

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

FORM 10-K
ANNUAL REPORT
PURSUANT TO SECTIONS 13 OR 15(d)
OF THE SECURITIES EXCHANGE ACT OF 1934

(MARK ONE)

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

For the fiscal year ended December 31, 2017
OR

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

Commission file number 001-06462

TERADYNE, INC.

(Exact Name of Registrant as Specified in Its Charter)

MASSACHUSETTS
(State or Other Jurisdiction of
Incorporation or Organization)

04-2272148
(I.R.S. Employer
Identification Number)

600 RIVERPARK DRIVE
NORTH READING, MASSACHUSETTS
(Address of Principal Executive Offices)

01864
(Zip Code)

Registrant's telephone number, including area code: (978) 370-2700

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

Title of Each Class	Name of Each Exchange on Which Registered
Common Stock, par value \$0.125 per share	New York Stock Exchange

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

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

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

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

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

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

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 stock held by non-affiliates of the registrant as of June 30, 2017 was approximately \$5.9 billion based upon the closing price of the registrant's Common Stock on the New York Stock Exchange on that date.

The number of shares outstanding of the registrant's only class of Common Stock as of February 23, 2018 was 195,422,673 shares.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's proxy statement in connection with its 2018 annual meeting of shareholders are incorporated by reference into Part III of this Form 10-K.

TERADYNE, INC.

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TERADYNE, INC.

FORM 10-K

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995, Section 27A of the Securities Act and Section 21E of the Securities Exchange Act. When used herein, the words “will,” “would,” “believe,” “anticipate,” “plan,” “expect,” “estimate,” “project,” “intend,” “may,” “see,” “target” and other words and terms of similar meaning are intended to identify forward-looking statements although not all forward looking statements contain these identifying words. Forward looking statements involve risks and uncertainties, including, but not limited to, those discussed in the section entitled “Risk Factors” of this annual report on Form 10-K and elsewhere, and in other reports we file with the Securities and Exchange Commission. Readers are cautioned not to place undue reliance on these forward-looking statements which reflect management’s analysis only as of the date hereof and are subject to risks and uncertainties that could cause actual results to differ materially from those stated or implied. Teradyne assumes no obligation to update these forward-looking statements for any reason, except as may be required by law.

PART I

Item 1: *Business*

Teradyne, Inc. (“Teradyne”) was founded in 1960 and is a leading global supplier of automation equipment for test and industrial applications.

We design, develop, manufacture and sell automatic test systems used to test semiconductors, wireless products, data storage and complex electronics systems in the consumer electronics, wireless, automotive, industrial, computing, communications, and aerospace and defense industries. Our industrial automation products include collaborative robots used by global manufacturing and light industrial customers to improve quality, increase manufacturing efficiency and decrease manufacturing costs. Our automatic test equipment and industrial automation products and services include:

- semiconductor test (“Semiconductor Test”) systems;
- defense/aerospace (“Defense/Aerospace”) test instrumentation and systems, storage test (“Storage Test”) systems, and circuit-board test and inspection (“Production Board Test”) systems (collectively these products represent “System Test”);
- industrial automation (“Industrial Automation”) products; and
- wireless test (“Wireless Test”) systems.

We have a customer base which includes integrated device manufacturers (“IDMs”), outsourced semiconductor assembly and test providers (“OSATs”), original equipment manufacturers (“OEMs”), wafer foundries, fabless companies that design, but contract with others for the manufacture of integrated circuits (“ICs”), developers of wireless devices and consumer electronics, manufacturers of circuit boards, automotive suppliers, wireless product manufacturers, storage device manufacturers, aerospace and military contractors, and distributors that sell collaborative robots.

The market for our test products is concentrated with a limited number of significant customers accounting for a substantial portion of the purchases of test equipment. One customer drives significant demand for our products both through direct sales and sales to the customer’s supply partners. We expect that sales of our test products will continue to be concentrated with a limited number of significant customers for the foreseeable future.

In 2015, we acquired Universal Robots A/S (“Universal Robots”), the leading supplier of collaborative robots which are low-cost, easy-to-deploy and simple-to-program robots that work side by side with production workers to improve quality, increase manufacturing efficiency and decrease manufacturing costs. Universal Robots is a separate operating and reportable segment, Industrial Automation. The acquisition of Universal Robots provides a growth engine to our business and complements our existing System Test and Wireless Test segments. The total purchase price for Universal Robots was approximately \$315 million, which included cash paid of approximately \$284 million and \$32 million in fair value of contingent consideration payable upon achievement of revenue and earnings targets through 2018. Contingent consideration for the period from July 2015 to December 2017 was \$24.5 million and is expected to be paid in March 2018. Contingent consideration for 2015 was \$15 million and was paid in February 2016. The remaining maximum contingent consideration that could be paid is \$25 million.

Investor Information

We are a Massachusetts corporation incorporated on September 23, 1960. We are subject to the informational requirements of the Securities Exchange Act of 1934 (“Exchange Act”). We file periodic reports, proxy statements and other information with the Securities and Exchange Commission (“SEC”). Such reports, proxy statements and other information may be obtained by visiting the Public Reference Room of the SEC at 100 F Street, N.E., Washington, DC 20549 or by calling the SEC at 1-800-SEC-0330. In addition, the SEC maintains an internet site (<http://www.sec.gov>) that contains reports, proxy and information statements and other information regarding issuers that file documents electronically.

You can access financial and other information, including the charters of our Audit Committee, Compensation Committee and Nominating and Corporate Governance Committee, our Corporate Governance Guidelines and Code of Conduct, by clicking the Investors link on our web site at www.teradyne.com. We make available, free of charge, copies of our filings with the SEC, including our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Exchange Act through our web site as soon as reasonably practicable after filing such material electronically or otherwise furnishing it to the SEC.

Products

Semiconductor Test

We design, manufacture, sell and support Semiconductor Test products and services on a worldwide basis. The test systems we provide are used both for wafer level and device package testing. These chips are used in automotive, industrial, communications, consumer, and computer and electronic game applications, among others. Semiconductor devices span a broad range of functionality, from very simple low-cost devices such as appliance microcontrollers, operational amplifiers or voltage regulators to complex digital signal processors and microprocessors as well as memory devices. Semiconductor Test products and services are sold to IDMs that integrate the fabrication of silicon wafers into their business, “Fabless” companies that outsource the manufacturing of silicon wafers, “Foundries” that cater to the processing and manufacturing of silicon wafers, and OSATs that provide test and assembly services for the final packaged devices to both Fabless companies and IDMs. Fabless companies perform the design of integrated circuits without manufacturing capabilities, and use Foundries for wafer manufacturing and OSATs for test and assembly. These customers obtain the overall benefit of comprehensively testing devices and reducing the total costs associated with testing by using our Semiconductor Test systems to:

- improve and control product quality;
- measure and improve product performance;
- reduce time to market; and
- increase production yields.

Our FLEX Test Platform architecture advances our core technologies to produce test equipment that is designed for high efficiency multi-site testing. Multi-site testing involves the simultaneous testing of many devices in parallel. Leading semiconductor manufacturers are using multi-site testing to significantly improve their “Cost of Test” economics. The FLEX Test Platform architecture addresses customer requirements through the following key capabilities:

- A high efficiency multi-site architecture that reduces tester overhead such as instrument setup, synchronization and data movement, and signal processing;
- The IG-XL™ software operating system which provides fast program development, including instant conversion from single to multi-site test; and
- Broad technology coverage by instruments designed to cover the range of test parameters, coupled with a universal slot test head design that allows easy test system reconfiguration to address changing test needs.

FLEX Test Platform purchases are being made by IDMs, OSATs, Foundries and Fabless customers. The FLEX Test Platform has become a widely used test solution at OSATs by providing versatile testers that can handle the widest range of devices, allowing OSATs to leverage their capital investments. The broad consumer, automotive and broadband markets have historically driven most of the device volume growth in the semiconductor industry. These markets include smart phones, cell phones, tablets, set top boxes, HDTVs, game controllers, computer graphics, and automotive controllers to name a few. These end use markets continue to be drivers for the FLEX Test Platform family of products because they require a wide range of technologies and instrument coverage. The UltraFLEX-M tester extends the FLEX Test Platform into the High Speed DRAM testing market. The FLEX Test Platform has an installed base of more than 6,000 systems.

Our J750™ test system shares the IG-XL software environment with the family of FLEX Test Platform systems. The J750 is designed to address the highest volume semiconductor devices, such as microcontrollers, that are central to the functionality of almost every consumer electronics product, from small appliances to automobiles. J750 test systems combine compact packaging, high throughput and ease of production test. We extended the J750 platform technology to create the IP750 Image Sensor™ test system. The IP750 is focused on testing image sensor devices used in smart phones and other imaging products. We have continued to invest in the J750 platform with new instrument releases that bring new capabilities to existing market segments and expand the J750 platform to new devices that include high end microcontrollers and the latest generation of cameras. The J750 platform has an installed base of over 5,400 systems.

Our Magnum platform addresses the requirements of mass production test of memory devices such as flash memory and DRAM. Flash and DRAM memory are widely used core building blocks in modern electronic products finding wide application in consumer, industrial, and computing equipment. Magnum V, the newest member of the family, is a next generation memory test solution designed for parallel memory test in the flash, DRAM and multi-chip package markets. The Magnum platform has an installed base of over 2,200 systems.

Our ETS platform is used by semiconductor manufacturers and assembly and test subcontractors, primarily in the analog/mixed signal markets that cover more cost sensitive applications. Our proprietary SmartPin™ technology enables high efficiency multi-site testing, on an individual test system, permitting greater test throughput. Semiconductors tested by ETS platform systems are incorporated into a wide range of products in historically high-growth markets, including mobile devices, video/multimedia products, automotive electronics, computer peripherals, and notebook and desktop computers. The newest products from the platform include the ETS-88, a high performance multi-site production test system designed to test a wide variety of high volume commodity and precision devices, and the ETS-800, a high performance multi-site production test system to test high complexity power devices in automotive, industrial and consumer applications. The ETS platform has an installed base of over 4,300 systems.

System Test

Our System Test segment is comprised of three business units: Defense/Aerospace, Storage Test and Production Board Test.

Defense/Aerospace

We are a leading provider of high performance test systems, subsystems, instruments and service for the defense and aerospace markets. Our test products are used to ensure the readiness of military and commercial aerospace electronics systems. New programs, such as tactical aircraft and missile systems, as well as upgrade programs, continue to fuel the demand for high performance test systems in this market. Our test products are well-suited to the demands of defense/aerospace electronics manufacturers and repair depots worldwide. Our leadership in this market is underscored by our success with major Department of Defense programs across all U.S. military service branches and many allied defense services worldwide. Our acquisition of Avionics Interface Technologies, LLC (“AIT”) in 2014 complements our line of bus test instrumentation for commercial and defense avionics systems. AIT is a supplier of equipment for testing state-of-the-art data communication buses.

Storage Test

The Storage Test business unit addresses the high throughput, automated manufacturing test requirements of hard disk drive (“HDD”) and solid state disk (“SSD”) manufacturers and semiconductor manufacturers. Our products address the client and enterprise storage markets. The client market is driven by the needs of desktop, laptop, and external HDD and SSD storage products. The enterprise market is driven by the needs of data centers and cloud storage. During 2017, we developed and shipped a system level test product for the semiconductor production market. The business unit’s products lead in addressing customer requirements related to factory density, throughput, and thermal performance.

Production Board Test

Our test systems are used by electronics manufacturers worldwide to perform In-Circuit-Test (“ICT”) and device programming of printed circuit board assemblies. Fast, accurate and cost-effective test capabilities are hallmark features of our Test Station and Spectrum ICT product families. We offer the Test Station in off-line and automated in-line configurations. The automated in-line configurations address the growing requirements for automating production lines for high volume applications, such as automotive electronics.

Industrial Automation

Universal Robots, which we acquired in June 2015, is the leading supplier of collaborative robots, which are low-cost, easy-to-deploy and simple-to-program robots that work side by side with production workers to improve quality, increase manufacturing efficiency and decrease manufacturing costs. Collaborative robots are designed to mimic the motion of a human arm and can be fitted with task specific grippers or fixtures to support a wide range of applications. Universal Robots offers three collaborative robot models, the UR3, UR5, and UR10, each with different weight carrying capacity and arm reach. All models are easily integrated into existing production environments. Universal Robots’ products are differentiated by their:

- easy programming using a graphical interface which allows users to program the collaborative robot in a few hours;
- flexibility and ease of use in allowing customers to change the task the collaborative robot is performing as their production demands dictate;
- safe operations as collaborative robots can assist workers in side by side production environments requiring no special safety enclosures or shielding to protect workers; and
- short payback period, on average less than 12 months.

Cumulatively, Universal Robots has sold over 20,000 collaborative robots in diverse production environments and applications.

Wireless Test

Our acquisition of LitePoint in 2011 and ZTEC Instruments Inc (“ZTEC”) in 2013 expanded our product offerings in the wireless test market. Under the LitePoint brand name, these products provide test solutions utilized in the development and manufacturing of wireless devices. The world’s leading makers of smart phones, tablets, notebooks, laptops, peripherals, and Internet-of-Things (IoT) devices rely on LitePoint technology to ensure their products get into consumer hands with high quality and high efficiency.

LitePoint hardware and software wireless test solutions are used in test insertions that span design verification to high volume manufacturing and are deployed across the entire production eco-system from the wireless chipset suppliers to the consumer brands. Wireless devices are often tested at multiple points along the manufacturing process that include insertions at component, system-in-package (“SiP”), module, PCB, SMT and finished product stages.

Design verification is an important step in the development process for evaluating product performance prior to starting production. As end market unit volumes have increased, the quantity of units and the amount of data that must be analyzed for a successful product launch continues to grow. LitePoint products provide easy to use, domain specific tools for rapid analysis of product performance. This helps to speed time to market.

In high volume manufacturing, before products are packaged and shipped, wireless test enables the calibration of each individual product’s wireless performance to improve range, data throughput and battery life. Testing also verifies product specifications for product quality control. As markets become increasingly competitive, product performance and quality provide brand differentiation.

Wireless standards can be thought of in two categories, connectivity and cellular. Connectivity covers many standards such as Wi-Fi, Bluetooth, and GPS. LitePoint’s IQxel products cover emerging Wi-Fi standards such as 802.11ax and 802.11ad as well as the existing standards 802.11a/b/g/n and 11ac, and includes a variety of other standards such as Bluetooth Classic, Bluetooth 5.0 and Bluetooth low energy, Zigbee, Z-Wave, NFC, LoRa, GPS, GLONASS and others.

The IQxel product family’s high-performance wireless and multi-device testing economics is aligned with the needs of networking equipment, Internet gateways, IoT products and embedded modules used in smartphones, tablets, and PCs. Another connectivity product, the IQnfc, addresses the growing use of NFC technology for payments with mobile devices.

Cellular standards include 2G, 3G, 4G and emerging 5G mobile phone technologies. LitePoint’s IQxstream is a multi-device optimized solution for high-speed testing of GSM, EDGE, CDMA2000, TD-SCDMA, WCDMA, HSPA+, LTE-FDD, TD_LTE, and LTE-A technologies. It is used for calibration and verification of smartphones, tablets, small cell wireless gateways and embedded cellular modules.

In 2017, LitePoint announced two new cellular products: (1) IQcell, a multi-device cellular signaling test solution which enables user experience testing of LTE cellular devices via over-the-air connections; and (2) IQgig, a fully integrated 5G millimeter wave test solution that enables 5G product developers to validate their designs and accelerate product introductions.

An important component in all wireless systems is the analog RF front end. The performance of these components is continually pushed higher as device makers add more bands, channels, antennas and higher data rates. We offer the LitePoint zSeries of modular wireless test instruments for design verification test and production testing of these wireless components. The lab-in-a-box zSeries solution provides simple and fast

design verification of RF power amplifier and smart device RF front end modules. It is capable of rapid analysis of the latest digital pre-distortion and envelope tracking technologies for both LTE and Wi-Fi standards. A ruggedized version of the product is designed for high volume testing of these same devices.

To complement the test systems, LitePoint offers turnkey test software for over 350 of the most popular wireless chipsets. These optimized solutions provide rapid development of high volume manufacturing solutions with a minimum of engineering effort by customers.

Summary of Revenues by Reportable Segment

Our four reportable segments accounted for the following percentages of consolidated revenues for each of the last three years:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
Semiconductor Test	78%	78%	73%
System Test	9	11	13
Industrial Automation	8	6	3
Wireless Test	<u>5</u>	<u>5</u>	<u>11</u>
	<u>100%</u>	<u>100%</u>	<u>100%</u>

Sales and Distribution

In 2017 and 2016, revenues from Taiwan Semiconductor Manufacturing Company Ltd. accounted for 13% and 12%, respectively, of our consolidated revenues. In 2016 and 2015, revenues from JA Mitsui Leasing, Ltd. accounted for 12% and 13%, respectively, of our consolidated revenues. Taiwan Semiconductor Manufacturing Company Ltd. and JA Mitsui Leasing, Ltd. are customers of our Semiconductor Test segment. In each of the years, 2017, 2016 and 2015, our five largest customers in aggregate accounted for 32%, 36% and 34% of our consolidated revenues, respectively.

OSAT customers, such as Taiwan Semiconductor Manufacturing Company Ltd., often purchase our test systems based upon recommendations from OEMs, IDMs and Fabless companies. In all cases when an OSAT customer purchases a test system from us, we consider the OSAT as the customer since credit risk, title and risk of loss, among other things, are between Teradyne and the OSAT. We estimate product demand driven by a single OEM customer, combining direct sales to that customer with sales to the customer’s OSATs (which include Taiwan Semiconductor Manufacturing Company Ltd. and its leasing company, JA Mitsui Leasing, Ltd.), accounted for approximately 22%, 26%, and 23% of our consolidated revenues in 2017, 2016, and 2015, respectively. The loss of, or significant decrease in demand from, this OEM customer, or any of our five largest direct customers, could have a material adverse effect on our business, results of operations and financial condition.

We have sales and service offices located throughout North America, Asia and Europe. We sell in these areas predominantly through a direct sales force, except for Industrial Automation products which are sold through distributors. Our manufacturing activities are primarily conducted through subcontractors and outsourced contract manufacturers with significant operations in China and Malaysia.

Sales to customers outside the United States were 88%, 87%, and 87%, respectively, of our consolidated revenues in 2017, 2016 and 2015. Sales are attributed to geographic areas based on the location of the customer site.

Sales to customers by country outside of the United States that accounted for 10% or more of our consolidated revenues in any of the previous three years were as follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
Taiwan	32%	37%	27%
China	12	10	16

See also “Item 1A: Risk Factors” and Note R: “Operating Segment, Geographic and Significant Customer Information” in Notes to Consolidated Financial Statements.

Competition

We face significant competition throughout the world in each of our reportable segments. Competitors in the Semiconductor Test segment include, among others, Advantest Corporation and Xcerra Corporation.

Competitors in the System Test segment include, among others, Keysight Technologies, Inc., Astronics, Test Research, Inc. and SPEA S.p.A.

Competitors in our Industrial Automation segment include manufacturers of traditional industrial robots such as KUKA Robotics Corporation, ABB, FANUC and Yaskawa Electric Corporation as well as emerging companies developing collaborative robots.

Competitors in our Wireless Test segment include, among others, Rohde & Schwarz GmbH & Co. KG, Anritsu Company, Keysight Technologies, Inc. and National Instruments Corporation.

Some of our competitors have substantially greater financial and other resources to pursue engineering, manufacturing, marketing and distribution of their products. We also face competition from emerging Asian companies and from internal suppliers at several of our customers. Some of our competitors have introduced or announced new products with certain performance characteristics which may be considered equal or superior to those we currently offer. We expect our competitors to continue to improve the performance of their current products and to introduce new products or new technologies that provide improved cost of ownership and performance characteristics. See also “Item 1A: Risk Factors.”

Backlog

At December 31, 2017 and 2016, our backlog of unfilled orders in our four reportable segments was as follows:

	<u>2017</u>	<u>2016</u>
	<u>(in millions)</u>	
Semiconductor Test	\$464.2	\$575.7
System Test	111.9	117.8
Wireless Test	35.5	32.4
Industrial Automation	14.8	6.0
	<u>\$626.4</u>	<u>\$731.9</u>

Of the backlog at December 31, 2017, approximately 99% of the Semiconductor Test backlog, 97% of the System Test backlog, and 69% of the Industrial Automation backlog is expected to be delivered in 2018. The above table does not include any adjustments for adoption of the new revenue standard, that was adopted January, 1, 2018. If the Wireless test backlog were calculated based upon the new revenue standard, the 2017 backlog balance would be \$21.3 million with approximately 68% expected to be delivered in 2018. Backlog for each of the other reportable segments would not be materially affected by adoption of the new revenue standard.

Customers may delay delivery of products or cancel orders suddenly and without advanced notice, subject to possible cancellation penalties. Due to possible customer changes in delivery schedules and cancellation of orders, our backlog at any particular date is not necessarily indicative of the actual sales for any succeeding period. Delays in delivery schedules or cancellations of backlog during any particular period could have a material adverse effect on our business, financial condition or results of operations.

Raw Materials

Our products contain electronic and mechanical components that are provided by a wide range of suppliers. Some of these components are standard products, while others are manufactured to our specifications. We can experience occasional delays in obtaining timely delivery of certain items. While the majority of our components are available from multiple suppliers, certain items are obtained from sole sources. We may experience a temporary adverse impact if any of our sole source suppliers delay or cease to deliver products.

Intellectual Property and Licenses

The development of our products, both hardware and software, is based in significant part on proprietary information, our brands and technology. We protect our rights in proprietary information, brands and technology through various methods, such as:

- patents;
- copyrights;
- trademarks;
- trade secrets;
- standards of business conduct and related business practices; and
- technology license agreements, software license agreements, non-disclosure agreements, employment agreements, and other agreements.

However, these protections might not be effective in all circumstances. Competitors might independently develop similar technology or exploit our proprietary information and our brands in countries where we lack enforceable intellectual property rights or where enforcement of such rights through the legal system provides an insufficient deterrent. Also, intellectual property protections can lapse or be invalidated through appropriate legal processes. We do not believe that any single piece of intellectual property or proprietary rights is essential to our business.

Employees

As of December 31, 2017, we employed approximately 4,500 people. Since the inception of our business, we have experienced no work stoppages or other labor disturbances.

Engineering and Development Activities

The highly technical nature of our products requires a large and continuing engineering and development effort. For the years ended December 31, 2017, 2016, and 2015, our engineering and development expenditures were \$305.7 million, \$291.0 million, and \$292.3 million, respectively. These expenditures accounted for approximately 14.3%, 16.6%, and 17.8%, of our consolidated revenues in 2017, 2016, and 2015, respectively.

Environmental Affairs

We are subject to various federal, state, and local government laws and regulations relating to the protection of employee health and safety and the environment. We accrue for all known environmental liabilities when it

becomes probable that we will incur cleanup costs and those costs can reasonably be estimated. Estimated environmental costs are not expected to materially affect the financial position or results of our operations in future periods. However, estimates of future costs are subject to change due to protracted cleanup periods and changing environmental remediation laws and regulations.

OUR EXECUTIVE OFFICERS

Pursuant to General Instruction G(3) of Form 10-K, the following table is included in Part I of this Annual Report on Form 10-K in lieu of being included in the Proxy Statement for the Annual Meeting of Shareholders. The table sets forth the names of all of our executive officers and certain other information relating to their positions held with Teradyne and other business experience. Our executive officers do not have a specific term of office but rather serve at the discretion of the Board of Directors.

<u>Executive Officer</u>	<u>Age</u>	<u>Position</u>	<u>Business Experience For The Past 5 Years</u>
Mark E. Jagiela	57	Chief Executive Officer and President	Chief Executive Officer since February 2014; President of Teradyne since January 2013; President of Semiconductor Test from 2003 to February 2016; Vice President of Teradyne from 2001 to 2013.
Gregory R. Beecher	60	Vice President, Chief Financial Officer and Treasurer	Vice President and Chief Financial Officer of Teradyne since 2001; Treasurer of Teradyne from 2003 to 2005 and since 2006.
Charles J. Gray	56	Vice President, General Counsel and Secretary	Vice President, General Counsel and Secretary of Teradyne since April 2009.
Bradford B. Robbins	59	President of Wireless Test	President of Wireless Test since August 2014; Chief Operating Officer of LitePoint Corporation from 2012 to 2014; Vice President of Teradyne since 2001.
Gregory S. Smith	54	President of Semiconductor Test	President of Semiconductor Test since February 2016; Vice President, SOC Business Group and Marketing Manager for Semiconductor Test Group from January 2014 to February 2016; Business Unit Manager, Complex SOC Business Unit from 2009 to January 2014.
Walter G. Vahey	53	President of System Test	President of System Test since July 2012; Vice President, Business Development since December 2017; Vice President of Teradyne since 2008; General Manager of Storage Test from 2008 to December 2017; General Manager of Production Board Test since April 2013; General Manager of Defense/Aerospace from 2004 to July 2012.

Item 1A: Risk Factors

Risks Associated with Our Business

The risks described below are not the only risks that we face. Additional risks and uncertainties not currently known to us or that we currently deem to be immaterial also may materially adversely affect our business, financial condition and/or operating results.

Our business is impacted by global and industry-specific economic cycles, which are difficult to predict, and actions we have taken or may take to offset these cycles may not be sufficient.

Capital equipment providers in the electronics and semiconductor industries, such as Teradyne, have, in the past, been negatively impacted by both sudden slowdowns in the global economies and recurring cyclicality

within those industries. These cycles have resulted in periods of over-supply; a trend we believe will continue to occur for newer generations of electronic products. Our business and results of operations depend, in significant part, upon capital expenditures of manufacturers of semiconductors and other electronics, which in turn depend upon the current and anticipated market demand for those products. Disruption or deterioration in economic conditions may reduce customer purchases of our products, thereby reducing our revenues and earnings. In addition, such adverse changes in economic conditions, and resulting slowdowns in the market for our products, may, among other things, result in increased price competition for our products, increased risk of excess and obsolete inventories, increased risk in the collectability of our accounts receivable from our customers, potential reserves for doubtful accounts and write-offs of accounts receivable, increased risk of restructuring charges, and higher operating costs as a percentage of revenues, which, in each case and together, adversely affect our operating results. We are unable to predict the likely duration, frequency and severity of disruptions in financial markets, credit availability, and adverse economic conditions throughout the world, and we cannot ensure that the level of revenues or new orders for a fiscal quarter will be sustained in subsequent quarters. We have taken actions to address the effects of general economic variability and recurring industry cyclicality, including implementing cost control and reduction measures. We cannot predict whether these measures will be sufficient to offset global or market-specific disruptions that might affect our test businesses and we may need to take additional or different measures in the future.

We are subject to intense competition.

We face significant competition throughout the world in each of our reportable segments. Some of our competitors have substantial financial and other resources to pursue engineering, manufacturing, marketing and distribution of their products. We also face competition from emerging Asian equipment companies and internal development at several of our customers. Some of our competitors have introduced or announced new products with certain performance characteristics that may be considered equal or superior to those we currently offer. We expect our competitors to continue to improve the performance of their current products and to introduce new products or new technologies that provide improved cost of ownership and performance characteristics. New product introductions by competitors could cause a decline in revenues or loss of market acceptance of our products.

The market for our products is concentrated, and our business depends, in part, on obtaining orders from a few significant customers.

The market for our products is concentrated with a limited number of significant customers accounting for a substantial portion of the purchases of test equipment. In each of the years 2017, 2016, and 2015, our five largest customers in aggregate accounted for 32%, 36%, and 34% of consolidated revenues, respectively. We estimate product demand driven by a single OEM customer, combining direct sales to that customer with sales to the customer's OSATs (which include Taiwan Semiconductor Manufacturing Company Ltd. and its leasing company, JA Mitsui Leasing, Ltd.), accounted for approximately 22%, 26%, and 23% of our consolidated revenues in 2017, 2016, and 2015, respectively. In any one reporting period, a single customer or several customers may contribute even a larger percentage of our consolidated revenues. In addition, our ability to increase sales will depend, in part, on our ability to obtain orders from current or new significant customers. The opportunities to obtain orders from these customers may be limited, which may impair our ability to grow revenues. We expect that sales of our products will continue to be concentrated with a limited number of significant customers for the foreseeable future. The loss of a significant customer or any reduction in orders by these customers, including reductions due to market or competitive conditions, such as we experienced in our Wireless Test segment, would likely have a material adverse effect on our business, financial condition or results of operations.

Our operating results are likely to fluctuate significantly.

Our operating results are affected by a wide variety of factors that could materially adversely affect revenues or profitability. The following factors could impact future operations:

- a worldwide economic slowdown or disruption in the global financial markets;
- competitive pressures on selling prices;
- our ability to introduce, and the market acceptance of, new products;
- changes in product revenues mix resulting from changes in customer demand;
- the level of orders received which can be shipped in a quarter because of the tendency of customers to wait until late in a quarter to commit to purchase due to capital expenditure approvals and constraints occurring at the end of a quarter, or the hope of obtaining more favorable pricing from a competitor seeking the business;
- engineering and development investments relating to new product introductions, and the expansion of manufacturing, outsourcing and engineering operations in Asia;
- provisions for excess and obsolete inventory relating to the lack of demand for and the discontinuance of products;
- impairment charges for certain long-lived and intangible assets, and goodwill;
- an increase in the leasing of our products to customers;
- our ability to expand our global distribution channel for our collaborative robots;
- parallel or multi-site testing could lead to a decrease in the ultimate size of the market for our products; and
- the ability of our suppliers and subcontractors to meet product quality or delivery requirements needed to satisfy customer orders for our products, especially if product demand increases.

As a result of the foregoing and other factors, we have experienced and may continue to experience material fluctuations in future operating results on a quarterly or annual basis which could materially and adversely affect our business, financial condition, operating results or stock price.

We are subject to risks of operating internationally.

A significant portion of our total revenues is derived from customers outside the United States. Our international sales and operations are subject to significant risks and difficulties, including:

- unexpected changes in legal and regulatory requirements affecting international markets;
- changes in tariffs and exchange rates;
- social, political and economic instability, acts of terrorism and international conflicts;
- difficulties in protecting intellectual property;
- difficulties in accounts receivable collection;
- cultural differences in the conduct of business;
- difficulties in staffing and managing international operations;
- compliance with customs regulations; and
- compliance with international tax laws and regulations.

In addition, an increasing portion of our products and the products we purchase from our suppliers are sourced or manufactured in foreign locations, including China and Malaysia, and a large portion of the devices our products test are fabricated and tested by foundries and subcontractors in Taiwan, China, Singapore and other parts of Asia. As a result, we are subject to a number of economic and other risks, particularly during times of political or financial instability in these regions. Disruption of manufacturing or supply sources in these international locations could materially adversely impact our ability to fill customer orders and potentially result in lost business.

If we fail to develop new technologies to adapt to our customers' needs and if our customers fail to accept our new products, our revenues will be adversely affected.

We believe that our technological position depends primarily on the technical competence and creative ability of our engineers. In a rapidly evolving market, such as ours, the development or acquisition of new technologies, commercialization of those technologies into products and market acceptance and customer demand for those products are critical to our success. Successful product development or acquisition, introduction and acceptance depend upon a number of factors, including:

- new product selection;
- ability to meet customer requirements;
- development of competitive products by competitors;
- timely and efficient completion of product design;
- timely and efficient implementation of manufacturing and manufacturing processes;
- timely remediation of product performance issues, if any, identified during testing;
- assembly processes and product performance at customer locations;
- differentiation of our products from our competitors' products;
- management of customer expectations concerning product capabilities and product life cycles;
- transition of customers to new product platforms;
- ability to attract and retain technical talent; and
- innovation that does not infringe on the intellectual property rights of third parties.

We may be subject to product recalls and warranty and product liability claims.

We invest significant resources in the design, manufacture and testing of our products. However, we may discover design or manufacturing defects in our products after they have been shipped and, as a result, we may incur development and remediation costs and be required to settle warranty and product liability claims. In addition, if any of our products contain defects or have reliability, quality or safety issues, we may need to conduct a product recall which could result in significant repair or replacement costs and substantial delays in product shipments and may damage our reputation which could make it more difficult to sell our products. Any of these results could have a material adverse effect on our business, results of operations or financial condition.

If our suppliers do not meet product or delivery requirements, we could have reduced revenues and earnings.

