chief Financial Officer Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 (filed herewith).
32.1	Certification of the Chief Executive Officer Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (furnished herewith).
32.2	Certification of the Chief Financial Officer Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (furnished herewith).
101.INS	XBRL Instance Document (filed herewith).
101.SCH	XBRL Taxonomy Extension Schema Document (filed herewith).
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document (filed herewith).
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document (filed herewith).
101.LAB	XBRL Taxonomy Extension Label Linkbase Document (filed herewith).
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document (filed herewith).

* Denotes a management contract or compensatory plan or arrangement required to be filed as an exhibit pursuant to Item 15 of Form 10-K.

ITEM 16. FORM 10-K SUMMARY

Not applicable.

SIGNATURES

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

MTS SYSTEMS CORPORATION

Date: November 26, 2018

/s/ JEFFREY A. GRAVES

Jeffrey A. Graves

President and Chief Executive Officer

(Principal Executive Officer)

Date: November 26, 2018

/s/ BRIAN T. ROSS

Brian T. Ross

Senior Vice President and Chief Financial Officer

(Principal Financial Officer and Principal Accounting 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 dates indicated.

<u>/s/ JEFFREY A. GRAVES</u> Jeffrey A. Graves	President and Chief Executive Officer and Director (Principal Executive Officer)	November 26, 2018
<u>/s/ BRIAN T. ROSS</u> Brian T. Ross	Senior Vice President and Chief Financial Officer (Principal Financial Officer and Principal Accounting Officer)	November 26, 2018
<u>/s/ DAVID J. ANDERSON</u> David J. Anderson	Non-Executive Chairman of the Board	November 26, 2018
<u>/s/ DAVID D. JOHNSON</u> David D. Johnson	Director	November 26, 2018
<u>/s/ RANDY J. MARTINEZ</u> Randy J. Martinez	Director	November 26, 2018
<u>/s/ MICHAEL V. SCHROCK</u> Michael V. Schrock	Director	November 26, 2018
<u>/s/ GAIL P. STEINEL</u> Gail P. Steinel	Director	November 26, 2018
<u>/s/ MAXIMILIANE C. STRAUB</u> Maximiliane C. Straub	Director	November 26, 2018
<u>/s/ CHUN HUNG (KENNETH) YU</u> Chun Hung (Kenneth) Yu	Director	November 26, 2018

MTS Systems Corporation and Subsidiaries

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Report of Independent Registered Public Accounting Firm

The Board of Directors and Shareholders
MTS Systems Corporation:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of MTS Systems Corporation and subsidiaries (the Company) as of September 29, 2018 and September 30, 2017, the related consolidated statements of income, comprehensive income, shareholders' equity, and cash flows for each of the fiscal years in the three-year period ended September 29, 2018, and the related notes and financial statement Schedule II (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of September 29, 2018 and September 30, 2017, and the results of its operations and its cash flows for each of the fiscal years in the three-year period ended September 29, 2018, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of September 29, 2018, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission, and our report dated November 26, 2018 expressed an unqualified opinion on the effectiveness of the Company's internal control over financial reporting.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ KPMG LLP

We have served as the Company's auditor since 2002.

Minneapolis, Minnesota
November 26, 2018

Consolidated Balance Sheets

(in thousands, except per share data)

	September 29, 2018	September 30, 2017
Assets		
Current assets		
Cash and cash equivalents	\$ 71,804	\$ 108,733
Accounts receivable, net of allowance for doubtful accounts of \$5,004 and \$5,371, respectively	122,243	123,994
Unbilled accounts receivable, net	70,474	76,914
Inventories, net	139,109	127,728
Prepaid expenses and other current assets	24,572	19,880
Total current assets	428,202	457,249
Property and equipment, net	90,269	99,930
Goodwill	369,275	369,762
Intangible assets, net	246,138	255,079
Other long-term assets	2,263	4,116
Deferred income taxes	3,249	3,556
Total assets	\$ 1,139,396	\$ 1,189,692
Liabilities and Shareholders' Equity		
Current liabilities		
Current maturities of long-term debt, net	\$ 32,738	\$ 39,095
Accounts payable	47,886	47,515
Accrued payroll and related costs	43,554	49,434
Advance payments from customers	80,131	76,712
Accrued warranty costs	5,418	6,018
Accrued income taxes	4,928	4,464
Accrued dividends	5,312	5,278
Other accrued liabilities	19,146	18,873
Total current liabilities	239,113	247,389
Long-term debt, less current maturities, net	355,640	418,544
Deferred income taxes	46,482	74,981
Non-current accrued income taxes	6,158	5,855
Defined benefit pension plan obligation	9,177	8,588
Other long-term liabilities	4,894	5,558
Total liabilities	661,464	760,915
Shareholders' Equity		
Common stock, \$0.25 par value; 64,000 shares authorized: 17,856 and 17,760 shares issued and outstanding as of September 29, 2018 and September 30, 2017, respectively	4,464	4,440
Additional paid-in capital	171,407	163,632
Retained earnings	300,585	261,258
Accumulated other comprehensive income (loss)	1,476	(553)
Total shareholders' equity	477,932	428,777
Total liabilities and shareholders' equity	\$ 1,139,396	\$ 1,189,692

The accompanying Notes to Consolidated Financial Statements are an integral part of these consolidated financial statements.

Consolidated Statements of Income

(in thousands, except per share data)

For the fiscal year ended	September 29, 2018		September 30, 2017		October 1, 2016	
Revenue						
Product	\$	674,391	\$	691,471	\$	562,340
Service		103,641		96,484		87,807
Total revenue		778,032		787,955		650,147
Cost of sales						
Product		409,525		427,405		365,401
Service		62,978		58,272		53,342
Total cost of sales		472,503		485,677		418,743
Gross profit		305,529		302,278		231,404
Operating expenses						
Selling and marketing		126,333		124,912		94,992
General and administrative		79,240		87,539		69,313
Research and development		34,784		34,999		25,336
Total operating expenses		240,357		247,450		189,641
Income from operations		65,172		54,828		41,763
Interest expense, net		(25,882)		(30,821)		(8,489)
Other income (expense), net		4,933		(996)		238
Income before income taxes		44,223		23,011		33,512
Income tax provision (benefit)		(17,105)		(2,073)		6,018
Net income	\$	61,328	\$	25,084	\$	27,494
Earnings per share						
Basic						
Earnings per share	\$	3.20	\$	1.32	\$	1.72
Weighted average common shares outstanding		19,163		19,040		16,027
Diluted						
Earnings per share	\$	3.18	\$	1.31	\$	1.70
Weighted average common shares outstanding		19,293		19,137		16,179
Dividends declared per share	\$	1.20	\$	1.20	\$	1.20

The accompanying Notes to Consolidated Financial Statements are an integral part of these consolidated financial statements.

Consolidated Statements of Comprehensive Income

(in thousands, except per share data)

For the fiscal year ended	September 29, 2018		September 30, 2017		October 1, 2016
Net income	\$	61,328	\$	25,084	\$ 27,494
Other comprehensive income (loss), net of tax					
Foreign currency translation gain (loss) adjustments		(2,174)		3,273	(332)
Derivative instruments					
Unrealized net gain (loss)		4,325		2,110	(855)
Net (gain) loss reclassified to earnings		(598)		98	214
Defined benefit pension plan					
Unrealized net gain (loss)		(621)		4,132	(4,213)
Net (gain) loss reclassified to earnings		367		696	408
Currency exchange rate gain (loss)		90		(489)	(18)
Other comprehensive income (loss)		1,389		9,820	(4,796)
Comprehensive income	\$	62,717	\$	34,904	\$ 22,698

The accompanying Notes to Consolidated Financial Statements are an integral part of these consolidated financial statements.

Consolidated Statements of Shareholders' Equity

(in thousands, except per share data)

	Common Stock		Additional Paid-In Capital	Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Total Shareholders' Equity
	Shares Issued	Amount				
Balance, October 3, 2015	14,932	\$ 3,733	\$ 4,275	\$ 255,711	\$ (5,577)	\$ 258,142
Total comprehensive income	—	—	—	27,494	(4,796)	22,698
Issuance of common stock, net of issuance costs	1,897	474	73,827	—	—	74,301
Issuance of tangible equity units, net of issuance costs	—	—	84,511	—	—	84,511
Purchase of capped calls	—	—	(7,935)	—	—	(7,935)
Exercise of stock options	68	17	2,782	—	—	2,799
Stock-based compensation	47	12	7,144	—	—	7,156
Tax shortfall from equity compensation	—	—	(172)	—	—	(172)
Issuance for employee stock purchase plan	24	6	1,042	—	—	1,048
Common stock purchased and retired	(308)	(77)	(10,595)	(7,742)	—	(18,414)
Dividends, \$1.20 per share	—	—	—	(18,874)	—	(18,874)
Balance, October 1, 2016	16,660	\$ 4,165	\$ 154,879	\$ 256,589	\$ (10,373)	\$ 405,260
Total comprehensive income	—	—	—	25,084	9,820	34,904
Conversion of tangible equity units	939	235	(235)	—	—	—
Settlement of capped calls	(12)	(3)	3	—	—	—
Exercise of stock options	112	28	4,531	—	—	4,559
Stock-based compensation	69	17	5,603	—	—	5,620
Tax shortfall from equity compensation	—	—	(386)	—	—	(386)
Issuance for employee stock purchase plan	25	6	1,014	—	—	1,020
Common stock purchased and retired	(33)	(8)	(1,777)	—	—	(1,785)
Dividends, \$1.20 per share	—	—	—	(20,415)	—	(20,415)
Balance, September 30, 2017	17,760	\$ 4,440	\$ 163,632	\$ 261,258	\$ (553)	\$ 428,777
Total comprehensive income	—	—	—	61,328	1,389	62,717
Exercise of stock options	19	5	916	—	—	921
Stock-based compensation	79	19	7,224	—	—	7,243
Issuance for employee stock purchase plan	24	6	1,065	—	—	1,071
Cumulative effect of accounting change	—	—	(33)	(607)	640	—
Common stock purchased and retired	(26)	(6)	(1,397)	—	—	(1,403)
Dividends, \$1.20 per share	—	—	—	(21,394)	—	(21,394)
Balance, September 29, 2018	17,856	\$ 4,464	\$ 171,407	\$ 300,585	\$ 1,476	\$ 477,932

The accompanying Notes to Consolidated Financial Statements are an integral part of these consolidated financial statements.

Consolidated Statements of Cash Flows
(in thousands)

For the fiscal year ended	September 29, 2018	September 30, 2017	October 1, 2016
Cash Flows from Operating Activities			
Net income	\$ 61,328	\$ 25,084	\$ 27,494
Adjustments to reconcile net income to net cash provided by (used in) operating activities			
Stock-based compensation	7,283	5,600	7,224
Fair value adjustment to acquired inventory	—	7,975	7,916
Net periodic pension benefit cost	1,178	1,768	1,136
Depreciation and amortization	34,492	35,523	24,077
(Gain) loss on sale or disposal of property and equipment	(4,162)	733	1,069
Amortization of debt issuance costs	4,644	3,863	1,054
Loss on debt extinguishment	—	503	502
Deferred income taxes	(28,252)	(9,127)	(5,274)
Bad debt provision (recovery), net	2,271	1,930	957
Other	(111)	—	—
Changes in operating assets and liabilities			
Accounts receivable and unbilled accounts receivable	4,763	7,652	(22,059)
Inventories, net	(12,343)	(2,253)	3,365
Prepaid expenses	(375)	(1,486)	(1,086)
Accounts payable	(846)	1,751	5,647
Accrued payroll and related costs	(5,338)	4,781	9,057
Advance payments from customers	3,531	3,635	5,701
Accrued warranty costs	(594)	278	414
Other assets and liabilities	(4,222)	(16,350)	874
Net Cash Provided by (Used in) Operating Activities	63,247	71,860	68,068
Cash Flows from Investing Activities			
Purchases of property and equipment	(12,321)	(17,798)	(20,806)
Proceeds from sale of property and equipment	6,793	45	1,514
Purchases of business, net of acquired cash	—	(853)	(580,920)
Other	823	—	—
Net Cash Provided by (Used in) Investing Activities	(4,705)	(18,606)	(600,212)
Cash Flows from Financing Activities			
Payment of long-term debt	(64,517)	(4,881)	—
Proceeds from issuance of long-term debt	—	—	460,000
Proceeds from issuance of common stock, net of issuance costs	—	—	74,301
Proceeds from issuance of equity component of tangible equity units, net of issuance costs	—	—	84,511
Payment for capped calls	—	—	(7,935)
Proceeds from issuance of debt component of tangible equity units	—	—	27,386
Payment of debt component of tangible equity units	(9,153)	(8,541)	(2,401)
Payment of debt issuance costs for long-term debt	—	(782)	(19,837)
Payment of debt issuance costs for debt component of tangible equity units	—	—	(971)
Payment of debt issuance costs for revolving credit facility	(125)	(200)	(920)
Receipts under short-term borrowings	38,750	—	20,000
Payments under short-term borrowings	(38,750)	—	(41,343)
Cash dividends	(21,360)	(20,079)	(13,932)
Proceeds from exercise of stock options and employee stock purchase plan	1,992	5,579	3,847
Payments to purchase and retire common stock	(1,403)	(1,785)	(18,414)
Net Cash Provided by (Used in) Financing Activities	(94,566)	(30,689)	564,292
Effect of Exchange Rate Changes on Cash and Cash Equivalents	(905)	1,388	864
Cash and Cash Equivalents			
Increase (decrease) during the period	(36,929)	23,953	33,012
Balance, beginning of period	108,733	84,780	51,768
Balance, End of Period	\$ 71,804	\$ 108,733	\$ 84,780
Supplemental Disclosures			
Cash paid during the year for			
Interest	\$ 22,224	\$ 29,881	\$ 1,225
Income taxes	11,380	11,478	10,826

Non-cash investing and financing activities			
Deferred endowment consideration not yet paid	—	—	1,000
Net working capital adjustment not yet received	—	—	513
Property and equipment acquired under capital lease	67	2,747	—
Dividends declared not yet paid	5,312	5,278	4,942
Debt issuance costs not yet paid recorded in accounts payable and other accrued liabilities	—	—	235

The accompanying Notes to Consolidated Financial Statements are an integral part of these consolidated financial statements.

Notes to Consolidated Financial Statements

(Dollars and shares in thousands, unless otherwise noted)

NOTE 1 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Nature of Operations

MTS Systems Corporation is a leading global supplier of high-performance test systems and sensors. Our testing hardware and software solutions help customers accelerate and improve their design, development and manufacturing processes and are used for determining the mechanical behavior of materials, products and structures. Our high-performance sensors provide measurements of vibration, pressure, position, force and sound in a variety of applications.

Fiscal Year

We have a 5-4-4 week, quarterly accounting cycle with our fiscal year ending on the Saturday closest to September 30. Fiscal years 2018, 2017 and 2016 ended September 29, 2018, September 30, 2017 and October 1, 2016, respectively. Fiscal years 2018, 2017 and 2016 all include 52 weeks.

Consolidation

The Consolidated Financial Statements include the accounts of MTS Systems Corporation and its wholly owned subsidiaries. Significant intercompany account balances and transactions have been eliminated.

Revenue Recognition

We recognize revenue on a sales arrangement when it is realized or realizable and earned, which occurs when all of the following criteria have been met: (1) persuasive evidence of an arrangement exists; (2) delivery and title transfer has occurred or services have been rendered; (3) the sales price is fixed and determinable; (4) collectability is reasonably assured; and (5) all significant obligations to the customer have been fulfilled.

Orders that are manufactured and delivered in less than six months with routine installations and no special acceptance protocols may contain multiple elements for revenue recognition purposes. We consider each deliverable that provides value to the customer on a standalone basis a separable element. Separable elements in these arrangements may include the design and manufacture of hardware and essential software, installation services, training and/or post contract maintenance and support. We initially allocate consideration to each separable element using the relative selling price method. Selling prices are determined based on either vendor-specific objective evidence (VSOE) (the actual selling prices of similar products and services sold on a standalone basis) or, in the absence of VSOE, our best estimate of the selling price. Factors considered in determining estimated selling prices for applicable elements generally include overall economic conditions, customer demand and costs incurred to provide the deliverable, as well as our historical pricing practices. Under these arrangements, revenue associated with each delivered element is recognized in an amount equal to the lesser of the consideration initially allocated to the delivered element or the amount for which payment is not deemed contingent upon future delivery of other elements in the arrangement. Under arrangements where special acceptance protocols exist, installation services and training are not considered separable. Accordingly, revenue for the entire arrangement is recognized upon the completion of installation, training and fulfillment of any other significant obligations specific to the terms of the arrangement. Arrangements that do not contain any separable elements are typically recognized when the products are shipped and title has transferred to the customer.