Certain components, including semiconductor chips, may be in short supply from time to time because of high industry demand or the inability of some vendors to consistently meet our quality or delivery requirements. If any of our suppliers were to cancel contracts or commitments or fail to meet the quality or delivery requirements needed to satisfy customer orders for our products, we could lose time-sensitive customer orders, have significantly decreased revenues and earnings and be subject to contractual penalties, which would have a

material adverse effect on our business, results of operations and financial condition. In addition, we rely on contract manufacturers for certain subsystems used in our products, and our ability to meet customer orders for those products depends upon the timeliness and quality of the work performed by these subcontractors, over whom we do not exercise any control.

To a certain extent, we are dependent upon the ability of our suppliers and contractors to help meet increased product or delivery requirements. It may be difficult for certain suppliers to meet delivery requirements in a period of rapid growth, therefore impacting our ability to meet our customers' demands.

We rely on the financial strength of our suppliers. There can be no assurance that the loss of suppliers either as a result of financial viability, bankruptcy or otherwise will not have a material adverse effect on our business, results of operations or financial condition.

Our operations may be adversely impacted if our outsourced contract manufacturers or service providers fail to perform.

We depend on Flex Ltd. ("Flex") to manufacture and test our FLEX and J750 family of products from its facility in China and on other contract manufacturers to manufacture other products. If for any reason these contract manufacturers cannot provide us with these products in a timely fashion, or at all, we may not be able to sell these products to our customers until we enter a similar arrangement with an alternative contract manufacturer. If we experience a problem with our supply of products from Flex or our other contract manufacturers, it may take us significant time to either manufacture the product or find an alternate contract manufacturer, which could result in substantial expense and disruption to our business.

We have also outsourced a number of our general and administrative functions to reputable service providers, many of which are in foreign countries, sometimes impacting communication with them because of language and time differences. Their presence in foreign countries also increases the risk they could be exposed to political risk. Additionally, there may be difficulties encountered in coordinating the outsourced operations with existing functions and operations. If we fail in successfully coordinating and managing the outsourced service providers, it may cause an adverse effect on our operations which could have a material adverse effect on our business, results of operations or financial condition.

We may not fully realize the benefits of our acquisitions or strategic alliances.

In June 2015, we acquired Universal Robots. We may not be able to realize the benefit of acquiring Universal Robots or successfully grow Universal Robots' business. We may continue to acquire additional businesses, form strategic alliances or create joint ventures with third parties that we believe will complement or augment our existing businesses. We may not be able to realize the expected synergies and cost savings from the integration with our existing operations of other businesses or technologies that we may acquire. In addition, the integration process for our acquisitions may be complex, costly and time consuming and include unanticipated issues, expenses and liabilities. We may have difficulty in developing, manufacturing and marketing the products of a newly acquired company in a manner that enhances the performance of our combined businesses or product lines and allows us to realize value from expected synergies. Following an acquisition, we may not achieve the revenue or net income levels that justify the acquisition. Acquisitions may also result in one-time charges (such as acquisition-related expenses, write-offs or restructuring charges) or in the future, impairment of goodwill or acquired intangible assets that adversely affect our operating results. Additionally, we may fund acquisitions of new businesses, strategic alliances or joint ventures by utilizing our cash, incurring debt, issuing shares of our common stock, or by other means.

In the second quarter of 2016, we performed an interim goodwill impairment test and recorded a goodwill impairment loss of \$254.9 million and \$83.3 million intangible asset impairment in our Wireless Test segment as a result of a sharp decline in projected demand attributable to an estimated smaller future wireless test market.

The decrease in projected demand was due to lower forecasted buying from our largest Wireless Test segment customer (who has contributed between 51% and 73% of annual Wireless Test sales since the LitePoint acquisition in 2011 through 2015) as a result of the customer's numerous operational efficiencies; slower smartphone growth rates; and a slowdown of new wireless technology adoption. No impairment was identified in 2017.

We may incur significant liabilities if we fail to comply with environmental regulations.

We are subject to both domestic and international environmental regulations and statutory strict liability relating to the use, storage, discharge, site cleanup and disposal of hazardous chemicals used in our manufacturing processes. If we fail to comply with present and future regulations, or are required to perform site remediation, we could be subject to future liabilities or cost, including penalties or the suspension of production. Present and future regulations may also:

- restrict our ability to expand facilities;
- restrict our ability to ship certain products;
- require us to modify our operations logistics;
- require us to acquire costly equipment; or
- require us to incur other significant costs and expenses.

Pursuant to present regulations and agreements, we are conducting groundwater and subsurface assessment and monitoring and are implementing remediation and corrective action plans for facilities located in Massachusetts and New Hampshire which are no longer conducting manufacturing operations. As of December 31, 2017, we have not incurred material costs as a result of the monitoring and remediation steps taken at the Massachusetts and New Hampshire sites.

On January 27, 2003, the European Union adopted the following directives: (i) the directive on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (the "RoHS Directive"); and (ii) the directive on Waste Electrical and Electronic Equipment (the "WEEE Directive"). The WEEE Directive became effective August 13, 2005 and the RoHS Directive became effective on July 6, 2006. Both the RoHS Directive and the WEEE Directive alter the form and manner in which electronic equipment is imported, sold and handled in the European Union. Other jurisdictions, such as China, have followed the European Union's lead in enacting legislation with respect to hazardous substances and waste removal. Ensuring compliance with the RoHS Directive, the WEEE Directive and similar legislation in other jurisdictions, and integrating compliance activities with our suppliers and customers could result in additional costs and disruption to operations and logistics and thus, could have a negative impact on our business, operations or financial condition.

We currently are, and in the future may be, subject to litigation or regulatory proceedings that could have an adverse effect on our business.

From time to time, we may be subject to litigation or other administrative, regulatory or governmental proceedings, including tax audits and resulting claims that could require significant management time and resources and cause us to incur expenses and, in the event of an adverse decision, pay damages or incur costs in an amount that could have a material adverse effect on our financial position or results of operations.

Third parties may claim we are infringing their intellectual property and we could suffer significant litigation costs, licensing expenses or be prevented from selling our products.

We have been sued for patent infringement in the past and receive notifications from time to time that we may be in violation of patents held by others. An assertion of patent infringement against us, if successful, could

have a material adverse effect on our ability to sell our products or it could force us to seek a license to the intellectual property rights of others or alter such products so that they no longer infringe the intellectual property rights of others. A license could be very expensive to obtain or may not be available at all. Similarly, changing our products or processes to avoid infringing the rights of others may be costly or impractical. Additionally, patent litigation could require a significant use of management resources and involve a lengthy and expensive defense, even if we eventually prevail. If we do not prevail, we might be forced to pay significant damages, obtain licenses, modify our products, or stop making our products; each of which could have a material adverse effect on our financial condition, operating results or cash flows.

If we are unable to protect our intellectual property (“IP”), we may lose a valuable asset or may incur costly litigation to protect our rights.

We protect the technology that is incorporated in our products in several ways, including through patent, copyright, trademark and trade secret protection and by contractual agreement. However, even with these protections, our IP may still be challenged, invalidated or subject to other infringement actions. While we believe that our IP has value in the aggregate, no single element of our IP is in itself essential. If a significant portion of our IP is invalidated or ineffective, our business could be materially adversely affected.

We may incur higher tax rates than we expect and may have exposure to additional international tax liabilities and costs.

We are subject to paying income taxes in the United States and various other countries where we operate. Our effective tax rate is dependent on where our earnings are generated and the tax regulations and the interpretation and judgment of administrative tax or revenue entities in the United States and other countries. We have pursued a global tax strategy which could adversely be affected by the mix of earnings and tax rates in the countries where we operate, changes to tax laws or an adverse tax ruling by administrative entities. We are also subject to tax audits in the countries where we operate. Any material assessment resulting from an audit from an administrative tax or revenue entity could also negatively affect our financial results.

As a multinational corporation, we are subject to income taxes as well as non-income based taxes, in both the United States and various foreign jurisdictions. In certain foreign jurisdictions, we qualify for tax incentives and tax holidays based on our ability to meet, on a continuing basis, various tests relating to our employment levels, research and development expenditures and other qualification requirements in a particular foreign jurisdiction. While we intend to operate in such a manner to maintain and maximize our tax incentives, no assurance can be given that we have so qualified or that we will so qualify for any particular year or jurisdiction. If we fail to qualify and to remain qualified for certain foreign tax incentives and tax holidays, we may be subject to further taxation or an increase in our effective tax rate which would adversely impact our financial results. In December 2015, we entered into an agreement with the Singapore Economic Development Board which extended our Singapore tax holiday under substantially similar terms to the agreement which expired on December 31, 2015. The new tax holiday is scheduled to expire on December 31, 2020. The tax savings attributable to the Singapore tax holiday for the years ended December 31, 2017, 2016 and 2015 were \$24.8 million or \$0.12 per diluted share, \$17.0 million or \$0.08 per diluted share and \$11.5 million or \$0.05 per diluted share, respectively.

In addition, we may incur additional costs, including headcount expenses, in order to maintain or obtain a foreign tax incentive in a particular foreign jurisdiction.

We may need to adjust estimates resulting from the U.S. Tax Cuts and Jobs Act of 2017.

On December 22, 2017, the U.S. enacted the Tax Cuts and Jobs Act of 2017 (the “Tax Reform Act”) making significant changes to the Internal Revenue Code. Among other changes, the Tax Reform Act permanently reduces the U.S. corporate tax rate from 35% to 21% effective for tax years beginning after

December 31, 2017, shifts the U.S. tax regime from a worldwide system to a modified territorial tax system, and requires companies to pay a transition tax on earnings of certain foreign subsidiaries that were previously tax deferred. U.S. Generally Accepted Accounting Principles (“GAAP”) requires that the impact of tax legislation be recognized in the period in which the law was enacted. As a result of the Tax Reform Act, in the fourth quarter of 2017 we recorded a provisional amount of \$186.0 million of additional income tax expense primarily composed of \$161.0 million of expense related to the one-time transition tax on the mandatory deemed repatriation of foreign earnings, \$33.6 million of expense related to the remeasurement of certain deferred tax assets and liabilities, and a benefit of \$10.3 million associated with the impact of correlative adjustments on uncertain tax positions. The provisional amount represents our best estimate of the impact of the Tax Reform Act in accordance with our understanding of the Tax Reform Act and available guidance as of the date of this filing and may change as additional guidance is provided by tax authorities or as changes are made in accounting standards for income taxes or related interpretations in response to the Tax Reform Act. Any subsequent adjustment to these amounts will be recorded in 2018. Adjustments may impact our financial results in a given reporting period.

We have significant guarantees, indemnification and customer confidentiality obligations.

From time to time, we make guarantees to customers regarding the delivery, price and performance of our products and guarantee certain indebtedness, performance obligations or lease commitments of our subsidiary and affiliate companies. We also have agreed to provide indemnification to our officers, directors, employees and agents, to the extent permitted by law, arising from certain events or occurrences while the officer, director, employee or agent, is or was serving at our request in such capacity. Additionally, we have confidentiality obligations to certain customers and if breached would require the payment of significant penalties. If we become liable under any of these obligations, it could materially and adversely affect our business, financial condition or operating results. For additional information see Note K: “Commitments and Contingencies—Guarantees and Indemnification Obligations” in Notes to Consolidated Financial Statements.

We may discontinue or reduce our quarterly cash dividend or share repurchase program.

In January 2014, our Board of Directors initiated a quarterly cash dividend of \$0.06 per share. In January 2017, our Board of Directors increased our quarterly cash dividend to \$0.07 per share and in January 2018, our Board of Directors increased our quarterly cash dividend to \$0.09 per share. In January 2018, our Board of Directors approved a new \$1.5 billion share repurchase authorization. We intend to repurchase \$750 million in 2018. Our December 2016 stock repurchase program was terminated. In 2017 and 2016, we repurchased \$200 million and \$146 million of common stock, respectively. Holders of our common stock are only entitled to receive dividends when and if they are declared by our Board of Directors. Future cash dividends and share repurchases are subject to the discretion of our Board of Directors and will depend, among other things, upon our earnings, capital requirements and financial condition. While we have declared a quarterly cash dividend on our common stock and authorized a share repurchase program, we are not required to do either and may reduce or eliminate our cash dividend or share repurchase program in the future. The reduction or elimination of our cash dividend or our share repurchase program could adversely affect the market price of our common stock.

We have incurred indebtedness and may incur additional indebtedness.

On December 12, 2016, we completed a private offering of \$460.0 million aggregate principal amount of 1.25% convertible senior unsecured notes (the “Notes”) due December 15, 2023 and received net proceeds, after issuance costs, of approximately \$450.8 million. \$33.0 million of which was used to pay the net cost, after being partially offset by proceeds from the sale of the warrants, of the convertible note hedge transactions and \$50.1 million of which was used to repurchase 2 million shares of our common stock. Holders of the Notes may require us to repurchase the Notes upon the occurrence of certain fundamental changes involving us or the holders may elect to convert into shares of our common stock.

On April 27, 2015, we entered into a five-year, senior secured revolving credit facility of up to \$350.0 million. Subject to customary conditions, we may seek to obtain from existing or new lenders incremental commitments under the credit facility in an aggregate principal amount not to exceed \$150.0 million. We have not borrowed any funds under this credit facility. We could borrow funds under this credit facility at any time for general corporate purposes and working capital.

The issuance of the Notes and any additional indebtedness, among other things, could:

- make it difficult to make payments on this indebtedness and our other obligations;
- make it difficult to obtain any necessary future financing for working capital, capital expenditures, debt service requirements or other purposes;
- require the dedication of a substantial portion of any cash flow from operations to service for indebtedness, thereby reducing the amount of cash flow available for other purposes, including capital expenditures; and
- limit our flexibility in planning for, or reacting to, changes in our business and the industries in which we compete.

Our convertible note hedge and warrant transactions could impact the value of our stock.

Concurrent with the offering of the Notes, we entered into convertible note hedge transactions (the “Note Hedge Transactions”) with the initial purchasers or their affiliates (the “Option Counterparties”). The Note Hedge Transactions cover, subject to customary anti-dilution adjustments, the number of shares of our common stock that underlie the Notes, with a strike price equal to the conversion price of the Notes of \$31.80. The Note Hedge Transactions cover, subject to customary antidilution adjustments, approximately 14.5 million shares of our common stock.

Separately and concurrent with the pricing of the Notes, we entered into warrant transactions with the Option Counterparties (the “Warrant Transactions”) in which we sold net-share-settled (or, at our election subject to certain conditions, cash-settled) warrants to the Option Counterparties. The Warrant Transactions cover, subject to customary antidilution adjustments, approximately 14.5 million shares of our common stock. The strike price of the warrants is \$39.91 per share. The Warrant Transactions could have a dilutive effect to our common stock to the extent that the market price per share of our common stock, as measured under the terms of the Warrant Transactions, exceeds the applicable strike price of the warrants.

The Note Hedge Transactions are expected to reduce the potential dilution to our common stock upon any conversion of the Notes. However, the Warrant Transactions could separately have a dilutive effect to the extent that the market value per share of our common stock exceeds the applicable strike price of the warrants. The net cost of the Note Hedge Transactions, after being partially offset by the proceeds from the sale of the warrants, was approximately \$33.0 million.

In connection with establishing their initial hedge of these convertible note hedge and warrant transactions, the Option Counterparties have entered into various derivative transactions with respect to our common stock and/or purchase shares of our common stock or other securities, including the Notes, concurrent with, or shortly after, the pricing of the Notes. In addition, the Option Counterparties may modify their hedge positions by entering into or unwinding various derivative transactions with respect to our common stock or by selling our common stock or other securities, including the Notes, in secondary market transactions (and may do so during any observation period related to the conversion of the Notes). These activities could adversely impact the value of our common stock and the Notes.

We may not be able to pay our debt and other obligations.

If our cash flow is inadequate to meet our obligations, we could face substantial liquidity problems. If we are unable to generate sufficient cash flow or otherwise obtain funds necessary to make required payments on the

Notes or certain of our other obligations, we would be in default under the terms thereof, which would permit the holders of those obligations to accelerate their maturity and also could cause defaults under future indebtedness we may incur. Any such default could have a material adverse effect on our business, prospects, financial position and operating results. In addition, we cannot be certain that we would be able to repay amounts due on the Notes if those obligations were to be accelerated following the occurrence of any other event of default as defined in the instruments creating those obligations, or if the holders of the Notes require us to repurchase the Notes upon the occurrence of a fundamental change involving us. Moreover, we cannot be certain that we will have sufficient funds or will be able to arrange for financing to pay the principal amount due on the Notes at maturity.

Restrictive covenants in the agreement governing our senior secured revolving credit facility may restrict our ability to pursue business strategies.

The agreement governing our senior secured revolving credit facility limits our ability, among other things, to: incur additional secured indebtedness; sell, transfer, license or dispose of assets; consolidate or merge; enter into transactions with our affiliates; and incur liens. In addition, our senior secured revolving credit facility contains financial and other restrictive covenants that limit our ability to engage in activities that may be in our long term best interest, such as, subject to permitted exceptions, making capital expenditures in excess of certain thresholds, making investments, loans and other advances, and prepaying any additional indebtedness while our indebtedness under our senior secured revolving credit facility is outstanding. Our failure to comply with financial and other restrictive covenants could result in an event of default, which if not cured or waived, could result in the lenders requiring immediate payment of all outstanding borrowings or foreclosing on collateral pledged to them to secure the indebtedness.

Our business may suffer if we are unable to attract and retain key employees.

Competition for employees with skills we require is intense in the high technology industry. Our success will depend on our ability to attract and retain key technical employees. The loss of one or more key or other employees, a decrease in our ability to attract additional qualified employees, or the delay in hiring key personnel could each have a material adverse effect on our business, results of operations or financial condition.

Our operations, and the operations of our customers and suppliers, are subject to risks of natural catastrophic events, widespread health epidemics, acts of war, terrorist attacks and the threat of domestic and international terrorist attacks, any one of which could result in cancellation of orders, delays in deliveries or other business activities, or loss of customers and could negatively affect our business and results of operations.

Our business is international in nature, with our sales, service and administrative personnel and our customers and suppliers located in numerous countries throughout the world. Our operations, and those of our customers and suppliers, are subject to disruption for a variety of reasons, including work stoppages, acts of war, terrorism, health epidemics, fires, earthquakes, hurricanes, volcanic eruptions, energy shortages, telecommunication failures, tsunamis, flooding or other natural disasters. Such disruption could materially increase our costs and expenses as well as cause delays in, among other things, shipments of products to our customers, our ability to perform services requested by our customers, or the installation and acceptance of our products at customer sites. Any of these conditions could have a material adverse effect on our business, financial condition or results of operations.

A breach of our operational or security systems could negatively affect our business and results of operations.

We rely on various information technology networks and systems, some of which are managed by third parties, to process, transmit and store electronic information, including confidential data, and to carry out and support a variety of business activities, including manufacturing, research and development, supply chain management, sales and accounting. A failure in or a breach of our operational or security systems or

infrastructure, or those of our suppliers and other service providers, including as a result of cyber attacks, could disrupt our business, result in the disclosure or misuse of proprietary or confidential information, damage our reputation, cause losses and increase our costs.

We may face risks associated with shareholder activism.

Publicly traded companies have increasingly become subject to campaigns by shareholders advocating corporate actions such as financial restructuring, increased borrowing, special dividends, stock repurchases or divestitures. We may become subject in the future to such shareholder activity and demands. Such activities could interfere with our ability to execute our business plans, be costly and time-consuming, disrupt our operations, divert the attention of management or result in our initiating borrowing or increasing our share repurchase plan or dividend, any of which could have an adverse effect on our business or stock price.

Provisions of our charter and by-laws and Massachusetts law may make a takeover of Teradyne more difficult.

There are provisions in our basic corporate documents and under Massachusetts law that could discourage, delay or prevent a change in control, even if a change in control may be regarded as beneficial to some or all of our stockholders.

Item 1B: *Unresolved Staff Comments*

None.

Item 2: *Properties*

The following table provides information as to our principal facilities:

<u>Location</u>	<u>Operating Segment</u>	<u>Major Activity (1)</u>	<u>Approximate Square Feet of Floor Space</u>
Properties owned:			
North Reading, Massachusetts	Semiconductor Test & System Test	1-2-3-4-5	422,000
Agoura Hills, California	Semiconductor Test	3-4	120,000
Kumamoto, Japan	Semiconductor Test	2-3-4-5	<u>76,500</u>
			618,500
Properties leased:			
Cebu, Philippines	Semiconductor Test	1-2-5	198,300
San Jose, California	Semiconductor Test	2-3-4-5	128,000
Odense, Denmark	Industrial Automation	2-3-4-5	130,000
Buffalo Grove, Illinois	Semiconductor Test	2-3-4-5	95,000
Shanghai, China	Semiconductor Test, System Test, Wireless Test & Industrial Automation	3-4-5	77,400
Sunnyvale, California	Wireless Test & Semiconductor Test	2-3-4-5	71,300
Heredia, Costa Rica	Semiconductor Test	1-3-5	63,000
Hsinchu, Taiwan	Semiconductor Test & System Test	4	43,000
Singapore, Singapore	Semiconductor Test & Industrial Automation	1-3-4	32,000
Seoul, Korea	Semiconductor Test	4	<u>30,000</u>
			868,000

(1) Major activities have been separated into the following categories: 1. Corporate Administration, 2. Manufacturing, 3. Engineering, 4. Sales and Marketing, 5. Storage and Distribution.

Item 3: *Legal Proceedings*

We are subject to legal proceedings, claims and investigations that arise in the ordinary course of business such as, but not limited to, patent, employment, commercial and environmental matters. We believe that we have meritorious defenses against all pending claims and intend to vigorously contest them. While it is not possible to predict or determine the outcomes of any pending claims or to provide possible ranges of losses that may arise, we believe the potential losses associated with all of these actions are unlikely to have a material adverse effect on our results of operations, financial condition or cash flows.

Item 4: *Mine Safety Disclosure*

Not Applicable.

PART II

Item 5: *Market for Registrant’s Common Equity, Related Shareholder Matters and Issuer Purchases of Equity Securities*

The following table shows the market range for our common stock based on reported sales price on the New York Stock Exchange and the dividends declared per share during such periods:

<u>Period</u>	<u>High</u>	<u>Low</u>	<u>Dividends</u>
2016			
First quarter	\$21.83	\$17.34	\$0.06
Second quarter	21.84	18.07	0.06
Third quarter	21.66	18.87	0.06
Fourth quarter	26.59	20.22	0.06
2017			
First quarter	\$31.21	\$25.24	\$0.07
Second quarter	36.59	29.88	0.07
Third quarter	37.47	29.68	0.07
Fourth quarter	44.63	37.30	0.07

The number of record holders of our common stock at February 23, 2018 was 1,586.

In January 2016, May 2016, August 2016 and November 2016, our Board of Directors declared a quarterly cash dividend of \$0.06 per share.

In January 2017, May 2017, August 2017 and November 2017, our Board of Directors declared a quarterly cash dividend of \$0.07 per share.

In January 2015, our Board of Directors cancelled the November 2010 stock repurchase program and authorized a new stock repurchase program for up to \$500 million of common stock. The cumulative repurchases as of December 31, 2016 totaled 22.5 million shares of common stock for \$446 million at an average price per share of \$19.87.

In December 2016, our Board of Directors cancelled the January 2015 stock repurchase program and approved a new \$500 million share repurchase authorization which commenced on January 1, 2017. The cumulative repurchases as of December 31, 2017 totaled 5.8 million shares of common stock for \$200 million at an average price per share of \$34.30.

In January 2018, our Board of Directors cancelled the December 2016 stock repurchase program and authorized a new stock repurchase program for up to \$1.5 billion of common stock. We intend to repurchase \$750 million in 2018.

In January 2018, our Board of Directors approved an increase to our quarterly cash dividend to \$0.09 per share.

See “Item 7: Management’s Discussion and Analysis of Financial Condition and Results of Operations,” for information on our equity compensation plans and our performance graph.

The following table includes information with respect to repurchases we made of our common stock during the three months ended December 31, 2017 (in thousands except per share price):

<u>Period</u>	<u>(a) Total Number of Shares (or Units) Purchased</u>	<u>(b) Average Price Paid per Share (or Unit)</u>	<u>(c) Total Number of Shares (or Units) Purchased as Part of Publicly Announced Plans or Programs</u>	<u>(d) Maximum Number (or Approximate Dollar Value) of Shares (or Units) that may Yet Be Purchased Under the Plans or Programs</u>
October 2, 2017 – October 29, 2017	470	\$38.34	468	\$330,218
October 30, 2017 – November 26, 2017	400	\$43.19	395	\$313,159
November 27, 2017 – December 31, 2017	328	\$41.09	328	\$299,696
	<u>1,198(1)</u>	<u>\$40.71(1)</u>	<u>1,191</u>	

(1) Includes approximately seven thousand shares at an average price of \$41.25 withheld from employees for the payment of taxes.

We satisfy U.S. federal and state minimum withholding tax obligations due upon the vesting and the conversion of restricted stock units into shares of our common stock, by automatically withholding from the shares being issued, a number of shares with an aggregate fair market value on the date of such vesting and conversion that would satisfy the minimum withholding amount due.

Item 6: Selected Financial Data

	<u>Years Ended December 31,</u>				
	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>
	(dollars in thousands, except per share amounts)				
Consolidated Statements of Operations					
Data (1)(2)(3)(4)(5):					
Revenues	\$2,136,606	\$1,753,250	\$1,639,578	\$1,647,824	\$1,427,933
Net income (loss)	\$ 257,692	\$ (43,421)	\$ 206,477	\$ 81,272	\$ 164,947
Net income (loss) per common share—basic	\$ 1.30	\$ (0.21)	\$ 0.98	\$ 0.40	\$ 0.86
Net income (loss) per common share—diluted	\$ 1.28	\$ (0.21)	\$ 0.97	\$ 0.37	\$ 0.70
Cash dividend declared per common share	\$ 0.28	\$ 0.24	\$ 0.24	\$ 0.18	\$ —
Consolidated Balance Sheet Data:					
Total assets	\$3,109,545	\$2,762,493	\$2,548,674	\$2,538,520	\$2,629,824
Short-term debt obligations	\$ —	\$ —	\$ —	\$ —	\$ 186,663
Long-term debt obligations	\$ 365,987	\$ 352,669	\$ —	\$ —	\$ —

- (1) The year ended December 31, 2017 includes \$186.0 million of provisional tax expense related to the Tax Reform Act and \$6.6 million of pension actuarial gains.
- (2) The year ended December 31, 2016 includes a \$254.9 million goodwill impairment charge and an \$83.3 million acquired intangible assets impairment charge related to the Wireless Test segment, and \$3.2 million of pension actuarial gains.
- (3) The year ended December 31, 2015 includes \$17.7 million of pension actuarial losses, a \$5.4 million gain from the sale of an equity investment and the results of operations of Universal Robots from June 12, 2015.
- (4) The year ended December 31, 2014 includes a \$98.9 million goodwill impairment charge related to the Wireless Test segment and \$46.6 million of pension actuarial losses.

- (5) The year ended December 31, 2013 includes a \$34.2 million gain from the sale of an equity investment and \$10.3 million of pension actuarial gains.

Item 7: *Management’s Discussion and Analysis of Financial Condition and Results of Operations*

Overview

We are a leading global supplier of automation equipment for test and industrial applications. We design, develop, manufacture and sell automatic test systems used to test semiconductors, wireless products, data storage and complex electronics systems in the consumer electronics, wireless, automotive, industrial, computing, communications, and aerospace and defense industries. Our industrial automation products include collaborative robots used by global manufacturing and light industrial customers to improve quality, increase manufacturing efficiency and decrease manufacturing costs. Our automatic test equipment and industrial automation products and services include:

- semiconductor test (“Semiconductor Test”) systems;
- defense/aerospace (“Defense/Aerospace”) test instrumentation and systems, storage test (“Storage Test”) systems, and circuit-board test and inspection (“Production Board Test”) systems (collectively these products represent “System Test”);
- industrial automation (“Industrial Automation”) products; and
- wireless test (“Wireless Test”) systems.

We have a broad customer base which includes integrated device manufacturers (“IDMs”), outsourced semiconductor assembly and test providers (“OSATs”), original equipment manufacturers (“OEMs”), wafer foundries, fabless companies that design, but contract with others for the manufacture of integrated circuits (“ICs”), developers of wireless devices and consumer electronics, manufacturers of circuit boards, automotive suppliers, wireless product manufacturers, storage device manufacturers, aerospace and military contractors, and distributors that sell collaborative robots.

The market for our test products is concentrated with a limited number of significant customers accounting for a substantial portion of the purchases of test equipment. One customer drives significant demand for our products both through direct sales and sales to the customer’s supply partners. We expect that sales of our test products will continue to be concentrated with a limited number of significant customers for the foreseeable future.

In 2015, we acquired Universal Robots A/S (“Universal Robots”), the leading supplier of collaborative robots which are low-cost, easy-to-deploy and simple-to-program robots that work side by side with production workers to improve quality, increase manufacturing efficiency and decrease manufacturing costs. Universal Robots is a separate operating and reportable segment, Industrial Automation. The acquisition of Universal Robots provides a growth engine to our business and complements our existing System Test and Wireless Test segments. The total purchase price for Universal Robots was approximately \$315 million, which included cash paid of approximately \$284 million and \$32 million in fair value of contingent consideration payable upon achievement of revenue and earnings targets through 2018. Contingent consideration for the period from July 2015 to December 2017 was \$24.5 million and is expected to be paid in March 2018. Contingent consideration for 2015 was \$15 million and was paid in February 2016. The remaining maximum contingent consideration that could be paid is \$25 million.

We believe our recent acquisition has enhanced our opportunities for growth. We intend to continue to invest in our business, grow market share in our markets and expand further our addressable markets while tightly managing our costs.

The sales of our products and services are dependent, to a large degree, on customers who are subject to cyclical trends in the demand for their products. These cyclical periods have had, and will continue to have, a

significant effect on our business since our customers often delay or accelerate purchases in reaction to changes in their businesses and to demand fluctuations in the semiconductor and electronics industries. Historically, these demand fluctuations have resulted in significant variations in our results of operations. The sharp swings in the semiconductor and electronics industries have generally affected the semiconductor and electronics test equipment and services industries more significantly than the overall capital equipment sector.

In the second quarter of 2016, the Wireless Test reporting unit (which is our Wireless Test operating and reportable segment) reduced headcount by 11% as a result of a sharp decline in projected demand attributable to an estimated smaller future wireless test market. The decrease in projected demand was due to lower forecasted buying from our largest Wireless Test segment customer (who had previously contributed between 51% and 73% of annual Wireless Test sales since the LitePoint acquisition in 2011) as a result of the customer's numerous operational efficiencies; slower smartphone growth rates; and a slowdown of new wireless technology adoption. We considered the headcount reduction and sharp decline in projected demand to be a triggering event for an interim goodwill impairment test. Following the interim goodwill impairment test, we recorded a goodwill impairment charge of \$254.9 million, with approximately \$8.0 million of goodwill remaining, and \$83.3 million for the impairment of acquired intangible assets with approximately \$3.6 million of acquired intangible assets remaining at December 31, 2017.

Critical Accounting Policies and Estimates

We have identified the policies discussed below as critical to understanding our business and our results of operations and financial condition. The impact and any associated risks related to these policies on our business operations is discussed throughout Management's Discussion and Analysis of Financial Condition and Results of Operations where such policies affect our reported and expected financial results.

Revenue Recognition

We recognize revenues, including revenues from distributors, when there is persuasive evidence of an arrangement, title and risk of loss have passed, delivery has occurred or the services have been rendered, the sales price is fixed or determinable and collection of the related receivable is reasonably assured. Title and risk of loss generally pass to our customers upon shipment or at delivery destination point. In circumstances where either title or risk of loss pass upon destination, acceptance or cash payment, we defer revenue recognition until such events occur except when title transfer is tied to cash payment outside the United States. Outside the United States, we recognize revenues upon shipment or at delivery destination point, even if we retain a form of title to products delivered to customers, provided the sole purpose is to enable us to recover the products in the event of customer payment default and the arrangement does not prohibit the customer's use or resale of the product in the ordinary course of business.