Certain contractual arrangements require longer production periods, generally longer than six months (long-term contracts), and may contain non-routine installations and special acceptance protocols. These arrangements often include hardware and essential software, installation services, training and support. Long-term contractual arrangements involving essential software typically include significant production, modification and customization. For long-term arrangements with essential software and all other long-term arrangements with complex installations and/or unusual acceptance protocols, revenue is recognized using the percentage-of-completion method, based on the cost incurred to date relative to estimated total cost of the contract. Elements of an arrangement that do not separately fall within the scope of the percentage-of-completion method (e.g., training and post contract software maintenance and support) are recognized as the service is provided in amounts determined based on VSOE, or in the absence of VSOE, our best estimate of the selling price.

Under the terms of our long-term contracts, revenue recognized using the percentage-of-completion method may not, in certain circumstances, be invoiced until completion of contractual milestones, upon shipment of the equipment or upon installation and acceptance by the customer. Unbilled amounts for these contracts are included in unbilled accounts receivable, net in the Consolidated Balance Sheets.

Revenue from the rental of equipment is recognized in the period that the rental is provided. Revenue from the profit on the sale of used rental equipment is recognized when the products are shipped and title has transferred. Rental revenue is included in product revenue in the Consolidated Statements of Income.

Revenue from arrangements for services such as maintenance, repair, consulting and technical support are recognized either as the service is performed or ratably over the defined contractual period for service maintenance contracts. Revenue from post contract software maintenance and support services is recognized ratably over the defined contractual period of the maintenance agreement.

Our sales arrangements typically do not include specific performance, cancellation, termination or refund-type provisions. In the event a customer cancels a contractual arrangement, we would typically be entitled to receive reimbursement from the customer for actual costs incurred under the arrangement plus a reasonable margin.

Revenue is recorded net of taxes collected from customers that are remitted to governmental authorities with the collected taxes recorded as current liabilities until remitted to the relevant government authority.

Shipping and Handling

Freight revenue billed to customers is reported within revenue in the Consolidated Statements of Income. Expenses incurred for shipping products to customers are reported within cost of sales in the Consolidated Statements of Income.

Research and Development

Research and development (R&D) costs associated with new products are charged to operations as incurred. We have also allocated certain resources to capitalized software development activities. Total internal software development costs capitalized during fiscal years 2018 and 2017 were \$1,803 and \$2,046, respectively.

Foreign Currency

The financial position and results of operations of our foreign subsidiaries are measured using local currency as the functional currency. Assets and liabilities are translated using fiscal period-end exchange rates, and monthly statements of income are translated using average exchange rates applicable to each month, with the resulting adjustments recorded in foreign currency translation gain (loss) adjustments in the Consolidated Statements of Comprehensive Income. Net gains and losses from foreign currency transactions are recognized in the Consolidated Statements of Income. We recorded a net foreign currency transaction gain of \$104 in fiscal year 2018 and net foreign currency transaction losses of \$2,499 and \$1,567 during fiscal years 2017 and 2016, respectively.

Cash and Cash Equivalents

Cash and cash equivalents represent cash, demand deposits and highly liquid investments with original maturities of three months or less. Cash equivalents are recorded at cost, which approximates fair value. Cash equivalents, both within and outside the U.S., are invested in bank deposits or money market funds and are held in local currency.

Accounts Receivable and Long-term Contracts

We grant credit to customers and generally do not require collateral or other security from domestic customers. When deemed appropriate, receivables from customers located outside the U.S. are supported by letters of credit from financial institutions. The allowance for doubtful accounts is based on our assessment of the collectability of specific customer accounts and includes consideration of the credit worthiness and financial condition of those specific customers. We record an allowance to reduce receivables to the amount reasonably believed to be collectible and consider factors such as the financial condition of the customer and the aging of the receivables. If there is a deterioration of a customer's financial condition, if we become aware of additional information related to the credit worthiness of a customer or if future actual default rates on trade receivables differ from those currently anticipated, we may adjust the allowance for doubtful accounts, which would affect earnings in the period the adjustments were made.

We enter into long-term contracts for customized equipment sold to our customers. Under the terms of such contracts, revenue recognized using the percentage-of-completion method may be invoiced upon completion of contractual milestones, shipment to the customer or installation and customer acceptance. Unbilled amounts relating to these contracts are included in unbilled accounts receivable, net in the Consolidated Balance Sheets. Amounts unbilled as of September 29, 2018 are expected to be invoiced during fiscal year 2019.

Inventories

Inventories consist of material, labor and overhead costs and are stated at the lower of cost or net realizable value determined under the first-in, first-out accounting method. Certain inventories are measured using the weighted average cost method. Inventories, net are as follows:

	2018	2017
Components, assemblies and parts	\$ 93,020	\$ 86,991
Customer projects in various stages of completion	35,675	30,225
Finished goods	10,414	10,512
Total inventories, net	\$ 139,109	\$ 127,728

Software Development Costs

We capitalize certain software development costs related to software to be sold or otherwise marketed. Capitalized software development costs include purchased materials and services, salary and benefits of our development and technical support staff and other costs associated with the development of new products and services. Software development costs are expensed as incurred until technological feasibility has been established, at which time future costs incurred are capitalized until the product is available for general release to the public. Based on our product development process, technological feasibility is generally established once product and detailed program designs have been completed, uncertainties related to high-risk development issues have been resolved through coding and testing, and we have the capability to manufacture the end product. Once a software product is available for general release to the public, capitalized development costs associated with that product will begin to be amortized to cost of sales in the Consolidated Statements of Income over the product's estimated economic life, using the greater of straight-line or a method that results in cost recognition in future periods that is consistent with the anticipated timing of product revenue recognition.

Our capitalized software development costs are subject to an ongoing assessment of recoverability, which is impacted by estimates and assumptions of future revenues and expenses for these software products, as well as other factors such as changes in product technologies. Any portion of unamortized capitalized software development costs that is determined to be in excess of net realizable value is expensed in the period such a determination is made. We capitalized \$5,167, \$2,900 and \$3,637 of software development costs during fiscal years 2018, 2017 and 2016, respectively. Amortization expense for software development costs was \$30, \$892 and \$892 for fiscal years 2018, 2017 and 2016, respectively. See Note 2 for additional information on capitalized software development costs.

Impairment of Long-lived Assets

We review the carrying value of long-lived assets or asset groups, such as property and equipment and intangible assets subject to amortization, when events or changes in circumstances such as asset utilization, physical change, legal factors or other matters indicate that the carrying value may not be recoverable. When this review indicates the carrying value of an asset or asset group exceeds the sum of the undiscounted cash flows expected to result from the use and eventual disposition of the asset or asset group, we recognize an asset impairment charge in earnings in the period such a determination is made. The amount of the impairment loss recorded is the amount by which the carrying value of the impaired asset or asset group exceeds its fair value.

Property and Equipment

Property and equipment are capitalized at cost, including additions, replacements and improvements. Repairs and maintenance are expensed as incurred. Depreciation is recorded over the following estimated useful lives of the asset:

Asset Type	Useful Life
Buildings and improvements	10 to 40 years
Machinery and equipment	3 to 10 years

Building and equipment additions are generally depreciated on a straight-line basis for financial reporting purposes and on an accelerated basis for income tax purposes. Property and equipment includes assets held under capital leases, consisting of machinery and equipment, which are recorded at the present value of minimum lease payments and amortized on a straight-line basis over the estimated life of the asset or the lease term. Amortization of assets held under capital leases is included in depreciation expense in the Consolidated Statements of Income. See Note 2 for additional information on property and equipment.

Goodwill and Indefinite-lived Intangible Assets

Goodwill represents the excess of cost over the fair value of the identifiable net assets of businesses acquired and allocated to our reporting units at the time of acquisition. We test goodwill for impairment annually in the fourth quarter and when an event occurs or circumstances change that indicate the carrying value of the reporting unit may not be recoverable. As of both September 29, 2018 and September 30, 2017, we determined there was no impairment of our goodwill or indefinite-lived intangible assets.

Evaluating goodwill for impairment involves the determination of the fair value of each reporting unit in which goodwill is recorded using a qualitative or quantitative analysis. A reporting unit is an operating segment or a component of an operating segment for which discrete financial information is available and reviewed by management on a regular basis. For fiscal year 2018, we identified three reporting units: Test, Temposonics and PCB Group, Inc. (PCB).

Prior to completing the quantitative analysis described below, we have the option to perform a qualitative assessment of goodwill for impairment to determine whether it is more likely than not (a likelihood of more than 50%) that the fair value of a reporting unit is less than its carrying amount, including goodwill and other intangible assets. If we conclude the fair value is more likely than not less than the carrying value, we perform the quantitative analysis. Otherwise, no further testing is needed.

If the quantitative analysis is required, the impairment test is used to compare the calculated fair value of each reporting unit to its carrying value, including goodwill. We estimate the fair value of a reporting unit using both the income approach and the market approach. The income approach uses a discounted cash flow model that requires input of certain estimates and assumptions requiring judgment, including projections of revenue, profit margins, operating costs, capital expenditures, changes in working capital, discount rates and perpetual growth rates based on economic conditions, customer demand, changes in competition and new product introductions. The market approach uses a multiple of earnings and revenue based on guidelines for publicly traded companies. Fair value calculations contain significant judgments and estimates. If the fair value exceeds the carrying value, no further work is required and no impairment loss is recognized. If the carrying value exceeds the fair value, an impairment loss shall be recognized in an amount equal to that excess, limited to the total amount of goodwill allocated to that reporting unit.

Fiscal Year 2018

In fiscal year 2018, we performed a qualitative analysis of goodwill for our three reporting units as described above. Based on the analysis, we determined that it was more likely than not that the fair value exceeds the carrying amount for all three reporting units. Therefore, a quantitative analysis was not necessary for any of our reporting units. As of September 29, 2018, our Test, Temposonics and PCB reporting units had goodwill balances of \$24,631, \$1,466 and \$343,178, respectively.

Fiscal Year 2017

In fiscal year 2017, we elected to perform the quantitative analysis of goodwill for our three reporting units as described above as this was the first goodwill assessment following a full fiscal year of operations for PCB. Based on the analysis, we determined that goodwill was not impaired for any of our reporting units. The fiscal year 2017 impairment test indicated the fair value of the Test and Temposonics reporting units significantly exceeded their carrying values. The PCB reporting unit exceeded its carrying value by approximately 11 percent.

While we believe the estimates and assumptions used in determining the fair value of our reporting units in fiscal year 2017 are reasonable, significant changes in estimates of future cash flows, such as those caused by unforeseen events or changes in market conditions, could materially impact the fair value of a reporting unit which could result in the recognition of a goodwill impairment charge and adversely affect financial results.

We performed our annual test of goodwill during the fourth quarter of fiscal year 2017, utilizing discount rates of approximately 10 percent based on market, company specific and reporting unit specific data to discount projected future cash flows for each reporting unit and perpetual growth rates of 3 percent based on historical and forecasted reporting unit and industry growth rates.

For the PCB reporting unit, we performed the quantitative analysis on the fair values resulting from the discounted cash flow analysis utilizing alternate assumptions that reflect reasonably possible changes to future assumptions. Based on the analysis, a 50 basis point increase in the discount rate utilized in the discounted cash flow analysis would not have resulted in the PCB reporting unit failing the quantitative analysis of the impairment test. Additionally, a 50 basis point decrease in the estimated perpetual sales growth rates utilized in the discounted cash flow analysis would not have resulted in the PCB reporting unit failing the quantitative analysis of the impairment test.

Changes in our assumptions or estimates could materially affect the estimation of fair value of the PCB reporting unit and, therefore, could reduce the excess of fair value over the carrying value of the PCB reporting unit entirely resulting in goodwill impairment. Events and conditions that could negatively impact the estimated fair value include a sustained decline in our stock

price, inability to realize the anticipated sales growth opportunities as a result of the PCB acquisition, unsuccessful integration of PCB, lack of development of new products and a decrease in projected profitability.

Indefinite-lived Intangible Assets

Intangible assets with indefinite lives are not amortized. These assets are tested annually for impairment and when an event occurs or circumstances change that indicate the carrying value of the asset may not be recoverable. Fair value of indefinite-lived intangible assets is primarily determined using a relief from royalty method if a quantitative analysis is deemed necessary. See Note 2 for additional information on goodwill and intangible assets.

Other Long-term Assets

Other assets primarily consist of the cash value of security deposits paid on leased property, life insurance policies and debt issuance costs.

Warranty Obligations

Sales of our products and systems are subject to limited warranty obligations that are included in customer contracts. For sales that include installation services, warranty obligations generally extend for a period of 12 to 24 months from the date of either shipment or acceptance based on the contract terms. Product obligations generally extend for a period of 12 to 24 months from the date of purchase. Certain products offered in our Sensors segment include a lifetime warranty.

Under the terms of these warranties, we are obligated to repair or replace any components or assemblies deemed defective due to workmanship or materials. We reserve the right to reject warranty claims where it is determined that failure is due to normal wear, customer modifications, improper maintenance or misuse. We record general warranty provisions based on an estimated warranty expense percentage applied to current period revenue. The percentage applied reflects our historical warranty claims experience over the preceding 12-month period. Both the experience percentage and the warranty liability are evaluated on an ongoing basis for adequacy. Warranty provisions are also recognized for certain unanticipated product claims that are individually significant.

Changes to accrued warranty costs are as follows:

	2018	2017
Beginning accrued warranty costs	\$ 6,018	\$ 5,718
Warranty claims	(5,443)	(4,383)
Warranty provisions	5,109	4,310
Adjustments to preexisting warranties	(260)	352
Currency translation	(6)	21
Ending accrued warranty costs	\$ 5,418	\$ 6,018

Derivative Financial Instruments

Our results of operations could be materially impacted by changes in foreign currency exchange rates, as well as interest rates on our floating-rate indebtedness. In an effort to manage exposure to these risks, we periodically enter into forward and option currency exchange contracts, interest rate swaps and forward interest rate swaps. Since the market value of these hedging contracts is derived from current market rates, they are classified as derivative financial instruments. We do not use derivatives for speculative or trading purposes. The derivative contracts contain credit risk to the extent that our bank counterparties may be unable to meet the terms of the agreements. The amount of such credit risk is generally limited to the unrealized gains, if any, in such contracts. Such risk is minimized by limiting those counterparties to major financial institutions of high credit quality. For derivative instruments executed under master netting arrangements, we have the contractual right to offset fair value amounts recognized for the right to reclaim cash collateral against obligations to return cash collateral. We do not offset fair value amounts recognized on these derivative instruments. As of both September 29, 2018 and September 30, 2017, we did not have any foreign exchange contracts with credit risk related contingent features. See Note 4 for additional information on derivatives and hedging activities.

Income Taxes

We record a tax provision for the anticipated tax consequences of the reported results of operations. Deferred tax assets and liabilities are measured using the currently enacted tax rates that apply to taxable income in effect for the years in which those deferred tax assets and liabilities are expected to be realized or settled. We record a valuation allowance to reduce deferred tax assets to the amount that is believed more likely than not to be realized. We believe it is more likely than not that forecasted income, including income that may be generated as a result of certain tax planning strategies, together with the tax effects of the deferred tax liabilities, will be sufficient to fully recover the remaining net realizable value of our deferred tax assets. In the event that all or part of the net deferred tax assets are determined not to be realizable in the future, an adjustment to the

valuation allowance would be charged to earnings in the period such determination is made. In addition, the calculation of tax liabilities involves significant judgment in estimating the impact of uncertainties in the application of complex tax laws. Resolution of these uncertainties in a manner inconsistent with our expectations could have a material impact on our financial condition and operating results. See Note 8 for additional information on income taxes.

Earnings Per Common Share

Basic earnings per share is computed by dividing net income by the daily weighted average number of common shares outstanding during the applicable period. The 8.75% tangible equity units (TEUs) are assumed to be settled at the minimum settlement amount of 1.9841 shares per TEU when calculating weighted average common shares outstanding for purposes of basic earnings per share.

Using the treasury stock method, diluted earnings per share includes the potentially dilutive effect of common shares issued in connection with outstanding stock-based compensation options and grants. The potentially dilutive effect of common shares issued in connection with outstanding stock options is determined based on the average market price for the period. For diluted earnings per share, the TEUs are assumed to be settled at a conversion factor based on our daily volume-weighted average price per share of our common stock for the 20 consecutive trading days preceding the end of the current fiscal quarter not to exceed 2.3810 shares of common stock per TEU.

Under the treasury stock method, shares associated with certain stock options have been excluded from the diluted weighted average shares outstanding calculation because the exercise of those options would lead to a net reduction in common shares outstanding or anti-dilution. As a result, stock options to acquire 584, 726 and 673 weighted common shares have been excluded from the diluted weighted shares outstanding calculation for fiscal years 2018, 2017 and 2016, respectively.

In connection with the pricing of the TEUs, we purchased capped calls. The capped calls will not be reflected in the calculation of diluted earnings per share until settled as they will lead to a net reduction in common shares outstanding or anti-dilution. See Note 9 for additional information on our equity instruments.

Basic and diluted earnings per share were calculated as follows:

	2018	2017	2016
Net income	\$ 61,328	\$ 25,084	\$ 27,494
Weighted average common shares outstanding	19,163	19,040	16,027
Effect of dilutive securities			
Stock-based compensation	130	97	105
Tangible equity units	—	—	47
Weighted average dilutive common shares outstanding	19,293	19,137	16,179
Earnings per share			
Basic	\$ 3.20	\$ 1.32	\$ 1.72
Diluted	\$ 3.18	\$ 1.31	\$ 1.70

Stock-based Compensation

We measure the cost of employee services received in exchange for the award of equity instruments based on the fair value of the award at the date of grant. We recognize the cost over the period during which an employee is required to provide services in exchange for the award. Forfeitures of stock-based awards are recognized as they occur.

For purposes of determining estimated fair value of stock-based payment awards, we utilize the Black-Scholes option pricing model, which requires the input of certain assumptions requiring management judgment. Because our employee stock option awards have characteristics significantly different from those of traded options and because changes in the input assumptions can materially affect fair value estimates, existing models may not provide a reliable single measure of the fair value of employee stock options. We continue to assess the assumptions and methodologies used to calculate estimated fair value of stock-based compensation. Circumstances may change and additional data may become available over time that could result in changes to these assumptions and methodologies and thereby materially impact the fair value determination of future grants of stock-based payment awards. If factors change and we employ different assumptions in future periods, the compensation expense recorded may differ significantly from the stock-based compensation expense recorded in the current period. See Note 6 for additional information on stock-based compensation.

Loss Contingencies

We establish an accrual for loss contingencies when it is both probable that an asset has been impaired or a liability has been incurred and the amount of the loss can be reasonably estimated. When both of these criteria are not met, we do not establish an accrual. However, when there is at least a reasonable possibility that a loss has been incurred, but it is not probable or reasonably estimable, we disclose the nature of the loss contingency and an estimate of the possible loss or range of loss, as applicable. Any adjustment made to a loss contingency accrual during an accounting period affects the earnings of the period.

Use of Estimates

The preparation of financial statements in accordance with U.S. generally accepted accounting principles (GAAP) requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities as of the date of the financial statements, and reported amounts of revenue and expense during the reporting period. Additionally, we frequently undertake significant technological innovation on certain of our long-term contracts, involving performance risk that may result in delayed delivery of product and/or revenue and gross profit variation due to changes in the ultimate costs of these contracts versus estimates. On an ongoing basis, we evaluate our estimates including those related to receivables, inventory, property and equipment, intangible assets, warranties, accrued expenses, stock-based compensation, income taxes and capitalized software, among others. Actual results could differ from those estimates.

Recently Issued Accounting Pronouncements

Revenue Recognition

In May 2014, the Financial Accounting Standards Board (FASB) issued Accounting Standards Update (ASU) No. 2014-09, *Revenue from Contracts with Customers (Topic 606)* followed by incorporated related amendments ("the new revenue standard") to provide a single, comprehensive revenue recognition model for all contracts with customers. Under the new revenue standard, a company recognizes revenue to depict the transfer of promised goods or services to a customer in an amount that reflects the consideration a company expects to receive in exchange for those goods or services. Determination of when and how revenue is recognized is based on a five-step analysis. Enhanced disclosures regarding the nature, amount, timing and uncertainty of revenue and cash flows arising from a company's contracts with customers are required. Adoption of the new revenue standard is required for annual periods beginning after December 15, 2017, including interim periods within that annual period, which is our fiscal year 2019. The new guidance may be adopted retrospectively for all periods presented, or adopted using a modified retrospective transition method.

We will adopt the new revenue standard on September 30, 2018 for our fiscal year 2019 under the modified retrospective transition method. We have identified changes to our accounting policies and practices, business processes, systems and controls, as well as designed and substantially performed specific controls over our evaluation of the impact of the new guidance, including the cumulative effect calculation (i.e. transition adjustment) and disclosure requirements. Based on our evaluation of current contracts and revenue streams, the timing of revenue recognition for the majority of our products and contracts remains substantially unchanged, with the exception of certain contracts in our Test segment. Dependent on contract-specific terms that evidence customer control of the work in process or an enforceable right to payment with no alternative use, certain contracts will have a delay in revenue recognition until the customer takes control of the product, while certain contracts will accelerate to recognize revenue over the life of the contract. Under the new revenue standard, certain costs to obtain contracts (i.e. pre-contract costs) will be capitalized at contract inception and recognized as revenue is earned.

As of September 30, 2018, we expect to record a cumulative-effect reduction to the opening balance of our fiscal year 2019 retained earnings of approximately \$7,000, net of tax, for the deferral of previously recognized revenue and related cost of sales related to these specific contracts, partially offset by the capitalization and deferral of pre-contract costs. While we do not expect the adoption of the new revenue standard to have a significant impact on annual revenue recognized, our financial condition or results of operations, we do expect that it will have an impact on the timing of revenue recognition in interim periods. Expanded disclosures will be provided beginning in the first quarter of fiscal year 2019.

Leases

In February 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842)*, which requires lessees to recognize a right-of-use asset, representing the right to use the underlying asset for the lease term, and a lease liability on the balance sheet for all leases with terms greater than 12 months. Lessees can forgo recognizing a right-of-use asset and lease liability with lease terms of 12 months or less on the balance sheet through accounting policy elections as long as the lease does not include options to renew or purchase the underlying assets that are reasonably certain to be exercised. The new guidance also requires certain qualitative and quantitative disclosures designed to assess the amount, timing and uncertainty of cash flows arising from leases, along with additional key information about leasing arrangements.

In July 2018, the FASB issued ASU No. 2018-10, *Codification Improvements to Topic 842, Leases*, to clarify certain aspects of the new lease standard. The FASB also issued ASU No. 2018-11, *Leases (Topic 842): Targeted Improvements*, which allows the

election of an optional transition method to apply the provisions of the new lease standard as of the date of adoption and recognize a cumulative-effect adjustment to retained earnings in the period of adoption, while continuing to present all prior periods under previous lease accounting guidance.

The aforementioned lease standards and amendments are required to be adopted for annual periods beginning after December 15, 2018, including interim periods within that annual period, which is our fiscal year 2020. The new standards and amendments are to be applied using a modified retrospective approach, which includes a number of optional practical expedients and an optional transition method. Early adoption is permitted. We are currently evaluating the impact the adoption of this guidance will have on our financial condition, results of operations and disclosures.

Other

In March 2016, the FASB issued ASU No. 2016-04, *Liabilities—Extinguishments of Liabilities (Subtopic 405-20): Recognition of Breakage for Certain Prepaid Stored-Value Products*, which amends existing guidance on extinguishing financial liabilities for certain prepaid stored-value products. The new standard requires recognition of the expected breakage amount or the value that is ultimately not redeemed either proportionally in earnings as redemption occurs or when redemption is remote, if issuers are not entitled to breakage. The standard is required to be adopted for annual periods beginning after December 15, 2017, including interim periods within that annual period, which is our fiscal year 2019. The amendment is to be applied either using a modified retrospective approach by recognizing a cumulative-effect adjustment to retained earnings as of the beginning of the year or retrospectively to each period presented. Early adoption is permitted. We do not expect the adoption of this standard to have a material effect on our financial condition, results of operations or disclosures.

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments—Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments*, which changes the accounting for credit losses on instruments measured at amortized cost by adding an impairment model that is based on expected losses rather than incurred losses. An entity will recognize as an allowance its estimate of expected credit losses, which is believed to result in more timely recognition of such losses as the standard eliminates the probable initial recognition threshold. The standard is required to be adopted for annual periods beginning after December 15, 2019, including interim periods within that annual period, which is our fiscal year 2021. The amendment is to be applied using a modified retrospective approach as a cumulative-effect adjustment to retained earnings as of the beginning of the first reporting period in which adopted. Early adoption is permitted for annual periods beginning after December 15, 2018, including interim periods within that annual period, which is our fiscal year 2020. We have not yet evaluated the impact the adoption of this guidance may have on our financial condition, results of operations or disclosures.

In October 2016, the FASB issued ASU No. 2016-16, *Income Taxes (Topic 740), Intra-Entity Transfers of Assets Other Than Inventory*, which requires companies to account for the income tax effects of intercompany sales and transfers of assets other than inventory when the transfer occurs. Current guidance requires companies to defer the income tax effects of intercompany transfers of assets until the asset has been sold to an outside party or otherwise recognized. The standard is required to be adopted for annual periods beginning after December 15, 2017, including interim periods within that annual period, which is our fiscal year 2019. The amendment is to be applied using a modified retrospective approach. Early adoption is permitted as of the beginning of an annual period. We do not expect the adoption of this standard to have a material effect on our financial condition, results of operations or disclosures.

In March 2017, the FASB issued ASU No. 2017-07, *Compensation—Retirement Benefits (Topic 715): Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost*, which changes how employers that sponsor defined benefit pension or other postretirement benefit plans present the net periodic benefit cost in the income statement. The new guidance requires the service cost component of net periodic benefit cost to be presented in the same income statement line items as other employee compensation costs arising from services rendered during the period with only the service cost component eligible for capitalization in assets. Other components of the net periodic benefit cost are to be stated separately from the line items that include the service cost and outside of operating income. These components are not eligible for capitalization in assets. The standard is required to be adopted for annual periods beginning after December 15, 2017, including interim periods within that annual period, which is our fiscal year 2019. The amendment is to be applied retrospectively. Early adoption is permitted as of the beginning of an annual period. We do not expect the adoption of this standard to have a material effect on our financial condition, results of operations or disclosures.

In August 2017, the FASB issued ASU No. 2017-12, *Derivatives and Hedging (Topic 815): Targeted Improvements to Accounting for Hedging Activities*, which amends the hedge accounting model in Accounting Standards Codification (ASC) 815 to enable entities to better portray the economics of their risk management activities in the financial statements and enhance the transparency and understandability of hedge results. The standard is required to be adopted for annual periods beginning after December 15, 2018, including interim periods within that annual period, which is our fiscal year 2020. The amendment is to be applied using a modified retrospective approach, with early adoption permitted. We have not yet evaluated the impact the adoption of this guidance may have on our financial condition, results of operations or disclosures.

In August 2018, the FASB issued ASU No. 2018-13, *Fair Value Measurements (Topic 820): Disclosure Framework—Changes to the Disclosure Requirements for Fair Value Measurement*, which eliminates, amends and adds disclosure requirements for fair value measurements. The standard is required to be adopted for annual periods beginning after December 15, 2019, including interim periods within that annual period, which is our fiscal year 2021. Certain disclosures in the amendment are to be applied using a retrospective approach while other disclosures are to be applied using a prospective approach. Early adoption is permitted. We have not yet evaluated the impact the adoption of this guidance may have on our financial condition, results of operations or disclosures.

In August 2018, the FASB issued ASU No. 2018-14, *Compensation—Retirement Benefits—Defined Benefit Plans—General (Subtopic 715-20): Disclosure Framework—Changes to the Disclosure Requirements for Defined Benefit Plans*, which eliminates, amends and adds disclosure requirements for defined benefit pension and other postretirement plans. The standard is required to be adopted for annual periods ending after December 15, 2020, which is our fiscal year 2021. The amendment is to be applied using a retrospective approach with early adoption permitted. We have not yet evaluated the impact the adoption of this guidance may have on our financial condition, results of operations or disclosures.

Adopted

In July 2015, the FASB issued ASU No. 2015-11, *Inventory (Topic 330): Simplifying the Measurement of Inventory*, which modifies existing requirements regarding measuring inventory at the lower of cost or market. Under current inventory standards, the market value requires consideration of replacement cost, net realizable value and net realizable value less an approximately normal profit margin. The new guidance replaces market with net realizable value defined as estimated selling prices in the ordinary course of business, less reasonably predictable costs of completion, disposal and transportation. This eliminates the need to determine and consider replacement cost or net realizable value less an approximately normal profit margin when measuring inventory. We adopted the new standard on a prospective basis for the annual period ended September 29, 2018, including interim periods within that annual period. The adoption of this guidance had no impact on our financial condition, results of operations or disclosures.

In March 2016, the FASB issued ASU No. 2016-09, *Compensation—Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting*, which is intended to simplify certain aspects of accounting for share-based compensation arrangements, including modifications to the accounting for income taxes upon vesting or settlement of awards, employer tax withholding on share-based compensation, classification on the statement of cash flows and forfeitures. We adopted the new standard for the annual period ended September 29, 2018, including interim periods within that annual period. Certain aspects of the amendment were applied using a retrospective transition method, while others were applied prospectively. The adoption of this standard resulted in an increase in cash flows from operating activities and a decrease of cash flows from financing activities of \$208 for fiscal year 2017 and \$187 for fiscal year 2016 for the reclassification from financing activities to operating activities of excess tax benefits from stock-based compensation. Additionally, we elected to modify our accounting policy for forfeitures on stock-based awards to record forfeitures when the forfeiture occurs instead of recording stock-based compensation expense based on an estimation of stock awards that will ultimately vest, resulting in an increase of \$33 to fiscal year 2018 beginning retained earnings with an offsetting decrease in additional paid-in capital. The adoption of this guidance did not have a material impact on our financial condition, results of operations or disclosures for fiscal year 2018.

In August 2016, the FASB issued ASU No. 2016-15, *Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments*, which provides guidance on the classification of certain cash receipts and cash payments with the objective of reducing diversity in practice. We early adopted the new standard on a retrospective basis for the annual period ended September 29, 2018, including interim periods within that annual period. The adoption of this guidance did not have a material impact on our current or prior year financial condition, results of operations or disclosures.

In January 2017, the FASB issued ASU No. 2017-01, *Business Combinations (Topic 805): Clarifying the Definition of a Business*, which changes the definition of a business to assist entities with evaluating when a set of transferred assets and activities is a business. The new guidance clarifies that a business must also include at least one substantive process and narrows the definition of outputs by more closely aligning it with how outputs are described in ASC 606, *Revenue from Contracts with Customers*. We early adopted the new standard on a prospective basis for the annual period ended September 29, 2018, including interim periods within that annual period. The adoption of this guidance had no impact on our financial condition, results of operations or disclosures as the standard only applies to transactions occurring subsequent to adoption.

In May 2017, the FASB issued ASU No. 2017-09, *Compensation—Stock Compensation (Topic 718): Scope of Modification Accounting*, which clarifies when changes to the terms or conditions of a share-based payment award must be accounted for as modifications. Modification guidance must be applied if the fair value, vesting conditions or classification of the awards changes. We early adopted the new standard on a prospective basis beginning in the interim period commencing July 1, 2018 of the annual period ended September 29, 2018. The adoption of this guidance had no impact on our financial condition, results of

operations or disclosures as the standard only applies to transactions occurring subsequent to adoption, and we had no modifications to our stock-based compensation awards in fiscal year 2018.

In March 2018, the FASB issued ASU No. 2018-02, *Income Statement—Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income*, which provides an option to reclassify stranded tax effects within accumulated other comprehensive income (loss) (AOCI) to retained earnings due to the lower U.S. corporate tax rate in the Tax Cuts and Jobs Act (the Tax Act). We early adopted the new standard as of September 29, 2018. The adoption of this guidance resulted in the reclassification of \$640 accumulated other comprehensive income into retained earnings. The adoption of this guidance did not have a material effect on our financial condition, results of operations or disclosures.

In March 2018, the FASB issued ASU No. 2018-05, *Income Taxes (Topic 740): Amendments to SEC Paragraphs Pursuant to SEC Staff Accounting Bulletin No. 118 (SAB 118)*, which incorporates various SEC paragraphs from SAB 118 into income tax accounting guidance effective immediately. The SEC issued the interpretive guidance in SAB 118 on December 22, 2017 concurrent with the enactment of the Tax Act to clarify accounting and disclosure requirements. Pursuant to SAB 118, we recognized the estimated income tax effects of the Tax Act in our consolidated financial statements for all interim periods in our fiscal year ended September 29, 2018. We adopted the new standard in the interim period ended March 31, 2018. See Note 8 for disclosure of the impact the adoption of this guidance on our financial condition and results of operations for fiscal year 2018.