Our equipment has non-software and embedded software components that function together to deliver the equipment's essential functionality. Revenue is recognized upon shipment or at delivery destination point, provided that customer acceptance criteria can be demonstrated prior to shipment. Certain contracts require us to perform tests of the product to ensure that performance meets the published product specifications or customer requested specifications, which are generally conducted prior to shipment. Where the criteria cannot be demonstrated prior to shipment, revenue is deferred until customer acceptance has been received. We also defer the portion of the sales price that is not due until acceptance, which represents deferred profit.

For multiple element arrangements, we allocate revenues to all deliverables based on their relative selling prices. In such circumstances, a hierarchy is used to determine the selling price for allocating revenues to deliverables as follows: (i) vendor-specific objective evidence of selling price ("VSOE"), (ii) third-party evidence of selling price ("TPE"), and (iii) best estimate of the selling price ("BESP"). For a delivered item to be considered a separate unit, the delivered item must have value to the customer on a standalone basis and the delivery or performance of the undelivered item must be considered probable and substantially in our control.

Our post-shipment obligations include installation, training services, one-year standard warranties, and extended warranties. Installation does not alter the product capabilities, does not require specialized skills or tools and can be performed by the customers or other vendors. Installation is typically provided within five days of product shipment and is completed within one to two days thereafter. Training services are optional and do not affect the customers' ability to use the product. We defer revenues for the selling price of installation and training. Extended warranties constitute warranty obligations beyond one year and we defer revenues in accordance with Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") 605-20, "*Separately Priced Extended Warranty and Product Maintenance Contracts*" and ASC 605-25, "*Revenue Recognition Multiple-Element Arrangements*." Service revenue is recognized over the contractual period or as services are performed.

Our products are generally subject to warranty and the related costs of the warranty are provided for in cost of revenues when product revenue is recognized. We classify shipping and handling costs in cost of revenues.

We do not provide our customers with contractual rights of return for any of our products.

Translation of Non-U.S. Currencies

The functional currency for all non-U.S. subsidiaries is the U.S. dollar, except for the Industrial Automation segment for which the local currency is its functional currency. All foreign currency denominated monetary assets and liabilities are remeasured on a monthly basis into the functional currency using exchange rates in effect at the end of the period. All foreign currency denominated non-monetary assets and liabilities are remeasured into the functional currency using historical exchange rates. Net foreign exchange gains and losses resulting from remeasurement are included in other (income) expense, net. For Industrial Automation, assets and liabilities are translated into U.S. dollars using exchange rates in effect at the end of the period. Revenues and expense amounts are translated using an average of exchange rates in effect during the period. Translation adjustments are recorded within accumulated other comprehensive income (loss).

Retirement and Postretirement Plans

We recognize net actuarial gains and losses and the change in the fair value of the plan assets in our operating results in the year in which they occur or upon any interim remeasurement of the plans. We calculate the expected return on plan assets using the fair value of the plan assets. Actuarial gains and losses are generally measured annually as of December 31 and, accordingly, recorded during the fourth quarter of each year or upon any interim remeasurement of the plans.

Inventories

Inventories are stated at the lower of cost (first-in, first-out basis) or net realizable value. On a quarterly basis, we use consistent methodologies to evaluate all inventories for net realizable value. We record a provision for both excess and obsolete inventory when such write-downs or write-offs are identified through the quarterly review process. The inventory valuation is based upon assumptions about future demand, product mix, and possible alternative uses.

Equity Incentive and Stock Purchase Plans

Stock-based compensation expense is based on the grant-date fair value estimated in accordance with the provisions of ASC 718, "*Compensation—Stock Compensation*." Upon adoption of Accounting Standards Update ("ASU") 2016-09, "*Compensation-Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting*," in the first quarter of 2017, we made an accounting policy election to continue accounting for forfeitures by applying an estimated forfeiture rate and recognizing compensation costs only for those stock-based compensation awards expected to vest. In accordance with ASU 2016-09, starting in the first quarter of

2017, excess tax benefits or tax deficiencies are recognized as a discrete tax benefit or discrete tax expense to the current income tax provision in our consolidated statements of operations and are reported as cash flows from operating activities. A cumulative effect adjustment of \$39.1 million for any prior year excess tax benefits or tax deficiencies not previously recorded was recorded as an increase to retained earnings and deferred tax assets. All cash payments made to taxing authorities on the employees' behalf for withheld shares are presented as financing activities on the statement of cash flows. In 2017, we recognized a discrete tax benefit of \$6.3 million, related to net excess tax benefit.

Income Taxes

Deferred tax assets and liabilities are determined based on differences between financial reporting and tax basis of assets and liabilities and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse. The measurement of deferred tax assets is reduced by a valuation allowance if it is more likely than not that some or all of the deferred tax assets will not be realized. We performed the required assessment of positive and negative evidence regarding the realization of the net deferred tax assets in accordance with ASC 740, "*Accounting for Income Taxes*." This assessment included the evaluation of scheduled reversals of deferred tax liabilities, estimates of projected future taxable income and tax-planning strategies. Although realization is not assured, based on our assessment, we concluded that it is more likely than not that such assets, net of the existing valuation allowance, will be realized.

Investments

We account for our investments in debt and equity securities in accordance with the provisions of ASC 320-10, "*Investments—Debt and Equity Securities*." On a quarterly basis, we review our investments to identify and evaluate those that have an indication of a potential other-than-temporary impairment. Factors considered in determining whether a loss is other-than-temporary include:

- The length of time and the extent to which the market value has been less than cost;
- The financial condition and near-term prospects of the issuer; and
- The intent and ability to retain the investment in the issuer for a period of time sufficient to allow for any anticipated recovery in market value.

Goodwill, Intangible and Long-Lived Assets

We assess goodwill for impairment at least annually in the fourth quarter, as of December 31, on a reporting unit basis, or more frequently, when events and circumstances occur indicating that the recorded goodwill may be impaired. If the book value of a reporting unit exceeds its fair value, the implied fair value of goodwill is compared with the carrying amount of goodwill. If the carrying amount of goodwill exceeds the implied fair value, an impairment charge is recorded in an amount equal to that excess.

In the second quarter of 2016, the Wireless Test reporting unit (which is our Wireless Test operating and reportable segment) reduced headcount by 11% as a result of a sharp decline in projected demand attributable to an estimated smaller future wireless test market. The decrease in projected demand was due to lower forecasted buying from our largest Wireless Test segment customer (who had previously contributed between 51% and 73% of annual Wireless Test sales since the LitePoint acquisition in 2011) as a result of the customer's numerous operational efficiencies; slower smartphone growth rates; and a slowdown of new wireless technology adoption. We considered the headcount reduction and sharp decline in projected demand to be a triggering event for an interim goodwill impairment test. Following the interim goodwill impairment test, we recorded a goodwill impairment charge of \$254.9 million, with approximately \$8.0 million of goodwill remaining.

No goodwill impairment was identified in the fourth quarter of 2017, 2016 and 2015, as part of the annual goodwill impairment test.

We assess the impairment of intangible and long-lived assets whenever events or changes in circumstances indicate that the carrying value may not be recoverable. Factors we consider important in the determination of an impairment include significant underperformance relative to historical or projected future operating results, significant changes in the manner that we use the acquired asset and significant negative industry or economic trends.

As a result of the interim goodwill impairment test in the second quarter of 2016 described above, we performed an impairment test of the Wireless Test segment's intangible and long-lived assets based on the comparison of the estimated undiscounted cash flows to the recorded value of the assets and recorded an \$83.3 million acquired intangible assets impairment charge, with approximately \$3.6 million of intangible assets remaining at December 31, 2017. There were no events or circumstances indicating that the carrying value of acquired intangible and long-lived assets may not be recoverable in 2017 and 2015, as such no impairment test was performed. When we determine that the carrying value of intangible and long-lived assets may not be recoverable based upon the existence of one or more of the above indicators of impairment, we measure any impairment based on a projected discounted cash flow method using a discount rate commensurate with the associated risks.

Results of Operations

The following table sets forth the percentage of total net revenues included in our consolidated statements of operations:

	Years Ended December 31,		
	2017	2016	2015
Percentage of revenues:			
Revenues:			
Products	83.5%	82.9%	81.8%
Services	16.5	17.1	18.2
Total revenues	100.0	100.0	100.0
Cost of revenues:			
Cost of products	35.5	37.6	36.1
Cost of services	7.2	7.7	8.1
Total cost of revenues (exclusive of acquired intangible assets amortization shown separately below)	42.7	45.3	44.2
Gross profit	57.3	54.7	55.8
Operating expenses:			
Selling and administrative	16.3	18.0	18.7
Engineering and development	14.3	16.6	17.8
Acquired intangible assets amortization	1.4	3.0	4.2
Restructuring and other	0.4	1.3	0.3
Goodwill impairment	—	14.5	—
Acquired intangible assets impairment	—	4.8	—
Total operating expenses	32.5	58.2	41.0
Income (loss) from operations	24.8	(3.4)	14.8
Non-operating (income) expenses:			
Interest income	(0.8)	(0.5)	(0.4)
Interest expense	1.0	0.2	0.1
Other (income) expense, net	0.1	—	(0.3)
Income (loss) before income taxes	24.5	(3.1)	15.4
Income tax provision (benefit)	12.5	(0.7)	2.8
Net income (loss)	12.1%	(2.5)%	12.6%

Book to Bill Ratio

Book to bill ratio is calculated as net bookings divided by net sales. Book to bill ratio by reportable segment was as follows:

	Three months ended December 31,		
	2017	2016	2015
Semiconductor Test	1.3	1.9	2.0
System Test	0.9	0.9	1.1
Industrial Automation	1.0	1.0	0.8
Wireless Test	0.9	0.9	0.9
Total Company	1.2	1.7	1.6

Revenues

Revenues for our four reportable segments were as follows:

	2017	2016	2015	2016-2017 Dollar Change	2015-2016 Dollar Change
			(in millions)		
Semiconductor Test	\$1,662.5	\$1,368.2	\$1,201.5	\$294.3	\$166.7
System Test	192.1	189.8	211.6	2.3	(21.8)
Industrial Automation	170.1	99.0	41.9	71.1	57.1
Wireless Test	111.9	96.2	184.6	15.7	(88.4)
	<u>\$2,136.6</u>	<u>\$1,753.3</u>	<u>\$1,639.6</u>	<u>\$383.3</u>	<u>\$113.7</u>

The increase in Semiconductor Test revenues of \$294.3 million, or 22%, from 2016 to 2017 was driven primarily by increased sales in the microcontroller, power management, flash memory, and automotive safety test segments and an increase in service revenues. The increase in Semiconductor Test revenues of \$166.7 million, or 14%, from 2015 to 2016 was driven primarily by system-on-a-chip (“SOC”) product volume in the mobile application processor market.

The increase in System Test revenues of \$2.3 million, or 1%, from 2016 to 2017 was primarily due to higher service revenue in defense/aerospace test instrumentation and systems. The decrease in System Test revenues of \$21.8 million, or 10%, from 2015 to 2016 was primarily due to lower sales in Storage Test of 3.5” hard disk drive testers.

The increase in Industrial Automation revenues of \$71.1 million, or 72%, from 2016 to 2017 was due to higher demand for collaborative robots. The acquisition of Universal Robots, completed in June 2015, added \$99.0 million of revenues in 2016 and \$41.9 million of revenues in 2015.

The increase in Wireless Test revenues of \$15.7 million, or 16%, from 2016 to 2017 was primarily due to higher demand for connectivity test systems and higher service revenue. The decrease in Wireless Test revenues of \$88.4 million, or 48%, from 2015 to 2016 was driven by lower demand for connectivity and cellular test systems primarily from our largest Wireless Test segment customer.

Our four reportable segments accounted for the following percentages of consolidated revenues:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
Semiconductor Test	78%	78%	73%
System Test	9	11	13
Industrial Automation	8	6	3
Wireless Test	5	5	11
	<u>100%</u>	<u>100%</u>	<u>100%</u>

Revenues by country as a percentage of total revenues were as follows (1):

	<u>2017</u>	<u>2016</u>	<u>2015</u>
Taiwan	32%	37%	27%
United States	12	13	13
China	12	10	16
Korea	10	8	7
Japan	8	8	8
Europe	8	7	7
Malaysia	6	6	5
Philippines	5	3	6
Singapore	5	4	6
Thailand	1	3	4
Rest of the World	1	1	1
	<u>100%</u>	<u>100%</u>	<u>100%</u>

(1) Revenues attributable to a country are based on the location of the customer site.

The breakout of product and service revenues was as follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2016-2017</u> <u>Dollar</u> <u>Change</u>	<u>2015-2016</u> <u>Dollar</u> <u>Change</u>
			(in millions)		
Product revenues	\$1,784.7	\$1,453.2	\$1,340.6	\$331.5	\$112.6
Service revenues	351.9	300.0	299.0	51.9	1.0
	<u>\$2,136.6</u>	<u>\$1,753.3</u>	<u>\$1,639.6</u>	<u>\$383.3</u>	<u>\$113.7</u>

Our product revenues increased \$331.5 million, or 23%, in 2017 from 2016 primarily due to higher sales across all Semiconductor Test products and higher sales in Industrial Automation. Service revenues, which are derived from the servicing of our installed base of products and include equipment maintenance contracts, repairs, extended warranties, parts sales, and applications support increased \$51.9 million, or 17%.

Our product revenues increased \$112.6 million, or 8%, in 2016 from 2015 primarily due to higher volume in the mobile application processor market in Semiconductor Test and the addition of Universal Robots in June 2015, partially offset by a decrease in Wireless Test revenues due to lower demand for connectivity and cellular test systems and lower sales in Storage Test of 3.5" hard disk drive testers for cloud storage.

In 2017, revenues from one customer accounted for 13% of our consolidated revenues. In 2016, two customers each accounted for 12% of our consolidated revenues. In 2015, revenues from one customer accounted for 13% of our consolidated revenues. In each of the years, 2017, 2016, and 2015, our five largest customers in aggregate accounted for 32%, 36%, and 34%, respectively, of our consolidated revenues. We estimate product

demand driven by a single OEM customer, combining direct sales to that customer with sales to the customer's OSATs, accounted for approximately 22%, 26%, and 23% of our consolidated revenues in 2017, 2016, and 2015, respectively.

Gross Profit

	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2016-2017 Dollar / Point Change</u>	<u>2015-2016 Dollar / Point Change</u>
	(dollars in millions)				
Gross profit	\$1,223.9	\$959.6	\$915.6	\$264.3	\$44.0
Percent of total revenues	57.3%	54.7%	55.8%	2.6	(1.1)

Gross profit as a percent of total revenues increased from 2016 to 2017 by 2.6 points, as a result of a 1.5 point increase related to favorable product mix in Semiconductor Test and a 1.1 point increase due to higher sales primarily in Semiconductor Test and Industrial Automation.

Gross profit as a percent of total revenues decreased from 2015 to 2016 by 1.1 points, of which a 2.5 point decrease was related to product mix and sales of previously leased testers in Semiconductor Test in 2015, and lower Wireless Test sales, partially offset by a 0.6 point increase due to lower pension expense related to actuarial gains in 2016 compared to actuarial losses in 2015, a 0.5 point increase due to higher product volume and a 0.3 point increase due to lower excess and obsolete inventory provisions.

The breakout of product and service gross profit was as follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2016-2017 Dollar / Point Change</u>	<u>2015-2016 Dollar / Point Change</u>
	(dollars in millions)				
Product gross profit	\$1,026.1	\$794.2	\$748.8	\$231.9	\$45.4
Percent of product revenues	57.5%	54.6%	55.9%	2.9	(1.3)
Service gross profit	\$ 197.7	\$165.4	\$166.8	\$ 32.3	\$(1.4)
Percent of service revenues	56.2%	55.1%	55.8%	1.1	(0.7)

We assess the carrying value of our inventory on a quarterly basis by estimating future demand and comparing that demand against on-hand and on-order inventory positions. Forecasted revenues information is obtained from the sales and marketing groups and incorporates factors such as backlog and future product demand. This quarterly process identifies obsolete and excess inventory. Obsolete inventory, which represents items for which there is no demand, is fully reserved. Excess inventory, which represents inventory items that are not expected to be consumed during the next twelve quarters for our Semiconductor Test, Industrial Automation and System Test segments and next four quarters for our Wireless Test segment, is written-down to estimated net realizable value.

During the year ended December 31, 2017, we recorded an inventory provision of \$8.8 million included in cost of revenues, primarily due to downward revisions to previously forecasted demand levels for certain products. Of the \$8.8 million of total excess and obsolete provisions, \$4.6 million was related to Semiconductor Test, \$2.2 million was related to Wireless Test, and \$1.9 million was related to System Test.

During the year ended December 31, 2016, we recorded an inventory provision of \$17.5 million included in cost of revenues, primarily due to downward revisions to previously forecasted demand levels. Of the \$17.5 million of total excess and obsolete provisions, \$9.7 million was in Semiconductor Test, \$7.2 million was in Wireless Test and \$0.6 million was related to System Test.

During the year ended December 31, 2015, we recorded an inventory provision of \$21.3 million included in cost of revenues, due to the following factors:

- A charge of \$15.3 million due to downward revisions to previously forecasted demand levels, of which \$8.2 million was for our 2.5” hard disk drive testers in Storage Test, \$4.5 million was in Semiconductor Test and \$2.5 million was in Wireless Test; and
- A \$6.0 million inventory write-down as a result of product transition in Semiconductor Test.

During the years ended December 31, 2017, 2016 and 2015, we scrapped \$14.4 million, \$15.2 million and \$7.0 million of inventory, respectively, and sold \$7.5 million, \$10.0 million and \$7.9 million of previously written-down or written-off inventory, respectively. As of December 31, 2017, we had inventory related reserves for amounts which had been written-down or written-off totaling \$102.9 million. We have no pre-determined timeline to scrap the remaining inventory.

Selling and Administrative

Selling and administrative expenses were as follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2016-2017</u> <u>Change</u>	<u>2015-2016</u> <u>Change</u>
	(dollars in millions)				
Selling and administrative	\$348.3	\$315.7	\$306.3	\$32.6	\$9.4
Percent of total revenues	16.3%	18.0%	18.7%		

The increase of \$32.6 million in selling and administrative expenses from 2016 to 2017 was due primarily to higher variable compensation across all segments and higher spending in Universal Robots, partially offset by lower spending in Wireless Test.

The increase of \$9.4 million in selling and administrative expenses from 2015 to 2016 was due to \$22.6 million of additional costs as a result of the acquisition of Universal Robots in June 2015, partially offset by lower pension expense related to \$0.9 million of actuarial gains in 2016 as compared to actuarial losses of \$4.8 million in 2015, and lower variable compensation.

Engineering and Development

Engineering and development expenses were as follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2016-2017</u> <u>Change</u>	<u>2015-2016</u> <u>Change</u>
	(dollars in millions)				
Engineering and development	\$305.7	\$291.0	\$292.3	\$14.7	\$(1.3)
Percent of total revenues	14.3%	16.6%	17.8%		

The increase of \$14.7 million in engineering and development expenses from 2016 to 2017 was due primarily to higher variable compensation across all segments and higher spending in System Test and Industrial Automation, partially offset by lower spending in Wireless Test and Semiconductor Test.

The decrease of \$1.3 million in engineering and development expenses from 2015 to 2016 was due primarily to lower pension expense related to \$1.2 million of actuarial gains in 2016 compared to \$4.7 million of actuarial losses in 2015, partially offset by additional costs as a result of the acquisition of Universal Robots in June 2015.

Acquired Intangible Assets Amortization

Acquired intangible assets amortization expense was as follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2016-2017</u> <u>Change</u>	<u>2015-2016</u> <u>Change</u>
				(dollars in millions)	
Acquired intangible assets amortization	\$30.5	\$52.6	\$69.0	\$(22.1)	\$(16.4)
Percent of total revenues	1.4%	3.0%	4.2%		

Acquired intangible assets amortization expense decreased from 2016 to 2017 primarily in the Wireless Test segment due to the impairment of acquired intangible assets in the second quarter of 2016 and in the Industrial Automation segment due to intangible assets that became fully amortized in June 2017. Acquired intangible assets amortization expense decreased from 2015 to 2016 due to lower amortization expense in the Wireless Test segment due to the impairment of acquired intangible assets in the second quarter of 2016, partially offset by increased amortization expense due to the Universal Robots acquisition in June 2015.

Goodwill Impairment

We assess goodwill for impairment at least annually, in the fourth quarter, as of December 31, or on an interim basis between annual tests when events or circumstances indicate that it is more-likely-than-not that the fair value of a reporting unit is less than its carrying value. In the second quarter of 2016, the Wireless Test reporting unit (which is our Wireless Test operating and reportable segment) reduced headcount by 11% as a result of a sharp decline in projected demand attributable to an estimated smaller future wireless test market. The decrease in projected demand was due to lower forecasted buying from our largest Wireless Test segment customer (which had contributed between 51% and 73% of annual Wireless Test sales since the LitePoint acquisition in 2011 through 2015) as a result of the customer's numerous operational efficiencies; slower smartphone growth rates; and a slowdown of new wireless technology adoption. We considered the headcount reduction and sharp decline in projected demand to be a triggering event for an interim goodwill impairment test. Following the interim goodwill impairment test, we recorded a goodwill impairment charge of \$254.9 million in the second quarter of 2016. The fourth quarter 2017, 2016 and 2015 goodwill impairment tests did not identify any goodwill impairments.

Acquired Intangible Assets Impairment

We review long-lived assets for impairment whenever events or changes in business circumstances indicate that the carrying amount of the assets may not be fully recoverable or that the useful lives of these assets are no longer appropriate. If undiscounted cash flows for the asset are less than the carrying amount, the asset is written down to its estimated fair value based on a discounted cash flow analysis. The cash flow estimates used to determine the impairment contain management's best estimates using appropriate assumptions and projections at that time. As a result of the Wireless Test segment goodwill impairment charge in the second quarter of 2016, we performed an impairment test of the Wireless Test segment's intangible and long-lived assets based on a comparison of the estimated undiscounted cash flows to the recorded value of the assets. As a result of the analysis, we recorded an \$83.3 million impairment charge in the second quarter of 2016 in acquired intangible assets impairment on the statements of operations.

Restructuring and Other

During the year ended December 31, 2017, we recorded an expense of \$7.8 million for the increase in the fair value of the Universal Robots contingent consideration liability, \$3.8 million of severance charges related to headcount reduction of 91 people, of which 75 people were in Semiconductor Test and 8 people each in Industrial Automation and in Corporate, \$1.1 million for an impairment of fixed assets in Semiconductor Test, \$1.0 million for a lease impairment of a Wireless Test facility in Sunnyvale, CA, which was terminated in September 2017, and \$0.8 million of expenses related to an earthquake in Kumamoto, Japan, partially offset by \$5.1 million of property insurance recovery related to the Japan earthquake.

During the year ended December 31, 2016, we recorded an expense of \$15.9 million for the increase in the fair value of the contingent consideration liability, of which \$15.3 million was related to Universal Robots and \$0.6 million was related to AIT, \$6.0 million of severance charges related to headcount reductions of 146 people, of which 102 people were in Wireless Test and 44 people were in Semiconductor Test, \$4.2 million for an impairment of fixed assets, and \$0.9 million for expenses related to an earthquake in Kumamoto, Japan, partially offset by \$5.1 million of property insurance recovery related to the Japan earthquake.

During the year ended December 31, 2015, we recorded an expense of \$5.3 million for the increase in the fair value of the Universal Robots contingent consideration liability, \$1.5 million of severance charges related to headcount reductions of 23 people primarily in System Test and Semiconductor Test, and \$1.0 million for acquisition costs related to Universal Robots, partially offset by a \$2.9 million gain from fair value adjustments to decrease the acquisition contingent consideration liability, of which \$1.6 million was related to ZTEC and \$1.3 million was related to AIT.

The remaining accrual for severance of \$1.4 million is reflected in the accrued employees' compensation and withholdings on the balance sheet and is expected to be paid by December 2018.

Interest and Other

	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2016-2017</u> <u>Change</u>	<u>2015-2016</u> <u>Change</u>
	(in millions)				
Interest income	\$(17.8)	\$(9.3)	\$(7.2)	\$(8.5)	\$(2.1)
Interest expense	21.7	3.6	1.9	18.1	1.7
Other (income) expense, net	1.8	0.7	(4.8)	1.1	5.5

Interest income increased by \$8.5 million from 2016 to 2017 and by \$2.1 million from 2015 to 2016 due primarily to higher cash and marketable securities balances and higher interest rates.

Interest expense increased by \$18.1 million from 2016 to 2017 due primarily to interest expense related to our convertible senior notes. Interest expense increased by \$1.7 million, from 2015 to 2016, due primarily to \$1.0 million of interest expense related to our convertible senior notes in 2016 and \$0.7 million related to revolving credit facility costs and realized losses on sales of marketable securities in 2016.

Other (income) expense, net includes net foreign exchange losses. In 2015, other (income) expense, net included a \$5.4 million gain from the sale of an equity investment.

Income (Loss) Before Income Taxes

	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2016-2017</u> <u>Change</u>	<u>2015-2016</u> <u>Change</u>
	(in millions)				
Semiconductor Test	\$491.4	\$ 311.9	\$260.2	\$179.5	\$ 51.7
Wireless Test	17.4	(371.4)	(13.8)	388.8	(357.6)
System Test	10.3	28.9	25.1	(18.6)	3.8
Industrial Automation	8.8	(16.8)	(7.6)	26.8	(9.2)
Corporate (1)	(3.3)	(7.7)	(10.7)	3.1	3.0
	<u>\$524.4</u>	<u>\$ (55.1)</u>	<u>\$253.1</u>	<u>\$579.5</u>	<u>\$(308.2)</u>

(1) Included in Corporate are the following: contingent consideration adjustments, pension and postretirement plans actuarial gains (losses), employee severance, impairment of fixed assets and expenses related to the Japan earthquake, property insurance recovery and proceeds, interest income and interest expense, net foreign exchange gains and losses, and gain from the sale of an equity investment.

The increase in income before income taxes in Semiconductor Test from 2016 to 2017 was driven primarily by increased sales and higher gross margin due to favorable product mix. The increase in income before income taxes in Wireless Test from 2016 to 2017 was primarily due to goodwill and intangible assets impairment charges in 2016, lower intangible assets amortization, lower operating expenses, higher demand for connectivity test systems and higher service revenue in 2017. The decrease in income before income taxes in System Test from 2016 to 2017 was primarily due to lower sales in Storage Test of 3.5” hard disk drive testers for cloud storage and increased spending for new product development. The increase in income before income taxes in Industrial Automation was due primarily to higher demand for collaborative robots.

The decrease in income before income taxes from 2015 to 2016 was primarily due to a \$254.9 million goodwill impairment charge and an \$83.3 million acquired intangible assets impairment charge related to Wireless Test in 2016, and amortization of intangible assets related to our June 2015 acquisition of Universal Robots, which is our Industrial Automation segment, partially offset by higher revenues in the Semiconductor Test application processor market and \$3.2 million of pension actuarial gains in 2016 as compared to actuarial losses of \$17.7 million in 2015.

Income Taxes

Income tax expense for 2017 totaled \$266.7 million. Income tax benefit for 2016 totaled \$11.6 million. Income tax expense for 2015 totaled \$46.6 million. The effective tax rate for 2017, 2016 and 2015 was 50.9%, 21.1%, and 18.4% respectively.

The increase in the effective tax rate from 2016 to 2017 is primarily attributable to the effect of changes in U.S. Federal tax law. On December 22, 2017, the U.S. enacted the Tax Cuts and Jobs Act of 2017 (the “Tax Reform Act”), making significant changes to the Internal Revenue Code. Among other changes, the Tax Reform Act permanently reduces the corporate tax rate from 35% to 21% effective for tax years beginning after December 31, 2017, shifts the U.S. tax regime from a worldwide system to a modified territorial tax system and requires companies to pay a transition tax on earnings of certain foreign subsidiaries that were previously tax deferred.

We recorded a provisional amount of \$186.0 million of additional income tax expense in the fourth quarter of 2017 which represents our best estimate of the impact of the Tax Reform Act in accordance with our understanding of the Tax Reform Act and available guidance as of the date of this filing. The \$186.0 million is primarily composed of expense of \$161.0 million related to the one-time transition tax on the mandatory deemed repatriation of foreign earnings, \$33.6 million of expense related to the remeasurement of certain deferred tax assets and liabilities based on the rates at which they are expected to reverse in the future, and benefit of \$10.3 million associated with the impact of correlative adjustments on uncertain tax positions.

The change in the effective rate was also impacted by the U.S. non-deductible goodwill impairment charge recorded in 2016, a shift in the geographic distribution of income which increased income subject to taxation in the U.S. relative to lower tax rate jurisdictions, decreases in the discrete benefits from tax reserve releases, increases in discrete expense from non-taxable foreign exchange gains and losses and an increase in the discrete benefit from stock-based compensation.

The increase in the effective tax rate from 2015 to 2016 resulted from a shift in the geographic distribution of income which decreased income subject to taxation in the U.S. relative to lower tax rate jurisdictions, reductions in uncertain tax positions resulting from the expiration of statutes and the settlement of an audit, and an increase in non-taxable foreign exchange gains. These increases in the effective tax rate were partially offset by the effect of the non-deductible goodwill impairment charge, which reduced the benefit of the loss before income taxes in the U.S.

We qualify for a tax holiday in Singapore by fulfilling the requirements of an agreement with the Singapore Economic Development Board under which certain headcount and spending requirements must be met. The tax savings attributable to the Singapore tax holiday for the years ended December 31, 2017, 2016, and 2015 were \$24.8 million or \$0.12 per diluted share, \$17.0 million or \$0.08 per diluted share, and \$11.5 million or \$0.05 per diluted share, respectively. The tax holiday is scheduled to expire on December 31, 2020.

Contractual Obligations

The following table reflects our contractual obligations as of December 31, 2017:

	Payments Due by Period					Other
	Total	Less than 1 year	1-3 years	3-5 years	More than 5 years	
	(in thousands)					
Convertible debt	\$ 460,000	\$ —	\$ —	\$ —	\$460,000	\$ —
Purchase obligations	280,433	271,137	9,296	—	—	—
Retirement plans contributions	123,664	5,955	8,599	8,706	100,404	—
Operating lease obligations	67,723	17,560	26,206	16,532	7,425	—
Interest on long term debt	34,500	5,750	11,500	11,500	5,750	—
Fair value of contingent consideration	45,102	24,497	20,605	—	—	—
Transition tax payable (1)	160,971	12,896	26,355	25,707	96,013	—
Other long-term liabilities reflected on the balance sheet under GAAP (2)	47,120	—	30,127	—	—	16,993
Total	\$1,219,513	\$337,795	\$132,688	\$62,445	\$669,592	\$16,993

- (1) Represents our estimate of a provisional tax amount for the transition tax liability associated with our accumulated foreign earnings as a result of enactment of the Tax Reform Act on December 22, 2017.
- (2) Included in other long-term liabilities are liabilities for customer advances, extended warranty, uncertain tax positions, deferred tax liabilities and other obligations. For certain long-term obligations, we are unable to provide a reasonably reliable estimate of the timing of future payments relating to these obligations and therefore we included these amounts in the column marked "Other."

Liquidity and Capital Resources

Our cash, cash equivalents and marketable securities balance increased by \$291 million from 2016 to 2017 to \$1,904 million.

In 2017, changes in operating assets and liabilities provided cash of \$183.1 million. This was due to a \$33.4 million increase in operating assets and a \$216.5 million increase in operating liabilities.

The increase in operating assets was due to an \$80.6 million increase in accounts receivable due to higher sales, partially offset by a \$45.0 million decrease in inventories and a \$2.3 million decrease in prepayments and other assets.

The increase in operating liabilities was due to a \$173.8 million increase in income taxes, primarily related to the estimated impact of U.S. Tax Reform Act, a \$30.9 million increase in accrued employee compensation due primarily to variable compensation, a \$24.0 million increase in other accrued liabilities, and a \$5.0 million increase in customer advance payments and deferred revenue, partially offset by an \$11.3 million decrease in accounts payable and \$5.9 million of retirement plans contributions.

Investing activities during 2017 used cash of \$262.8 million, due to \$1,391.9 million used for purchases of marketable securities and \$105.4 million used for purchases of property, plant and equipment, partially offset by

proceeds from maturities and sales of marketable securities of \$701.7 million and \$527.7 million, respectively, and proceeds from property insurance of \$5.1 million related to the Japan earthquake.