NOTE 2 CAPITAL ASSETS

Property and Equipment

Property and equipment, net are as follows:

	2018	2017
Land and improvements	\$ 2,881	\$ 2,867
Buildings and improvements	58,880	60,340
Machinery and equipment	203,647	196,621
Assets held under capital leases	2,815	2,747
Total property and equipment	268,223	262,575
Less: Accumulated depreciation	(177,954)	(162,645)
Total property and equipment, net	\$ 90,269	\$ 99,930

Goodwill

Changes to the carrying amount of goodwill are as follows:

	Test	Sensors	Total
Balance, October 1, 2016	\$ 25,022	\$ 344,678	\$ 369,700
Adjustment related to finalization of purchase accounting ¹	—	(64)	(64)
Currency translation gain (loss)	87	39	126
Balance, September 30, 2017	\$ 25,109	\$ 344,653	\$ 369,762
Currency translation gain (loss)	(478)	(9)	(487)
Balance, September 29, 2018	\$ 24,631	\$ 344,644	\$ 369,275

¹ See Note 13 for additional information regarding acquisitions.

See Note 1 for additional information on our goodwill impairment analysis.

Intangible Assets

Intangible assets are as follows:

	September 29, 2018			Weighted Average Useful Life (in Years)
	Gross Carrying Amount	Accumulated Amortization	Net Carrying Value	
Software development costs ¹	\$ 31,251	\$ (15,860)	\$ 15,391	6.5
Technology and patents	46,405	(12,188)	34,217	14.9
Trademarks and trade names	6,754	(2,987)	3,767	25.4
Customer lists	156,971	(23,314)	133,657	15.8
Land-use rights	2,336	(730)	1,606	26.0
Trade names	57,500	—	57,500	Indefinite
Total intangible assets	\$ 301,217	\$ (55,079)	\$ 246,138	14.8

¹ The gross carrying amount of software development costs as of September 29, 2018 includes \$15,391 not yet placed in service.

	September 30, 2017			Weighted Average Useful Life (in Years)
	Gross Carrying Amount	Accumulated Amortization	Net Carrying Value	
Software development costs	\$ 26,083	\$ (15,830)	\$ 10,253	5.9
Technology and patents	46,731	(9,399)	37,332	14.9
Trademarks and trade names	6,936	(2,484)	4,452	25.6
Customer lists	157,016	(13,359)	143,657	15.8
Land-use rights	2,377	(492)	1,885	26.4
Trade names	57,500	—	57,500	Indefinite
Total intangible assets	\$ 296,643	\$ (41,564)	\$ 255,079	15.0

Amortization expense recognized is as follows:

	2018	2017	2016
Amortization expense	\$ 13,831	\$ 14,665	\$ 5,517

See Note 1 for additional information on our intangible asset impairment analysis.

Estimated future amortization expense related to finite-lived intangible assets is as follows:

Fiscal Year	Amortization Expense
2019	\$ 13,569
2020	13,288
2021	14,239
2022	15,007
2023	14,905
Thereafter	117,630

Future amortization amounts presented above are estimates. Actual future amortization expense may be different due to fluctuations in foreign currency exchange rates, future acquisitions, impairments, changes in amortization periods or other factors.

NOTE 3 FAIR VALUE MEASUREMENTS

In determining the fair value of financial assets and liabilities, we currently utilize market data or other assumptions that we believe market participants would use in pricing the asset or liability in the principal or most advantageous market and adjust for non-performance and/or other risk associated with the company as well as counterparties, as appropriate. When considering market participant assumptions in fair value measurements, the following fair value hierarchy distinguishes between observable and unobservable inputs, which are categorized in one of the following levels:

- **Level 1:** Unadjusted quoted prices which are available in active markets for identical assets or liabilities accessible to us at the measurement date.
- **Level 2:** Inputs other than quoted prices included in Level 1 inputs that are observable for the asset or liability, either directly or indirectly, for substantially the full term of the asset or liability.
- **Level 3:** Unobservable inputs for the asset or liability used to measure fair value to the extent that observable inputs are not available, thereby allowing for situations in which there is little, if any, market activity for the asset or liability at the measurement date.

The hierarchy gives the highest priority to Level 1, as this level provides the most reliable measure of fair value, while giving the lowest priority to Level 3.

Assets and Liabilities Measured at Fair Value on a Recurring Basis

Financial assets and liabilities subject to fair value measurements on a recurring basis are as follows:

	September 29, 2018			
	Level 1	Level 2	Level 3	Total
Assets				
Currency contracts ¹	\$ —	\$ 1,080	\$ —	\$ 1,080
Interest rate swaps ²	—	7,411	—	7,411
Total assets	—	8,491	—	8,491
Liabilities				
Currency contracts ¹	—	173	—	173
Total liabilities	\$ —	\$ 173	\$ —	\$ 173

	September 30, 2017			
	Level 1	Level 2	Level 3	Total
Assets				
Currency contracts ¹	\$ —	\$ 150	\$ —	\$ 150
Interest rate swaps ²	—	3,499	—	3,499
Total assets	—	3,649	—	3,649
Liabilities				
Currency contracts ¹	—	551	—	551
Total liabilities	\$ —	\$ 551	\$ —	\$ 551

¹ Based on observable market transactions of spot currency rates and forward currency rates on equivalently-termed instruments. Carrying amounts of the financial assets and liabilities are equal to the fair value. See Note 4 for additional information on derivative financial instruments.

² Based on London Interbank Offered Rate (LIBOR) and spot rates. Carrying amount of the financial asset is equal to the fair value. See Note 4 for additional information on derivative financial instruments.

Assets and Liabilities Measured at Fair Value on a Nonrecurring Basis

We measure certain financial instruments at fair value on a nonrecurring basis. These assets primarily include goodwill, intangible assets and other long-lived assets acquired either as part of a business acquisition, individually or with a group of other assets, as well as property and equipment. These assets were initially measured and recognized at amounts equal to the

fair value determined as of the date of acquisition or purchase subject to changes in value only for foreign currency translation. Periodically, these assets are tested for impairment, by comparing their respective carrying values to the estimated fair value of the reporting unit or asset group in which they reside. In the event any of these assets were to become impaired, we would recognize an impairment loss equal to the amount by which the carrying value of the reporting unit, impaired asset or asset group exceeds its estimated fair value. Fair value measurements of reporting units are estimated using an income approach involving discounted or undiscounted cash flow models that contain certain Level 3 inputs requiring management judgment, including projections of economic conditions and customer demand, revenue and margins, changes in competition, operating costs, working capital requirements and new product introductions. Fair value measurements of the reporting units associated with our goodwill balances and our indefinite-lived intangible assets are estimated at least annually in the fourth quarter of each fiscal year for purposes of impairment testing if a quantitative analysis is performed. Fair value measurements associated with our intangible assets, other long-lived assets and property and equipment are estimated when events or changes in circumstances such as market value, asset utilization, physical change, legal factors or other matters indicate that the carrying value may not be recoverable. See Note 1 and Note 2 for additional information on goodwill, indefinite-lived intangible assets, other long-lived assets, property and equipment and impairment testing.

Assets and Liabilities Not Measured at Fair Value

Certain financial instruments are not measured at fair value but are recorded at carrying amounts approximating fair value based on their short-term nature or variable interest rate. These financial instruments include cash and cash equivalents, accounts receivable, accounts payable and short-term borrowings.

Other Financial Instruments

Other financial instruments subject to fair value measurements include debt, which is recorded at carrying value in the Consolidated Balance Sheets. The carrying amount and estimated fair values of our debt are as follows:

	September 29, 2018				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
Debt component of tangible equity units ³	\$ 7,290	\$ 8,626	\$ —	\$ 8,626	\$ —
Tranche B term loan ⁴	391,416	395,330	—	395,330	—
Total debt	\$ 398,706	\$ 403,956	\$ —	\$ 403,956	\$ —

	September 30, 2017				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
Debt component of tangible equity units ³	\$ 16,443	\$ 19,844	\$ —	\$ 19,844	\$ —
Tranche B term loan ⁴	455,400	457,085	—	457,085	—
Total debt	\$ 471,843	\$ 476,929	\$ —	\$ 476,929	\$ —

³ The fair value of the TEUs is based on the most recently quoted price for the outstanding securities, adjusted for any known significant deviations in value. The estimated fair value of these long-term obligations is not necessarily indicative of the amount that would be realized in a current market exchange. See Note 9 for additional information on the TEUs.

⁴ The fair value of the tranche B term loan is based on the most recently quoted market price for the outstanding debt instrument, adjusted for any known significant deviations in value. The estimated fair value of the debt obligation is not necessarily indicative of the amount that would be realized in a current market exchange. See Note 5 for additional information on financing arrangements.

NOTE 4 DERIVATIVE INSTRUMENTS AND HEDGING ACTIVITIES

Our currency exchange contracts and interest rate swaps are designated as cash flow hedges and qualify as hedging instruments. We also have derivatives which are not designated as cash flow hedges and, therefore, are accounted for and reported under foreign currency guidance. Regardless of designation for accounting purposes, we believe all of our derivative instruments are hedges of transactional risk exposures. The fair value of our outstanding designated and undesignated derivative assets and liabilities are reported in the Consolidated Balance Sheets as follows:

	September 29, 2018	
	Prepaid Expenses and Other Current Assets	Other Accrued Liabilities
Designated hedge derivatives		
Cash flow derivatives	\$ 989	\$ 173
Interest rate swaps	7,411	—
Total designated hedge derivatives	8,400	173
Undesignated hedge derivatives		
Balance sheet derivatives	91	—
Total hedge derivatives	\$ 8,491	\$ 173

	September 30, 2017	
	Prepaid Expenses and Other Current Assets	Other Accrued Liabilities
Designated hedge derivatives		
Cash flow derivatives	\$ 73	\$ 551
Interest rate swaps	3,499	—
Total designated hedge derivatives	3,572	551
Undesignated hedge derivatives		
Balance sheet derivatives	77	—
Total hedge derivatives	\$ 3,649	\$ 551

A reconciliation of the net fair value of designated hedge derivatives subject to master netting arrangements that are recorded in the Consolidated Balance Sheets to the net fair value that could have been reported in the Consolidated Balance Sheets are as follows:

	Gross Recognized Amount	Gross Offset Amount	Net Amount Presented	Derivatives Subject to Offset	Cash Collateral Received	Net Amount
September 29, 2018						
Assets	\$ 8,400	\$ —	\$ 8,400	\$ (173)	\$ —	\$ 8,227
Liabilities	173	—	173	(173)	—	—
September 30, 2017						
Assets	\$ 3,572	\$ —	\$ 3,572	\$ (210)	\$ —	\$ 3,362
Liabilities	551	—	551	(210)	—	341

Cash Flow Hedging – Currency Risks

Currency exchange contracts utilized to maintain the functional currency value of expected financial transactions denominated in foreign currencies are designated as cash flow hedges. Qualifying gains and losses related to changes in the market value of these contracts are reported as a component of AOCI within shareholders' equity in the Consolidated Balance Sheets and reclassified into earnings in the same period during which the underlying hedged transaction affects earnings. The effective portion of the cash flow hedges represents the change in fair value of the hedge that offsets the change in the functional currency value of the hedged item. We periodically assess whether our currency exchange contracts are effective and, when a contract is determined to be no longer effective as a hedge, we discontinue hedge accounting prospectively. Subsequent

changes in the market value of ineffective currency exchange contracts are recognized as an increase or decrease in revenue in the Consolidated Statements of Income as that is the same line item in which the underlying hedged transaction is reported.

As of September 29, 2018 and September 30, 2017, we had outstanding cash flow hedge currency exchange contracts with gross notional U.S. dollar equivalent amounts of \$39,856 and \$29,136, respectively. Upon netting offsetting contracts to sell foreign currencies against contracts to purchase foreign currencies, irrespective of contract maturity dates, the net notional U.S. dollar equivalent amount of contracts outstanding was \$29,315 and \$24,093 at September 29, 2018 and September 30, 2017, respectively. As of September 29, 2018, the net market value of the foreign currency exchange contracts was a net asset of \$816, consisting of \$989 in assets and \$173 in liabilities. As of September 30, 2017, the net market value of the foreign currency exchange contracts was a net liability of \$478, consisting of \$73 in assets and \$551 in liabilities.

The pre-tax amounts recognized in AOCI on currency exchange contracts, including (gains) losses reclassified into earnings in the Consolidated Statements of Income and gains (losses) recognized in other comprehensive income (loss) (OCI), are as follows:

	2018	2017
Beginning unrealized net gain (loss) in AOCI	\$ (443)	\$ (400)
Net (gain) loss reclassified into revenue (effective portion)	399	(459)
Net gain (loss) recognized in OCI (effective portion)	716	416
Ending unrealized net gain (loss) in AOCI	\$ 672	\$ (443)

The amount recognized in earnings as a result of the ineffectiveness of cash flow hedges was \$5, \$8, and less than \$1 in the fiscal years ended September 29, 2018, September 30, 2017 and October 1, 2016, respectively. As of September 29, 2018, the amount projected to be reclassified from AOCI into earnings in the next 12 months was a net gain of \$618. The maximum remaining maturity of any forward or optional contracts as of September 29, 2018 was 1.4 years.

Interest Rate Swaps

On October 20, 2016, we entered into a floating to fixed interest rate swap agreement to mitigate our exposure to interest rate increases related to a portion of our tranche B term loan facility. The total notional amount of the interest rate swap was \$255,000 as of September 29, 2018. The swap agreement expires April 3, 2021. As a result of this agreement, every month we pay fixed interest at 1.256% in exchange for interest received at one month U.S. LIBOR. The market value of the interest rate swap as of September 29, 2018 was an asset of \$7,411. The interest rate swap has been designated as a cash flow hedge. As a result, changes in the fair value of the interest rate swap are recorded in AOCI within shareholders' equity in the Consolidated Balance Sheets.

The pre-tax amounts recognized in AOCI on interest rate swaps, including (gains) losses reclassified into earnings in the Consolidated Statements of Income and gains (losses) recognized in OCI, are as follows:

	2018	2017
Beginning unrealized net gain (loss) in AOCI	\$ 3,499	\$ —
Net (gain) loss reclassified into interest expense (effective portion)	(1,204)	614
Net gain (loss) recognized in OCI (effective portion)	5,116	2,885
Ending unrealized net gain (loss) in AOCI	\$ 7,411	\$ 3,499

As of September 29, 2018, the amount projected to be reclassified from AOCI into earnings in the next 12 months was a net gain of \$2,927.

Foreign Currency Balance Sheet Derivatives

We also use foreign currency derivative contracts to maintain the functional currency value of monetary assets and liabilities denominated in non-functional foreign currencies. The gains and losses related to the changes in the market value of these derivative contracts are included in other income (expense), net in the Consolidated Statements of Income.

As of September 29, 2018 and September 30, 2017, we had outstanding foreign currency balance sheet derivative contracts with gross notional U.S. dollar equivalent amounts of \$90,816 and \$52,208, respectively. Upon netting offsetting contracts by counterparty banks to sell foreign currencies against contracts to purchase foreign currencies, irrespective of contract maturity dates, the net notional U.S. dollar equivalent amount of contracts outstanding at September 29, 2018 and September 30, 2017 was \$28,271 and \$14,762, respectively. As of September 29, 2018 and September 30, 2017, the net market value of the foreign exchange balance sheet derivative contracts was a net asset of \$91 and \$77, respectively.

The net gain (loss) recognized in the Consolidated Statements of Income on foreign exchange balance sheet derivative contracts is as follows:

	2018	2017	2016
Net gain (loss) recognized in other income (expense), net	\$ 316	\$ (876)	\$ (950)

NOTE 5 FINANCING

Long-term debt consists of the following:

	2018	2017
Long-term debt		
Tranche B term loan, 1.00% amortizing per year, maturing July 5, 2023	\$ 391,416	\$ 455,400
Tangible equity units, 8.75% coupon, maturing July 1, 2019 ¹	7,290	16,443
Capital lease obligations	2,000	2,466
Total long-term debt	\$ 400,706	\$ 474,309
Less: Unamortized underwriting discounts, commissions and other expenses	(8,623)	(12,491)
Less: Current maturities of tranche B term loan debt ^{2,3}	(28,600)	(33,600)
Less: Current maturities of TEU debt ²	(7,290)	(9,152)
Less: Current maturities of capital lease obligations ²	(553)	(522)
Total long-term debt, less current maturities, net	\$ 355,640	\$ 418,544

¹ See Note 9 for more information on our TEUs.

² In addition to the current maturities above, current maturities of long-term debt, net on the Consolidated Balance Sheets includes the current portion of unamortized underwriting discounts, commissions and other expenses of \$3,705 and \$4,179 as of September 29, 2018 and September 30, 2017, respectively.

³ As of September 29, 2018 and September 30, 2017, current maturities of tranche B term loan consist of the 1% annual payment and calculated required annual Excess Cash Flow payment as defined below, as well as planned prepayments.

Tranche B Term Loan and Revolving Credit Facility

We have a credit agreement with U.S. Bank National Association and HSBC Bank USA, National Association as Co-Documentation Agents, Wells Fargo Bank, National Association as Syndication Agent, JPMorgan Chase Bank, N.A. as Administrative Agent and JP Morgan Chase Bank, N.A. and Wells Fargo Securities, LLC as Joint Bookrunners and Joint Lead Arrangers (the Credit Agreement). The Credit Agreement provides for senior secured credit facilities consisting of a \$120,000 revolving credit facility (the Revolving Credit Facility) which expires on July 5, 2021, and a \$460,000 tranche B term loan facility (the Term Facility) which expires on July 5, 2023. The proceeds of the Revolving Credit Facility can be drawn upon to refinance existing indebtedness and for working capital and other general corporate purposes up to a maximum of \$120,000. The proceeds of the Term Facility were used for financing the acquisition of PCB. The Term Facility amortizes in equal quarterly installments equal to 1% of the original principal amount.

In the fourth quarter of fiscal year 2017, we completed a repricing of the tranche B term loan through an amendment to the Credit Agreement (Second Credit Agreement Amendment) to reduce the Applicable Rate (as defined in the Credit Agreement) by 100 basis points for both the Term Facility and Revolving Credit Facility and to make certain reductions to the Revolving Credit Facility commitment fee rates. During the fourth quarter of 2017, in connection with the execution of the Second Credit Agreement Amendment, we paid debt financing costs of \$1,770, of which \$1,147 was expensed in interest expense, net in the Consolidated Income Statements and \$623 was capitalized in current maturities of long-term debt, net; long-term debt, less current maturities, net; and prepaid expenses and other current assets in the Consolidated Balance Sheets. We also recognized non-cash charges of \$503 in interest expense, net in the Consolidated Income Statements for the loss on debt extinguishment resulting from the write-off of existing unamortized debt financing costs.

The primary categories of borrowing include Alternate Base Rate (ABR) Borrowings (ABR Term Loans and ABR Revolving Loans), Swingline Loans and Eurocurrency Borrowing (each as defined in the Credit Agreement). ABR Borrowings and Swingline Loans made in U.S. dollars under the Credit Agreement bear interest at a rate per annum equal to the ABR plus the Applicable Rate (as defined in the Credit Agreement). The ABR is defined as the greater of (a) the Prime Rate (as defined in the Credit Agreement) in effect on such day, (b) the New York Federal Reserve Bank Rate (NYFRB Rate) (as defined in the Credit

Agreement) in effect on such day plus ½ of 1.00%, or (c) the Adjusted LIBOR (as defined in the Credit Agreement) for a one-month interest period in dollars on such day plus 1.00%. The ABR for ABR Term Loans shall not be less than 1.75% per annum. The Applicable Rate for any ABR Revolving Loans is based upon the leverage ratio applicable on such date. As of September 29, 2018, the Applicable Rate for ABR Term Loans was 2.25% per annum.

Eurocurrency Borrowings made under the Credit Agreement bear interest at a rate per annum equal to the Adjusted LIBOR Rate plus the Applicable Rate. The Adjusted LIBOR Rate is defined as an interest rate per annum equal to (a) the LIBOR Rate for such interest period multiplied by (b) the Statutory Reserve Rate (as defined in the Credit Agreement). The Applicable Rate for any Eurocurrency Revolving Loans is based upon the leverage ratio applicable on such date. The Adjusted LIBOR Rate for Eurocurrency Term Loans shall not be less than 0.75% per annum. Based on our leverage ratio as of September 29, 2018, the Applicable Rate for Eurocurrency Revolving Loans was 3.00%. As of September 29, 2018, the Applicable Rate for Eurocurrency Term Loans was 3.25% per annum, plus the applicable Adjusted LIBOR rate of 2.16%. The weighted average interest rate on the Term Facility debt during fiscal year 2018 was 4.95%.

As of September 29, 2018 and September 30, 2017, there were no outstanding borrowings under the Revolving Credit Facility. We had outstanding letters of credit drawn from the Revolving Credit Facility totaling \$20,448 and \$37,811 as of September 29, 2018 and September 30, 2017, respectively, leaving approximately \$99,552 and \$82,189, respectively, of unused borrowing capacity. Commitment fees are payable on the unused portion of the Revolving Credit Facility at rates between 0.25% and 0.40% based on our leverage ratio. For fiscal years 2018 and 2017, commitment fees incurred totaled \$342 and \$405, respectively.

The Credit Agreement governing the Term Facility requires us to prepay outstanding term loans, subject to certain exceptions, depending on the leverage ratio with (a) up to 50% of the Company's annual Excess Cash Flow (as defined in the Credit Agreement) and (b) 100% of the net cash proceeds of (i) certain asset sales and casualty and condemnation events, subject to reinvestment rights and certain other exceptions; and (ii) any incurrence or issuance of certain debt, other than debt permitted under the Credit Agreement. We may voluntarily prepay outstanding loans under the Term Facility at any time without premium or penalty. All obligations under the Term Facility are unconditionally guaranteed by certain of the Company's existing wholly owned domestic subsidiaries, and are secured, subject to certain exceptions, by substantially all of the Company's assets and the assets of the Company's subsidiary guarantors.

Under the Credit Agreement, we are subject to customary affirmative and negative covenants, including, among others, restrictions on our ability to incur debt, create liens, dispose of assets, make investments, loans, advances, guarantees and acquisitions, enter into transactions with affiliates, and enter into any restrictive agreements and customary events of default (including payment defaults, covenant defaults, change of control defaults and bankruptcy defaults). The Credit Agreement also contains financial covenants, including the ratio of consolidated total indebtedness to adjusted consolidated earnings before income, taxes, depreciation and amortization (Adjusted EBITDA), as defined in the Credit Agreement, as well as the ratio of Adjusted EBITDA to consolidated interest expense. These covenants restrict our ability to purchase outstanding shares of our common stock. As of September 29, 2018 and September 30, 2017, we were in compliance with these financial covenants.

See Note 3 for additional information on the fair value of the Term Facility and the TEU debt.

Interest Rate Swaps

On October 20, 2016, in order to mitigate our exposure to interest rate increases on our variable rate debt, we entered into a variable to fixed amortizing interest rate swap. See Note 4 for additional information on derivative financial instruments.

The interest rate swap will be reduced to the following notional amounts over the next five years:

	Notional Amount
October 3, 2018	\$ 225,000
October 3, 2019	180,000
October 3, 2020	125,000
April 3, 2021	—

Future Maturities of Long-term Debt

Future maturities of long-term debt, excluding unamortized original issue discounts and deferred financing costs, for the next five fiscal years and thereafter are as follows:

Fiscal Year	Future Maturities ⁴
2019	\$ 12,443
2020	5,176
2021	5,192
2022	4,879
2023	373,016
Thereafter	—

⁴ Includes the 1% annual payment on the Term Facility, current maturities of TEU debt and current maturities of capital lease obligations. For fiscal year 2019, no Excess Cash Flow prepayment is required under the provisions of the Credit Agreement for the Term Facility due to the planned prepayments made during fiscal year 2018. Fiscal years 2020 and thereafter exclude any Excess Cash Flow prepayments which may be required under the provisions of the Credit Agreement for the Term Facility based on fiscal year 2019 and subsequent fiscal year results because the amount of future prepayments, if any, is not reasonably estimable as of September 29, 2018. Capital lease obligations expire on various dates through fiscal year 2022.

Letters of Credit and Guarantees

As of September 29, 2018, we had outstanding letters of credit and guarantees totaling \$26,753 and \$17,572, respectively, primarily to bond advance payments and performance guarantees related to customer contracts in Test.

NOTE 6 STOCK-BASED COMPENSATION

We compensate our officers, directors and employees with stock-based compensation under the 2017 Stock Incentive Plan (the 2017 Plan) approved by our shareholders and administered under the supervision of our Board of Directors. The 2017 Plan provides stock incentive awards in the form of stock options (incentive and non-qualified), stock appreciation rights, restricted stock, restricted stock units, performance stock, performance stock units and other awards. In fiscal year 2017, our shareholders approved the 2017 Plan and authorized 1,500 shares for issuance. As of September 29, 2018, a total of 1,313 shares were available for issuance under the 2017 Plan. Shares will be available for issuance under the 2017 Plan until June 6, 2027. We make an annual stock grant under the 2017 Plan of stock options, restricted stock units and performance restricted stock units, as well as stock grants throughout the fiscal year. For fiscal years 2018, 2017 and 2016, the annual stock grant occurred in April 2018, April 2017 and December 2015, respectively.

In fiscal year 2018, we adopted ASU No. 2016-09, *Compensation - Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting*. See Note 1 for additional information regarding the impact of adoption.

Stock-based Compensation Expense

Stock-based compensation expense recognized in the Consolidated Statements of Income is as follows:

	2018	2017	2016
Stock-based compensation expense by type of award			
Employee stock options	\$ 1,849	\$ 1,588	\$ 2,436
Employee stock purchase plan	283	298	519
Restricted stock units, performance restricted stock units and restricted stock	5,112	3,737	4,203
Amounts capitalized as inventory	(1,799)	(1,444)	(2,354)
Amounts recognized in income for amounts previously capitalized as inventory	1,838	1,421	2,420
Total stock-based compensation included in income from operations	7,283	5,600	7,224
Income tax benefit on stock-based compensation	(1,763)	(1,893)	(2,421)
Net stock-based compensation expense included in net income	\$ 5,520	\$ 3,707	\$ 4,803

As of September 29, 2018, there was \$2,462 of total unrecognized expense related to non-vested awards of stock options which is expected to be recognized over a weighted average period of approximately 1.2 years. As of September 29, 2018, there was \$6,559 of total unrecognized expense related to non-vested awards of restricted stock units and performance restricted stock units which is expected to be recognized over a weighted average period of approximately 1.2 years.

Stock Options

Stock options are granted at an exercise price equal to the closing market price of our stock on the date of grant. Generally, stock options vest proportionally on the first three anniversaries of the grant date and expire, depending on the date of grant, five or seven years from the grant date.

The fair value of stock options granted is estimated as of the date of each grant using the multiple option form of the Black-Scholes valuation model based on the exercise price and assumptions regarding the expected grant life, stock price volatility, dividends and risk-free interest rates. Each vesting period of an option award is valued separately and recognized evenly over the respective vesting period. The weighted average per share fair value of stock options granted during fiscal years 2018, 2017 and 2016 was \$11.10, \$8.91 and \$11.71, respectively.

The weighted average assumptions used to determine fair value of stock options granted are as follows:

	2018	2017	2016
Expected life (in years)	4.0	4.0	4.1
Risk-free interest rate	2.6%	1.6%	1.5%
Expected volatility	29.4%	29.2%	26.7%
Dividend yield	2.3%	2.6%	2.0%

The expected life represents the period that the stock option awards are expected to be outstanding and was determined based on historical and anticipated future exercise and expiration patterns. The risk-free interest rate used is based on the yield of constant maturity U.S. Treasury bonds on the grant date with a remaining term equal to the expected life of the grant. Stock price volatility is estimated based on a historical weekly price observation. The dividend yield assumption is based on the annualized current dividend divided by the share price on the grant date.

Stock option activity is as follows:

	2018		2017		2016	
	Shares	WAEP ¹	Shares	WAEP ¹	Shares	WAEP ¹
Options outstanding at beginning of year	766	\$ 57.86	784	\$ 60.34	687	\$ 58.17
Granted	245	\$ 52.30	288	\$ 46.35	316	\$ 61.57
Exercised	(19)	\$ 47.26	(112)	\$ 40.68	(68)	\$ 41.10
Forfeited or expired	(111)	\$ 57.64	(194)	\$ 60.74	(151)	\$ 61.74
Options outstanding at end of year	881	\$ 56.57	766	\$ 57.86	784	\$ 60.34
Options eligible for exercise at year end	443	\$ 61.61	329	\$ 64.52	331	\$ 56.23

¹ Weighted Average Exercise Price

Options outstanding as of September 29, 2018 had a weighted average remaining contractual term of 4.6 years and an aggregate intrinsic value of \$2,426. Options eligible for exercise as of September 29, 2018 had a weighted average remaining contractual term of 3.3 years and an aggregate intrinsic value of \$589.

The total intrinsic value of stock options exercised during fiscal years 2018, 2017 and 2016 was \$121, \$1,467 and \$1,082, respectively.

Restricted Stock, Restricted Stock Units and Performance Restricted Stock Units

We award restricted stock units to directors. The restricted stock units vest one year from the date of the grant, provided the director continues to serve on the Board of Directors. The directors are entitled to cash dividend equivalents on restricted stock units, but they do not have voting rights on the unvested shares until they become owners of the shares, unless otherwise approved by the Compensation and Leadership Development Committee of the Board of Directors. Additionally, in fiscal year 2013, we awarded restricted stock to our directors that vested proportionately on the first three anniversaries of the grant date. For restricted stock awarded to directors, participants are entitled to cash dividends and voting rights on unvested shares, but the sale and transfer of these shares is restricted during the vesting period. Restricted stock and restricted stock units are valued based on the market value of the shares as of the date of grant with the value allocated to expense evenly over the restricted period.

We award restricted stock units to key employees. Employees awarded restricted stock units are not entitled to cash dividends or voting rights on unvested units. Awards are valued based on the market value of our stock as of the date of grant with the

value recognized as expense evenly over the restricted period. Restricted stock units vest proportionally on the first three anniversaries of the grant date.

We award performance restricted stock units to key employees. Performance restricted stock units vest based on attainment of average return on invested capital performance targets over a one or three year performance period. Participants awarded performance restricted stock units are not entitled to cash dividends or voting rights on unvested units. Performance restricted stock units are valued based on the market value of our shares as of the date of grant with the value recognized as an expense over the performance period. Once the performance criteria has been met, the value of the performance restricted stock units is finalized at the end of the performance period.

Restricted stock activity is as follows:

	2018		2017		2016	
	Shares	WAGDFV ²	Shares	WAGDFV ²	Shares	WAGDFV ²
Unvested shares at beginning of year	—	\$ —	—	\$ —	3	\$ 57.01
Granted	—	\$ —	—	\$ —	—	\$ —
Vested and released	—	\$ —	—	\$ —	(3)	\$ 57.01
Forfeited	—	\$ —	—	\$ —	—	\$ —
Unvested shares at end of year	—	\$ —	—	\$ —	—	\$ —

² Weighted Average Grant Date Fair Value per share

Restricted stock unit and performance restricted stock unit activity are as follows:

	2018		2017		2016	
	Shares	WAGDFV ³	Shares	WAGDFV ³	Shares	WAGDFV ³
Outstanding at beginning of year	223	\$ 49.95	165	\$ 58.98	119	\$ 64.77
Granted	140	\$ 49.67	157	\$ 45.05	114	\$ 55.84
Vested and released	(75)	\$ 52.45	(68)	\$ 59.07	(47)	\$ 64.69
Forfeited	(21)	\$ 48.96	(31)	\$ 53.08	(21)	\$ 62.15
Outstanding at end of year	267	\$ 48.99	223	\$ 49.95	165	\$ 58.98

³ Weighted Average Grant Date Fair Value per share

Employee Stock Purchase Plan

Our U.S. employees are eligible to participate in the 2012 Employee Stock Purchase Plan (the 2012 ESPP). Employee purchases of our stock are funded through payroll deductions over calendar six-month periods. The purchase price is 85% of the lower of the market price at the beginning or end of the six-month period. The shares are required to be held by the employee for at least 18 months subsequent to the purchase. Employee stock purchase plan share awards are valued based on the value of the discount feature plus the fair value of the optional features as of the date of grant using the Black-Scholes valuation model. The value of these share awards is allocated to expense evenly over each purchase period.

In fiscal year 2011, our shareholders approved the 2012 ESPP that was effective beginning January 1, 2012. As of September 29, 2018, a total of 615 shares were available for issuance under the 2012 ESPP. Shares will be available for issuance under the 2012 ESPP until December 31, 2021.

In fiscal years 2018, 2017 and 2016, purchases under the 2012 ESPP were 24, 25 and 24 shares, respectively, with weighted average prices per share of \$44.39, \$40.49 and \$44.20, respectively.

NOTE 7 EMPLOYEE BENEFIT PLANS

Retirement Savings Plan

We sponsor a defined contribution retirement savings plan subject to the provisions of the Employee Retirement Income Security Act. Employees may contribute a portion of their eligible compensation to the plan on a pre-tax or after-tax basis. We match a portion of certain employee contributions by contributing cash into the investment options selected by the employees. The total amount contributed by MTS is determined by plan provisions for matching contributions, as well as at our discretion.

Matching contributions were 75% of eligible compensation for fiscal years 2018, 2017 and 2016, up to a maximum of 6% of compensation subject to Internal Revenue Service (IRS) limitations. Employer matching and discretionary contributions were \$5,394, \$5,483 and \$4,694 for fiscal years 2018, 2017 and 2016, respectively.

Defined Benefit Pension Plan

We sponsor a non-contributory, defined benefit pension plan for eligible employees of one of our German subsidiaries. This plan provides benefits based on the employee's years of service and compensation during the years immediately preceding retirement, termination, disability or death, as defined in the plan. We use a September 30 measurement date for this defined benefit pension plan.