Financing activities during 2017 used cash of \$245.2 million, due to \$200.3 million used for repurchase of 5.8 million shares of common stock at an average price of \$34.30 per share, \$55.4 million used for dividend payments, \$12.9 million used for payments related to net settlement of employee stock compensation awards and \$1.1 million used for a payment related to AIT acquisition contingent consideration, partially offset by \$24.5 million from the issuance of common stock under employee stock purchase and stock option plans.

In 2016, changes in operating assets and liabilities provided cash of \$49.0 million. This was due to a \$33.4 million decrease in operating assets and a \$15.6 million increase in operating liabilities.

The decrease in operating assets was due to an \$18.3 million decrease in accounts receivable due to increased collections and a \$34.3 million decrease in inventories, partially offset by a \$19.2 million increase in prepayments and other assets.

The increase in operating liabilities was due to an \$18.4 million increase in income taxes, a \$3.9 million increase in accounts payable and a \$6.7 million increase in other accrued liabilities, partially offset by a \$3.8 million decrease in accrued employee compensation due primarily to variable compensation, \$6.0 million of retirement plans contributions and a \$3.6 million decrease in customer advance payments and deferred revenue.

Investing activities during 2016 used cash of \$640.5 million, due to \$1,656.3 million used for purchases of marketable securities and \$85.3 million used for purchases of property, plant and equipment, partially offset by proceeds from maturities and sales of marketable securities of \$243.2 million and \$852.8 million, respectively, and proceeds from property insurance of \$5.1 million related to the Japan earthquake.

Financing activities during 2016 provided cash of \$228.4 million, due to \$450.8 million of proceeds from the issuance of senior convertible notes, net of issuance costs, \$67.9 million of proceeds from the issuance of warrants, \$20.5 million from the issuance of common stock under employee stock purchase and stock option plans, and \$6.2 million from the tax benefit related to employee stock compensation awards, partially offset by \$146.3 million used for the repurchase of 6.8 million shares of common stock at an average price of \$21.39 per share, \$100.8 million used for the purchase of convertible note hedges, \$48.6 million used for dividend payments, \$11.7 million used for a payment related to the Universal Robots acquisition contingent consideration and \$9.4 million used for payments related to net settlement of employee stock compensation awards.

In 2015, changes in operating assets and liabilities, net of businesses acquired, provided cash of \$19.5 million. This was due to a \$38.7 million increase in operating assets and a \$58.2 million increase in operating liabilities.

The increase in operating assets was due to a \$57.3 million increase in accounts receivable due to an increase in sales during the last month of the fourth quarter of 2015 compared to 2014, partially offset by a \$15.6 million decrease in inventories and a \$3.0 million decrease in prepayments and other assets.

The increase in operating liabilities was due to a \$37.0 million increase in accounts payable as a result of our planned inventory increase in the fourth quarter of 2015 as we added material to maintain attractive lead times, a \$17.0 million increase in customer advance payments and deferred revenue, an \$11.3 million increase in other accrued liabilities, and a \$10.2 million increase in accrued employee compensation due to variable compensation, partially offset by \$12.1 million of retirement plans contributions and a \$5.2 million decrease in income taxes.

Investing activities during 2015 used cash of \$113.7 million, due to \$1,424.0 million used for purchases of marketable securities, \$282.7 million used for the acquisition of Universal Robots, and \$89.9 million used for

purchases of property, plant and equipment, partially offset by proceeds from maturities and sales of marketable securities of \$360.3 million and \$1,316.1 million, respectively, proceeds from the sale of an equity investment of \$5.4 million, and proceeds from life insurance of \$1.1 million related to the cash surrender value from the cancellation of Teradyne owned life insurance policies.

Financing activities during 2015 used cash of \$338.9 million, due to \$300.0 million used for the repurchase of 15.6 million shares of common stock at an average price of \$19.20 per share, \$50.7 million used for dividend payments, \$10.2 million used for payments related to net settlement of employee stock compensation awards and \$2.3 million used for debt issuance costs related to our April 2015 revolving credit facility, partially offset by \$19.5 million from the issuance of common stock under employee stock purchase and stock option plans and \$4.7 million from the tax benefit related to employee stock compensation awards.

In January 2017, May 2017, August 2017 and November 2017, our Board of Directors declared a quarterly cash dividend of \$0.07 per share. Total dividend payments in 2017 were \$55.4 million.

In January 2016, May 2016, August 2016 and November 2016, our Board of Directors declared a quarterly cash dividend of \$0.06 per share. Total dividend payments in 2016 were \$48.6 million.

In January 2015, May 2015, August 2015 and November 2015, our Board of Directors declared a quarterly cash dividend of \$0.06 per share. Total dividend payments in 2015 were \$50.7 million.

In January 2018, our Board of Directors declared a quarterly cash dividend of \$0.09 per share to be paid on March 23, 2018 to shareholders of record as of February 23, 2018. Payment of future cash dividends are subject to the discretion of our Board of Directors and will depend, among other things, upon our earnings, capital requirements and financial condition.

In January 2015, our Board of Directors cancelled the November 2010 stock repurchase program and authorized a new stock repurchase program for up to \$500 million of common stock. In 2015, we repurchased 15.6 million shares of common stock at an average price of \$19.20, for a total cost of \$300.0 million. In 2016, we repurchased 6.8 million shares of common stock at an average price of \$21.39, for a total cost of \$146.3 million. The cumulative repurchases as of December 31, 2016 totaled 22.5 million shares of common stock for \$446 million at an average price per share of \$19.87.

In December 2016, our Board of Directors cancelled the January 2015 stock repurchase program and approved a new \$500 million share repurchase authorization which commenced on January 1, 2017. The cumulative repurchases as of December 31, 2017 totaled 5.8 million shares of common stock for \$200.3 million at an average price per share of \$34.30.

In January 2018, our Board of Directors cancelled the December 2016 stock repurchase program and authorized a new stock repurchase program for up to \$1.5 billion of common stock. We intend to repurchase \$750 million in 2018.

We believe our cash, cash equivalents and marketable securities balance will be sufficient to pay our quarterly dividend, execute our authorized share repurchase program and meet our working capital and expenditure needs for at least the next twelve months. Inflation has not had a significant long-term impact on earnings.

Retirement Plans

ASC 715-20, “*Compensation—Retirement Benefits—Defined Benefit Plans*,” requires an employer with defined benefit plans or other postretirement benefit plans to recognize an asset or a liability on its balance sheet for the overfunded or underfunded status of the plans as defined by ASC 715-20. The pension asset or liability

represents the difference between the fair value of the pension plan's assets and the projected benefit obligation as of December 31. For other postretirement benefit plans, the liability is the difference between the fair value of the plan's assets and the accumulated postretirement benefit obligation as of December 31.

For the year ended December 31, 2017, our pension income, which includes the U.S. Qualified Pension Plan ("U.S. Plan"), certain qualified plans for non-U.S. subsidiaries, and a U.S. Supplemental Executive Defined Benefit Plan, was approximately \$(2.1) million. The largest portion of our 2017 pension income was \$(7.9) million for our U.S. Plan. Pension expense or income is calculated based upon a number of actuarial assumptions. Discount rate and expected return on assets are two assumptions which are important elements of pension plan expense (income) and asset/liability measurement. We evaluate our discount rate and expected rate of return on assets assumptions annually on a plan and country specific basis. We evaluate other assumptions related to demographic factors, such as retirement age, mortality and turnover periodically, and update them to reflect our experience and expectations for the future.

In developing the expected return on U.S. Plan assets assumption, we evaluated input from our investment manager and pension consultants, including their forecast of asset class return expectations. We believe that 4.0% was an appropriate rate of return on assets to use for 2017. The December 31, 2017 asset allocation for our U.S. Plan was 88% invested in fixed income securities, 10% invested in equity securities, and 2% invested in other securities. Our investment manager regularly reviews the actual asset allocation and periodically rebalances the portfolio to ensure alignment with our target allocations.

We recognize net actuarial gains and losses and the change in the fair value of plans assets in our operating results in the year in which they occur or upon any interim remeasurement of the plans. We calculate the expected return on plan assets using the fair value of the plan assets. Actuarial gains and losses are generally measured annually as of December 31 and, accordingly, recorded during the fourth quarter of each year or upon any interim remeasurement of the plans.

The discount rate that we utilized for determining future pension obligations for the U.S. Plan is based on the Citigroup Pension Index adjusted for the U.S. Plan's expected cash flows and was 3.4% at December 31, 2017, down from 3.9% at December 31, 2016. We estimate that in 2018 we will recognize approximately \$(1.8) million of pension income for the U.S. Plan. The U.S. Plan pension income estimate for 2018 is based on a 3.4% discount rate and a 4.3% return on assets. Future pension expense or income will depend on future investment performance, changes in future discount rates and various other factors related to the employee population participating in our pension plans.

As of December 31, 2017, our pension plans had unrecognized pension prior service cost of \$0.1 million.

We performed a sensitivity analysis, which expresses the potential U.S. Plan (income) expense for the year ending December 31, 2018, which would result from changes to either the discount rate or the expected return on plan assets. The below estimates exclude the impact of any potential actuarial gains or losses. It is difficult to reliably forecast or predict whether there will be any actuarial gains or losses in 2018 as they are primarily driven by events and circumstances beyond our control, such as changes in interest rates and the performance of the financial markets.

<u>Return on Plan Assets</u>	<u>Discount Rate</u>		
	<u>2.90%</u>	<u>3.40%</u>	<u>3.90%</u>
	(in millions)		
3.75%	\$(0.9)	\$(0.2)	\$ 0.6
4.25%	(2.5)	(1.8)	(1.0)
4.75%	(4.1)	(3.3)	(2.6)

The assets of the U.S. Plan consist substantially of fixed income securities. U.S. Plan assets have increased from \$307.3 million at December 31, 2016 to \$324.5 million at December 31, 2017 while the U.S. Plan's liability increased from \$299.6 million at December 31, 2016 to \$307.0 million at December 31, 2017.

Our funding policy is to make contributions to our pension plans in accordance with local laws and to the extent that such contributions are tax deductible. During 2017, we made contributions of \$1.9 million to the U.S. Plan, \$2.6 million to the U.S. supplemental executive defined benefit pension plan, and \$0.9 million to certain qualified plans for non-U.S. subsidiaries. In 2018, we expect to contribute approximately \$1.9 million to the U.S. Plan and \$2.5 million to the U.S. supplemental executive defined benefit pension plan. Contributions to be made in 2018 to certain qualified plans for non-U.S. subsidiaries are based on local statutory requirements and are estimated at approximately \$0.9 million.

Equity Compensation Plans

In addition to our 1996 Employee Stock Purchase Plan discussed in Note O: “*Stock-Based Compensation*” in Notes to Consolidated Financial Statements, we have a 2006 Equity and Cash Compensation Incentive Plan (the “2006 Equity Plan”) under which equity securities are authorized for issuance. The 2006 Equity Plan was initially approved by stockholders on May 25, 2006.

At our annual meeting of stockholders held May 21, 2013, our stockholders approved an amendment to the 2006 Equity Plan to increase the number of shares issuable thereunder by 10.0 million, for an aggregate of 32.0 million shares issuable thereunder, and our stockholders also approved an amendment to our 1996 Employee Stock Purchase Plan to increase the number of shares issuable thereunder by 5.0 million, for an aggregate of 30.4 million shares issuable thereunder. At our annual meeting of stockholders held May 12, 2015, our stockholders approved an amendment to the 2006 Equity Plan to extend its term until May 12, 2025.

The following table presents information about these plans as of December 31, 2017 (share numbers in thousands):

<u>Plan category</u>	<u>Number of securities to be issued upon exercise of outstanding options, warrants and rights</u>	<u>Weighted-average exercise price of outstanding options, warrants and rights</u>	<u>Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column one)</u>
Equity plans approved by shareholders	3,479(1)	\$22.43	11,699(2)
Equity plans not approved by shareholders (3)	<u>225</u>	2.41	<u>—</u>
Total	<u>3,704</u>	13.92	<u>11,699</u>

- (1) Includes 3,173,502 shares of restricted stock units that are not included in the calculation of the weighted average exercise price.
- (2) Consists of 8,604,184 securities available for issuance under the 2006 Equity Plan and 3,094,756 of securities available for issuance under the Employee Stock Purchase Plan.
- (3) In connection with the 2011 acquisition of LitePoint Corporation (the “LitePoint Acquisition”), we assumed the options granted under the LitePoint Corporation 2002 Stock Plan (the “LitePoint Plan”). Upon the consummation of the LitePoint Acquisition, these options were converted automatically into options to purchase an aggregate of 2,828,344 shares of our common stock. No additional awards will be granted under the LitePoint Plan. As of December 31, 2017, there were outstanding options exercisable for an aggregate of 225,456 shares of our common stock pursuant to the LitePoint Plan, with a weighted average exercise price of \$2.41 per share.

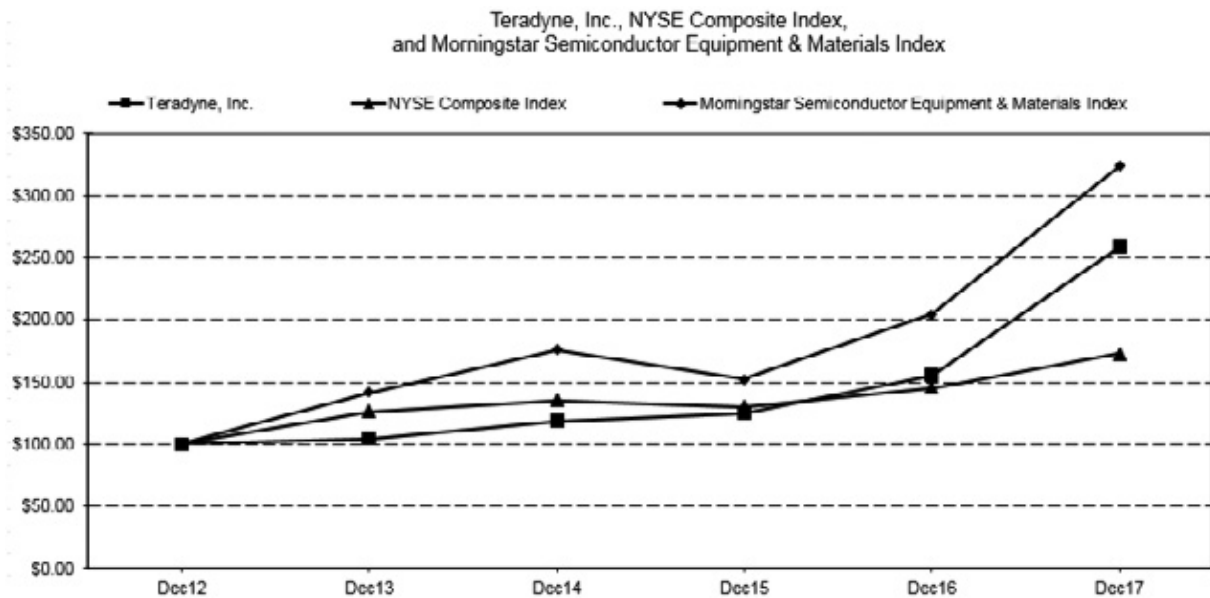
The purpose of the 2006 Equity Plan is to motivate employees, officers and directors by providing equity ownership and compensation opportunities in Teradyne. The aggregate number of shares available under the 2006 Equity Plan as of December 31, 2017 was 8,604,184 shares of our common stock. The 2006 Equity Plan authorizes the grant of stock-based awards in the form of (1) non-qualified and incentive stock options, (2) stock appreciation rights, (3) restricted stock awards and restricted stock unit awards, (4) phantom stock, and (5) other stock-based awards. Awards may be tied to time-based vesting schedules and/or performance-based vesting

measured by reference to performance criteria chosen by the Compensation Committee of the Board of Directors, which administers the 2006 Equity Plan. Awards may be made to any employee, officer, consultant and advisor of Teradyne and our subsidiaries, as well as, to our directors. The maximum number of shares of stock-based awards that may be granted to one participant during any one fiscal year is 2,000,000 shares of common stock.

As of December 31, 2017, total unrecognized compensation expense related to non-vested restricted stock units and options was \$42 million, and is expected to be recognized over a weighted average period of 2.3 years.

Performance Graph

The following graph compares the change in our cumulative total shareholder return in our common stock with (i) the NYSE Composite Index and (ii) the Morningstar Semiconductor Equipment & Materials Industry Group (compiled by Morningstar, Inc.). The comparison assumes \$100.00 was invested on December 31, 2012 in our common stock and in each of the foregoing indices and assumes reinvestment of dividends, if any. Historic stock price performance is not necessarily indicative of future price performance.



Recently Issued Accounting Pronouncements

On February 15, 2018, the FASB issued ASU 2018-02, “*Income Statement—Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income.*” This ASU allows a reclassification from accumulated other comprehensive income to retained earnings for stranded tax effects resulting from the Tax Cuts and Jobs Act enacted in December 2017. The guidance is effective for fiscal years beginning after December 15, 2018. Early adoption is permitted. We do not expect this ASU to have a material impact on our financial position, results of operations and statements of cash flows.

On March 10, 2017, the FASB issued ASU 2017-07, “*Compensation—Retirement Benefits (Topic 715): Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost.*” This ASU provides guidance on presentation of net periodic pension cost and net periodic postretirement benefit cost. The new standard requires the service cost component to be presented in the same line item as other employee compensation costs arising from services rendered during the period. The other components of net benefit cost such as interest cost, amortization of prior service cost, and actuarial gains or losses, are required to be presented separately outside of income or loss from operations. The presentation of service cost should be applied

retrospectively. The guidance is effective for fiscal years beginning after December 15, 2017. Early adoption is permitted. This guidance will impact the presentation of our consolidated financial statements. Upon adoption of the new standard, we will present interest cost, amortization of prior service cost, and actuarial gains or losses within other (income) expense, net.

On January 26, 2017, the FASB issued ASU 2017-04, *“Intangibles—Goodwill and Other (Topic 350): Simplifying the Accounting for Goodwill Impairment.”* The new guidance removes Step 2 of the goodwill impairment test, which requires a hypothetical purchase price allocation. Goodwill impairment will now be the amount by which a reporting unit’s carrying value exceeds its fair value, not to exceed the carrying amount of goodwill. All other goodwill impairment guidance will remain largely unchanged. Entities will continue to have the option to perform a qualitative assessment to determine if a quantitative impairment test is necessary. The same one-step impairment test will be applied to goodwill at all reporting units, even those with zero or negative carrying amounts. Entities will be required to disclose the amount of goodwill at reporting units with zero or negative carrying amounts. The revised guidance will be applied prospectively, and is effective in 2020. Early adoption is permitted for any impairment tests performed after January 1, 2017. We are currently evaluating the impact of this ASU on our financial position, results of operations and statements of cash flows.

In October 2016, the FASB issued ASU 2016-16, *“Accounting for Income Taxes: Intra-Entity Asset Transfers of Assets Other than Inventory.”* Under current Generally Accepted Accounting Principles (“GAAP”), the tax effects of intra-entity asset transfers are deferred until the transferred asset is sold to a third party or otherwise recovered through use. The new guidance requires recognition of the tax expense from the sale of the asset in the seller’s tax jurisdiction when the transfer occurs, even though the pre-tax effects of that transaction are eliminated in consolidation. Any deferred tax asset that arises in the buyer’s jurisdiction would also be recognized at the time of the transfer. The new guidance does not apply to intra-entity transfers of inventory. The income tax consequences from the sale of inventory from one member of a consolidated entity to another will continue to be deferred until the inventory is sold to a third party. The new guidance will be effective in fiscal years beginning after December 15, 2017. Early adoption is permitted. The modified retrospective approach will be required for transition to the new guidance, with a cumulative-effect adjustment recorded in retained earnings as of the beginning of the period of adoption. We do not expect this ASU to have a material impact on our financial position, results of operations and statements of cash flows.

In February 2016, the FASB issued ASU 2016-02, *“Leases (Topic 842).”* The guidance in this ASU supersedes the lease recognition requirements in Accounting Standards Codification (“ASC”) Topic 840, *“Leases.”* The new standard establishes a right-of-use (“ROU”) model that requires a lessee to record an ROU asset and a lease liability on the balance sheet for all leases with terms longer than twelve months. Leases will be classified as either finance or operating, with classification affecting the pattern of expense recognition in the statements of operations. The new standard is effective for annual periods beginning after December 15, 2018 with early adoption permitted. A modified retrospective transition approach is required for lessees for capital and operating leases existing at, or entered into after, the beginning of the earliest comparative period presented in the financial statements. We are currently evaluating the impact of this ASU on our financial position and results of operations.

In January 2016, the FASB issued ASU 2016-01, *“Financial Instruments—Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities.”* This ASU provides guidance for the recognition, measurement, presentation, and disclosure of financial instruments. The new pronouncement revises accounting related to equity investments and the presentation of certain fair value changes for financial liabilities measured at fair value. Among other things, it amends the presentation and disclosure requirements of equity securities that do not result in consolidation and are not accounted for under the equity method. Changes in the fair value of these equity securities will be recognized directly in net income. This pronouncement is effective for fiscal years beginning after December 15, 2017. We do not expect this ASU to have a material impact on our financial position and results of operations.

In May 2014, the FASB issued ASU 2014-09, “*Revenue from Contracts with Customers (Topic 606)*,” which will replace numerous requirements in U.S. GAAP, including industry-specific requirements, and provide companies with a single revenue recognition model for recognizing revenue from contracts with customers. The core principle of the new standard is that a company should recognize revenue to show the transfer of promised goods or services to customers in an amount that reflects the consideration to which the company expects to be entitled to in exchange for those goods or services. In August 2015, FASB issued ASU 2015-14, which deferred the effective date of the new revenue standard by one year. For us, the standard will be effective in the first quarter of 2018. The two permitted transition methods under the new standard are the full retrospective method, in which case the standard would be applied to each prior reporting period presented, or the modified retrospective method, in which case the cumulative effect of applying the standard would be recognized in retained earnings at the date of initial application. We have selected the modified retrospective transition method. We have completed our preliminary assessment of the financial statement impact of the new standard and expect that the cumulative effect adjustment recognized to retained earnings on January 1, 2018 will be approximately \$12 million, primarily as a result of recognizing revenues for software licenses at the time of delivery since the Vendor Specific Objective Evidence (“VSOE”) requirement for undelivered elements such as post-contract support is eliminated. Companies are allowed to use established or best estimate selling price for the undelivered element to allocate and defer the revenue. As a result, we will recognize as revenue upon delivery of the software and defer a portion of the sales price for the estimated selling price of post-contract support, compared to the current practice of recognizing the entire sales price ratably over the term of the post-contract support period due to the lack of VSOE. The \$12 million adjustment to retained earnings reflects acceleration of approximately \$16 million in revenues net of less than \$1 million in cost of revenues and approximately \$3 million of income tax expense. This preliminary assessment is based on a review of the types and number of revenue arrangements in place, including the review of individual customer contracts. Based on our preliminary assessment, we do not expect any major changes to be made to existing accounting systems or internal controls.

Item 7A: *Quantitative and Qualitative Disclosures about Market Risks*

Concentration of Credit Risk

Financial instruments which potentially subject us to concentrations of credit risk consist principally of cash equivalents, marketable securities, forward currency contracts and accounts receivable. Our cash equivalents consist primarily of money market funds invested in U.S. Treasuries and government agencies. Our fixed income available-for-sale marketable securities have a minimum rating of AA by one or more of the major credit rating agencies. We place forward currency contracts with high credit-quality financial institutions in order to minimize credit risk exposure. Concentrations of credit risk with respect to accounts receivable are limited due to the large number of geographically dispersed customers. We perform ongoing credit evaluations of our customers’ financial condition and from time to time may require customers to provide a letter of credit from a bank to secure accounts receivable. There were no customers who accounted for more than 10% of our accounts receivable balance as of December 31, 2017 and December 31, 2016.

In addition to market risks, we have an equity price risk related to the fair value of our convertible senior unsecured notes issued in December 2016. In December 2016, Teradyne issued \$460 million aggregate principal amount of 1.25% convertible senior unsecured notes (the “Notes”) due December 15, 2023. As of December 31, 2017, the Notes had a fair value of \$659.5 million. The table below provides a sensitivity analysis of hypothetical 10% changes of Teradyne’s stock price as of the end of 2017 and the estimated impact on the fair value of the Notes. The selected scenarios are not predictions of future events, but rather are intended to illustrate the effect such event may have on the fair value of the Notes. The fair value of the Notes is subject to equity price risk due to the convertible feature. The fair value of the Notes will generally increase as Teradyne’s common stock price increases and will generally decrease as the common stock price declines in value. The change in stock price affects the fair value of the convertible senior notes, but does not impact Teradyne’s financial position, cash flows or results of operations due to the fixed nature of the debt obligation. Additionally, we carry the Notes at face value less unamortized discount on our balance sheet, and we present the fair value for required disclosure

purposes only. In connection with the offering of the Notes we also sold warrants to the option counterparties. These transactions have been accounted for as an adjustment to our shareholders' equity. The convertible note hedge transactions are expected to reduce the potential equity dilution upon conversion of the Notes. The warrants along with any shares issuable upon conversion of the Notes will have a dilutive effect on our earnings per share to the extent that the average market price of our common stock for a given reporting period exceeds the applicable strike price or conversion price of the warrants or Notes, respectively.

Hypothetical Change in Teradyne Stock Price	Fair Value	Estimated Change in Fair Value	Hypothetical Percentage Increase (Decrease) in Fair Value
10% Increase	\$709,452	\$ 49,927	7.6%
No Change	659,525	—	—
10% Decrease	612,030	(47,495)	(7.2)

See Note H: "Debt" for further information.

Exchange Rate Risk Management

We regularly enter into foreign currency forward contracts to hedge the value of our monetary assets and liabilities in Japanese Yen, British Pound, Korean Won, Taiwan Dollar, Singapore Dollar and Euro. These foreign currency forward contracts have maturities of approximately one month. These contracts are used to minimize the effect of exchange rate fluctuations associated with the remeasurement of monetary assets and liabilities. We do not engage in currency speculation.

We performed a sensitivity analysis assuming a hypothetical 10% fluctuation in foreign exchange rates to the hedging contracts and the underlying exposures described above. As of December 31, 2017, 2016 and 2015, the analysis indicated that these hypothetical market movements would not have a material effect on our consolidated financial position, results of operations or cash flows.

Interest Rate Risk Management

We are exposed to potential losses due to changes in interest rates. Our interest rate exposure is primarily in the Netherlands, United States and Singapore related to short-term and long-term marketable securities.

In order to estimate the potential loss due to interest rate risk, a fluctuation in interest rates of 25 basis points was assumed. Market risk for the short and long-term marketable securities was estimated as the potential change in the fair value resulting from a hypothetical change in interest rates for securities contained in the investment portfolio. The potential change in the fair value from changes in interest rates is immaterial as of December 31, 2017 and 2016.

Item 8: Financial Statements and Supplementary Data

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Teradyne, Inc.:

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Teradyne, Inc. and its subsidiaries as of December 31, 2017 and 2016, and the related consolidated statements of operations, comprehensive income (loss), shareholders' equity and cash flows for each of the three years in the period ended December 31, 2017, including the related notes and schedule of valuation and qualifying accounts for each of the three years in the period ended December 31, 2017 appearing under Item 15(c) (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2017, based on criteria established in *Internal Control—Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2017 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2017, based on criteria established in *Internal Control—Integrated Framework* (2013) issued by the COSO.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management's Annual Report on Internal Control over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) ("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 audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements 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. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

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

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

[PricewaterhouseCoopers LLP (signed)]

Boston, Massachusetts
March 1, 2018

We have served as the Company's auditor since 1968.

TERADYNE, INC.
CONSOLIDATED BALANCE SHEETS

	December 31,	
	2017	2016
	(in thousands, except per share information)	
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 429,843	\$ 307,884
Marketable securities	1,347,979	871,024
Accounts receivable, less allowance for doubtful accounts of \$2,219 and \$2,356 in 2017 and 2016, respectively	272,783	192,444
Inventories, net	107,525	135,958
Prepayments and other current assets	112,151	116,493
Total current assets	2,270,281	1,623,803
Property, plant and equipment, net	268,447	253,821
Marketable securities	125,926	433,843
Deferred tax assets	84,026	107,405
Retirement plans assets	17,491	7,712
Other assets	12,275	12,165
Acquired intangible assets, net	79,088	100,401
Goodwill	252,011	223,343
Total assets	\$3,109,545	\$2,762,493
LIABILITIES		
Current liabilities:		
Accounts payable	\$ 86,393	\$ 95,362
Accrued employees' compensation and withholdings	141,694	109,944
Deferred revenue and customer advances	83,614	84,478
Other accrued liabilities	59,083	51,382
Contingent consideration	24,497	1,050
Income taxes payable	59,055	30,480
Total current liabilities	454,336	372,696
Retirement plans liabilities	119,776	106,938
Long-term deferred revenue and customer advances	30,127	23,463
Long-term contingent consideration	20,605	37,282
Deferred tax liabilities	6,720	12,144
Long-term other accrued liabilities	10,273	28,642
Long-term income taxes payable	148,075	—
Long-term debt	365,987	352,669
Total liabilities	1,155,899	933,834
Commitments and contingencies (Note K)		
SHAREHOLDERS' EQUITY		
Common stock, \$0.125 par value, 1,000,000 shares authorized, 195,548 and 199,177 shares issued and outstanding at December 31, 2017 and 2016, respectively	24,444	24,897
Additional paid-in capital	1,638,413	1,593,684
Accumulated other comprehensive income (loss)	18,776	(20,214)
Retained earnings	272,013	230,292
Total shareholders' equity	1,953,646	1,828,659
Total liabilities and shareholders' equity	\$3,109,545	\$2,762,493

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

TERADYNE, INC.
CONSOLIDATED STATEMENTS OF OPERATIONS

	Years Ended December 31,		
	2017	2016	2015
	(in thousands, except per share amounts)		
Revenues:			
Products	\$1,784,695	\$1,453,248	\$1,340,566
Services	351,911	300,002	299,012
Total revenues	2,136,606	1,753,250	1,639,578
Cost of revenues:			
Cost of products	758,548	659,097	591,772
Cost of services	154,186	134,586	132,163
Total cost of revenues (exclusive of acquired intangible assets amortization shown separately below)	912,734	793,683	723,935
Gross profit	1,223,872	959,567	915,643
Operating expenses:			
Selling and administrative	348,287	315,682	306,313
Engineering and development	305,665	291,025	292,250
Acquired intangible assets amortization	30,530	52,648	69,031
Restructuring and other	9,362	21,942	5,080
Goodwill impairment	—	254,946	—
Acquired intangible assets impairment	—	83,339	—
Total operating expenses	693,844	1,019,582	672,674
Income (loss) from operations	530,028	(60,015)	242,969
Non-operating (income) expenses:			
Interest income	(17,805)	(9,296)	(7,214)
Interest expense	21,663	3,637	1,876
Other (income) expense, net	1,758	704	(4,817)
Income (loss) before income taxes	524,412	(55,060)	253,124
Income tax provision (benefit)	266,720	(11,639)	46,647
Net income (loss)	\$ 257,692	\$ (43,421)	\$ 206,477
Net income (loss) per common share:			
Basic	\$ 1.30	\$ (0.21)	\$ 0.98
Diluted	\$ 1.28	\$ (0.21)	\$ 0.97
Weighted average common shares—basic	198,069	202,578	211,544
Weighted average common shares—diluted	201,641	202,578	213,321
Cash dividend declared per common share	\$ 0.28	\$ 0.24	\$ 0.24

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

TERADYNE, INC.

CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)

	Years Ended December 31,		
	2017	2016	2015
	(in thousands)		
Net income (loss)	\$257,692	\$(43,421)	\$206,477
Other comprehensive income (loss), net of tax:			
Foreign currency translation adjustment, net of tax of \$0, \$0, \$0	37,840	(13,162)	(8,759)
Available-for-sale marketable securities:			
Unrealized gains (losses) on marketable securities arising during period, net of tax of \$1,903, \$923, \$(1,667), respectively	1,863	2,037	(3,075)
Less: Reclassification adjustment for gains included in net income (loss), net of tax of \$(297), \$(255), \$(390), respectively	(441)	(683)	(704)
	1,422	1,354	(3,779)
Defined benefit pension and post-retirement plans:			
Amortization of prior service (credit) cost included in net periodic pension and post-retirement expense/income, net of tax \$(154), \$(190), \$(169), respectively	(272)	(321)	(295)
Prior service income arising during period, net of tax of \$0, \$34, \$0, respectively	—	59	—
	(272)	(262)	(295)
Other comprehensive income (loss)	38,990	(12,070)	(12,833)
Comprehensive income (loss)	\$296,682	\$(55,491)	\$193,644

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

TERADYNE, INC.

CONSOLIDATED STATEMENTS OF SHAREHOLDERS' EQUITY

Years Ended December 31, 2017, 2016 and 2015

	Common Stock Shares Issued	Common Stock Par Value	Additional Paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Retained Earnings	Total Shareholders' Equity
Balance, December 31, 2014	216,613	\$27,077	\$1,437,135	\$ 4,689	\$ 610,079	\$2,078,980
Issuance of stock to employees under benefit plans, net of shares withheld for payroll tax of \$10,235	2,649	331	8,602			8,933
Stock-based compensation expense			30,285		(297,996)	30,285
Repurchase of common stock		(1,953)			(50,732)	(299,949)
Tax benefit related to stock options and restricted stock units			4,625		206,477	4,625
Cash dividends				(8,759)		(8,759)
Net income				(3,075)		(3,075)
Foreign currency translation adjustment				(704)		(704)
Unrealized losses on marketable securities:				(295)		(295)
Less: reclassification adjustment for gains included in net income, net of tax \$(390)						
Amortization of prior service (credit) cost, net of tax of \$(169)						
Balance, December 31, 2015	203,641	25,455	1,480,647	(8,144)	467,828	1,965,786
Issuance of stock to employees under benefit plans, net of shares withheld for payroll tax of \$9,398	2,377	297	10,368			10,665
Equity component of convertible debt			100,836			100,836
Equity component of convertible notes issuance cost			(2,017)			(2,017)
Purchase of convertible notes hedges			(100,834)			(100,834)
Proceeds from issuance of warrants			67,852			67,852
Stock-based compensation expense			30,745		(145,476)	30,745
Repurchase of common stock		(855)				(855)
Tax benefit related to stock options and restricted stock units			6,087			6,087
Cash dividends					(48,639)	(48,639)
Net loss				(13,162)	(43,421)	(43,421)
Foreign currency translation adjustment						
Unrealized gains on marketable securities:						
Unrealized gains on marketable securities, net of tax of \$923				2,037		2,037
Less: reclassification adjustment for gains included in net income, net of tax \$(255)				(683)		(683)
Amortization of prior service (credit) cost, net of tax of \$(190)				(321)		(321)
Prior service income arising during period, net of tax of \$34				59		59
Balance, December 31, 2016	199,177	24,897	1,593,684	(20,214)	230,292	1,828,659
Issuance of stock to employees under benefit plans, net of shares withheld for payroll tax of \$12,881	2,211	277	10,747			11,024
Stock-based compensation expense			33,982			33,982
Repurchase of common stock		(730)			(199,574)	(200,304)
Cumulative effect adjustment for prior year tax benefits related to stock options and restricted stock units						
Cash dividends					39,081	39,081
Net income				37,840	(55,478)	(17,638)
Foreign currency translation adjustment					257,692	257,692
Unrealized gains on marketable securities:						
Unrealized gains on marketable securities, net of tax of \$1,903				1,863		1,863
Less: reclassification adjustment for gains included in net income, net of tax \$(297)				(441)		(441)
Amortization of prior service (credit) cost, net of tax of \$(154)				(272)		(272)
Balance, December 31, 2017	195,548	\$24,444	\$1,638,413	\$ 18,776	\$ 272,013	\$1,953,646

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

TERADYNE, INC.

CONSOLIDATED STATEMENTS OF CASH FLOWS

	Years Ended December 31,		
	2017	2016	2015
	(in thousands)		
Cash flows from operating activities:			
Net income (loss)	\$ 257,692	\$ (43,421)	\$ 206,477
Adjustments to reconcile net income (loss) from operations to net cash provided by operating activities:			
Depreciation	66,122	64,782	68,181
Amortization	41,953	55,227	72,592
Stock-based compensation	34,097	30,750	30,451
Deferred taxes	37,105	(62,936)	(7,124)
Provision for excess and obsolete inventory	8,844	17,493	21,332
Contingent consideration fair value adjustment	7,820	15,896	2,489
Retirement plans actuarial (gains) losses	(6,624)	(3,203)	17,732
Property insurance recovery, net	(4,309)	—	—
Goodwill impairment	—	254,946	—
Acquired intangible assets impairment	—	83,339	—
Tax benefit related to employee stock compensation awards	—	(6,198)	(4,715)
Gain from the sale of an equity investment	—	—	(5,406)
Non-cash charge for the sale of inventories revalued at the date of acquisition	—	—	1,567
Other	707	(448)	(34)
Changes in operating assets and liabilities, net of businesses acquired:			
Accounts receivable	(80,584)	18,325	(57,267)
Inventories	44,960	34,263	15,559
Prepayments and other assets	2,254	(19,194)	3,034
Accounts payable and other accrued expenses	43,574	6,820	58,448
Deferred revenue and customer advances	4,984	(3,634)	17,011
Retirement plan contributions	(5,902)	(6,044)	(12,095)
Income taxes	173,802	18,434	(5,156)
Net cash provided by operating activities	<u>626,495</u>	<u>455,197</u>	<u>423,076</u>
Cash flows from investing activities:			
Purchases of property, plant and equipment	(105,375)	(85,272)	(89,878)
Purchases of available-for-sale marketable securities	(1,391,917)	(1,656,267)	(1,424,002)
Proceeds from maturities of available-for-sale marketable securities	701,681	243,232	360,264
Proceeds from sales of available-for-sale marketable securities	527,746	852,794	1,316,131
Proceeds from property insurance	5,064	5,051	—
Acquisition of businesses, net of cash acquired	—	—	(282,741)
Proceeds from life insurance	—	—	1,098
Proceeds from the sale of an equity investment	—	—	5,406
Net cash used for investing activities	<u>(262,801)</u>	<u>(640,462)</u>	<u>(113,722)</u>
Cash flows from financing activities:			
Issuance of common stock under stock purchase and stock option plans	24,493	20,473	19,530
Repurchase of common stock	(200,304)	(146,331)	(299,949)
Dividend payments	(55,447)	(48,619)	(50,713)
Payments related to net settlement of employee stock compensation awards	(12,881)	(9,398)	(10,235)
Payments of contingent consideration	(1,050)	(11,697)	—
Proceeds from issuance of convertible notes, net of issuance costs	—	450,800	—
Purchase of convertible note hedges	—	(100,834)	—
Proceeds from issuance of warrants	—	67,852	—
Tax benefit related to employee stock compensation awards	—	6,198	4,715
Payment of revolving credit facility costs	—	—	(2,253)
Net cash (used for) provided by financing activities	<u>(245,189)</u>	<u>228,444</u>	<u>(338,905)</u>
Effects of exchange rate changes on cash and cash equivalents	3,454	—	—
Increase (decrease) in cash and cash equivalents	121,959	43,179	(29,551)
Cash and cash equivalents at beginning of year	307,884	264,705	294,256
Cash and cash equivalents at end of year	<u>\$ 429,843</u>	<u>\$ 307,884</u>	<u>\$ 264,705</u>
Supplementary disclosure of cash flow information:			
Cash paid for:			
Interest	\$ 6,446	\$ 446	\$ 301
Income taxes	\$ 53,775	\$ 40,424	\$ 35,218

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

TERADYNE, INC.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

A. THE COMPANY

Teradyne, Inc. (“Teradyne”) is a leading global supplier of automation equipment for test and industrial applications. Teradyne designs, develops, manufactures and sells automatic test systems used to test semiconductors, wireless products, data storage and complex electronics systems in the consumer electronics, wireless, automotive, industrial, computing, communications, and aerospace and defense industries. Teradyne’s industrial automation products include collaborative robots used by global manufacturing and light industrial customers to improve quality, increase manufacturing efficiency and decrease manufacturing costs. Teradyne’s automatic test equipment and industrial automation products and services include:

- semiconductor test (“Semiconductor Test”) systems;
- defense/aerospace (“Defense/Aerospace”) test instrumentation and systems, storage test (“Storage Test”) systems, and circuit-board test and inspection (“Production Board Test”) systems (collectively these products represent “System Test”);
- industrial automation (“Industrial Automation”) products; and
- wireless test (“Wireless Test”) systems.

On June 11, 2015, Teradyne acquired Universal Robots A/S (“Universal Robots”) for approximately \$284 million of cash plus up to an additional \$65 million of cash if certain performance targets are met extending through 2018. Universal Robots is the leading supplier of collaborative robots which are low-cost, easy-to-deploy and simple-to-program robots that work side by side with production workers. Universal Robots is a separate operating and reportable segment, Industrial Automation.

B. ACCOUNTING POLICIES

The consolidated financial statements include the accounts of Teradyne and its wholly-owned subsidiaries. All significant intercompany balances and transactions are eliminated. Certain prior years’ amounts were reclassified to conform to the current year presentation.

Preparation of Financial Statements and Use of Estimates

The preparation of consolidated financial statements requires management to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses, and related disclosure of contingent liabilities. On an on-going basis, management evaluates its estimates, including those related to inventories, investments, goodwill, intangible and other long-lived assets, accounts receivable, income taxes, deferred tax assets and liabilities, pensions, warranties, and loss contingencies. Management bases its estimates on historical experience and on appropriate and customary assumptions 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 significantly from these estimates.

Revenue Recognition

Teradyne recognizes revenues, including revenues from distributors, when there is persuasive evidence of an arrangement, title and risk of loss have passed, delivery has occurred or the services have been rendered, the sales price is fixed or determinable and collection of the related receivable is reasonably assured. Title and risk of loss generally pass to Teradyne’s customers upon shipment or at delivery destination point. In circumstances where either title or risk of loss pass upon destination, acceptance or cash payment, Teradyne defers revenue

recognition until such events occur except when title transfer is tied to cash payment outside the United States. Outside the United States, Teradyne recognizes revenue upon shipment or at delivery destination point, even if Teradyne retains a form of title to products delivered to customers, provided the sole purpose is to enable Teradyne to recover the products in the event of customer payment default and the arrangement does not prohibit the customer's use or resale of the product in the ordinary course of business.

Teradyne's equipment has non-software and software components that function together to deliver the equipment's essential functionality. Revenue is recognized upon shipment or at delivery destination point, provided that customer acceptance criteria can be demonstrated prior to shipment. Certain contracts require Teradyne to perform tests of the product to ensure that performance meets the published product specifications or customer requested specifications, which are generally conducted prior to shipment. Where the criteria cannot be demonstrated prior to shipment, revenue is deferred until customer acceptance has been received. Teradyne also defers the portion of the sales price that is not due until acceptance, which represents deferred profit.

For multiple element arrangements, Teradyne allocates revenue to all deliverables based on their relative selling prices. In such circumstances, a hierarchy is used to determine the selling price for allocating revenue to deliverables as follows: (i) vendor-specific objective evidence of selling price ("VSOE"), (ii) third-party evidence of selling price ("TPE"), and (iii) best estimate of the selling price ("BESP"). For a delivered item to be considered a separate unit the delivered item must have value to the customer on a standalone basis and the delivery or performance of the undelivered item must be considered probable and substantially in Teradyne's control.

Teradyne's post-shipment obligations include installation, training services, one-year standard warranties, and extended warranties. Installation does not alter the product capabilities, does not require specialized skills or tools and can be performed by the customers or other vendors. Installation is typically provided within five days of product shipment and is completed within one to two days thereafter. Training services are optional and do not affect the customers' ability to use the product. Teradyne defers revenue for the selling price of installation and training. Extended warranties constitute warranty obligations beyond one year and Teradyne defers revenue in accordance with Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") 605-20, "*Separately Priced Extended Warranty and Product Maintenance Contracts*" and ASC 605-25, "*Revenue Recognition Multiple-Element Arrangements*." Service revenue is recognized over the contractual period or as services are performed.

Teradyne's products are generally subject to warranty and related costs of the warranty are provided for in cost of revenues when product revenue is recognized. Teradyne classifies shipping and handling costs in cost of revenue. Teradyne does not provide its customers with contractual rights of return for any of its products.

As of December 31, 2017 and 2016, deferred revenue and customer advances consisted of the following and are included in the short and long-term deferred revenue and customer advances:

	<u>2017</u>	<u>2016</u>
	(in thousands)	
Maintenance and training	\$ 57,256	\$ 46,803
Customer advances, undelivered elements and other	32,047	32,938
Extended warranty	<u>24,438</u>	<u>28,200</u>
Total deferred revenue and customer advances	<u>\$113,741</u>	<u>\$107,941</u>

Product Warranty

Teradyne generally provides a one-year warranty on its products, commencing upon installation, acceptance or shipment. A provision is recorded upon revenue recognition to cost of revenues for estimated warranty

expense based on historical experience. Related costs are charged to the warranty accrual as incurred. The balance below is included in other accrued liabilities:

	<u>Amount</u> <u>(in thousands)</u>
Balance at December 31, 2014	\$ 8,942
Acquisition	409
Accruals for warranties issued during the period	11,539
Accruals related to pre-existing warranties	(3,159)
Settlements made during the period	<u>(10,806)</u>
Balance at December 31, 2015	6,925
Accruals for warranties issued during the period	14,291
Accruals related to pre-existing warranties	(1,354)
Settlements made during the period	<u>(12,659)</u>
Balance at December 31, 2016	7,203
Accruals for warranties issued during the period	14,223
Accruals related to pre-existing warranties	(379)
Settlements made during the period	<u>(12,847)</u>
Balance at December 31, 2017	<u>\$ 8,200</u>

When Teradyne receives revenue for extended warranties, beyond one year, it is deferred and recognized on a straight-line basis over the contract period. Related costs are expensed as incurred. The balance below is included in short and long-term deferred revenue and customer advances:

	<u>Amount</u> <u>(in thousands)</u>
Balance at December 31, 2014	\$ 34,197
Acquisition	870
Deferral of new extended warranty revenue	17,698
Recognition of extended warranty deferred revenue	<u>(22,741)</u>
Balance at December 31, 2015	30,024
Deferral of new extended warranty revenue	19,909
Recognition of extended warranty deferred revenue	<u>(21,733)</u>
Balance at December 31, 2016	28,200
Deferral of new extended warranty revenue	20,513
Recognition of extended warranty deferred revenue	<u>(24,275)</u>
Balance at December 31, 2017	<u>\$ 24,438</u>

Accounts Receivable and Allowance for Doubtful Accounts

Trade accounts receivable are recorded at the invoiced amount and do not bear interest. The volatility of the industries that Teradyne serves can cause certain of its customers to experience shortages of cash flows, which can impact their ability to make required payments. Teradyne maintains allowances for doubtful accounts for estimated losses resulting from the inability of its customers to make required payments. Estimated allowances for doubtful accounts are reviewed periodically taking into account the customer's recent payment history, the customer's current financial statements and other information regarding the customer's credit worthiness. Account balances are written off against the allowance when it is determined the receivable will not be recovered.

Inventories

Inventories are stated at the lower of cost (first-in, first-out basis) or net realizable value. On a quarterly basis, Teradyne uses consistent methodologies to evaluate all inventories for net realizable value. Teradyne records a provision for both excess and obsolete inventory when such write-downs or write-offs are identified through the quarterly review process. The inventory valuation is based upon assumptions about future demand, product mix and possible alternative uses.

Investments

Teradyne accounts for its investments in debt and equity securities in accordance with the provisions of ASC 320-10, “*Investments—Debt and Equity Securities.*” ASC 320-10 requires that certain debt and equity securities be classified into one of three categories; trading, available-for-sale or held-to-maturity securities. On a quarterly basis, Teradyne reviews its investments to identify and evaluate those that have an indication of a potential other-than-temporary impairment. Factors considered in determining whether a loss is other-than-temporary include:

- The length of time and the extent to which the market value has been less than cost;
- The financial condition and near-term prospects of the issuer; and
- The intent and ability to retain the investment in the issuer for a period of time sufficient to allow for any anticipated recovery in market value.

As defined in ASC 820-10, “*Fair Value Measurements and Disclosures,*” fair value is the price that would be received from the sale of an asset or paid to transfer a liability in an orderly transaction between market participants. Teradyne uses the market and income approach techniques to value its financial instruments and there were no changes in valuation techniques during the years ended December 31, 2017, 2016 and 2015. ASC 820-10 requires that assets and liabilities carried at fair value be classified and disclosed in one of the following three categories:

Level 1: Quoted prices in active markets for identical assets as of the reporting date.

Level 2: Inputs other than Level 1, that are observable either directly or indirectly as of the reporting date. For example, a common approach for valuing fixed income securities is the use of matrix pricing. Matrix pricing is a mathematical technique used to value securities by relying on the securities’ relationship to other benchmark quoted prices, and therefore is considered a Level 2 input.

Level 3: Unobservable inputs that are not supported by market data. Unobservable inputs are developed based on the best information available, which might include Teradyne’s own data.

In accordance with ASC 820-10, Teradyne measures its debt and equity investments at fair value. Teradyne’s debt and equity investments are primarily classified within Level 1 and 2. Acquisition-related contingent consideration is classified within Level 3. Teradyne determines the fair value of acquisition-related contingent consideration using a Monte Carlo simulation model. Assumptions utilized in the model include forecasted revenues, revenues volatility and discount rate.

Prepayments

Prepayments consist of the following and are included in prepayments and other current assets on the balance sheet:

	<u>2017</u>	<u>2016</u>
	(in thousands)	
Contract manufacturer and supplier prepayments	\$ 82,503	\$ 84,473
Prepaid maintenance and other services	8,189	7,676
Prepaid taxes	5,039	4,664
Other prepayments	12,386	11,641
Total prepayments	<u>\$108,117</u>	<u>\$108,454</u>

Retirement and Postretirement Plans

Teradyne recognizes net actuarial gains and losses and the change in the fair value of the plan assets in its operating results in the year in which they occur or upon any interim remeasurement of the plans. Teradyne calculates the expected return on plan assets using the fair value of the plan assets. Actuarial gains and losses are generally measured annually as of December 31 and, accordingly, recorded during the fourth quarter of each year or upon any interim remeasurement of the plans.

Goodwill, Intangible and Long-Lived Assets

Teradyne accounts for goodwill and intangible assets in accordance with ASC 350-10, “*Intangibles-Goodwill and Other*.” Intangible assets are amortized over their estimated useful economic life and are carried at cost less accumulated amortization. Goodwill is assessed for impairment at least annually in the fourth quarter, as of December 31, on a reporting unit basis, or more frequently when events and circumstances occur indicating that the recorded goodwill may be impaired. In accordance with ASC 350-10, Teradyne has the option to perform a qualitative assessment to determine whether it is more-likely-than-not that the fair value of a reporting unit is less than its carrying amount. If Teradyne determines this is the case, Teradyne is required to perform the two-step goodwill impairment test to identify potential goodwill impairment and measure the amount of goodwill impairment loss to be recognized. If Teradyne determines that it is more-likely-than-not that the fair value of the reporting unit is greater than its carrying amounts, the two-step goodwill impairment test is not required.

In accordance with ASC 360-10, “*Impairment or Disposal of Long-Lived Assets*,” Teradyne reviews long-lived assets for impairment whenever events or changes in business circumstances indicate that the carrying amount of the assets may not be fully recoverable or that the useful lives of these assets are no longer appropriate. Each impairment test is based on a comparison of the estimated undiscounted cash flows to the recorded value of the asset. If impairment is indicated, the asset is written down to its estimated fair value based on a discounted cash flow analysis. The cash flow estimates used to determine the impairment, if any, contain management’s best estimates using appropriate assumptions and projections at that time.

Property, Plant and Equipment

Property, plant and equipment are stated at cost and depreciated over the estimated useful lives of the assets. Leasehold improvements and major renewals are capitalized and included in property, plant and equipment accounts while expenditures for maintenance and repairs and minor renewals are charged to expense. When assets are retired, the assets and related accumulated depreciation are removed from the accounts and any resulting gain or loss is reflected in the consolidated statements of operations.

Teradyne provides for depreciation of its assets principally on the straight-line method with the cost of the assets being charged to expense over their useful lives as follows:

Buildings	40 years
Building improvements	5 to 10 years
Leasehold improvements	Lesser of lease term or 10 years
Furniture and fixtures	10 years
Test systems manufactured internally	6 years
Machinery and equipment	3 to 5 years
Software	3 to 5 years

Test systems manufactured internally are used by Teradyne for customer evaluations and manufacturing and support of its customers. Teradyne depreciates the test systems manufactured internally over a six-year life to cost of revenues, engineering and development, and selling and administrative expenses. Teradyne often sells internally manufactured test equipment to customers. Upon the sale of an internally manufactured test system, the net book value of the system is transferred to inventory and expensed as cost of revenues. The net book value of internally manufactured test systems sold in the years ended December 31, 2017, 2016, and 2015 was \$3.6 million, \$11.4 million, and \$50.7 million, respectively.

Engineering and Development Costs

Teradyne’s products are highly technical in nature and require a large and continuing engineering and development effort. Software development costs incurred prior to the establishment of technological feasibility are charged to expense. Software development costs incurred subsequent to the establishment of technological feasibility are capitalized until the product is available for release to customers. To date, the period between achieving technological feasibility and general availability of the product has been short and software development costs eligible for capitalization have not been material. Engineering and development costs are expensed as incurred and consist primarily of salaries, contractor fees including non-recurring engineering charges related to product design, allocated facility costs, depreciation, and tooling costs.

Stock Compensation Plans and Employee Stock Purchase Plan

Stock-based compensation expense is based on the grant-date fair value estimated in accordance with the provisions of ASC 718-10, “*Compensation-Stock Compensation*.”

In March 2016, the FASB issued Accounting Standards Update (“ASU”) 2016-09, “*Compensation-Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting*.” Teradyne adopted this ASU in the first quarter of 2017. This ASU changes how Teradyne accounts for certain aspects of share-based payment awards to employees, including the accounting for income taxes, forfeitures, and statutory tax withholding requirements, as well as classification in the statements of cash flows.

Adoption of this ASU required recognition of a cumulative effect adjustment to retained earnings for any prior year excess tax benefits or tax deficiencies not previously recorded. The cumulative effect adjustment of \$39 million was recorded in the first quarter of 2017 as an increase to retained earnings and deferred tax assets.

This ASU also required a change in how Teradyne recognizes the excess tax benefits or tax deficiencies related to stock-based compensation. Prior to adopting ASU 2016-09, these excess tax benefits or tax deficiencies were credited or charged to additional paid-in capital in Teradyne’s consolidated balance sheets. In accordance with ASU 2016-09, starting in the first quarter of 2017, these excess tax benefits or tax deficiencies are recognized as a discrete tax benefit or discrete tax expense to the current income tax provision in Teradyne’s consolidated statements of operations.

ASU 2016-09 requires companies to adopt the amendment related to accounting for excess tax benefits or tax deficiencies on a prospective basis. In 2017, Teradyne recognized a discrete tax benefit of \$6.3 million related to net excess tax benefit.

In addition, under ASU 2016-09, all excess tax benefits related to share-based payments are reported as cash flows from operating activities. Previously, excess tax benefits from share-based payment arrangements were reported as cash flows from financing activities. The classification amendment was applied prospectively. This ASU also clarifies that all cash payments made to taxing authorities on the employees' behalf for withheld shares should be presented as financing activities on the statement of cash flows. Previously, Teradyne reported cash payments made to taxing authorities as operating activities on the statement of cash flows. This change was applied retrospectively.

Upon adoption of ASU 2016-09, Teradyne made an accounting policy election to continue accounting for forfeitures by applying an estimated forfeiture rate and to continue to recognize compensation costs only for those stock-based compensation awards expected to vest.

Under its stock compensation plans, Teradyne has granted stock options, restricted stock units and performance-based restricted stock units, and employees are eligible to purchase Teradyne's common stock through its Employee Stock Purchase Plan ("ESPP").

Income Taxes

Deferred tax assets and liabilities are determined based on differences between financial reporting and tax basis of assets and liabilities and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse. The measurement of deferred tax assets is reduced by a valuation allowance if it is more likely than not that some or all of the deferred tax assets will not be realized. Teradyne performed the required assessment of positive and negative evidence regarding the realization of the net deferred tax assets in accordance with ASC 740, "Accounting for Income Taxes." This assessment included the evaluation of scheduled reversals of deferred tax liabilities, estimates of projected future taxable income and tax-planning strategies. Although realization is not assured, based on its assessment, Teradyne concluded that it is more likely than not that such assets, net of the existing valuation allowance, will be realized.

Advertising Costs

Teradyne expenses all advertising costs as incurred. Advertising costs were \$9.1 million, \$6.4 million, and \$3.3 million in 2017, 2016, and 2015, respectively.

Translation of Non-U.S. Currencies

The functional currency for all subsidiaries is the U.S. dollar, except for the Industrial Automation segment for which the local currency is its functional currency. All foreign currency denominated monetary assets and liabilities are remeasured on a monthly basis into the functional currency using exchange rates in effect at the end of the period. All foreign currency denominated non-monetary assets and liabilities are remeasured into the functional currency using historical exchange rates. Net foreign exchange gains and losses resulting from remeasurement are included in other (income) expense, net. For Industrial Automation, assets and liabilities are translated into U.S. dollars using exchange rates in effect at the end of the period. Revenue and expense amounts are translated using an average of exchange rates in effect during the period. Translation adjustments are recorded within accumulated other comprehensive income (loss).

Net foreign exchange gains and losses resulting from remeasurement are included in other (income) expense, net. For the years ended December 31, 2017, 2016, and 2015, losses (gains) from the remeasurement of the monetary assets and liabilities denominated in foreign currencies were \$2.9 million, \$(8.0) million, and \$(2.5) million, respectively.

These amounts do not reflect the corresponding (gains) losses from foreign exchange contracts. See Note G: “Financial Instruments” regarding foreign exchange contracts.

Net Income (Loss) per Common Share

Basic net income (loss) per common share is calculated by dividing net income (loss) by the weighted average number of common shares outstanding during the period. Except where the result would be antidilutive, diluted net income (loss) per common share is calculated by dividing net income (loss) by the sum of the weighted average number of common shares plus common stock equivalents, if applicable.

With respect to its convertible debt issued in 2016, Teradyne has determined that it has the ability and intent to settle the principal of the convertible debt in cash; accordingly, the principal amount is excluded from the determination of diluted earnings per share. As a result, Teradyne is accounting for the conversion spread using the treasury stock method.

Comprehensive Income (Loss)

Comprehensive income (loss) includes net income, unrealized pension and postretirement prior service costs and benefits, unrealized gains and losses on investments in debt and equity marketable securities and foreign currency translation adjustment.

C. RECENTLY ISSUED ACCOUNTING PRONOUNCEMENTS

On February 15, 2018, the FASB issued ASU 2018-02, “*Income Statement—Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income.*” This ASU allows a reclassification from accumulated other comprehensive income to retained earnings for stranded tax effects resulting from the Tax Cuts and Jobs Act enacted in December 2017. The guidance is effective for fiscal years beginning after December 15, 2018. Early adoption is permitted. Teradyne does not expect this ASU to have a material impact on its financial position, results of operations and statements of cash flows.

On March 10, 2017, the FASB issued ASU 2017-07, “*Compensation—Retirement Benefits (Topic 715): Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost.*” This ASU provides guidance on presentation of net periodic pension cost and net periodic postretirement benefit cost. The new standard requires the service cost component to be presented in the same line item as other employee compensation costs arising from services rendered during the period. The other components of net benefit cost such as interest cost, amortization of prior service cost, and actuarial gains or losses, are required to be presented separately outside of income or loss from operations. The presentation of service cost should be applied retrospectively. The guidance is effective for fiscal years beginning after December 15, 2017. Early adoption is permitted. This guidance will impact the presentation of Teradyne’s consolidated financial statements. Upon adoption of the new standard, Teradyne will present interest cost, amortization of prior service cost, and actuarial gains or losses within other (income) expense, net.

On January 26, 2017, the FASB issued ASU 2017-04, “*Intangibles—Goodwill and Other (Topic 350): Simplifying the Accounting for Goodwill Impairment.*” The new guidance removes Step 2 of the goodwill impairment test, which requires a hypothetical purchase price allocation. Goodwill impairment will now be the amount by which a reporting unit’s carrying value exceeds its fair value, not to exceed the carrying amount of goodwill. All other goodwill impairment guidance will remain largely unchanged. Entities will continue to have the option to perform a qualitative assessment to determine if a quantitative impairment test is necessary. The same one-step impairment test will be applied to goodwill at all reporting units, even those with zero or negative carrying amounts. Entities will be required to disclose the amount of goodwill at reporting units with zero or negative carrying amounts. The revised guidance will be applied prospectively, and is effective in 2020. Early adoption is permitted for any impairment tests performed after January 1, 2017. Teradyne is currently evaluating the impact of this ASU on its financial position, results of operations and statements of cash flows.

In October 2016, the FASB issued ASU 2016-16, “*Accounting for Income Taxes: Intra-Entity Asset Transfers of Assets Other than Inventory.*” Under current Generally Accepted Accounting Principles (“GAAP”), the tax effects of intra-entity asset transfers are deferred until the transferred asset is sold to a third party or otherwise recovered through use. The new guidance requires recognition of the tax expense from the sale of the asset in the seller’s tax jurisdiction when the transfer occurs, even though the pre-tax effects of that transaction are eliminated in consolidation. Any deferred tax asset that arises in the buyer’s jurisdiction would also be recognized at the time of the transfer. The new guidance does not apply to intra-entity transfers of inventory. The income tax consequences from the sale of inventory from one member of a consolidated entity to another will continue to be deferred until the inventory is sold to a third party. The new guidance will be effective in fiscal years beginning after December 15, 2017. Early adoption is permitted. The modified retrospective approach will be required for transition to the new guidance, with a cumulative-effect adjustment recorded in retained earnings as of the beginning of the period of adoption. Teradyne does not expect this ASU to have a material impact on its financial position, results of operations and statements of cash flows.

In February 2016, the FASB issued ASU 2016-02, “*Leases (Topic 842).*” The guidance in this ASU supersedes the lease recognition requirements in ASC Topic 840, “*Leases.*” The new standard establishes a right-of-use (“ROU”) model that requires a lessee to record an ROU asset and a lease liability on the balance sheet for all leases with terms longer than twelve months. Leases will be classified as either finance or operating, with classification affecting the pattern of expense recognition in the statements of operations. The new standard is effective for annual periods beginning after December 15, 2018 with early adoption permitted. A modified retrospective transition approach is required for lessees for capital and operating leases existing at, or entered into after, the beginning of the earliest comparative period presented in the financial statements. Teradyne is currently evaluating the impact of this ASU on its financial position and results of operations.

In January 2016, the FASB issued ASU 2016-01, “*Financial Instruments—Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities.*” This ASU provides guidance for the recognition, measurement, presentation, and disclosure of financial instruments. The new pronouncement revises accounting related to equity investments and the presentation of certain fair value changes for financial liabilities measured at fair value. Among other things, it amends the presentation and disclosure requirements of equity securities that do not result in consolidation and are not accounted for under the equity method. Changes in the fair value of these equity securities will be recognized directly in net income. This pronouncement is effective for fiscal years beginning after December 15, 2017. Teradyne is currently evaluating the impact of this ASU on its financial position and results of operations.

In May 2014, the FASB issued ASU 2014-09, “*Revenue from Contracts with Customers (Topic 606),*” which will replace numerous requirements in U.S. GAAP, including industry-specific requirements, and provide companies with a single revenue recognition model for recognizing revenue from contracts with customers. The core principle of the new standard is that a company should recognize revenue to show the transfer of promised goods or services to customers in an amount that reflects the consideration to which the company expects to be entitled to in exchange for those goods or services. In August 2015, FASB issued ASU 2015-14, which deferred the effective date of the new revenue standard by one year. For Teradyne, the standard will be effective in the first quarter of 2018. The two permitted transition methods under the new standard are the full retrospective method, in which case the standard would be applied to each prior reporting period presented, or the modified retrospective method, in which case the cumulative effect of applying the standard would be recognized in retained earnings at the date of initial application. Teradyne has selected the modified retrospective transition method. Teradyne has completed its preliminary assessment of the financial statement impact of the new standard and expects that the cumulative effect adjustment recognized to retained earnings on January 1, 2018 will be approximately \$12 million, primarily as a result of recognizing revenues for software licenses at the time of delivery since the Vendor Specific Objective Evidence (“VSOE”) requirement for undelivered elements such as post-contract support is eliminated. Companies are allowed to use established or best estimate selling price for the undelivered element to allocate and defer the revenue. As a result, Teradyne will recognize as revenue upon delivery of the software and defer a portion of the sales price for the estimated selling price of post-contract

support, compared to the current practice of recognizing the entire sales price ratably over the term of the post-contract support period due to the lack of VSOE. The \$12 million adjustment to retained earnings reflects acceleration of approximately \$16 million in revenues net of less than \$1 million in cost of revenues and approximately \$3 million of income tax expense. This preliminary assessment is based on a review of the types and number of revenue arrangements in place, including the review of individual customer contracts. Based on Teradyne's preliminary assessment, Teradyne does not expect any major changes to be made to existing accounting systems or internal controls.