We recognize the funded status of the defined benefit pension plan in our Consolidated Balance Sheets, recognize changes in the funded status in the year in which the changes occur through comprehensive income and measure the plan's assets and obligations that determine the plan's funded status as of the end of our fiscal year.

The portion of the pre-tax amount in AOCI as of September 30, 2017 that was recognized in earnings during fiscal year 2018 was \$526. The portion of the pre-tax amount in AOCI as of September 29, 2018 that is expected to be recognized as a component of net periodic retirement cost during fiscal year 2019 is \$560. The actuarial loss in fiscal year 2018 of \$871 was primarily a result of the change in the discount rate from 1.99% in fiscal year 2017 to 1.89% in fiscal year 2018.

Changes in benefit obligations and plan assets are as follows:

	2018		2017	
Change in benefit obligation				
Projected benefit obligation, beginning of year	\$	32,280	\$	34,434
Service cost		1,282		1,426
Interest cost		640		431
Actuarial (gain) loss		871		(5,214)
Currency translation		(405)		1,866
Benefits paid		(759)		(663)
Projected benefit obligation, end of year	\$	33,909	\$	32,280
Change in plan assets				
Fair value of plan assets, beginning of year	\$	22,886	\$	19,950
Actual return on plan assets		1,269		1,848
Employer contributions		759		663
Currency translation		(284)		1,088
Benefits paid		(759)		(663)
Fair value of plan assets, end of year	\$	23,871	\$	22,886

The funded status of the defined benefit pension plan and amounts included in our Consolidated Balance Sheets are as follows:

	2018		2017	
Funded status				
Funded status, end of year	\$	(10,038)	\$	(9,394)
Actuarial net loss in AOCI, pre-tax		9,496		9,261
Net amount recognized	\$	(542)	\$	(133)
Included in Consolidated Balance Sheets				
Accrued payroll and related costs	\$	(861)	\$	(806)
Defined benefit pension plan obligation		(9,177)		(8,588)
Deferred income taxes		2,880		2,809
AOCI, net of tax		6,616		6,452
Net amount recognized	\$	(542)	\$	(133)

The weighted average assumptions used to determine the defined benefit pension plan obligation as of September 29, 2018 and September 30, 2017 in the Consolidated Balance Sheets and the net periodic benefit cost for fiscal year 2019 are as follows:

	2018	2017
Discount rate	1.89%	1.99%
Expected rate of return on plan assets	5.50%	5.50%
Expected rate of increase in future compensation levels	3.00%	3.00%

The discount rate is calculated based on zero-coupon bond yields published by the Deutsche Bundesbank for maturities that match the weighted average duration of the pension liability, adjusted for the average credit spread of corporate bond rates above the government bond yields.

The expected rate of return on plan assets represents the weighted average of the expected returns on individual asset categories in the portfolio. We use investment advisors to assist with determining the overall expected rate of return on plan assets. Factors considered in our determination include historical long-term investment performance and estimates of future long-term returns by asset class.

The overall objective of our investment policy and strategy for the defined benefit pension plan is to maintain sufficient liquidity to pay benefits and minimize the volatility of returns while earning the highest possible rate of return over time to satisfy the benefit obligations. The plan fiduciaries assist us with setting our long-term strategic investment objectives for the defined benefit pension plan assets. The objectives include preserving the funded status of the trust and balancing risk and return. Investment performance and plan asset mix are reviewed periodically.

As of both September 29, 2018 and September 30, 2017, plan assets were invested in a single mutual fund, the underlying assets of which were allocated to fixed income and cash and cash equivalents categories as shown in the table below. Any decisions to change the asset allocation are made by the plan fiduciaries. The investment in equity and fixed income securities has a long-term targeted allocation of assets of 50% equity and 50% fixed income.

The actual defined benefit pension plan asset allocations within the balanced mutual fund are as follows:

	Percentage of Plan Assets	
	2018	2017
Fixed income securities ¹	77.2%	71.4%
Cash and cash equivalents ²	22.8%	28.6%
Total	100.0%	100.0%

¹ Fixed income securities are comprised primarily of international government agency and international corporate bonds with investment grade ratings.

² Cash and cash equivalents include deposit accounts holding cash in Euros and other currencies and term deposits primarily held as collateral for equity futures. The market values of the equity and futures are linked to the values of equity indices of developed country markets, including the U.S., Great Britain, Europe, Canada, Switzerland and Japan.

The fair value of the defined benefit pension plan assets, which are subject to fair value measurement as described in Note 3, are as follows:

	September 29, 2018			
	Level 1	Level 2	Level 3	Total
Mutual fund ¹	\$ —	\$ 23,871	\$ —	\$ 23,871

	September 30, 2017			
	Level 1	Level 2	Level 3	Total
Mutual fund ¹	\$ —	\$ 22,886	\$ —	\$ 22,886

¹ The fair value of the mutual fund is valued based on closing prices from national exchanges, if the underlying securities are traded on an active market, or fixed income pricing models that use observable market inputs.

Net periodic benefit cost for the defined benefit pension plan includes the following components:

	2018	2017	2016
Service cost	\$ 1,282	\$ 1,426	\$ 971
Interest cost	640	431	608
Expected return on plan assets	(1,270)	(1,085)	(1,027)
Net amortization and deferral	526	996	584
Net periodic benefit cost	\$ 1,178	\$ 1,768	\$ 1,136

The accumulated benefit obligation of our defined benefit pension plan as of September 29, 2018 and September 30, 2017 was \$31,077 and \$29,581, respectively.

Future pension benefit payments, which reflect expected future service for the next five fiscal years and the combined five fiscal years thereafter, are as follows:

Fiscal Year	Pension Benefit Payments
2019	\$ 861
2020	906
2021	1,024
2022	1,096
2023	1,123
2024 through 2028	6,382
Total	\$ 11,392

Other Retirement Plans

Certain of our international subsidiaries have non-contributory, unfunded post-retirement benefit plans that provide retirement benefits for eligible employees and managing directors. Generally, these post-retirement plans provide benefits that accumulate based on years of service and compensation levels. As of September 29, 2018 and September 30, 2017, the aggregate liabilities associated with these post-retirement benefit plans were \$3,924 and \$4,585, respectively.

NOTE 8 INCOME TAXES

The components of income (loss) before income taxes are as follows:

	2018	2017	2016
Domestic	\$ 6,139	\$ (9,658)	\$ 5,345
Foreign	38,084	32,669	28,167
Total income (loss) before income taxes	\$ 44,223	\$ 23,011	\$ 33,512

The income tax provision (benefit) is as follows:

	2018	2017	2016
Current			
Federal	\$ 1,613	\$ (1,493)	\$ 3,169
State	565	156	138
Foreign	10,331	11,980	6,712
Deferred	(29,614)	(12,716)	(4,001)
Income tax provision (benefit)	\$ (17,105)	\$ (2,073)	\$ 6,018

A reconciliation from the U.S. federal statutory income tax rate to our effective income tax rate is as follows:

	2018	2017	2016
U.S. federal statutory income tax rate	25 %	35 %	35 %
Impact from foreign operations	3	(10)	(5)
State income taxes, net of federal benefit	—	(1)	—
R&D tax credits	(10)	(22)	(16)
Domestic production activities deduction	(2)	(10)	(2)
Impact of U.S. Tax Act	(57)	—	—
Acquisition costs	—	(3)	5
Nondeductible stock option expense and other permanent items	2	2	1
Effective income tax rate	(39)%	(9)%	18 %

The Tax Act was signed into law on December 22, 2017 and made significant changes to U.S. federal corporate tax law. Effective January 1, 2018, the Tax Act lowers the U.S. corporate tax rate from 35% to 21% and prompts various other changes to U.S. federal corporate tax law, including the establishment of a territorial-style system for taxing foreign-source income of domestic multinational corporations and a one-time deemed repatriation tax on untaxed foreign earnings. The Tax Act resulted in a U.S. federal blended statutory rate of 24.5% for fiscal year 2018. The income tax benefit for fiscal year 2018 included certain discrete benefits of \$25,008 for the estimated impact of the Tax Act. The discrete benefits primarily related to \$31,647 of estimated benefit from the remeasurement of our estimated net deferred tax liabilities, partially offset by \$6,639 of estimated expense associated with the mandatory deemed repatriation tax.

Generally, the impacts of new tax legislation would be required to be recorded in the period of enactment, which was our first quarter of fiscal year 2018. However, in March 2018, the FASB issued ASU No. 2018-05 which incorporates various SEC paragraphs from SAB 118 into income tax accounting guidance effective immediately, allowing registrants to record provisional amounts during a one-year measurement period. The updated guidance summarizes a three-step process to be applied at each reporting period to account for and qualitatively disclose: (i) the effects of the change in tax law for which accounting is complete; (ii) provisional amounts (or adjustments to provisional amounts) for the effects of the tax law where accounting is not complete, but that a reasonable estimate has been determined; and (iii) if a reasonable estimate cannot yet be made and therefore taxes are reflected in accordance with law prior to the enactment of the Tax Act. See Note 1 for additional information on the adoption of this guidance.

As of September 29, 2018, we have not completed our accounting for the tax effects of the Tax Act. Our accounting for the tax effects of the Tax Act will be completed in our first quarter of fiscal year 2019.

Amounts recorded where the accounting is complete during fiscal year 2018 primarily relate to the reduction in the U.S. corporate income tax rate to 21%. We recorded an income tax benefit of \$32,244 to remeasure deferred tax liabilities associated with intangible assets that will reverse at the new 21% rate.

Amounts recorded where the accounting is provisional during fiscal year 2018 include the remeasurement of other deferred taxes where the timing of the reversal cannot be known at this time. We have performed a provisional estimate of the net impact of remeasurement of other deferred tax assets and liabilities and recorded \$597 income tax expense during fiscal year 2018. In addition, the Tax Act includes a one-time mandatory repatriation transition tax on the net accumulated earnings and profits of our foreign subsidiaries. We have performed a provisional estimate of this tax and recorded a \$6,639 income tax provision during fiscal year 2018. The provisional amounts are based on information available at this time and may change due to a variety of factors, including, among others, anticipated guidance from the U.S. Department of Treasury, Internal Revenue Service and other standard setting and regulatory bodies.

We have completed our initial analysis of the impact of all provisions of the Tax Act expected to be effective in fiscal year 2018, and there are no anticipated effects where we have not yet recorded a provisional estimate of the accounting effect as of September 29, 2018.

The fiscal year 2018 effective tax rate was a benefit of 38.7% primarily due to certain discrete benefits of \$25,008 for the estimated impact of the Tax Act. Excluding the impact of these discrete benefits, the effective tax rate for fiscal year 2018 was 17.9% and increased compared to the prior year rate excluding the impact of certain discrete benefits primarily due to higher current year earnings before taxes, partially offset by the lower U.S. corporate tax rate under the Tax Act.

The fiscal year 2017 effective tax rate was a benefit of 9.0% primarily due to certain discrete benefits of \$2,801 recognized during the third quarter of fiscal year 2017, which consisted of additional U.S. tax benefits for prior fiscal years associated with domestic manufacturing, deductible PCB acquisition-related expenses, and the U.S. R&D tax credit. Excluding the impact of these discrete benefits, the effective tax rate for fiscal year 2017 was 3.2%.

The fiscal year 2016 effective tax rate was 18.0% and included a \$2,283 discrete tax benefit for retroactive reinstatement of the U.S. R&D tax credit, partially offset by a one-time tax cost of \$1,834 associated with nondeductible PCB acquisition-related expenses. Excluding the impact of these items, the effective tax rate for fiscal year 2016 was 19.3%.

A summary of the deferred tax assets and liabilities are as follows:

	2018	2017
Deferred tax assets		
Accrued compensation and benefits	\$ 10,660	\$ 13,841
Inventory reserves	4,787	6,550
Other assets	4,255	4,920
Allowance for doubtful accounts	1,196	1,766
Net operating loss carryovers	516	227
State and foreign tax credit carryovers	1,252	3,358
Research and development tax credit carryovers	3,337	2,231
Total deferred tax asset before valuation allowance	26,003	32,893
Less valuation allowance	(4,792)	(3,487)
Total deferred tax assets	21,211	\$ 29,406
Deferred tax liabilities		
Property and equipment	10,210	\$ 13,382
Foreign deferred revenue and other	4,649	3,009
Intangible assets	48,019	83,207
Unrealized derivative instrument gains	1,566	1,233
Total deferred tax liabilities	64,444	\$ 100,831
Net deferred tax assets (liabilities)	\$ (43,233)	\$ (71,425)

As of September 29, 2018, we had a Minnesota R&D tax credit carryover of \$3,337, which may be carried forward fifteen years. We have determined that the benefit of this tax credit is not likely to be realized before it expires and have recorded a full valuation allowance against this deferred tax asset.

During fiscal year 2018, we repatriated \$54,778 of current earnings from various foreign subsidiaries and recorded \$1,249 of corresponding tax expense. During fiscal year 2017, we repatriated \$15,272 of current earnings from our German and Japanese subsidiaries and recorded \$11 of corresponding tax expense. During fiscal year 2016, we repatriated \$10,324 of earnings from our German and Japanese subsidiaries and recorded a \$112 corresponding tax benefit.

We have not recognized a deferred tax liability for the undistributed earnings of certain foreign operations because those subsidiaries have invested or will invest the undistributed earnings indefinitely. As of September 29, 2018 and September 30, 2017, undistributed earnings were \$73,819 and \$111,717, respectively. Because of the availability of U.S. foreign tax credits, it is impracticable for us to determine the amount of U.S. federal tax liability that would be payable if these earnings were not indefinitely reinvested. Deferred taxes are recorded for earnings of foreign operations when we determine that such earnings are no longer indefinitely reinvested.

A summary of changes to our liability for unrecognized tax benefits is as follows:

	2018	2017
Beginning liability for unrecognized tax benefits	\$ 5,849	\$ 6,232
Increase due to tax positions related to the current year	742	852
Increase (decrease) due to tax positions related to prior years	277	189
Decrease due to settlements with tax authorities	—	(493)
Decrease due to lapse of statute of limitations	(710)	(931)
Ending liability for unrecognized tax benefits	\$ 6,158	\$ 5,849

Included in the liability of unrecognized tax benefits as of September 29, 2018 and September 30, 2017 are potential benefits of \$3,740 and \$3,234, respectively, that, if recognized, would affect the effective tax rate.

As of September 29, 2018 and September 30, 2017, we have accrued interest related to uncertain income tax positions of approximately \$542 and \$404, respectively. As of September 29, 2018 and September 30, 2017, no accrual for penalties related to uncertain tax positions existed. Interest and penalties related to uncertain tax positions are included in interest expense, net and general and administrative expense, respectively, in the Consolidated Statements of Income.

We are subject to U.S. federal income tax as well as income tax of numerous state and foreign jurisdictions. We are no longer subject to U.S. federal tax examinations for fiscal years before 2015 and with limited exceptions, state and foreign income tax examinations for fiscal years before 2014. As of September 29, 2018, we do not expect significant changes in the amount of unrecognized tax benefits for our U.S. or foreign subsidiaries during the next 12 months.

As of September 29, 2018 and September 30, 2017, we expected to receive income tax refunds within the next fiscal year. As a result, we recognized a current income tax receivable of \$5,155 and \$5,392 as of September 29, 2018 and September 30, 2017, respectively, which is included in prepaid expenses and other current assets in the Consolidated Balance Sheets.

NOTE 9 SHAREHOLDERS' EQUITY

Share Issuance

During the third quarter of fiscal year 2016, we issued 1,897 shares of our common stock at \$42.00 per share in a registered public offering primarily to finance the acquisition of PCB, to repay amounts outstanding under our existing revolving credit facility and to pay related costs, fees and expenses. Total net proceeds for fiscal year 2016 were as follows:

	Common Stock	Additional Paid-in Capital	Total
Public offering	\$ 474	\$ 79,221	\$ 79,695
Less: Underwriting discounts and commissions	—	(4,782)	(4,782)
Less: Other expenses ¹	—	(612)	(612)
Issuance of common stock, net	\$ 474	\$ 73,827	\$ 74,301

¹ Other expenses include direct and incremental costs related to the issuance of the common stock.

Tangible Equity Units

During the third quarter of fiscal year 2016, we issued 1,150 TEUs in a registered public offering primarily to finance the acquisition of PCB, to repay amounts outstanding under our existing revolving credit facility and to pay related costs, fees and expenses. Total proceeds, net of underwriting discounts, commissions and other expenses were \$110,926. Each TEU has a stated amount of \$100 per TEU and is comprised of a prepaid stock purchase contract and a senior amortizing note having a final installment payment date of July 1, 2019. We allocated the proceeds from the issuance of the TEUs between equity and debt based on the relative fair values of the respective components of each TEU. The fair value of the prepaid stock purchase contracts, net of underwriting discounts, commissions and other expenses, was recorded in additional paid-in capital in the Consolidated Balance Sheets. The fair value of the senior amortizing notes, net of underwriting discounts, commissions and other expenses, was split between current maturities of long-term debt, net and long-term debt, less current maturities, net in the Consolidated Balance Sheets. Underwriting discounts, commissions and other costs directly associated with the TEU-related debt are amortized using the effective interest rate method over the three-year term of the instrument.

The aggregate values assigned upon issuance to each component of the TEUs, based on the relative fair value of the respective components, were as follows:

	Equity Component		Debt Component		Total
Fair value price per TEU ¹	\$	76.19	\$	23.81	\$ 100.00
Gross proceeds	\$	87,614	\$	27,386	\$ 115,000
Less: Underwriting discounts and commissions		(2,628)		(822)	(3,450)
Less: Other expenses ²		(475)		(149)	(624)
Issuance of TEUs, net	\$	84,511	\$	26,415	\$ 110,926

¹ The fair value price allocation between equity and debt for each TEU was determined using a discounted cash flow model.

² Other expenses include direct and incremental costs related to the issuance of the TEUs.

Equity Component

Unless converted earlier at the option of the holder, each prepaid stock purchase contract will automatically settle on July 1, 2019. If converted prior to the automatic settlement date at the option of the holder, the minimum of 1.9841 shares of our common stock are delivered to the holder of each prepaid stock purchase contract. On the automatic settlement date, a minimum of 1.9841 shares and a maximum of 2.3810 shares of our common stock, subject to adjustment based upon the applicable market value discussed below, will be delivered to the holder of each prepaid stock purchase contract at the settlement date.

The number of shares of our common stock issuable upon settlement of each purchase contract on July 1, 2019 will be determined as follows:

- if the applicable market value is equal to or greater than the threshold appreciation price of \$50.40 per share, holders will receive 1.9841 shares of common stock per purchase contract, or the minimum settlement rate;
- if the applicable market value is greater than the reference price of \$42.00 per share, but less than the threshold appreciation price of \$50.40 per share, holders will receive a number of shares of common stock equal to \$100 per TEU divided by the applicable market value; or
- if the applicable market value is less than or equal to the reference price of \$42.00 per share, holders will receive 2.3810 shares of common stock per purchase contract, or the maximum settlement rate.

The "applicable market value" is defined as the average of the daily volume-weighted average price of the common stock on each of the 20 consecutive trading days beginning on, and including, the 23rd scheduled trading day immediately preceding July 1, 2019.

During the fourth quarter of fiscal year 2017, certain holders of our TEUs elected to early convert the equity component on 473 of our outstanding TEUs at the minimum conversion rate of 1.9841 which resulted in the issuance of 939 shares of our common stock. During fiscal year 2018, no holders of our TEUs elected to early convert the equity component of our TEUs. There were 677 units of the equity component of TEUs outstanding as of both September 29, 2018 and September 30, 2017.

Debt Component

The senior amortizing note was issued with an initial principal amount of \$27,386, or \$23.8136 per TEU. Equal quarterly cash installments of \$2.1875 per amortizing note are paid, which in the aggregate are equivalent to a 8.75% cash distribution per year with respect to each \$100 stated amount per TEU. Each installment constitutes a payment of interest and partial repayment of principal.

Earnings Per Common Share

The TEUs have a dilutive effect on our earnings per share. The 1.9841 minimum shares to be issued are included in the calculation of basic weighted average shares outstanding. The 0.3969 difference between the minimum shares and the 2.3810 maximum shares are potentially dilutive, and accordingly, are included in our diluted earnings per share on a pro rata basis to the extent the applicable market value is higher than the reference price but less than the threshold appreciation price. See Note 1 for additional information regarding the calculation of earnings per share.

Capped Calls

In connection with the pricing of the TEUs sold in our public offering in fiscal year 2016, we purchased capped calls from third party banking institutions (Capped Calls) for \$7,935. The initial Capped Calls were for 2,282 equivalent shares of our common stock with a strike price of \$50.40, a cap price of \$58.80 and an expiration date of July 1, 2019. The value of the Capped Calls is settled with shares of our common stock, based on the approximate market value of our common stock at such time, and could be settled as the TEUs were early converted or settled upon expiration on July 1, 2019 (Capped Call Expiration). During the fourth quarter of fiscal year 2017, we settled approximately 10% of the Capped Calls, which resulted in us receiving and retiring 12 shares of our common stock. During fiscal year 2018, no Capped Calls were settled.

On June 13, 2018, we amended the agreements with third party banking institutions for the outstanding Capped Calls (Capped Call Agreements) to modify the timing of settlement to be only upon expiration for all outstanding Capped Calls. Per the Capped Call Agreements, the outstanding Capped Calls are for 2,054 equivalent shares of our common stock with a strike price of \$50.40 and a cap price of \$57.97. The Capped Calls will be automatically settled upon Capped Call Expiration with shares of our common stock based on the average market value of our common stock as defined in the Capped Call Agreements.

As of September 29, 2018, the range of shares of our common stock to be received for the outstanding Capped Calls was a minimum of 0 shares to a maximum of 268 shares, which will be realized if the average market value of our common stock as defined in the Capped Call Agreements is at or below \$50.40 or at \$57.97, respectively, upon Capped Call Expiration.

NOTE 10 OTHER COMPREHENSIVE INCOME (LOSS)

Other comprehensive income (loss), a component of shareholders' equity, consists of foreign currency translation adjustments, gains or losses on derivative instruments and defined benefit pension plan adjustments.

Income tax expense or benefit allocated to each component of other comprehensive income (loss) is as follows:

	2018			2017			2016		
	Pre-tax	Tax	Net	Pre-tax	Tax	Net	Pre-tax	Tax	Net
Foreign currency translation gain (loss) adjustments	\$ (2,174)	\$ —	\$ (2,174)	\$ 3,273	\$ —	\$ 3,273	\$ (332)	\$ —	\$ (332)
Derivative instruments									
Unrealized net gain (loss)	5,832	(1,507)	4,325	3,301	(1,191)	2,110	(1,342)	487	(855)
Net (gain) loss reclassified to earnings	(805)	207	(598)	155	(57)	98	334	(120)	214
Defined benefit pension plan									
Unrealized net gain (loss)	(890)	269	(621)	5,918	(1,786)	4,132	(6,034)	1,821	(4,213)
Net (gain) loss reclassified to earnings	526	(159)	367	996	(300)	696	584	(176)	408
Currency exchange rate gain (loss)	90	—	90	(489)	—	(489)	(18)	—	(18)
Other comprehensive income (loss)	\$ 2,579	\$ (1,190)	\$ 1,389	\$ 13,154	\$ (3,334)	\$ 9,820	\$ (6,808)	\$ 2,012	\$ (4,796)

The changes in the net-of-tax balances of each component of AOCI are as follows:

	Foreign Currency Translation Adjustments	Unrealized Derivative Instrument Adjustments	Defined Benefit Pension Plan Adjustments	Total
Balance, October 3, 2015	\$ 1,005	\$ 386	\$ (6,968)	\$ (5,577)
Other comprehensive net gain (loss) reclassifications	(332)	(855)	(4,231)	(5,418)
Net (gain) loss reclassified to earnings	—	214	408	622
Other comprehensive income (loss)	(332)	(641)	(3,823)	(4,796)
Balance, October 1, 2016	\$ 673	\$ (255)	\$ (10,791)	\$ (10,373)
Other comprehensive net gain (loss) reclassifications	3,273	2,110	3,643	9,026
Net (gain) loss reclassified to earnings	—	98	696	794
Other comprehensive income (loss)	3,273	2,208	4,339	9,820
Balance, September 30, 2017	\$ 3,946	\$ 1,953	\$ (6,452)	\$ (553)
Other comprehensive net gain (loss) reclassifications	(2,174)	4,325	(531)	1,620
Net (gain) loss reclassified to earnings	—	(598)	367	(231)
Other comprehensive income (loss)	(2,174)	3,727	(164)	1,389
Reclassification to retained earnings ¹	—	640	—	640
Balance, September 29, 2018	\$ 1,772	\$ 6,320	\$ (6,616)	\$ 1,476

¹ Deferred taxes stranded in AOCI as a result of the Tax Act that were reclassified to retained earnings upon adoption of ASU 2018-02. See Note 1 for additional information regarding the impact of adoption.

The effect on certain line items in the Consolidated Statements of Income of amounts reclassified out of AOCI are as follows:

	2018	2017	2016	Affected Line Item in the Consolidated Statements of Income
Derivative instruments				
Currency exchange contracts gain (loss)	\$ (399)	\$ 459	\$ (334)	Revenue
Interest rate swap contracts gain (loss)	1,204	(614)	—	Interest expense, net
Income tax benefit (expense)	(207)	57	120	Income tax provision (benefit)
Total net gain (loss) on derivative instruments	598	(98)	(214)	Net income
Defined benefit pension plan				
Actuarial loss	(288)	(543)	(319)	Cost of sales
Actuarial loss	(148)	(282)	(165)	Selling and marketing
Actuarial loss	(90)	(171)	(100)	General and administrative
Total actuarial loss	(526)	(996)	(584)	Income before income taxes
Income tax benefit	159	300	176	Income tax provision (benefit)
Total net loss on pension plan	(367)	(696)	(408)	Net income
Total net of tax reclassifications out of AOCI included in net income	\$ 231	\$ (794)	\$ (622)	

NOTE 11 BUSINESS SEGMENT INFORMATION

Our Chief Executive Officer (the Chief Operating Decision Maker) regularly reviews financial information for our two operating segments, Test and Sensors. Test provides hardware, software and service solutions that help customers accelerate and improve their design, development and manufacturing processes and are used for determining the mechanical behavior of materials, products and structures. Sensors provides high-performance sensors used for measurement of vibration, pressure, position, force and sound in a variety of applications.

In evaluating each segment's performance, our Chief Executive Officer focuses on income from operations. This measure excludes interest income and expense, income taxes and other non-operating items. Corporate expenses, including costs associated with various support functions such as human resources, information technology, legal, finance and accounting, and general and administrative costs are allocated to the reportable segments on the basis of revenue.

The acquisition of PCB in fiscal year 2016 generated new opportunities to sell between our operating segments. Intersegment revenue is based on standard costs with reasonable mark-ups established between the reportable segments. All significant intersegment amounts are eliminated to arrive at consolidated financial results.

Financial information by reportable segment is as follows:

	2018	2017	2016
Revenue			
Test	\$ 464,924	\$ 504,087	\$ 512,265
Sensors	314,269	283,868	137,882
Intersegment eliminations	(1,161)	—	—
Total revenue	\$ 778,032	\$ 787,955	\$ 650,147
Income from Operations			
Test	\$ 19,225	\$ 28,622	\$ 40,660
Sensors	45,980	26,206	1,103
Intersegment eliminations	(33)	—	—
Total income from operations	\$ 65,172	\$ 54,828	\$ 41,763
Identifiable Assets			
Test	\$ 299,242	\$ 374,698	\$ 395,067
Sensors	840,187	814,994	792,953
Intersegment eliminations	(33)	—	—
Total identifiable assets	\$ 1,139,396	\$ 1,189,692	\$ 1,188,020
Goodwill			
Test	\$ 24,631	\$ 25,109	\$ 25,022
Sensors	344,644	344,653	344,678
Total goodwill	\$ 369,275	\$ 369,762	\$ 369,700
Capital Expenditures			
Test	\$ 8,111	\$ 13,281	\$ 17,570
Sensors	4,210	4,517	3,236
Total capital expenditures	\$ 12,321	\$ 17,798	\$ 20,806
Depreciation and Amortization			
Test	\$ 16,353	\$ 17,275	\$ 17,279
Sensors	18,139	18,248	6,798
Total depreciation and amortization	\$ 34,492	\$ 35,523	\$ 24,077

Geographic information is as follows:

	2018	2017	2016
Revenue			
U.S.	\$ 245,909	\$ 246,679	\$ 154,707
Europe	223,236	192,491	163,944
China	165,421	174,044	152,264
Asia, excluding China	113,953	142,644	148,056
Americas, excluding U.S.	29,513	32,097	31,176
Total revenue	\$ 778,032	\$ 787,955	\$ 650,147
Property and Equipment, Net			
U.S.	\$ 69,782	\$ 78,080	\$ 79,794
Europe	15,130	15,296	13,695
China	4,858	5,542	5,630
Asia, excluding China	499	1,012	1,670
Total property and equipment, net	\$ 90,269	\$ 99,930	\$ 100,789

Revenue by geographic area is presented based on customer location. The U.S. and China were the only countries with revenue in excess of 10% of total revenue during fiscal years 2018, 2017 and 2016. No single customer accounted for 10% or more of consolidated revenue for fiscal years 2018, 2017 and 2016. Revenue is not reported for each of our products and services because it is impracticable to do so.

NOTE 12 RESTRUCTURING AND RELATED COSTS

Fiscal Year 2018 Restructuring

In fiscal year 2018, we initiated a Test workforce reduction intended to simplify the organization and reduce the overall cost structure. As a result, during the fourth quarter of fiscal year 2018, we recorded \$880 of pre-tax severance and related expense. These expenses will be paid in the first quarter of fiscal year 2019.

Fiscal Year 2017 Restructuring

In fiscal year 2017, we initiated a series of Test workforce reductions and facility closures intended to increase organizational effectiveness, gain manufacturing efficiencies and provide cost savings that can be reinvested in our growth initiatives. These actions include the transfer of certain production operations in China to a contract manufacturing partner throughout fiscal years 2018 and 2019. As a result, in fiscal year 2018, we recorded \$1,550 of pre-tax severance and related expense and \$269 of pre-tax facility closure costs. In fiscal year 2017, we recorded \$2,899 of pre-tax severance and related expense and \$23 of pre-tax facility closure costs. As of September 29, 2018, we have incurred a total of \$4,741 of pre-tax expense, including \$4,449 and \$292 of pre-tax expense related to severance and facility closure costs, respectively. In fiscal year 2019 we expect to incur approximately \$150 of additional pre-tax severance and related expense and facility closure costs related to these actions. The majority of the expenses are expected to be paid in the first half of fiscal year 2019.

During the fourth quarter of fiscal year 2017, in an effort to reduce costs and create economic efficiencies in Sensors, we initiated plans to close our Machida, Japan sales office in the second quarter of fiscal year 2018. As a result, in fiscal year 2018, we recorded \$31 of severance and related pre-tax expense. As of September 29, 2018, we have incurred a total of \$152 of pre-tax severance and related expense. We expect to incur additional pre-tax severance and related expense of approximately \$15 in fiscal year 2019. Remaining expenses are expected to be paid during the first half of fiscal year 2019.

Fiscal Year 2016 Restructuring

During fiscal year 2016, we initiated plans to reduce costs in Sensors by closing our Machida, Japan manufacturing facility in the third quarter of fiscal year 2017. As of September 29, 2018, we have incurred a total of \$1,964 of pre-tax expense, including \$1,444 and \$520 of pre-tax expense related to severance and facility closure costs, respectively. All severance and facility closure costs have been paid as of September 29, 2018.

During the third quarter of fiscal year 2016, we initiated restructuring actions to reduce our cost structure, primarily in our Corporate area and Test segment, through terminations, elimination of certain open positions as a result of employees leaving voluntarily throughout fiscal year 2016 and reductions in contractors. The restructuring activities resulted in severance and related pre-tax expense of \$1,237 in fiscal year 2016. All severance and related costs had been paid as of September 30, 2017.

Fiscal Year 2014 Restructuring

During fiscal year 2014, we initiated workforce and other cost reduction actions at certain of our Test locations in the U.S. and Europe. No restructuring expenses were recognized during fiscal years 2018, 2017 or 2016 related to these restructuring actions.