D. ACQUISITIONS

Business

Universal Robots

On June 11, 2015, Teradyne acquired all of the outstanding equity of Universal Robots located in Odense, Denmark. Universal Robots is the leading supplier of collaborative robots which are low-cost, easy-to-deploy and simple-to-program robots that work side by side with production workers to improve quality, increase manufacturing efficiency and decrease manufacturing costs. Universal Robots is a separate operating and reportable segment, Industrial Automation. The total purchase price of \$315.4 million consisted of \$283.8 million of cash paid and \$31.6 million of contingent consideration, measured at fair value. The contingent consideration was valued using a Monte Carlo simulation based on the following key inputs: (1) forecasted revenue; (2) forecasted EBITDA; (3) revenue volatility; (4) EBITDA volatility; and (5) discount rate. The contingent consideration is payable upon the achievement of certain thresholds and targets for earnings before income taxes, depreciation and amortization ("EBITDA") for calendar year 2015, revenue for the period from July 1, 2015 to December 31, 2017 and revenue for the period from July 1, 2015 to December 31, 2018. The maximum amount of contingent consideration that could be paid is \$65 million. Based on Universal Robots' calendar 2015 EBITDA results, Teradyne paid \$15 million or 100% of the eligible EBITDA contingent consideration amount in the first quarter of 2016. The contingent consideration related to revenue for the period from July 1, 2015 to December 31, 2017 in the amount of \$24.5 million is expected to be paid in March 2018. The maximum payment for the remaining Universal Robots earn-out is \$25.0 million.

The Universal Robots acquisition was accounted for as a business combination and, accordingly, the results have been included in Teradyne's consolidated results of operations from the date of acquisition. The allocation of the total purchase price to Universal Robots' net tangible liabilities and identifiable intangible assets was based on their estimated fair values as of the acquisition date. The excess of the purchase price over the identifiable intangible assets and net tangible liabilities in the amount of \$221.1 million was allocated to goodwill, which is not deductible for tax purposes.

The following table represents the final allocation of the purchase price:

	<u>Purchase Price Allocation</u> (in thousands)
Goodwill	\$221,128
Intangible assets	121,590
Tangible assets acquired and liabilities assumed:	
Current assets	10,853
Non-current assets	3,415
Accounts payable and current liabilities	(11,976)
Long-term deferred tax liabilities	(26,653)
Long-term other liabilities	(2,920)
Total purchase price	<u>\$315,437</u>

Teradyne estimated the fair value of intangible assets using the income and cost approaches. Acquired intangible assets are amortized on a straight-line basis over their estimated useful lives. Components of these intangible assets and their estimated useful lives at the acquisition date are as follows:

	<u>Fair Value</u> (in thousands)	<u>Estimated Useful</u> <u>Life</u> (in years)
Developed technology	\$ 89,240	4.9
Trademarks and tradenames	22,920	10.0
Customer relationships	<u>9,430</u>	2.0
Total intangible assets	<u>\$121,590</u>	5.6

For the period from June 12, 2015 to December 31, 2015, Universal Robots contributed \$41.9 million of revenues and had a \$7.6 million loss before income taxes.

The following unaudited pro forma information gives effect to the acquisition of Universal Robots as if the acquisition occurred on January 1, 2014. The unaudited pro forma results are not necessarily indicative of what actually would have occurred had the acquisition been in effect for the periods presented:

	<u>For the Year Ended</u> <u>December 31, 2015</u> (in thousands, except per share amounts)
Revenue	\$1,657,626
Net income	\$ 199,784
Net income per common share:	
Basic	<u>\$ 0.94</u>
Diluted	<u>\$ 0.94</u>

Pro forma results for the year ended December 31, 2015 were adjusted to exclude \$1.6 million of non-recurring expense related to the fair value adjustment to acquisition-date inventory and \$1.0 million of acquisition related costs incurred in 2015.

E. INVENTORIES

Inventories, net consisted of the following at December 31, 2017 and 2016:

	<u>2017</u>	<u>2016</u>
	(in thousands)	
Raw material	\$ 62,668	\$ 58,530
Work-in-process	19,464	22,946
Finished Goods	<u>25,393</u>	<u>54,482</u>
	<u>\$107,525</u>	<u>\$135,958</u>

Inventory reserves for the years ended December 31, 2017 and 2016 were \$102.9 million and \$116.0 million, respectively.

F. PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment, net consisted of the following at December 31, 2017 and 2016:

	<u>2017</u>	<u>2016</u>
	(in thousands)	
Land	\$ 16,561	\$ 16,561
Buildings	98,369	98,031
Machinery and equipment	647,961	601,835
Furniture and fixtures, and software	88,539	82,897
Leasehold improvements	49,540	46,612
Construction in progress	13,522	3,032
	<u>914,492</u>	<u>848,968</u>
Less: accumulated depreciation	646,045	595,147
	<u>\$268,447</u>	<u>\$253,821</u>

Depreciation of property, plant and equipment for the years ended December 31, 2017, 2016, and 2015 was \$66.1 million, \$64.8 million, and \$68.2 million, respectively. As of December 31, 2017 and 2016, the gross book value included in machinery and equipment for internally manufactured test systems being leased by customers was \$18.1 million and \$19.4 million, respectively. As of December 31, 2017 and 2016, the accumulated depreciation on these test systems was \$13.7 million and \$10.5 million, respectively.

G. FINANCIAL INSTRUMENTS

Cash Equivalents

Teradyne considers all highly liquid investments with maturities of three months or less at the date of acquisition to be cash equivalents.

Marketable Securities

Teradyne's available-for-sale securities are classified as Level 1 and Level 2. Contingent consideration is classified as Level 3. The vast majority of Level 2 securities are fixed income securities priced by third party pricing vendors. These pricing vendors utilize the most recent observable market information in pricing these securities or, if specific prices are not available, use other observable inputs like market transactions involving identical or comparable securities.

Realized gains recorded in 2017, 2016, and 2015 were \$1.1 million, \$1.6 million, and \$1.7 million, respectively. Realized losses recorded in 2017, 2016, and 2015 were \$0.3 million, \$0.5 million, and \$0.4 million, respectively. Realized gains are included in interest income, and realized losses are included in interest expense. Unrealized gains and losses are included in accumulated other comprehensive income (loss). The cost of securities sold is based on the specific identification method.

During the years ended December 31, 2017 and 2016, there were no transfers in or out of Level 1, Level 2 or Level 3 financial instruments.

The following table sets forth by fair value hierarchy Teradyne's financial assets and liabilities that were measured at fair value on a recurring basis as of December 31, 2017 and 2016:

	December 31, 2017			Total
	Quoted Prices in Active Markets for Identical Instruments (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	
	(in thousands)			
Assets				
Cash	\$197,955	\$ —	\$ —	\$ 197,955
Cash equivalents	206,335	25,553	—	231,888
Available for sale securities:				
U.S. Treasury securities	—	855,795	—	855,795
Commercial paper	—	282,840	—	282,840
Certificates of deposit and time deposits	—	167,342	—	167,342
Corporate debt securities	—	133,186	—	133,186
Equity and debt mutual funds	23,430	—	—	23,430
U.S. government agency securities	—	10,726	—	10,726
Non-U.S. government securities	—	586	—	586
	<u>\$427,720</u>	<u>\$1,476,028</u>	<u>\$ —</u>	<u>\$1,903,748</u>
Derivative assets	—	389	—	389
Total	<u>\$427,720</u>	<u>\$1,476,417</u>	<u>\$ —</u>	<u>\$1,904,137</u>
Liabilities				
Contingent consideration	\$ —	\$ —	\$45,102	\$ 45,102
Derivative liabilities	—	446	—	446
Total	<u>\$ —</u>	<u>\$ 446</u>	<u>\$45,102</u>	<u>\$ 45,548</u>

Reported as follows:

	(Level 1)	(Level 2)	(Level 3)	Total
	(in thousands)			
Assets				
Cash and cash equivalents	\$404,290	\$ 25,553	\$ —	\$ 429,843
Marketable securities	—	1,347,979	—	1,347,979
Long-term marketable securities	23,430	102,496	—	125,926
Prepayments	—	389	—	389
Total	<u>\$427,720</u>	<u>\$1,476,417</u>	<u>\$ —</u>	<u>\$1,904,137</u>
Liabilities				
Other current liabilities	\$ —	\$ 446	\$ —	\$ 446
Contingent consideration	—	—	24,497	24,497
Long-term contingent consideration	—	—	20,605	20,605
Total	<u>\$ —</u>	<u>\$ 446</u>	<u>\$45,102</u>	<u>\$ 45,548</u>

December 31, 2016

	Quoted Prices in Active Markets for Identical Instruments (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Total
	(in thousands)			
Assets				
Cash	\$214,722	\$ —	\$ —	\$ 214,722
Cash equivalents	37,458	55,704	—	93,162
Available for sale securities:				
U.S. Treasury securities	—	902,800	—	902,800
Commercial paper	—	161,630	—	161,630
Corporate debt securities	—	100,153	—	100,153
Certificates of deposit and time deposits	—	82,133	—	82,133
U.S. government agency securities	—	39,252	—	39,252
Equity and debt mutual funds	18,171	—	—	18,171
Non-U.S. government securities	—	728	—	728
	<u>\$270,351</u>	<u>\$1,342,400</u>	<u>\$ —</u>	<u>\$1,612,751</u>
Derivative assets	—	1	—	1
Total	<u><u>\$270,351</u></u>	<u><u>\$1,342,401</u></u>	<u><u>\$ —</u></u>	<u><u>\$1,612,752</u></u>
Liabilities				
Contingent consideration	\$ —	\$ —	\$38,332	\$ 38,332
Derivative liabilities	—	131	—	131
Total	<u><u>\$ —</u></u>	<u><u>\$ 131</u></u>	<u><u>\$38,332</u></u>	<u><u>\$ 38,463</u></u>

Reported as follows:

	(Level 1)	(Level 2)	(Level 3)	Total
	(in thousands)			
Assets				
Cash and cash equivalents	\$252,180	\$ 55,704	\$ —	\$ 307,884
Marketable securities	—	871,024	—	871,024
Long-term marketable securities	18,171	415,672	—	433,843
Prepayments	—	1	—	1
Total	<u><u>\$270,351</u></u>	<u><u>\$1,342,401</u></u>	<u><u>\$ —</u></u>	<u><u>\$1,612,752</u></u>
Liabilities				
Other current liabilities	\$ —	\$ 131	\$ —	\$ 131
Contingent consideration	—	—	1,050	1,050
Long-term contingent consideration	—	—	37,282	37,282
Total	<u><u>\$ —</u></u>	<u><u>\$ 131</u></u>	<u><u>\$38,332</u></u>	<u><u>\$ 38,463</u></u>

Changes in the fair value of Level 3 contingent consideration for the years ended December 31, 2017 and 2016 were as follows:

	<u>Contingent Consideration</u> (in thousands)
Balance at December 31, 2015	\$ 37,436
Payments (1)	(15,000)
Fair value adjustment of AIT (2)	550
Fair value adjustment of Universal Robots (2)	<u>15,346</u>
Balance at December 31, 2016	38,332
Payments (3)	(1,050)
Fair value adjustment of Universal Robots (4)	<u>7,820</u>
Balance at December 31, 2017	<u>\$ 45,102</u>

- (1) During the year ended December 31, 2016, based on Universal Robots' calendar year 2015 EBITDA results, Teradyne paid \$15 million or 100% of the eligible EBITDA contingent consideration amount.
- (2) During the year ended December 31, 2016, the fair value of contingent consideration for the earn-out in connection with the acquisition of Universal Robots was increased by \$15.3 million primarily due to an increase in forecasted revenues and a decrease in the discount rate. During the year ended 2016, the fair value of contingent consideration for the earn-out in connection with the acquisition of Avionics Interface Technologies, LLC ("AIT") was increased by \$0.6 million due to an increase in forecasted revenues.
- (3) During the year ended December 31, 2017, Teradyne paid \$1.1 million of contingent consideration for the earn-out in connection with the acquisition of AIT.
- (4) During the year ended December 31, 2017, the fair value of contingent consideration for the earn-out in connection with the acquisition of Universal Robots was increased by \$7.8 million primarily due to an increase in forecasted revenues and decrease in discount rate.

The following table provides quantitative information associated with the fair value measurement of Teradyne's Level 3 financial instrument:

<u>Liability</u>	<u>December 31, 2017 Fair Value</u>	<u>Valuation Technique</u>	<u>Unobservable Inputs</u>	<u>Weighted Average</u>
	(in thousands)			
Contingent consideration (Universal Robots)	\$24,497(1) \$20,605	Monte Carlo simulation	Revenue for the period July 1, 2015—December 31, 2018 volatility Discount Rate	11.2% 3.3%

- (1) Contingent consideration of \$24.5 million is expected to be paid in March 2018.

As of December 31, 2017, the significant unobservable inputs used in the Monte Carlo simulation to fair value the Universal Robots contingent consideration include forecasted revenues, revenue volatility and discount rate. Increases or decreases in the inputs would result in a higher or lower fair value measurement. The maximum payment for the remaining Universal Robots earn-out is \$25.0 million.

The carrying amounts and fair values of financial instruments at December 31, 2017 and 2016 were as follows:

	December 31, 2017		December 31, 2016	
	Carrying Value	Fair Value	Carrying Value	Fair Value
	(in thousands)			
Assets				
Cash and cash equivalents	\$ 429,843	\$ 429,843	\$ 307,884	\$ 307,884
Marketable securities	1,473,905	1,473,905	1,304,867	1,304,867
Derivative assets	389	389	1	1
Liabilities				
Contingent consideration	45,102	45,102	38,332	38,332
Derivative liabilities	446	446	131	131
Convertible debt (1)	365,987	659,525	352,669	486,754

(1) The carrying value represents the bifurcated debt component only, while the fair value is based on quoted market prices for the convertible note which includes the equity conversion features.

The fair values of accounts receivable, net and accounts payable approximate the carrying amount due to the short term nature of these instruments.

The following tables summarize the composition of available for sale marketable securities at December 31, 2017 and 2016:

	December 31, 2017				Fair Market Value of Investments with Unrealized Losses
	Cost	Unrealized Gain	Unrealized (Loss)	Fair Market Value	
	(in thousands)				
U.S. Treasury securities	\$ 858,258	\$ 72	\$(2,535)	\$ 855,795	\$ 850,163
Commercial paper	283,009	18	(187)	282,840	258,933
Certificates of deposit and time deposits	167,523	6	(187)	167,342	138,340
Corporate debt securities	131,179	2,380	(373)	133,186	91,010
Equity and debt mutual funds	19,403	4,102	(75)	23,430	1,723
U.S. government agency securities	10,775	—	(49)	10,726	10,726
Non-U.S. government securities	582	4	—	586	—
	<u>\$1,470,729</u>	<u>\$6,582</u>	<u>\$(3,406)</u>	<u>\$1,473,905</u>	<u>\$1,350,896</u>

Reported as follows:

	Cost	Unrealized Gain	Unrealized (Loss)	Fair Market Value	Fair Market Value of Investments with Unrealized Losses
		(in thousands)			
Marketable securities	\$1,349,970	\$ 38	\$(2,029)	\$1,347,979	\$1,288,844
Long-term marketable securities	120,759	6,544	(1,377)	125,926	62,052
	<u>\$1,470,729</u>	<u>\$6,582</u>	<u>\$(3,406)</u>	<u>\$1,473,905</u>	<u>\$1,350,896</u>

December 31, 2016

	Available-for-Sale			Fair Market Value	Fair Market Value of Investments with Unrealized Losses
	Cost	Unrealized Gain	Unrealized (Loss)		
	(in thousands)				
U.S. Treasury securities	\$ 904,737	\$ 97	\$(2,034)	\$ 902,800	\$572,284
Commercial paper	161,672	24	(66)	161,630	84,034
Corporate debt securities	99,708	1,065	(620)	100,153	53,642
Certificates of deposit and time deposits	82,080	54	(1)	82,133	7,760
U.S. government agency securities	39,264	7	(19)	39,252	13,461
Equity and debt mutual funds	16,505	1,724	(58)	18,171	1,661
Non-U.S. government securities	745	6	(23)	728	137
	<u>\$1,304,711</u>	<u>\$2,977</u>	<u>\$(2,821)</u>	<u>\$1,304,867</u>	<u>\$732,979</u>

Reported as follows:

	Cost	Unrealized Gain	Unrealized (Loss)	Fair Market Value	Fair Market Value of Investments with Unrealized Losses
		(in thousands)			
Marketable securities	\$ 871,321	\$ 134	\$ (431)	\$ 871,024	\$423,128
Long-term marketable securities	433,390	2,843	(2,390)	433,843	309,851
	<u>\$1,304,711</u>	<u>\$2,977</u>	<u>\$(2,821)</u>	<u>\$1,304,867</u>	<u>\$732,979</u>

As of December 31, 2017, the fair market value of investments with unrealized losses totaled \$1,350.9 million. Of this value, \$141.0 million had unrealized losses of \$1.2 million greater than one year and \$1,209.9 million had unrealized losses of \$2.2 million for less than one year.

As of December 31, 2016, the fair market value of investments with unrealized losses totaled \$733.0 million. Of this value, \$2.9 million had unrealized losses of \$0.3 million greater than one year and \$730.1 million had unrealized losses of \$2.5 million for less than one year.

Teradyne reviews its investments to identify and evaluate investments that have an indication of possible impairment. Based on this review, Teradyne determined that the unrealized losses related to these investments, at December 31, 2017 and 2016, were temporary.

The contractual maturities of investments held at December 31, 2017 were as follows:

	Cost	Fair Value
	(in thousands)	
Due within one year	\$1,349,970	\$1,347,979
Due after 1 year through 5 years	48,796	48,599
Due after 5 years through 10 years	13,916	13,489
Due after 10 years	38,644	40,408
Total	<u>\$1,451,326</u>	<u>\$1,450,475</u>

Contractual maturities of investments held at December 31, 2017 exclude \$23.4 million of equity and debt mutual funds as they do not have a contractual maturity date.

The following table sets forth by fair value hierarchy Teradyne's non-financial assets that were measured at fair value on a non-recurring basis as of July 3, 2016:

	July 3, 2016			Total	Total Losses
	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Other Unobservable Inputs (Level 3)		
	(in thousands)				
Assets					
Goodwill	\$—	\$—	\$ 7,976	\$ 7,976	\$254,946
Definite lived intangible assets	—	—	5,750	5,750	83,339
	<u>\$—</u>	<u>\$—</u>	<u>\$13,726</u>	<u>\$13,726</u>	<u>\$338,285</u>

- (1) In accordance with the provisions of ASC 350-20, "Goodwill", goodwill in the Wireless Test reporting unit with a carrying amount of \$262.9 million was written down in the second quarter of 2016 to its implied fair value of \$8.0 million, resulting in an impairment charge of \$254.9 million. See Note J: "Goodwill and Intangible Assets" regarding goodwill impairment.
- (2) In accordance with the provisions of ASC 360-10, "Property, Plant and Equipment", definite lived intangible assets in the Wireless Test reporting unit with a carrying amount of \$89.2 million were written down in the second quarter of 2016 to their implied fair value of \$5.8 million, resulting in an impairment charge of \$83.3 million. See Note J: "Goodwill and Intangible Assets" regarding definite lived intangible assets impairment.

Derivatives

Teradyne conducts business in a number of foreign countries, with certain transactions denominated in local currencies. The purpose of Teradyne's foreign currency management is to minimize the effect of exchange rate fluctuations on certain foreign currency denominated monetary assets and liabilities. Teradyne does not use derivative financial instruments for trading or speculative purposes.

To minimize the effect of exchange rate fluctuations associated with the remeasurement of monetary assets and liabilities denominated in foreign currencies, Teradyne enters into foreign currency forward contracts. The change in fair value of these derivatives is recorded directly in earnings, and is used to offset the change in value of the monetary assets and liabilities denominated in foreign currencies.

At December 31, 2017 and 2016, Teradyne had the following contracts to buy and sell non-U.S. currencies for U.S. dollars and other non-U.S. currencies with the following notional amounts:

	December 31, 2017			December 31, 2016		
	Buy Position	Sell Position	Net Total	Buy Position	Sell Position	Net Total
	(in millions)					
Japanese Yen	\$(35.7)	\$ —	\$(35.7)	\$(17.7)	\$ —	\$(17.7)
Taiwan Dollar	(9.9)	—	(9.9)	(6.9)	—	(6.9)
Korean Won	(8.9)	—	(8.9)	(8.8)	—	(8.8)
British Pound Sterling	(1.4)	—	(1.4)	(1.3)	—	(1.3)
Singapore Dollar	—	33.5	33.5	—	24.0	24.0
Euro	—	27.4	27.4	—	25.2	25.2
Total	<u>\$(55.9)</u>	<u>\$60.9</u>	<u>\$ 5.0</u>	<u>\$(34.7)</u>	<u>\$49.2</u>	<u>\$ 14.5</u>

The fair value of the outstanding contracts was a loss of \$0.1 million, at December 31, 2017 and 2016.

Gains and losses on foreign currency forward contracts and foreign currency remeasurement gains and losses on monetary assets and liabilities are included in other (income) expense, net.

The following table summarizes the fair value of derivative instruments as of December 31, 2017 and 2016:

	<u>Balance Sheet Location</u>	<u>2017</u>	<u>2016</u>
		(in thousands)	
Derivatives not designated as hedging instruments:			
Foreign exchange contracts	Prepayments	\$ 389	\$ 1
Foreign exchange contracts	Other current liabilities	(446)	(131)
Total derivatives		<u>\$ (57)</u>	<u>\$(130)</u>

The following table summarizes the effect of derivative instruments in the statements of operations recognized for the years ended December 31, 2017, 2016, and 2015.

	<u>Location of (Gains) Losses Recognized in Statement of Operations</u>	<u>2017</u>	<u>2016</u>	<u>2015</u>
		(in thousands)		
Derivatives not designated as hedging instruments:				
Foreign exchange contracts	Other (income) expense, net	<u>\$(1,133)</u>	<u>\$8,671</u>	<u>\$3,047</u>

- (1) The table does not reflect the corresponding gains and losses from the remeasurement of the monetary assets and liabilities denominated in foreign currencies.
- (2) For the year ended December 31, 2017, net losses from the remeasurement of monetary assets and liabilities denominated in foreign currencies were \$2.9 million.
- (3) For the years ended December 31, 2016, and 2015, net gains from the remeasurement of the monetary assets and liabilities denominated in foreign currencies were \$8.0 million and \$2.5 million, respectively.

See Note H: "Debt" regarding derivatives related to the convertible senior notes.

Concentration of Credit Risk

Financial instruments which potentially subject Teradyne to concentrations of credit risk consist principally of cash equivalents, marketable securities, forward currency contracts and accounts receivable. Teradyne's cash equivalents consist primarily of money market funds invested in U.S. Treasuries and government agencies. Teradyne's fixed income available-for-sale marketable securities have a minimum rating of AA by one or more of the major credit rating agencies. Teradyne places foreign currency forward contracts with high credit-quality financial institutions in order to minimize credit risk exposure. Concentrations of credit risk with respect to accounts receivable are limited due to the large number of geographically dispersed customers. Teradyne performs ongoing credit evaluations of its customers' financial condition and from time to time may require customers to provide a letter of credit from a bank to secure accounts receivable. There were no customers who accounted for more than 10% of Teradyne's accounts receivable balance as of December 31, 2017 and December 31, 2016.

Equity Interest

On November 1, 2013, in connection with the acquisition of Empirix, Inc. by Thoma Bravo LLC, Teradyne sold its equity interest in Empirix, Inc., a private company, and received cash proceeds of \$34.2 million which was recorded as a gain in other (income) expense, net in the fourth quarter of 2013. An additional \$5.4 million of cash proceeds that was held in escrow for 15 months, for potential indemnifications to the buyer, was paid to Teradyne in February 2015 and it was recorded as a gain in other (income) expense, net in the first quarter of 2015.

H. DEBT

Convertible Senior Notes

On December 12, 2016, Teradyne completed a private offering of \$460.0 million aggregate principal amount of 1.25% convertible senior unsecured notes (the “Notes”) due December 15, 2023 and received net proceeds, after issuance costs, of approximately \$450.8 million, \$33.0 million of which was used to pay the net cost of the convertible note hedge transactions and \$50.1 million of which was used to repurchase 2.0 million shares of Teradyne’s common stock under its existing stock repurchase program from purchasers of the Notes in privately negotiated transactions effected through one of the initial purchasers or its affiliates conducted concurrently with the pricing of the Note offering. The Notes will mature on December 15, 2023, unless earlier repurchased or converted. The Notes bear interest from December 12, 2016 at a rate of 1.25% per year payable semiannually in arrears on June 15 and December 15 of each year, beginning on June 15, 2017. The Notes will be convertible at the option of the noteholders at any time prior to the close of business on the business day immediately preceding September 15, 2023, only under the following circumstances: (1) during any calendar quarter beginning after March 31, 2017 (and only during such calendar quarter), if the closing sale price of Teradyne’s common stock, for at least 20 trading days (whether or not consecutive) during a period of 30 consecutive trading days ending on the last trading day of the immediately preceding calendar quarter is greater than 130% of the conversion price on each applicable trading day; (2) during the five business day period after any five consecutive trading day period (the “measurement period”) in which the trading price (as defined in the Indenture) per \$1,000 principal amount of Notes for each trading day of the measurement period was less than 98% of the product of the closing sale price of the Teradyne’s common stock and the conversion rate on each such trading day; and (3) upon the occurrence of specified corporate events. On or after September 15, 2023 until the close of business on the second scheduled trading day immediately preceding the maturity date, holders may convert their Notes at any time, regardless of the foregoing circumstances. Teradyne may satisfy its conversion obligation by paying or delivering cash, shares of its common stock or a combination of cash and shares of its common stock, at Teradyne’s election. As of December 31, 2017, the conversion price was approximately \$31.80 per share of Teradyne’s common stock. The conversion rate is subject to adjustment under certain circumstances.

Concurrent with the offering of the Notes, Teradyne entered into convertible note hedge transactions (the “Note Hedge Transactions”) with the initial purchasers or their affiliates (the “Option Counterparties”). The Note Hedge Transactions cover, subject to customary anti-dilution adjustments, the number of shares of the common stock that underlie the Notes, with a strike price equal to the conversion price of the Notes of \$31.80. The Note Hedge Transactions cover, subject to customary antidilution adjustments, approximately 14.5 million shares of Teradyne’s common stock.

Separately and concurrent with the pricing of the Notes, Teradyne entered into warrant transactions with the Option Counterparties (the “Warrant Transactions”) in which it sold net-share-settled (or, at its election subject to certain conditions, cash-settled) warrants to the Option Counterparties. The Warrant Transactions cover, subject to customary antidilution adjustments, approximately 14.5 million shares of common stock. As of December 31, 2017, the strike price of the warrants was approximately \$39.91 per share. The strike price is subject to adjustment under certain circumstances. The Warrant Transactions could have a dilutive effect to Teradyne’s common stock to the extent that the market price per share of Teradyne’s common stock, as measured under the terms of the Warrant Transactions, exceeds the applicable strike price of the warrants.

The Note Hedge Transactions are expected to reduce the potential dilution to Teradyne’s common stock upon any conversion of the Notes. However, the Warrant Transactions could separately have a dilutive effect to the extent that the market value per share of Teradyne’s common stock exceeds the applicable strike price of the warrant. The net cost of the Note Hedge Transactions, after being partially offset by the proceeds from the sale of the warrants, was approximately \$33.0 million.

In connection with establishing their initial hedge of these convertible note hedge and warrant transactions, the Option Counterparties have entered into various derivative transactions with respect to Teradyne's common stock and/or purchased shares of Teradyne's common stock or other securities, including the Notes, concurrent with, or shortly after, the pricing of the Notes. In addition, the Option Counterparties may modify their hedge positions by entering into or unwinding various derivative transactions with respect to Teradyne's common stock or by selling Teradyne's common stock or other securities, including the Notes, in secondary market transactions (and may do so during any observation period related to the conversion of the Notes). These activities could adversely affect the value of Teradyne's common stock and the Notes.

Teradyne considered the guidance of ASC 815-40, "*Derivatives and Hedging—Contracts in Entity's Own Equity*," and concluded that the convertible note hedge is both indexed to Teradyne's stock and should be classified in stockholders' equity in its statements of financial position. The convertible note hedge is considered indexed to Teradyne's stock as the terms of the Note Hedge Transactions do not contain an exercise contingency and the settlement amount equals the difference between the fair value of a fixed number of Teradyne's shares and a fixed strike price. Because the only variable that can affect the settlement amount is Teradyne's stock price, which is an input to the fair value of a fixed-for-fixed option contract, the convertible note hedge is considered indexed to Teradyne's stock.

Teradyne assessed whether the convertible note hedge should be classified as equity under ASC 815-40. In the Note Hedge Transactions contract the settlement terms permit net cash settlement or net share settlement, at the option of Teradyne. Therefore, the criteria as set forth in ASC 815-40 were evaluated by Teradyne. In reviewing the criteria, Teradyne noted the following: (1) the convertible note hedge does not require Teradyne to issue shares; (2) there is no requirement to net cash settle the convertible note hedge for failure to make timely filings with the SEC; (3) in the case of termination, the convertible note hedge is settled in the same consideration as the holders of the underlying stock; (4) the counterparty does not have rights that rank higher than those of a shareholder of the stock underlying the convertible note hedge; and (5) there is no requirement to post collateral. Based on its analysis of those criteria, Teradyne concluded that the convertible note hedge should be recorded in equity and no further adjustment should be made in future periods to adjust the value of the convertible note hedge.

Teradyne analyzed the Warrant Transactions under ASC 815-40, "*Derivatives and Hedging—Contracts in Entity's Own Equity*," and other relevant literature, and determined that it met the criteria for classification as an equity transaction and is considered indexed to Teradyne's stock. As a result, Teradyne recorded the proceeds from the warrants as an increase to additional paid-in capital. Teradyne does not recognize subsequent changes in fair value of the warrants in its financial statements.

The provisions of ASC 470-20, "*Debt with Conversion and Other Options*," are applicable to the Notes. ASC 470-20 requires Teradyne to separately account for the liability (debt) and equity (conversion feature) components of the Notes in a manner that reflects Teradyne's nonconvertible debt borrowing rate at the date of issuance when interest cost is recognized in subsequent periods. Teradyne allocated \$100.8 million of the \$460.0 million principal amount of the Notes to the equity component, which represents a discount to the debt and will be amortized to interest expense using the effective interest method through December 2023. Accordingly, Teradyne's effective annual interest rate on the Notes will be approximately 5.0%. The Notes are classified as long-term debt in the balance sheet based on their December 15, 2023 maturity date. Debt issuance costs of approximately \$7.2 million are being amortized to interest expense using the effective interest method over the seven year term of the Notes. As of December 31, 2017, debt issuance costs were approximately \$6.3 million.

The below tables represents the key components of Teradyne’s convertible senior notes:

	<u>December 31, 2017</u>	<u>December 31, 2016</u>
	(in thousands)	(in thousands)
Debt Principal	\$460,000	\$460,000
Unamortized discount	94,013	107,331
Net Carrying amount of convertible debt	<u>\$365,987</u>	<u>\$352,669</u>
	<u>For the year ended</u>	
	<u>December 31, 2017</u>	<u>December 31, 2016</u>
	(in thousands)	(in thousands)
Contractual interest expense on the coupon	\$ 5,734	\$303
Amortization of the discount component and debt issue fees recognized as interest expense	<u>13,318</u>	<u>688</u>
Total interest expense on the convertible debt	<u>\$19,052</u>	<u>\$991</u>

As of December 31, 2017, the unamortized discount was \$94.0 million, which will be amortized over six years using the effective interest rate method. The carrying amount of the equity component was \$100.8 million. As of December 31, 2017, the conversion price was approximately \$31.80 per share and if converted value of the notes was \$605.7 million.