Restructuring expense included in the Consolidated Statements of Income for all restructuring actions is as follows:

	Test		Sensors		Total
Fiscal year 2018					
Cost of sales	\$	1,622	\$	—	\$ 1,622
Selling and marketing		236		31	267
General and administrative		317		—	317
Research and development		524		—	524
Total restructuring expense for fiscal year 2018	\$	2,699	\$	31	\$ 2,730
Fiscal year 2017					
Cost of sales	\$	2,439	\$	701	\$ 3,140
Selling and marketing		112		203	315
General and administrative		371		253	624
Research and development		—		—	—
Total restructuring expense for fiscal year 2017	\$	2,922	\$	1,157	\$ 4,079
Fiscal year 2016					
Cost of sales	\$	299	\$	762	\$ 1,061
Selling and marketing		129		155	284
General and administrative		414		401	815
Research and development		5		—	5
Total restructuring expense for fiscal year 2016	\$	847	\$	1,318	\$ 2,165

Restructuring expense accruals included in the Consolidated Balance Sheets for all restructuring actions are as follows:

	2018		2017		2016		2014		Total					
	Test		Test	Sensors	MTS	Sensors	Test							
Balance, October 1, 2016	\$	—	\$	—	\$	308	\$	935	\$	1,053	\$	2,296		
Restructuring expense		—		2,922		121		—		1,036		—	4,079	
Payments		—		—		—		(303)		(1,652)		(352)	(2,307)	
Other adjustments		—		(23)		—		—		—		—	(23)	
Currency translation		—		—		(1)		(5)		(110)		33	(83)	
Balance, September 30, 2017	\$	—	\$	2,899	\$	120	\$	—	\$	209	\$	734	\$	3,962
Restructuring expense		880		1,819		31		—		—		—	2,730	
Payments		(67)		(1,748)		(92)		—		(106)		(386)	(2,399)	
Other adjustments		238		(37)		—		—		(106)		3	98	
Currency translation		—		—		(2)		—		3		(1)	—	
Balance, September 29, 2018	\$	1,051	\$	2,933	\$	57	\$	—	\$	—	\$	350	\$	4,391

Restructuring expense accruals included in the Consolidated Balance Sheets are as follows:

	2018	2017
Accrued payroll and related costs	\$ 4,267	\$ 3,485
Other accrued liabilities	—	98
Other long-term liabilities	124	379
Total severance and related costs	\$ 4,391	\$ 3,962

NOTE 13 BUSINESS ACQUISITIONS

PCB Group, Inc. Acquisition

On July 5, 2016, we acquired 100% of the outstanding capital stock of PCB for a purchase price of \$581,773 subject to certain adjustments for cash, indebtedness, transaction costs and the level of net working capital that were made at closing. The transaction was accounted for under the acquisition method of accounting. PCB is a manufacturer of piezoelectric sensors and components used for pressure, force and vibration measurement and is headquartered in Depew, New York. We funded the acquisition of PCB with existing cash on hand as well as funds raised through borrowings under the Term Facility in an aggregate principal amount of \$460,000, proceeds from registered public offerings of our TEUs and common stock and the \$43,500 of restricted cash that was placed in escrow during the third quarter of fiscal year 2016 to secure termination fees that would have become payable to PCB had the acquisition not occurred under the definitive purchase agreement. The restricted cash was paid to the shareholders of PCB as part of the estimated purchase price. See Note 5 and Note 9 for additional financing information.

The acquired assets, liabilities and operating results have been included in our financial statements within Sensors from the date of acquisition. We included \$129,197 of revenue and operating income of \$2,773 for the first three quarters of fiscal year 2017 and \$44,503 of revenue and an operating loss of \$2,143 for the fourth quarter of fiscal year 2016 from PCB in our Consolidated Statements of Income. The operating income in fiscal year 2017 and the operating loss in fiscal year 2016 include a fair value adjustment to the acquired PCB inventory of \$7,975 and \$7,916, respectively. Costs of \$10,170 associated with the acquisition of PCB were expensed as incurred in the Consolidated Statements of Income within the Sensors segment in fiscal year 2016.

The final purchase price of PCB consisted of the following:

Consideration paid to PCB shareholders and employees ¹	\$ 580,000
Consideration for PCB closing cash	11,612
Deferred endowment consideration ²	1,000
Net preacquisition earn-out	(141)
Net working capital adjustment ³	(147)
Cash acquired	(10,551)
Total estimated purchase price, net of cash acquired	\$ 581,773

¹ Of the \$580,000 consideration paid to PCB, we paid \$10,000 directly to employees of PCB on behalf of the PCB shareholders during the fourth quarter of fiscal year 2016. The payment was made pursuant to the definitive purchase agreement entered into with PCB in connection with the acquisition.

² The deferred endowment consideration was paid during the third quarter of fiscal year 2017.

³ Payment was received for the net working capital adjustment during the fourth quarter of fiscal year 2017.

PCB's products include accelerometers, microphones, calibration systems, pressure sensors, load and torque sensors, force sensors, single- and multi-channel telemetry, ground fault detection and smart sensing solutions. PCB serves end markets including test and measurement, power and energy, aerospace and defense, industrial measurement and instrumentation, automotive and rail and acoustics and environmental noise monitoring. The acquisition strengthened our current Sensors business with complementary sensor products and expanded channels to market, balancing the revenue mix between Test and Sensors, while enhancing our margin profile and creating significant cross-selling opportunities across the combined portfolio.

The following table summarizes the final fair value measurement of the assets acquired and liabilities assumed net of cash acquired as of the date of acquisition:

Assets	
Accounts receivable	\$ 21,008
Inventories	57,981
Prepaid expenses and other current assets	2,362
Property and equipment	19,649
Intangible assets	
Customer lists	153,900
Trademarks and trade names	58,500
Technology	35,300
Land-use rights	1,200
Other long-term assets	1,796
Total identifiable assets acquired	351,696
Liabilities	
Accounts payable	(6,786)
Accrued payroll and related costs	(7,137)
Non-current deferred tax liability	(94,141)
Other accrued and long-term liabilities	(5,037)
Total identifiable liabilities acquired	(113,101)
Net identifiable assets acquired	238,595
Goodwill	343,178
Total estimated purchase price consideration, net of cash acquired	\$ 581,773

The fair value measurement was completed as of July 1, 2017. Measurement period adjustments were recorded in fiscal year 2017 and were not material. The impact to the Consolidated Statements of Income for fiscal year 2017 related to income effects that would have been recognized in the prior year if the measurement period adjustments were recorded at acquisition date was not material. The gross amount of the accounts receivable acquired was \$21,726, of which \$718 was expected to be uncollectible as of completion of fair value measurement as of July 1, 2017.

Goodwill was calculated as the difference between the acquisition date fair value of the total purchase price consideration and the fair value of the net assets acquired and represents the future economic benefits that we expect to achieve as a result of the acquisition. This resulted in a purchase price in excess of the fair value of identifiable net assets acquired. The purchase price also included the fair value of other assets that were not identifiable, not separately recognizable under accounting rules (e.g., assembled workforce) or of immaterial value, in addition to a going concern element that represents our ability to earn a higher rate of return on the group of assets than would be expected on the separate assets as determined during the valuation process. Based on the fair value measurement of the assets acquired and liabilities assumed, we allocated \$343,178 to goodwill for the expected synergies from combining PCB with our existing business. All of the goodwill was assigned to Sensors. None of the goodwill is deductible for income tax purposes.

The fair value of acquired identifiable assets was determined using the income approach on an individual project basis. In performing these valuations, the key underlying probability-adjusted assumptions of the discounted cash flows were projected revenues, gross margin expectations and operating cost estimates. The valuations were based on the information that was available as of the acquisition date and the expectations and assumptions that have been deemed reasonable by us. There are inherent uncertainties and management judgment required in these determinations. The fair value measurements of the assets acquired and liabilities assumed were based on valuations involving significant unobservable inputs, or Level 3 in the fair value hierarchy.

The fair value of the acquired intangible assets was \$248,900. The expected lives of the acquired intangible assets are approximately 15 years for developed technology, 16 years for customer lists, 5 years for leasehold interest and 3 years for finite-lived trademarks and trade names. The acquired intangible assets are being amortized on a straight-line basis. Trade names having a value of \$57,500 are considered to have indefinite lives.

Pro Forma Financial Information (Unaudited)

The following unaudited pro forma financial information presents the combined results of operations of MTS Systems Corporation as if the acquisition of PCB had occurred as of the beginning of the fiscal year ended October 1, 2016. The unaudited pro forma information is not necessarily indicative of what our consolidated results of operations actually would have been had the acquisition occurred at the beginning of the fiscal year. In addition, the unaudited pro forma financial information does not attempt to project the future results of operations of the combined company.

	2016
Revenue	\$ 782,379
Net income	18,779
Earnings per share	
Basic	\$ 0.93
Diluted	0.92

The unaudited pro forma financial information is based on certain assumptions which we believe are reasonable, directly attributable to the transactions, factually supportable and do not reflect the cost of any integration activities or the benefits from the acquisition of PCB and synergies that may be derived from any integration activities.

The unaudited pro forma financial information above gives effect to the following:

- Incremental amortization and depreciation expense related to the estimated fair value of identifiable intangible assets and property, plant and equipment from the purchase price allocation.
- Exclusion of the purchase accounting impact of the incremental charge reported in cost of sales for the sale of acquired inventory that was written-up to fair value of \$7,916.
- Includes \$22,968 of interest expense on outstanding debt entered into as part of funding the acquisition.
- Pro forma adjustments tax affected by 20% tax rate.
- Weighted average shares outstanding was adjusted to increase the amount by 4,179 shares for both basic and diluted shares in the earnings per share calculation to reflect the financing of the acquisition of PCB in the form of the issuance of shares of common stock and the minimum shares to be issued for our TEUs at the minimum settlement rate.

Our pro forma 2016 fiscal year ended on October 1, 2016, while PCB's fiscal year ended on December 31, 2016. The full-year unaudited pro forma financial information for fiscal year 2016 combines our audited financial information for the fiscal year ended October 1, 2016 and the unaudited financial information of PCB for the 12 months ended October 1, 2016. The unaudited financial information of PCB for the 12 months ended October 1, 2016 was determined by adding PCB's unaudited financial information for the three months ended December 31, 2015 (PCB's fourth quarter of 2015), the unaudited financial information for the six months ended June 30, 2016 (PCB's first six months of 2016) and the audited financial information of PCB for the period from acquisition (July 5, 2016) to October 1, 2016.

NOTE 14 COMMITMENTS AND CONTINGENCIES**Litigation**

We are subject to various claims, legal actions and complaints arising in the ordinary course of business. We believe the final resolution of legal matters outstanding as of September 29, 2018 will not have a material adverse effect on our consolidated financial position or results of operations. We expense legal costs as incurred.

Operating Leases

We have operating lease commitments for equipment, automobiles, land and facilities that expire on various dates through 2056. Total lease expense was \$7,924, \$7,506 and \$7,053 for fiscal years 2018, 2017 and 2016, respectively.

Minimum annual rents payable under operating leases for the next five fiscal years and thereafter are as follows:

Fiscal Year	Operating Lease Payments
2019	\$ 4,827
2020	2,994
2021	1,862
2022	1,282
2023	717
Thereafter	2,008
Total	\$ 13,690

NOTE 15 SUBSEQUENT EVENTS

On November 21, 2018, we acquired E2M Technologies B.V. (E2M) for an all cash purchase price of approximately \$80,000, subject to working capital and other adjustments. Based in Amsterdam, Netherlands, E2M is a leading manufacturer of high force, electrically driven actuation systems, serving primarily the human-rated entertainment and training simulation markets. The acquisition is a strategic addition to Test and was funded through borrowings on the Revolving Credit Facility. We entered into a third amendment to the Credit Agreement, which governs the Term Facility and the Revolving Credit Facility, on November 21, 2018 to increase the borrowing capacity on the Revolving Credit Facility to \$150,000 and extend the expiration date of the Revolving Credit Facility to June 5, 2022. Additionally, the required performance levels under certain financial covenants were modified. See Note 5 for additional information on financing arrangements.

MTS Systems Corporation
Schedule II – Summary of Consolidated Allowances for Doubtful Accounts

Changes to the allowance for doubtful accounts receivable are as follows:

	2018	2017	2016
Beginning balance	\$ 5,371	\$ 3,923	\$ 3,411
Provisions / (recoveries)	2,142	1,930	957
Amounts written-off / payments	(2,378)	(551)	(330)
Currency translation	(131)	69	(115)
Ending balance	\$ 5,004	\$ 5,371	\$ 3,923

**Subsidiaries of MTS Systems Corporation
As of September 29, 2018**

Subsidiaries

Instruments & Calibration Sweden AB
 MTS 1, LLC
 MTS 2, LLC
 MTS Systems (Hong Kong), Inc.
 MTS Holdings France, SARL
 MTS Japan Ltd.
 MTS Korea, Inc.
 MTS Sensor Technologie GmbH and Co. KG
 MTS Sensor Technologie und Verwaltungs-GmbH
 MTS Sensor Technology KK
 MTS Systems B.V.
 MTS Systems Holding B.V.
 MTS Systems (China) Co., Ltd.
 MTS Systems Finance C.V.
 MTS Systems GmbH
 MTS Systems Ltd.
 MTS Systems Norden AB
 MTS Systems SAS
 MTS Systems Srl
 MTS Systems Switzerland GmbH
 MTS Testing Solutions India Private Limited
 MTS Testing Systems (Canada) Ltd.
 MTS Systems do Brazil (inactive)
 PCB Piezotronics, Inc.
 PCB Piezotronics Srl
 PCB Piezotronics Europe GmbH
 PCB Piezotronics Limited
 The Modal Shop, Inc.
 PCB Group Sales Company, Inc.
 3395 Walden Avenue Acquisition Corp
 DI U.S. Holdings, Inc.
 Dalimar Instruments ULC
 PCB Piezotronics S.A.
 PCB Piezotronics Sensor Technology (Beijing) Co., Ltd.
 PCB Synotech GmbH
 PCB Piezotronics of North Carolina, Inc.
 Accumetrics, Inc.
 PCB Piezotronics BVBA

Jurisdiction

Sweden
 Minnesota
 Minnesota
 Minnesota
 France
 Japan
 Republic of Korea
 Germany
 Germany
 Japan
 Netherlands
 Netherlands
 People's Republic of China
 Netherlands
 Germany
 United Kingdom
 Sweden
 France
 Italy
 Switzerland
 India
 Ontario, Canada
 Brazil
 New York
 Italy
 Germany
 United Kingdom
 Ohio
 Delaware
 New York
 New York
 Alberta ULC
 France
 People's Republic of China
 Germany
 Delaware
 New York
 Belgium

Consent of Independent Registered Public Accounting Firm

The Board of Directors
MTS Systems Corporation:

We consent to the incorporation by reference in the registration statements (Nos. 333-172136, 333-172137, 333-187287, 333-211902, and 333-218556) on Form S-8 and the registration statement (No. 333-211901) on Form S-3 of MTS Systems Corporation of our reports dated November 26, 2018, with respect to the consolidated balance sheets of MTS Systems Corporation as of September 29, 2018 and September 30, 2017, and the related consolidated statements of income, comprehensive income, shareholders' equity, and cash flows for each of the fiscal years in the three-year period ended September 29, 2018, and the related notes and financial statement Schedule II (collectively, the "consolidated financial statements"), and the effectiveness of internal control over financial reporting as of September 29, 2018, which reports appear in the September 29, 2018 annual report on Form 10-K of MTS Systems Corporation.

/s/ KPMG LLP

Minneapolis, Minnesota
November 26, 2018

SARBANES-OXLEY SECTION 302 CERTIFICATION

I, Jeffrey A. Graves, certify that:

1. I have reviewed this annual report on Form 10-K of MTS Systems Corporation;
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 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 change 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.

Date: November 26, 2018

/s/ JEFFREY A. GRAVES

Jeffrey A. Graves

President and Chief Executive Officer

SARBANES-OXLEY SECTION 302 CERTIFICATION

I, Brian T. Ross, certify that:

1. I have reviewed this annual report on Form 10-K of MTS Systems Corporation;
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 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 change 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.

Date: November 26, 2018

/s/ BRIAN T. ROSS

Brian T. Ross

Senior Vice President and Chief Financial Officer

MTS SYSTEMS CORPORATION
CERTIFICATION OF CHIEF EXECUTIVE OFFICER
PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002 (18 U.S.C. 1350)

The undersigned, Jeffrey A. Graves, the Chief Executive Officer of MTS Systems Corporation (the "Company"), has executed this Certification in connection with the filing with the Securities and Exchange Commission of the Company's Annual Report on Form 10-K for the fiscal year ended September 29, 2018 (the "Report").

The undersigned hereby certifies that:

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.

Date: November 26, 2018

/s/ JEFFREY A. GRAVES

Jeffrey A. Graves

President and Chief Executive Officer

This certification accompanies the Report pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 and shall not be deemed "filed" by the Company for purposes of Section 18 of the Securities and Exchange Act of 1934, as amended.

**MTS SYSTEMS CORPORATION
CERTIFICATION OF CHIEF FINANCIAL OFFICER
PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002 (18 U.S.C. 1350)**

The undersigned, Brian T. Ross, the Chief Financial Officer of MTS Systems Corporation (the "Company"), has executed this Certification in connection with the filing with the Securities and Exchange Commission of the Company's Annual Report on Form 10-K for the fiscal year ended September 29, 2018 (the "Report").

The undersigned hereby certifies that:

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.

Date: November 26, 2018

/s/ BRIAN T. ROSS

Brian T. Ross

Senior Vice President and Chief Financial Officer

This certification accompanies the Report pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 and shall not be deemed "filed" by the Company for purposes of Section 18 of the Securities and Exchange Act of 1934, as amended.