Revolving Credit Facility

On April 27, 2015, Teradyne entered into a Credit Agreement (the “Credit Agreement”) with Barclays Bank PLC, as administrative agent and collateral agent, and the lenders party thereto. The Credit Agreement provides for a five-year, senior secured revolving credit facility of up to \$350 million (the “Credit Facility”). The Credit Agreement further provides that, subject to customary conditions, Teradyne may seek to obtain from existing or new lenders incremental commitments under the Credit Facility in an aggregate principal amount not to exceed \$150 million.

Proceeds from the Credit Facility may be used for general corporate purposes and working capital. Teradyne incurred \$2.3 million in costs related to the revolving credit facility. These costs are being amortized over the five-year term of the revolving credit facility and are included in interest expense in the statements of operations. As of March 1, 2018, Teradyne has not borrowed any funds under the Credit Facility.

The interest rates applicable to loans under the Credit Facility are, at Teradyne’s option, equal to either a base rate plus a margin ranging from 0.00% to 1.00% per annum or LIBOR plus a margin ranging from 1.00% to 2.00% per annum, based on the Consolidated Leverage Ratio of Teradyne and its Restricted Subsidiaries. In addition, Teradyne will pay a commitment fee on the unused portion of the commitments under the Credit Facility ranging from 0.125% to 0.350% per annum, based on the then applicable Consolidated Leverage Ratio.

Teradyne is not required to repay any loans under the Credit Facility prior to maturity, subject to certain customary exceptions. Teradyne is permitted to prepay all or any portion of the loans under the Credit Facility prior to maturity without premium or penalty, other than customary LIBOR breakage costs.

The Credit Agreement contains customary events of default, representations, warranties and affirmative and negative covenants that, among other things, limit Teradyne’s and its Restricted Subsidiaries’ ability to sell assets, grant liens on assets, incur other secured indebtedness and make certain investments and restricted payments, all subject to exceptions set forth in the Credit Agreement. The Credit Agreement also requires Teradyne to satisfy two financial ratios measured as of the end of each fiscal quarter: a consolidated leverage ratio and an interest coverage ratio. As of December 31, 2017, Teradyne was in compliance with all covenants.

The Credit Facility is guaranteed by certain of Teradyne’s domestic subsidiaries and collateralized by assets of Teradyne and such subsidiaries, including a pledge of 65% of the capital stock of certain foreign subsidiaries.

I. ACCUMULATED OTHER COMPREHENSIVE (LOSS) INCOME

Changes in accumulated other comprehensive (loss) income, which is presented net of tax, consists of the following:

	Foreign Currency Translation Adjustment	Unrealized Gains (Losses) on Marketable Securities	Retirement Plans Prior Service Credit	Total
	(in thousands)			
Balance at December 31, 2015, net of tax of \$0, (459), \$(622) ..	\$ (8,759)	\$(1,414)	\$2,029	\$ (8,144)
Other comprehensive (loss) income before reclassifications, net of tax of \$0, \$923, \$34	(13,162)	2,037	59	(11,066)
Amounts reclassified from accumulated other comprehensive income, net of tax of \$0, \$(255), \$(190)	—	(683)	(321)	(1,004)
Net current period other comprehensive (loss) income, net of tax of \$0, \$668, \$(156)	(13,162)	1,354	(262)	(12,070)
Balance at December 31, 2016, net of tax of \$0, \$209, \$(778) ..	(21,921)	(60)	1,767	(20,214)
Other comprehensive income before reclassifications, net of tax of \$0, \$1,903, \$0	37,840	1,863	—	39,703
Amounts reclassified from accumulated other comprehensive income, net of tax of \$0, \$(297), \$(154)	—	(441)	(272)	(713)
Net current period other comprehensive income, net of tax of \$0, \$1,606, \$(154)	37,840	1,422	(272)	38,990
Balance at December 31, 2017, net of tax of \$0, \$1,815, \$(932)	\$ 15,919	\$ 1,362	\$1,495	\$ 18,776

Reclassifications out of accumulated other comprehensive income to the statements of operations for the years ended December 31, 2017, 2016 and 2015, were as follows:

<u>Details about Accumulated Other Comprehensive Income Components</u>	<u>For the year ended</u>			<u>Affected Line Item in the Statements of Operations</u>
	<u>December 31, 2017</u>	<u>December 31, 2016</u>	<u>December 31, 2015</u>	
	(in thousands)			
Available-for-sale marketable securities				
Unrealized gains, net of tax of \$297, \$255, \$390	\$441	\$ 683	\$704	Interest income
Defined benefit pension and postretirement plans:				
Amortization of prior service benefit, net of tax of \$154, \$190, \$169	272	321	295	(a)
Total reclassifications, net of tax of \$451, \$445, \$559	\$713	\$1,004	\$999	Net income

(a) The amortization of prior service credit is included in the computation of net periodic pension cost and postretirement benefit; see Note N: “Retirement Plans.”

J. GOODWILL AND INTANGIBLE ASSETS

Goodwill

Teradyne performs its annual goodwill impairment test as required under the provisions of ASC 350-10, “*Intangibles—Goodwill and Other*,” on December 31 of each fiscal year unless interim indicators of impairment exist. Goodwill is considered to be impaired when the net book value of a reporting unit exceeds its estimated fair value.

Teradyne has the option to perform a qualitative assessment (“Step zero”) to determine whether it is more-likely-than-not that the fair value of a reporting unit is less than its carrying amount. If Teradyne determines this is the case, Teradyne is required to perform the two-step goodwill impairment test to identify potential goodwill impairment and measure the amount of goodwill impairment loss to be recognized. If Teradyne determines that it is more-likely-than-not that the fair value of the reporting unit is greater than its carrying amounts, the two-step goodwill impairment test is not required. When performing the two-step process, the first step involves a comparison of the estimated fair value of a reporting unit to its carrying amount, including goodwill. In performing the first step, Teradyne determines the fair value of a reporting unit using the results derived from an income approach and a market approach. The income approach is estimated through the discounted cash flow (“DCF”) analysis. Determining fair value requires the exercise of significant judgment, including judgments about appropriate discount rates, perpetual growth rates, and the amount and timing of expected future cash flows. Discount rates are based on a weighted average cost of capital (“WACC”), which represents the average rate a business must pay its providers of debt and equity, plus a risk premium. The WACC used to test goodwill is derived from a group of comparable companies. The cash flows employed in the DCF analysis are derived from internal forecasts and external market forecasts. The market approach estimates the fair value of the reporting unit by utilizing the market comparable method which is based on revenue and earnings multiples from comparable companies. If the estimated fair value of a reporting unit exceeds its carrying amount, goodwill of the reporting unit is not impaired and the second step of the impairment test is not necessary. If the carrying amount of a reporting unit exceeds its estimated fair value, then the second step of the goodwill impairment test must be performed. The second step of the goodwill impairment test compares the implied fair value of the reporting unit’s goodwill with its carrying amount of goodwill to measure the amount of impairment loss, if any. The implied fair value of goodwill is determined in the same manner as the amount of goodwill recognized in a business combination, whereby the estimated fair value of the reporting unit is allocated to all of the assets and liabilities of that unit (including any unrecognized intangible assets) as if the reporting unit had been acquired in a business combination and the fair value of the reporting unit was the purchase price paid. If the carrying amount of the reporting unit’s goodwill exceeds the implied fair value of that goodwill, an impairment loss is recognized in an amount equal to that excess.

In the second quarter of 2016, the Wireless Test reporting unit (which is Teradyne’s Wireless Test operating and reportable segment) reduced headcount by 11% as a result of a sharp decline in projected demand attributable to an estimated smaller future wireless test market. The decrease in projected demand was due to lower forecasted buying from Teradyne’s largest Wireless Test segment customer (who has contributed between 51% and 73% of annual Wireless Test sales since the LitePoint acquisition in 2011 through 2015) as a result of the customer’s numerous operational efficiencies; slower smartphone growth rates; and a slowdown of new wireless technology adoption. Teradyne considered the headcount reduction and sharp decline in projected demand to be a triggering event for an interim goodwill impairment test.

Teradyne allocated the fair value of the Wireless Test reporting unit to all of its assets and liabilities (including unrecognized intangible assets). The net book value of raw materials inventory was estimated as an approximation of current replacement costs. The fair value of finished goods inventory was estimated at the present value of selling price less direct selling costs and profit on the selling effort. The selling price used in the inventory fair values was based upon the product gross margins included in Teradyne’s forecast. The fair value of the deferred revenue liability was estimated by assessing the costs required to service the obligation plus a reasonable profit margin. The fair value for personal property assets, which consisted of furniture and fixtures,

machinery and equipment, computer equipment, software and leasehold improvements, was estimated using the replacement cost approach, which approximated carrying value. The fair value of intangible assets was estimated using the income approach and, in particular, developed technology and trademarks/trade names were valued using the relief-from-royalty method and customer relationships and customer backlog were valued using the discounted cash flow method. Royalty rates were estimated using rates applicable to wireless testing equipment and other similar technologies. Based upon this allocation, Teradyne determined that the Wireless Test reporting unit goodwill is valued at \$8.0 million and recorded an impairment loss of \$254.9 million in the second quarter of 2016.

In the fourth quarter of 2017, Teradyne performed the annual goodwill impairment test. Teradyne completed step one of the two-step impairment test for the Industrial Automation reporting unit. Teradyne completed step zero for the Wireless Test and Defense/Aerospace reporting units. There was no impairment as a result of the annual test performed in the fourth quarter of 2017.

In the fourth quarter of 2016, Teradyne performed the annual goodwill impairment test. Teradyne completed step one of the two-step impairment test for the Industrial Automation, Wireless Test and Defense/Aerospace reporting units. There was no impairment as a result of the annual test performed in the fourth quarter of 2016.

In 2015, Teradyne performed step one of the two-step impairment test for the Wireless Test and Defense/Aerospace reporting units and the step zero assessment for the Industrial Automation reporting unit. In 2015, there was no impairment.

The changes in the carrying amount of goodwill by reportable segments for the years ended December 31, 2017 and 2016 are as follows:

	<u>Industrial Automation</u>	<u>System Test</u>	<u>Wireless Test</u>	<u>Semiconductor Test</u>	<u>Total</u>
	(in thousands)				
Balance at December 31, 2015:					
Goodwill	\$214,975	\$ 158,699	\$ 361,819	\$ 260,540	\$ 996,033
Accumulated impairment losses	—	(148,183)	(98,897)	(260,540)	(507,620)
	214,975	10,516	262,922	—	488,413
Foreign currency translation adjustment	(10,124)	—	—	—	(10,124)
Goodwill impairment losses	—	—	(254,946)	—	(254,946)
Balance at December 31, 2016:					
Goodwill	204,851	158,699	361,819	260,540	985,909
Accumulated impairment losses	—	(148,183)	(353,843)	(260,540)	(762,566)
	204,851	10,516	7,976	—	223,343
Foreign currency translation adjustment	28,668	—	—	—	28,668
Balance at December 31, 2017:					
Goodwill	233,519	158,699	361,819	260,540	1,014,577
Accumulated impairment losses	—	(148,183)	(353,843)	(260,540)	(762,566)
	<u>\$233,519</u>	<u>\$ 10,516</u>	<u>\$ 7,976</u>	<u>\$ —</u>	<u>\$ 252,011</u>

Intangible Assets

Teradyne reviews long-lived assets for impairment whenever events or changes in business circumstances indicate that the carrying amount of the assets may not be fully recoverable or that the useful lives of these assets are no longer appropriate. As a result of the Wireless Test segment goodwill impairment review in the second quarter of 2016, Teradyne performed an impairment test of the Wireless Test segment's intangible and long-lived assets. The impairment test is based on a comparison of the estimated undiscounted cash flows to the carrying

value of the asset group. If undiscounted cash flows for the asset group are less than the carrying amount, the asset group is written down to its estimated fair value based on a discounted cash flow analysis. The cash flow estimates used to determine the impairment contain management's best estimates using appropriate assumptions and projections at that time. The fair value of intangible assets was estimated using the income approach and, in particular, developed technology and trademarks/trade names were valued using the relief-from-royalty method and customer relationships were valued using the discounted cash flow method. Royalty rates were estimated using rates applicable to wireless testing equipment and other similar technologies. As a result of the analysis, Teradyne recorded an \$83.3 million impairment charge in the second quarter of 2016 in acquired intangible assets impairment on the statements of operations, resulting in a remaining intangible assets balance of \$3.6 million at December 31, 2017, for the Wireless Test segment.

There were no events or circumstances indicating that the carrying value of intangible and long-lived assets may not be recoverable in 2017 and 2015.

Amortizable intangible assets consist of the following and are included in intangible assets, net on the balance sheets:

	December 31, 2017			
	Gross Carrying Amount	Accumulated Amortization	Foreign Currency Translation Adjustment	Net Carrying Amount
	(in thousands)			
Developed technology	\$270,877	\$(226,190)	\$1,618	\$46,305
Customer relationships	92,741	(83,585)	171	9,327
Tradenames and trademarks	50,100	(27,120)	416	23,396
Non-compete agreement	320	(260)	—	60
Total intangible assets	<u>\$414,038</u>	<u>\$(337,155)</u>	<u>\$2,205</u>	<u>\$79,088</u>

	December 31, 2016			
	Gross Carrying Amount	Accumulated Amortization	Foreign Currency Translation Adjustment	Net Carrying Amount
	(in thousands)			
Developed technology	\$270,877	\$(206,376)	\$(5,093)	\$ 59,408
Customer relationships	92,741	(76,707)	(538)	15,496
Tradenames and trademarks	50,100	(23,435)	(1,308)	25,357
Non-compete agreement	320	(180)	—	140
Total intangible assets	<u>\$414,038</u>	<u>\$(306,698)</u>	<u>\$(6,939)</u>	<u>\$100,401</u>

Aggregate intangible assets amortization expense for the years ended December 31, 2017, 2016, and 2015 was \$30.5 million, \$52.6 million, and \$69.0 million, respectively. Estimated intangible assets amortization expense for each of the five succeeding fiscal years is as follows:

Year	Amortization Expense
	(in thousands)
2018	\$29,496
2019	25,533
2020	11,249
2021	3,732
2022	2,927
Thereafter	6,151

K. COMMITMENTS AND CONTINGENCIES

Purchase Commitments

As of December 31, 2017, Teradyne had entered into non-cancelable purchase commitments for certain components and materials. The purchase commitments covered by the agreements aggregate to approximately \$280.4 million, of which \$271.1 million is for less than one year.

Commitments

Teradyne leases certain of its office buildings and other facilities under various operating lease arrangements that include renewal options and escalation clauses for adjusting rent payments to reflect changes in price indices. Rental expense for leases with fixed escalation clauses is recognized on a straight line basis over the lease term.

Rental expense for the years ended December 31, 2017, 2016, and 2015 was \$20.2 million, \$19.1 million, and \$16.2 million, respectively.

The following table reflects Teradyne's non-cancelable operating lease commitments:

	Non-cancelable Lease Commitments
	(in thousands)
2018	\$17,560
2019	14,355
2020	11,851
2021	9,201
2022	7,331
Beyond 2023	7,425
Total	<u>\$67,723</u>

Legal Claims

Teradyne is subject to legal proceedings, claims and investigations that arise in the ordinary course of business such as, but not limited to, patent, employment, commercial and environmental matters. Teradyne believes that it has meritorious defenses against all pending claims and intends to vigorously contest them. While it is not possible to predict or determine the outcomes of any pending claims or to provide possible ranges of losses that may arise, Teradyne believes the potential losses associated with all of these actions are unlikely to have a material adverse effect on its business, financial position or results of operations.

Guarantees and Indemnification Obligations

Teradyne provides indemnification, to the extent permitted by law, to its officers, directors, employees and agents for liabilities arising from certain events or occurrences while the officer, director, employee, or agent, is or was serving, at Teradyne's request in such capacity. Teradyne has entered into indemnification agreements with certain of its officers and directors. With respect to acquisitions, Teradyne provides indemnifications to or assumes indemnification obligations for the current and former directors, officers and employees of the acquired companies in accordance with the acquired companies' by-laws and charter. As a matter of practice, Teradyne has maintained directors' and officers' liability insurance coverage including coverage for directors and officers of acquired companies.

Teradyne enters into agreements in the ordinary course of business with customers, resellers, distributors, integrators and suppliers. Most of these agreements require Teradyne to defend and/or indemnify the other party against intellectual property infringement claims brought by a third party with respect to Teradyne's products. From time to time, Teradyne also indemnifies customers and business partners for damages, losses and liabilities they may suffer or incur relating to personal injury, personal property damage, product liability, breach of confidentiality obligations and environmental claims relating to the use of Teradyne's products and services or resulting from the acts or omissions of Teradyne, its employees, authorized agents or subcontractors. On occasion, Teradyne has also provided guarantees to customers regarding the delivery and performance of its products in addition to the warranty described below.

As a matter of ordinary business course, Teradyne warrants that its products will substantially perform in accordance with its standard published specifications in effect at the time of delivery. Most warranties have a one-year duration commencing from installation. A provision is recorded upon revenue recognition to cost of revenue for estimated warranty expense based upon historical experience. When Teradyne receives revenue for extended warranties beyond the standard duration, it is deferred and recognized on a straight line basis over the contract period. Related costs are expensed as incurred. As of December 31, 2017 and 2016, Teradyne had a product warranty accrual of \$8.2 million and \$7.2 million, respectively, included in other accrued liabilities, and revenue deferrals related to extended warranties of \$24.4 million and \$28.2 million, respectively, included in short and long-term deferred revenue and customer advances.

In addition, and in the ordinary course of business, Teradyne provides minimum purchase guarantees to certain vendors to ensure continuity of supply against the market demand. Although some of these guarantees provide penalties for cancellations and/or modifications to the purchase commitments as the market demand decreases, most of the guarantees do not. Therefore, as the market demand decreases, Teradyne re-evaluates these guarantees and determines what charges, if any, should be recorded.

With respect to its agreements covering product, business or entity divestitures and acquisitions, Teradyne provides certain representations, warranties and covenants to purchasers and agrees to indemnify and hold such purchasers harmless against breaches of such representations, warranties and covenants. Many of the indemnification claims have a definite expiration date while some remain in force indefinitely. With respect to its acquisitions, Teradyne may, from time to time, assume the liability for certain events or occurrences that took place prior to the date of acquisition.

As a matter of ordinary course of business, Teradyne occasionally guarantees certain indebtedness obligations of its subsidiary companies, limited to the borrowings from financial institutions, purchase commitments to certain vendors, and lease commitments to landlords.

Based on historical experience and information known as of December 31, 2017 and 2016, except for product warranty, Teradyne has not recorded any liabilities for these guarantees and obligations because the amount would be immaterial.

L. NET INCOME (LOSS) PER COMMON SHARE

The following table sets forth the computation of basic and diluted net income (loss) per common share:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
	<u>(in thousands, except per share amounts)</u>		
Net income (loss) for basic and diluted net income per share	<u>\$257,692</u>	<u>\$ (43,421)</u>	<u>\$206,477</u>
Weighted average common shares-basic	198,069	202,578	211,544
Effect of dilutive potential common shares:			
Restricted stock units	1,800	—	1,130
Incremental shares from assumed conversion of convertible notes (1)	1,298	—	—
Stock options	335	—	606
Convertible note hedge warrant shares (2)	112	—	—
Employee stock purchase rights	<u>27</u>	<u>—</u>	<u>41</u>
Dilutive potential common shares	<u>3,572</u>	<u>—</u>	<u>1,777</u>
Weighted average common shares-diluted	<u>201,641</u>	<u>202,578</u>	<u>213,321</u>
Net income (loss) per common share-basic	<u>\$ 1.30</u>	<u>\$ (0.21)</u>	<u>\$ 0.98</u>
Net income (loss) per common share-diluted	<u>\$ 1.28</u>	<u>\$ (0.21)</u>	<u>\$ 0.97</u>

- (1) Incremental shares from the assumed conversion of the convertible notes was calculated using the difference between the average Teradyne stock price for the period and the conversion price of \$31.80, multiplied by 14.5 million shares. The result of this calculation, representing the total intrinsic value of the convertible debt, was divided by the average Teradyne stock price for the period.
- (2) Convertible notes hedge warrant shares were calculated using the difference between the average Teradyne stock price for the period and the warrant price of \$39.91, multiplied by 14.5 million shares. The result of this calculation, representing the total intrinsic value of the warrant, was divided by the average Teradyne stock price for the period. Teradyne's call option on its common stock (convertible note hedge transaction) was excluded from the calculation of diluted shares because the effect was anti-dilutive.

The computation of diluted net income per common share for 2017 excludes the effect of the potential exercise of stock options to purchase approximately 0.1 million shares because the effect would have been anti-dilutive.

The computation of diluted net loss per common share for 2016 excludes the effect of the potential exercise of all outstanding stock options and restricted stock units because Teradyne had a net loss and inclusion would be anti-dilutive.

The computation of diluted net income per common share for 2015 excludes the effect of the potential exercise of stock options to purchase approximately 0.2 million shares because the effect would have been anti-dilutive.

M. RESTRUCTURING AND OTHER

During the year ended December 31, 2017, Teradyne recorded an expense of \$7.8 million for the increase in the fair value of the Universal Robots contingent consideration liability, \$3.8 million of severance charges related to headcount reduction of 91 people, of which 75 people were in Semiconductor Test, and 8 people each in Industrial Automation and in Corporate, \$1.1 million for an impairment of fixed assets in Semiconductor Test, \$1.0 million for a lease impairment of a Wireless Test facility in Sunnyvale, CA, which was terminated in September 2017, and \$0.8 million of expenses related to an earthquake in Kumamoto, Japan, partially offset by \$5.1 million of property insurance recovery related to the Japan earthquake.

During the year ended December 31, 2016, Teradyne recorded an expense of \$15.9 million for the increase in the fair value of the contingent consideration liability, of which \$15.3 million was related to Universal Robots and \$0.6 million was related to AIT, \$6.0 million of severance charges related to headcount reductions of 146 people, of which 102 people were in Wireless Test and 44 people were in Semiconductor Test, \$4.2 million for an impairment of fixed assets, and \$0.9 million for expenses related to an earthquake in Kumamoto, Japan, partially offset by \$5.1 million of property insurance recovery related to the Japan earthquake.

During the year ended December 31, 2015, Teradyne recorded an expense of \$5.3 million for the increase in the fair value of the Universal Robots contingent consideration liability, \$1.5 million of severance charges related to headcount reductions of 23 people primarily in System Test and Semiconductor Test, and \$1.0 million for acquisition costs related to Universal Robots, partially offset by a \$2.9 million gain from fair value adjustments to decrease the acquisition contingent consideration liability, of which \$1.6 million was related to ZTEC and \$1.3 million was related to AIT.

The remaining accrual for severance of \$1.4 million is reflected in the accrued employees' compensation and withholdings on the balance sheet and is expected to be paid by December 2018.

N. RETIREMENT PLANS

ASC 715, "*Compensation—Retirement Benefits*," requires an employer with defined benefit plans or other postretirement benefit plans to recognize an asset or a liability on its balance sheet for the overfunded or underfunded status of the plans as defined by ASC 715. The pension asset or liability represents a difference between the fair value of the pension plan's assets and the projected benefit obligation at December 31. Teradyne uses a December 31 measurement date for all of its plans.

Defined Benefit Pension Plans

Teradyne has defined benefit pension plans covering a portion of domestic employees and employees of certain non-U.S. subsidiaries. Benefits under these plans are based on employees' years of service and compensation. Teradyne's funding policy is to make contributions to the plans in accordance with local laws and to the extent that such contributions are tax deductible. The assets of these plans consist primarily of fixed income and equity securities. In addition, Teradyne has an unfunded supplemental executive defined benefit plan in the United States to provide retirement benefits in excess of levels allowed by the Employment Retirement Income Security Act ("ERISA") and the Internal Revenue Code (the "IRC"), as well as unfunded qualified foreign plans.

The December 31 balances of these defined benefit pension plans assets and obligations are shown below:

	2017		2016	
	United States	Foreign	United States	Foreign
	(in thousands)			
Assets and Obligations				
Change in benefit obligation:				
Projected benefit obligation:				
Beginning of year	\$353,616	\$ 60,738	\$351,117	\$ 62,290
Service cost	2,239	818	2,302	761
Interest cost	13,151	852	13,630	1,185
Actuarial loss	12,702	262	6,053	5,621
Benefits paid	(18,682)	(994)	(19,486)	(1,385)
Settlements	—	(28,560)	—	—
Expenses paid	—	(40)	—	(609)
Non-U.S. currency movement	—	6,277	—	(7,125)
End of year	<u>363,026</u>	<u>39,353</u>	<u>353,616</u>	<u>60,738</u>
Change in plan assets:				
Fair value of plan assets:				
Beginning of year	307,304	27,571	298,404	28,141
Company contributions	4,462	883	4,489	867
Actual return on plan assets	31,422	737	23,897	5,142
Benefits paid	(18,682)	(994)	(19,486)	(1,148)
Settlements	—	(28,560)	—	—
Expenses paid	—	(40)	—	(609)
Non-U.S. currency movement	—	1,710	—	(4,822)
End of year	<u>324,506</u>	<u>1,307</u>	<u>307,304</u>	<u>27,571</u>
Funded status	<u>\$ (38,520)</u>	<u>\$ (38,046)</u>	<u>\$ (46,312)</u>	<u>\$ (33,167)</u>

The following table provides amounts recorded within the account line items of the statements of financial position as of December 31:

	2017		2016	
	United States	Foreign	United States	Foreign
	(in thousands)			
Retirement plans assets	\$ 17,491	\$ —	\$ 7,712	\$ —
Accrued employees' compensation and withholdings	(2,524)	(863)	(2,591)	(772)
Retirement plans liabilities	(53,487)	(37,183)	(51,433)	(32,395)
Funded status	<u>\$ (38,520)</u>	<u>\$ (38,046)</u>	<u>\$ (46,312)</u>	<u>\$ (33,167)</u>

The following table provides amounts recognized in accumulated other comprehensive income as of December 31:

	2017		2016	
	United States	Foreign	United States	Foreign
	(in thousands)			
Prior service cost, before tax	\$ 58	\$—	\$127	\$—
Deferred taxes	539	—	514	—
Total recognized in other comprehensive income, net of tax	<u>\$597</u>	<u>\$—</u>	<u>\$641</u>	<u>\$—</u>

The estimated portion of prior service cost remaining in accumulated other comprehensive income that is expected to be recognized as a component of net periodic pension cost in 2018 is \$0.1 million.

The accumulated benefit obligation for the United States defined benefit pension plans was \$354.3 million and \$342.9 million at December 31, 2017 and 2016, respectively. The accumulated benefit obligation for foreign defined benefit pension plans was \$34.7 million and \$56.6 million at December 31, 2017 and 2016, respectively.

Information for pension plans with an accumulated benefit obligation in excess of plan assets as of December 31:

	2017		2016	
	United States	Foreign	United States	Foreign
	(in millions)			
Projected benefit obligation	\$56.0	\$39.4	\$54.0	\$34.3
Accumulated benefit obligation	51.6	34.7	48.0	30.1
Fair value of plan assets	—	1.3	—	1.1

Expense

For the years ended December 31, 2017, 2016, and 2015, Teradyne’s net periodic pension (income) cost was comprised of the following:

	2017		2016		2015	
	United States	Foreign	United States	Foreign	United States	Foreign
	(in thousands)					
Components of Net Periodic Pension (Income) Cost:						
Service cost	\$ 2,239	\$ 818	\$ 2,302	\$ 761	\$ 2,462	\$1,006
Interest cost	13,151	852	13,630	1,185	13,142	1,444
Expected return on plan assets	(12,008)	(165)	(13,830)	(443)	(14,517)	(781)
Amortization of prior service cost	70	—	96	—	134	—
Net actuarial (gain) loss	(6,712)	(310)	(4,013)	815	10,596	8,415
Curtailment	—	—	—	—	—	(634)
Total net periodic pension (income) cost	<u>\$ (3,260)</u>	<u>\$1,195</u>	<u>\$ (1,815)</u>	<u>\$2,318</u>	<u>\$ 11,817</u>	<u>\$9,450</u>
Changes in Plan Assets and Benefit Obligations						
Recognized in Other Comprehensive Income:						
Reversal of amortization items:						
Prior service cost	(70)	—	(96)	—	(134)	—
Total recognized in other comprehensive income	<u>(70)</u>	<u>—</u>	<u>(96)</u>	<u>—</u>	<u>(134)</u>	<u>—</u>
Total recognized in net periodic pension (income) cost and other comprehensive income	<u>\$ (3,330)</u>	<u>\$1,195</u>	<u>\$ (1,911)</u>	<u>\$2,318</u>	<u>\$ 11,683</u>	<u>\$9,450</u>

Weighted Average Assumptions to Determine Net Periodic Pension Cost at January 1:

	2017		2016		2015	
	United States	Foreign	United States	Foreign	United States	Foreign
Discount rate	3.9%	1.8%	4.0%	2.3%	3.7%	2.6%
Expected return on plan assets	4.0	2.0	4.8	2.0	4.8	2.6
Salary progression rate	2.6	2.7	2.7	3.2	2.9	3.2

Weighted Average Assumptions to Determine Pension Obligations at December 31:

	2017		2016	
	United States	Foreign	United States	Foreign
Discount rate	3.4%	1.8%	3.9%	1.8%
Salary progression rate	2.3	2.7	2.6	2.7

In developing the expected return on plan assets assumption, Teradyne evaluates input from its investment manager and pension consultants, including their forecast of asset class return expectations. Teradyne believes that 4.0% was an appropriate rate to use for fiscal 2017 for the U.S. Qualified Pension Plan (“U.S. Plan”).

Teradyne recognizes net actuarial gains and losses and the change in the fair value of the plan assets in its operating results in the year in which they occur or upon any interim remeasurement of the plans. Teradyne calculates the expected return on plan assets using the fair value of the plan assets. Actuarial gains and losses are generally measured annually as of December 31 and, accordingly, recorded during the fourth quarter of each year or upon any interim remeasurement of the plans.

The discount rate utilized to determine future pension obligations for the U.S. Plan is based on Citigroup Pension Index adjusted for the plan’s expected cash flows and was 3.4% at December 31, 2017, down from 3.9% at December 31, 2016.

Plan Assets

As of December 31, 2017, the fair value of Teradyne’s pension plans’ assets totaled \$325.8 million of which \$324.5 million was related to the U.S. Plan and \$1.3 million was related to the Taiwan defined benefit pension plan. Substantially all of Teradyne’s pension plans’ assets are held in individual trusts, which were established for the investment of assets of Teradyne’s sponsored retirement plans.

The following table provides weighted average pension asset allocation by asset category at December 31, 2017 and 2016:

	2017		2016	
	United States	Foreign	United States	Foreign
Fixed income securities	88.1%	— %	88.1%	— %
Equity securities	9.9	—	9.9	—
Other	2.0	100.0	2.0	100.0
	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>	<u>100.0%</u>

The assets of the U.S. Plan are overseen by the Teradyne Fiduciary Committee which is comprised of members of senior management drawn from appropriate diversified levels of the management team. The Fiduciary Committee is responsible for setting the policy that provides the framework for management of the U.S. Plan assets. In accordance with its responsibilities, the Fiduciary Committee meets on a regular basis to review the performance of the U.S. Plan assets and compliance with the investment policy. The policy sets forth an investment structure for managing U.S. Plan assets, including setting the asset allocation ranges, which are expected to provide an appropriate level of overall diversification required to maximize the long-term return on plan assets for a prudent and reasonable level of risk given prevailing market conditions, total investment return over the long term, and preservation of capital, while maintaining sufficient liquidity to pay the benefits of the U.S. Plan. The investment portfolio will not, at any time, have a direct investment in Teradyne stock. It may have indirect investment in Teradyne stock, if one of the funds selected by the investment manager invests in Teradyne stock. In developing the asset allocation ranges, third party asset allocation studies are periodically performed that consider the current and expected positions of the plan assets and funded status. Based on this

study and other appropriate information, the Fiduciary Committee establishes asset allocation ranges taking into account acceptable risk targets and associated returns. The investment return objectives are to avoid excessive volatility and produce a rate of return that at least matches the Policy Index identified below. The manager's investment performance is reviewed at least annually. Results for the total portfolio and for each major category of assets are evaluated in comparison with appropriate market indices and the Policy Index.

The target asset allocation and the index for each asset category for the U.S. Plan, per the investment policy, are as follows:

<u>Asset Category:</u>	<u>Policy Index:</u>	<u>Target Allocation</u>
U.S. corporate fixed income	Bloomberg Barclays U.S. Corporate A or Better Index	76%
Global equity	MSCI World Minimum Volatility Index	10
U.S. government fixed income	Bloomberg Barclays U.S. Long Government Bond Index	8
High yield fixed income	Bloomberg Barclays U.S. Corporate High Yield 2% Issuer Cap Index	5
Cash	Citigroup Three Month U.S. Treasury Bill Index	1

Teradyne's U.S. Plan invests primarily in common trust funds. Units held in the common trust funds are valued at the unit price as reported by the investment manager based on the asset value of the underlying investments; underlying investments in equity securities are valued at the last reported sales price, and underlying investments in fixed-income securities are generally valued using methods based upon market transactions for comparable securities.

In the fourth quarter of 2015, the Trustees of the U.K. defined benefit pension plan purchased group annuity insurance contracts. In 2017, the U.K. defined benefit pension was terminated and the obligations and assets of the plan were transferred to an insurance company.

During the years ended December 31, 2017 and 2016, there were no transfers of pension assets in or out of Level 1, Level 2 or Level 3.

The fair value of pension plan assets by asset category and by level at December 31, 2017 and December 31, 2016 were as follows:

	December 31, 2017							
	United States				Foreign			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
	(in thousands)							
Fixed income securities:								
Corporate debt securities	\$ —	\$260,294	\$ —	\$260,294	\$—	\$ —	\$—	\$ —
U.S. government debt securities	—	25,709	—	25,709	—	—	—	—
Global equity	—	32,120	—	32,120	—	—	—	—
Group annuity insurance contracts	—	—	3,166	3,166	—	—	—	—
Other	—	—	—	—	—	1,307	—	1,307
Cash and cash equivalents	3,217	—	—	3,217	—	—	—	—
Total	\$3,217	\$318,123	\$3,166	\$324,506	\$—	\$1,307	\$—	\$1,307

The pension plan assets identified as Level 3 above are related to group annuity insurance contracts held by the U.S. Plan. The fair value of these assets was calculated using the present value of future pension payments due under the group annuity insurance contracts.

	December 31, 2016							
	United States				Foreign			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
	(in thousands)							
Fixed income securities:								
Corporate debt securities	\$ —	\$246,528	\$ —	\$246,528	\$—	\$ —	\$ —	\$ —
U.S. government debt securities	—	24,322	—	24,322	—	—	—	—
Global equity	—	30,360	—	30,360	—	—	—	—
Group annuity insurance contracts	—	—	3,071	3,071	—	—	26,385	26,385
Other	—	—	—	—	—	1,124	—	1,124
Cash and cash equivalents	3,023	—	—	3,023	62	—	—	62
Total	\$3,023	\$301,210	\$3,071	\$307,304	\$ 62	\$1,124	\$26,385	\$27,571

The pension plan assets identified as Level 3 above are related to group annuity insurance contracts held by the U.K. defined benefit pension plan and the U.S. Plan.

Changes in the fair value of Level 3 group annuity insurance contracts for the years ended December 31, 2017 and 2016 were as follows:

	<u>Group Annuity Insurance Contracts</u> (in thousands)
Balance at December 31, 2015	\$ 29,392
Purchases of group annuity insurance contracts	709
Interest and market value adjustments	5,308
Benefits paid	(611)
Other	(634)
Non-U.S. currency movement	(4,708)
Balance at December 31, 2016	29,456
Settlements	(28,560)
Interest and market value adjustments	959
Benefits paid	(244)
Other	(61)
Non-U.S. currency movement	1,616
Balance at December 31, 2017	<u>\$ 3,166</u>

Contributions

Teradyne’s funding policy is to make contributions to the plans in accordance with local laws and to the extent that such contributions are tax deductible. During 2017, Teradyne contributed \$1.9 million to the U.S. Plan, \$2.6 million to the U.S. supplemental executive defined benefit pension plan and \$0.9 million to certain qualified plans for non-U.S. subsidiaries. During 2016, Teradyne contributed \$1.9 million to the U.S. Plan, \$2.6 million to the U.S. supplemental executive defined benefit pension plan and \$0.9 million to certain qualified plans for non-U.S. subsidiaries. In 2018, contributions to the U.S. supplemental executive defined benefit pension plan, U.S. Plan and certain qualified plans from non-U.S. subsidiaries will be approximately \$2.5 million, \$1.9 million and \$0.9 million, respectively.

Expected Future Pension Benefit Payments

Future benefit payments are expected to be paid as follows:

	<u>United States</u>	<u>Foreign</u>
	(in thousands)	
2018	\$ 19,387	\$ 886
2019	19,022	887
2020	19,688	1,253
2021	20,246	1,002
2022	20,994	952
2023-2027	110,214	6,294

Postretirement Benefit Plans

In addition to receiving pension benefits, U.S. Teradyne employees who meet early retirement eligibility requirements as of their termination dates may participate in Teradyne's Welfare Plan, which includes medical and dental benefits up to age 65. Death benefits provide a fixed sum to retirees' survivors and are available to all retirees. Substantially all of Teradyne's current U.S. employees could become eligible for these benefits, and the existing benefit obligation relates primarily to those employees.

The December 31 balances of the postretirement assets and obligations are shown below:

	<u>2017</u>	<u>2016</u>
	(in thousands)	
<i>Assets and Obligations</i>		
Change in benefit obligation:		
Projected benefit obligation:		
Beginning of year	\$ 5,510	\$ 6,030
Service cost	34	37
Interest cost	201	218
Actuarial loss	398	5
Special termination benefits	591	—
Benefits paid	(557)	(687)
Plan amendments	—	(93)
End of year	<u>6,177</u>	<u>5,510</u>
Change in plan assets:		
Fair value of plan assets:		
Beginning of year	—	—
Company contributions	557	687
Benefits paid	(557)	(687)
End of year	<u>—</u>	<u>—</u>
Funded status	<u>\$(6,177)</u>	<u>\$(5,510)</u>

The following table provides amounts recorded within the account line items of financial position as of December 31:

	<u>2017</u>	<u>2016</u>
	(in thousands)	
Accrued employees' compensation and withholdings	\$ (591)	\$ (571)
Retirement plans liability	(5,586)	(4,939)
Funded status	<u>\$(6,177)</u>	<u>\$(5,510)</u>

The following table provides amounts recognized in accumulated other comprehensive income as of December 31:

	<u>2017</u>	<u>2016</u>
	(in thousands)	
Prior service credit, before tax	\$ (622)	\$(1,118)
Deferred taxes	(1,472)	(1,292)
Total recognized in other comprehensive income, net of tax	<u>\$(2,094)</u>	<u>\$(2,410)</u>

The estimated portion of prior service credit remaining in accumulated other comprehensive income that is expected to be recognized as a component of net periodic postretirement benefit income in 2018 is \$(0.1) million.

Expense

For the years ended December 31, 2017, 2016, and 2015, Teradyne's net periodic postretirement benefit cost (income) was comprised of the following:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
	(in thousands)		
Components of Net Periodic Postretirement Benefit Cost (income):			
Service cost	\$ 34	\$ 37	\$ 48
Interest cost	201	218	237
Amortization of prior service credit	(496)	(607)	(598)
Net actuarial loss (gain)	398	5	(648)
Special termination benefits	591	—	—
Total net periodic postretirement benefit cost (income)	<u>728</u>	<u>(347)</u>	<u>(961)</u>
Changes in Plan Assets and Benefit Obligations Recognized in Other Comprehensive Income:			
Prior service cost	—	(93)	—
Reversal of amortization items:			
Prior service credit	496	607	598
Total recognized in other comprehensive income	<u>496</u>	<u>514</u>	<u>598</u>
Total recognized in net periodic postretirement cost (income) and other comprehensive income	<u>\$1,224</u>	<u>\$ 167</u>	<u>\$(363)</u>

Weighted Average Assumptions to Determine Net Periodic Postretirement Benefit Income as of January 1:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
Discount rate	3.9%	3.9%	3.5%
Initial health care cost trend rate	7.3	7.5	7.5
Ultimate health care cost trend rate	5.0	5.0	5.0
Year in which ultimate health care cost trend rate is reached	2023	2023	2022

Weighted Average Assumptions to Determine Postretirement Benefit Obligation as of December 31:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
Discount rate	3.4%	3.9%	3.9%
Initial medical trend	7.9	7.3	7.5
Ultimate health care trend	4.5	5.0	5.0
Medical cost trend rate decrease to ultimate rate in year	2026	2023	2023

Assumed health care trend rates could have a significant effect on the amounts reported for health care plans. A one percentage point change in the assumed health care cost trend rates for the year ended December 31, 2017 would have the following effects:

	<u>1 Percentage Point Increase</u>	<u>1 Percentage Point Decrease</u>
	(in thousands)	
Effect on total service and interest cost components	\$ 3	\$ (3)
Effect on postretirement benefit obligations	64	(60)

Expected Future Benefit Payments

Future benefit payments are expected to be paid as follows:

	<u>Benefit Payments</u>
	(in thousands)
2018	\$ 591
2019	597
2020	535
2021	502
2022	439
2023-2027	1,665

O. STOCK-BASED COMPENSATION

Stock Compensation Plans

Under Teradyne’s stock compensation plans, Teradyne grants stock options, restricted stock units and performance-based restricted stock units, and employees are eligible to purchase Teradyne’s common stock through its Employee Stock Purchase Plan (“ESPP”).

Stock options to purchase Teradyne’s common stock at 100% of the fair market value on the grant date vest in equal annual installments over four years from the grant date and have a maximum term of seven years. Time-based restricted stock unit awards granted to employees vest in equal annual installments over four years. Restricted stock unit awards granted to non-employee directors vest after a one year period, with 100% of the award vesting on the first anniversary of the grant date. Teradyne expenses the cost of the restricted stock unit awards subject to time-based vesting, which is determined to be the fair market value of the shares at the date of grant, ratably over the period during which the restrictions lapse.

Commencing in January 2014, Teradyne granted performance-based restricted stock units (“PRSUs”) to its executive officers with a performance metric based on relative total shareholder return (“TSR”). For TSR grants issued in 2015, Teradyne’s three-year TSR performance is measured against the Philadelphia Semiconductor Index. For TSR grants issued in 2017 and 2016, Teradyne’s three-year TSR performance is measured against the New York Stock Exchange (“NYSE”) Composite Index. The final number of TSR PRSUs that vest will vary based upon the level of performance achieved from 200% to 0% of the target shares and is capped at four times the grant date value. The TSR PRSUs will vest upon the three-year anniversary of the grant date. The TSR PRSUs are valued using a Monte Carlo simulation model. The number of units expected to be earned, based upon the achievement of the TSR market condition, is factored into the grant date Monte Carlo valuation. Compensation expense is recognized on a straight-line basis over the three-year service period. Compensation expense is recognized regardless of the eventual number of units that are earned based upon the market condition, provided the executive officer remains an employee at the end of the three-year period. Compensation expense is reversed if at any time during the three-year service period the executive officer is no longer an employee, subject to the retirement and termination eligibility provisions noted below.

In January 2017 and 2016, Teradyne granted PRSUs to its executive officers with a performance metric based on three-year cumulative non-GAAP profit before interest and tax (“PBIT”) as a percent of Teradyne’s revenue. Non-GAAP PBIT is a financial measure equal to GAAP income from operations less restructuring and other, net; amortization of acquired intangible assets; acquisition and divestiture related charges or credits; pension actuarial gains and losses; non-cash convertible debt interest expense; and other non-recurring gains and charges. The final number of PBIT PRSUs that vest will vary based upon the level of performance achieved from 200% to 0% of the target shares. The PBIT PRSUs will vest upon the three-year anniversary of the grant date. Compensation expense is recognized on a straight-line basis over the three-year service period. Compensation expense is recognized based on the number of units that are earned based upon the three-year Teradyne PBIT as a percent of Teradyne’s revenue, provided the executive officer remains an employee at the end of the three-year period subject to the retirement and termination eligibility provisions noted below.

Beginning with PRSUs granted in January 2014, if the recipient’s employment ends prior to the determination of the performance percentage due to (1) permanent disability or death or (2) retirement or termination other than for cause, after attaining both at least age sixty and at least ten years of service, then all or a portion of the recipient’s PRSUs (based on the actual performance percentage achieved on the determination date) will vest on the date the performance percentage is determined. Except as set forth in the preceding sentence, no PRSUs will vest if the executive officer is no longer an employee at the end of the three-year period.

During 2017, 2016, and 2015 Teradyne granted 0.1 million, 0.1 million, and 0.2 million TSR PRSUs, respectively, with a grant date fair value of \$35.66, \$20.29 and \$18.21, respectively. The fair value was estimated using the Monte Carlo simulation model with the following assumptions:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
Risk-free interest rate	1.5%	1.0%	0.8%
Teradyne volatility-historical	26.6%	27.0%	28.2%
NYSE Composite Index volatility-historical	13.4%	13.1%	—
Philadelphia Semiconductor Index volatility-historical	—	—	19.7%
Dividend yield	1.0%	1.2%	1.3%

Expected volatility was based on the historical volatility of Teradyne’s stock and the NYSE Composite Index for the 2017 and 2016 grants and Philadelphia Semiconductor Index for the 2015 grant, over the most recent three-year period. The risk-free interest rate was determined using the U.S. Treasury yield curve in effect at the time of grant. Dividend yield for 2017, 2016 and 2015 was based upon an estimated annual dividend amount of \$0.28 per share for 2017 and \$0.24 per share for 2016 and 2015 divided by Teradyne’s stock price on the grant date of \$28.56 for the 2017 grant, \$19.43 for the 2016 grant, and \$18.10 for the 2015 grant.

During 2017 and 2016, Teradyne granted 0.1 million PBIT PRSUs with a grant date fair value of \$27.72 and \$18.71, respectively.

During 2017, 2016, and 2015, Teradyne granted 0.8 million, 1.2 million, and 1.5 million of service-based restricted stock unit awards to employees, respectively, at a weighted average grant date fair value of \$28.19, \$18.88, and \$17.51, respectively.

During 2017, 2016, and 2015, Teradyne granted 0.1 million of service-based restricted stock unit awards to non-employee directors at a weighted average grant date fair value of \$34.48, \$18.71, and \$20.21, respectively.

During 2017, 2016, and 2015, Teradyne granted 0.1 million of service-based stock options to executive officers at a weighted average grant date fair value of \$7.13, \$5.30, and \$4.43, respectively.

The fair value of the stock options at grant date was estimated using the Black-Scholes option-pricing model with the following assumptions:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
Expected life (years)	5.0	5.0	4.0
Risk-free interest rate	2.0%	1.4%	1.1%
Volatility-historical	27.8%	32.9%	33.4%
Dividend yield	1.0%	1.2%	1.3%

Teradyne determined the stock option's expected life based upon historical exercise data for executive officers, the age of executives and the terms of the stock option award. Volatility was determined using historical volatility for a period equal to the expected life. The interest rate was determined using the U.S. Treasury yield curve in effect at the time of grant. Dividend yield was based upon an estimated annual dividend amount of \$0.28 per share for 2017 and \$0.24 per share for 2016 and 2015 divided by Teradyne's stock price on the grant date of \$28.56 for the 2017 grants, \$19.43 for the 2016 grants, and \$18.10 for the 2015 grants.

Stock compensation plan activity for the years 2017, 2016, and 2015 follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
	(in thousands)		
Restricted Stock Units:			
Non-vested at January 1	3,778	4,070	4,352
Awarded	939	1,471	1,681
Vested	(1,434)	(1,530)	(1,679)
Forfeited	(109)	(233)	(284)
Non-vested at December 31	<u>3,174</u>	<u>3,778</u>	<u>4,070</u>
Stock Options:			
Outstanding at January 1	926	1,121	1,507
Granted	111	130	132
Exercised	(501)	(324)	(518)
Forfeited	—	—	—
Expired	(5)	(2)	—
Outstanding at December 31	<u>531</u>	<u>926</u>	<u>1,121</u>
Vested and expected to vest at December 31	<u>531</u>	<u>926</u>	<u>1,121</u>
Exercisable at December 31	<u>233</u>	<u>598</u>	<u>779</u>

Total shares available for the years 2017, 2016, and 2015:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
	(in thousands)		
Shares available:			
Available for grant at January 1	9,546	10,914	12,443
Options granted	(111)	(130)	(132)
Restricted stock units awarded	(939)	(1,471)	(1,681)
Restricted stock units forfeited	109	233	284
Additional shares reserved	—	—	—
Available for grant at December 31	<u>8,605</u>	<u>9,546</u>	<u>10,914</u>

Weighted average restricted stock unit award date fair value information for the years 2017, 2016, and 2015 follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
Non-vested at January 1	\$18.27	\$17.66	\$17.35
Awarded	28.91	18.95	17.66
Vested	17.90	17.36	16.93
Forfeited	20.35	17.80	17.28
Non-vested at December 31	\$21.71	\$18.27	\$17.66

Restricted stock unit awards aggregate intrinsic value information at December 31 for the years 2017, 2016, and 2015 follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
	(in thousands)		
Vested	\$ 40,649	\$30,008	\$32,200
Outstanding	132,875	95,952	84,129
Expected to vest	130,594	91,871	79,611

Restricted stock units weighted average remaining contractual terms (in years) information at December 31, for the years 2017, 2016, and 2015 follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
Outstanding	1.00	1.04	1.09
Expected to vest	0.99	1.03	1.08

Weighted average stock options exercise price information for the year ended December 31, 2017 follows:

	<u>2017</u>
Outstanding at January 1	\$11.93
Options granted	28.56
Options exercised	13.60
Options forfeited	3.04
Options cancelled	—
Outstanding at December 31	13.92
Exercisable at December 31	2.95

The total cash received from employees as a result of employee stock options exercises during the years ended December 31, 2017, 2016, and 2015, was \$6.8 million, \$2.9 million and \$2.8 million, respectively. In connection with these exercises, the tax benefit realized by Teradyne for the years ended December 31, 2017, 2016, and 2015, was \$2.5 million, \$0.8 million and \$2.1 million, respectively.

Stock option aggregate intrinsic value information for the years ended December 31, 2017, 2016, and 2015 follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
	(in thousands)		
Exercised	\$ 8,035	\$ 3,729	\$ 7,255
Outstanding	14,831	12,468	11,729
Vested and expected to vest	14,831	12,468	11,729
Exercisable	9,076	10,217	10,716

Stock options weighted average remaining contractual terms (in years) information at December 31, for the years 2017, 2016, and 2015 follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
Outstanding	4.1	3.9	4.2
Vested and expected to vest	4.1	3.9	4.2
Exercisable	2.8	3.2	3.9

Significant option groups outstanding at December 31, 2017 and related weighted average price and remaining contractual life information follow:

<u>Range Of Exercise Prices</u>	<u>Options Outstanding</u>		<u>Options Exercisable</u>		
	<u>Weighted- Average Remaining Contractual Life (Years)</u>	<u>Shares</u>	<u>Weighted- Average Exercise Price</u>	<u>Shares</u>	<u>Weighted- Average Exercise Price</u>
		(shares in thousands)			
\$1.48 – \$2.58	2.19	99	\$ 1.81	99	\$ 1.81
\$2.67 – \$7.71	3.17	126	2.89	126	2.89
\$18.10 – \$19.43	4.48	194	18.91	8	18.51
\$28.56	6.08	112	28.56	—	—
		<u>531</u>	\$13.92	<u>233</u>	\$ 2.95

As of December 31, 2017, total unrecognized expense related to non-vested restricted stock unit awards and stock options was \$42 million, and is expected to be recognized over a weighted average period of 2.3 years.

Employee Stock Purchase Plan

Under the Teradyne 1996 Employee Stock Purchase Plan (“ESPP”), eligible employees may purchase shares of common stock through regular payroll deductions of up to 10% of their compensation, to a maximum of shares with a fair market value of \$25,000 per calendar year, not to exceed 6,000 shares. Under the plan, the price paid for the common stock is equal to 85% of the stock price on the last business day of the six-month purchase period.

In July 2017, 0.3 million shares of common stock were issued to employees who participated in the plan during the first half of 2017 at the price of \$25.53 per share. In January 2018, Teradyne issued 0.3 million shares of common stock to employees who participated in the plan during the second half of 2017 at the price of \$35.59 per share.

In July 2016, 0.5 million shares of common stock were issued to employees who participated in the plan during the first half of 2016 at the price of \$16.74 per share. In January 2017, Teradyne issued 0.4 million shares of common stock to employees who participated in the plan during the second half of 2016 at the price of \$21.59 per share.

In July 2015, 0.5 million shares of common stock were issued to employees who participated in the plan during the first half of 2015 at the price of \$16.40 per share. In January 2016, Teradyne issued 0.5 million shares of common stock to employees who participated in the plan during the second half of 2015 at the price of \$17.57 per share.

As of December 31, 2017, there were 3.1 million shares available for grant under the ESPP.

The effect to income from operations for recording stock-based compensation for the years ended December 31 was as follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
	(in thousands)		
Cost of revenues	\$ 3,212	\$ 3,153	\$ 3,065
Engineering and development	9,370	9,458	9,362
Selling and administrative	<u>21,515</u>	<u>18,139</u>	<u>18,024</u>
Stock-based compensation	34,097	30,750	30,451
Income tax benefit	<u>(10,462)</u>	<u>(8,752)</u>	<u>(8,528)</u>
Total stock-based compensation expense after income taxes	<u>\$ 23,635</u>	<u>\$21,998</u>	<u>\$21,923</u>

P. SAVINGS PLAN

Teradyne sponsors a defined contribution employee retirement savings plan (“Savings Plan”) covering substantially all U.S. employees. Under the Savings Plan, employees may contribute up to 20% of their compensation (subject to Internal Revenue Service limitations). The Savings Plan provides for a discretionary employer match that is determined each year. In 2017, 2016 and 2015, Teradyne matched 100% of eligible employee contributions up to 4% of their compensation for employees not accruing benefits in the U.S. Qualified Pension Plan. There was no match for employees still actively accruing benefits in the U.S. Qualified Pension Plan. Teradyne’s contributions vest 25% per year for the first four years of employment, and contributions for those employees with four years of service vest immediately.

In addition, Teradyne established an unfunded U.S. Supplemental Savings Plan to provide savings benefits in excess of those allowed by Employee Retirement Income Security Act of 1974 and the Internal Revenue Code. The provisions of this plan are the same as the Savings Plan. Teradyne also established defined contribution savings plans for its foreign employees. Under Teradyne’s savings plans, amounts charged to the statements of operations for the years ended December 31, 2017, 2016, and 2015 were \$15.3 million, \$14.5 million, and \$13.5 million, respectively.

Q. INCOME TAXES

The components of income (loss) before income taxes and the provision (benefit) for income taxes as shown in the consolidated statements of operations were as follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
	(in thousands)		
Income (loss) before income taxes:			
U.S.	\$ 76,699	\$(341,018)	\$ 56,270
Non-U.S.	447,713	285,958	196,854
	<u>\$524,412</u>	<u>\$ (55,060)</u>	<u>\$253,124</u>
Provision (benefit) for income taxes:			
Current:			
U.S. Federal	\$162,679	\$ 7,750	\$ 16,635
Non-U.S.	64,313	41,579	35,707
State	2,623	1,968	1,429
	<u>229,615</u>	<u>51,297</u>	<u>53,771</u>
Deferred:			
U.S. Federal	43,687	(51,482)	(574)
Non-U.S.	(6,476)	(9,240)	(7,761)
State	(106)	(2,214)	1,211
	<u>37,105</u>	<u>(62,936)</u>	<u>(7,124)</u>
Total provision (benefit) for income taxes:	<u>\$266,720</u>	<u>\$ (11,639)</u>	<u>\$ 46,647</u>

Income tax expense for 2017 totaled \$266.7 million. Income tax benefit for 2016 totaled \$11.6 million. Income tax expense for 2015 totaled \$46.6 million. The effective tax rate for 2017, 2016, and 2015 was 50.9%, 21.1%, and 18.4% respectively.

On December 22, 2017, the U.S. enacted the Tax Cuts and Jobs Act of 2017 (the "Tax Reform Act"), making significant changes to the Internal Revenue Code. Among other changes, the Tax Reform Act permanently reduces the corporate tax rate from 35% to 21% effective for tax years beginning after December 31, 2017, shifts the U.S. tax regime from a worldwide system to a modified territorial tax system and requires companies to pay a transition tax on earnings of certain foreign subsidiaries that were previously tax deferred. The Tax Reform Act has significant direct and indirect implications for accounting for income taxes under ASC 740 "Accounting for Income Taxes" some of which cannot be calculated with precision until further clarification and guidance is made available from tax authorities, regulatory bodies or the FASB. In light of this uncertainty, on December 22, 2017 the SEC issued Staff Accounting Bulletin ("SAB") No. 118, "Income Tax Accounting Implications of the Tax Cuts and Jobs Act" to address uncertainty in the application of U.S. GAAP when the registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting for certain income tax effects of the Tax Reform Act. In accordance with SAB 118, Teradyne has recorded a provisional amount of \$186.0 million of additional income tax expense in the fourth quarter of 2017 which represents Teradyne's best estimate of the impact of the Tax Reform Act in accordance with Teradyne's understanding of the Tax Reform Act and available guidance as of the date of this filing. The \$186.0 million is primarily composed of expense of \$161.0 million related to the one-time transition tax on the mandatory deemed repatriation of foreign earnings, \$33.6 million of expense related to the remeasurement of certain deferred tax assets and liabilities based on the rates at which they are expected to reverse in the future, and a benefit of \$10.3 million associated with the impact of correlative adjustments on uncertain tax positions. Additional work is necessary to do a more detailed analysis of foreign earnings, potential correlative adjustments and the impact of future guidance from tax authorities on the calculations. Any subsequent adjustment to these amounts will be recorded in 2018 when the analysis is complete.

In addition to the introduction of a modified territorial tax system, the Tax Reform Act includes two new U.S. tax base erosion provisions, the global intangible low-taxed income (“GILTI”) provisions and the base-erosion and anti-abuse tax (“BEAT”) provisions. The GILTI provisions impose taxes on foreign income in excess of a deemed return on tangible assets of foreign corporations. Teradyne has made an accounting policy election to account for GILTI as a component of tax expense in the period in which Teradyne is subject to the rules and therefore has not provided any deferred tax impacts of GILTI in its consolidated financial statements for the year ended December 31, 2017.

The BEAT provisions in the Tax Reform Act eliminate the deduction of certain base-erosion payments made to related foreign corporations, and impose a minimum tax if greater than regular tax. This provision is not effective for Teradyne until the 2018 calendar year. Teradyne does not presently expect that it will be subject to this tax.

The increase in the effective tax rate from 2016 to 2017 is primarily attributable to the effect of changes in U.S. Federal tax law which resulted in one-time charges for the U.S. transition tax and the impact of the reduction in the U.S. Federal corporate tax rate on Teradyne’s net U.S. deferred tax assets and uncertain tax positions. The change in the effective rate was also impacted by the U.S. non-deductible goodwill impairment charge recorded in 2016, a shift in the geographic distribution of income which increased income subject to taxation in the U.S. relative to lower tax rate jurisdictions, decreases in the discrete benefits from tax reserve releases, increases in discrete expense from non-taxable foreign exchange gains and losses and an increase in the discrete benefit from stock-based compensation.

The increase in the effective tax rate from 2015 to 2016 resulted from a shift in the geographic distribution of income which decreased income subject to taxation in the U.S. relative to lower tax rate jurisdictions, reductions in uncertain tax positions resulting from the expiration of statutes and the settlement of an audit, and an increase in non-taxable foreign exchange gains. These increases in the effective tax rate were partially offset by the effect of the non-deductible goodwill impairment charge, which reduced the benefit of the loss before income taxes in the U.S.

A reconciliation of the effective tax rate for the years 2017, 2016, and 2015 is as follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
U.S. statutory federal tax rate	35.0%	35.0%	35.0%
U.S. transition tax	28.7	—	—
Impact of rate change on deferred tax	6.4	—	—
Uncertain tax positions	1.7	(2.6)	2.2
Foreign taxes	(16.3)	78.0	(13.8)
Foreign tax credits	(2.2)	49.1	(2.7)
U.S. research and development credit	(1.6)	15.8	(3.0)
Equity compensation	(0.8)	(2.7)	0.6
Domestic production activities deduction	(0.3)	2.3	(1.0)
State income taxes, net of federal tax benefit	—	2.3	0.4
Goodwill impairment	—	(162.1)	—
U.S. alternative minimum tax credit	—	3.7	—
Inventory cost capitalization	—	1.8	—
Other, net	0.3	0.5	0.7
	<u>50.9%</u>	<u>21.1%</u>	<u>18.4%</u>

Teradyne qualifies for a tax holiday in Singapore by fulfilling the requirements of an agreement with the Singapore Economic Development Board under which certain headcount and spending requirements must be met. The tax savings attributable to the tax holiday for the years ended December 31, 2017, 2016, and 2015 were

\$24.8 million or \$0.12 per diluted share, \$17.0 million or \$0.08 per diluted share, and \$11.5 million or \$0.05 per diluted share, respectively. The tax holiday is scheduled to expire on December 31, 2020.

Significant components of Teradyne's deferred tax assets (liabilities) as of December 31, 2017 and 2016 were as follows:

	<u>2017</u>	<u>2016</u>
	(in thousands)	
Deferred tax assets:		
Tax credits	\$ 76,083	\$ 57,313
Accruals	27,508	27,247
Pension liabilities	22,602	31,581
Inventory valuations	17,793	31,227
Deferred revenue	9,016	12,806
Equity compensation	6,861	9,922
Net operating loss carryforwards	5,440	5,244
Vacation accrual	4,747	7,874
Other	713	630
Gross deferred tax assets	<u>170,763</u>	<u>183,844</u>
Less: valuation allowance	<u>(63,919)</u>	<u>(48,369)</u>
Total deferred tax assets	<u>\$106,844</u>	<u>\$135,475</u>
Deferred tax liabilities:		
Intangible assets	\$(16,120)	\$(22,887)
Depreciation	(12,293)	(17,117)
Marketable securities	<u>(1,125)</u>	<u>(210)</u>
Total deferred tax liabilities	<u>\$(29,538)</u>	<u>\$(40,214)</u>
Net deferred assets	<u>\$ 77,306</u>	<u>\$ 95,261</u>

During 2017, Teradyne's valuation allowance increased by \$15.6 million, of which \$11.3 million resulted from the effect of the reduction in the U.S. Federal corporate tax rate on the valuation allowance associated with state credits and net operating losses. The remaining change is primarily due to an increase in the deferred tax assets related to state tax credits generated in 2017.

As of December 31, 2017 and 2016, Teradyne evaluated the likelihood that it would realize the deferred income taxes to offset future taxable income and concluded that it is more likely than not that a substantial majority of its deferred tax assets will be realized through consideration of both the positive and negative evidence. At December 31, 2017 and 2016, Teradyne maintained a valuation allowance for certain deferred tax assets of \$63.9 million and \$48.4 million, respectively, primarily related to state net operating losses and state tax credit carryforwards, due to the uncertainty regarding their realization. Adjustments could be required in the future if Teradyne estimates that the amount of deferred tax assets to be realized is more or less than the net amount recorded.

At December 31, 2017, Teradyne had operating loss carryforwards that expire in the following years:

	<u>U.S. Federal Operating Loss Carryforwards</u>	<u>State Operating Loss Carryforwards</u> (in thousands)	<u>Foreign Operating Loss Carryforwards</u>
2018	\$—	\$ 9,943	\$ —
2019	—	174	—
2020	—	130	—
2021	—	2,919	—
2022	—	6,362	—
2023-2027	—	12,296	—
2028-2032	—	34,963	—
Beyond 2032	—	4,516	130
Non-expiring	—	—	7,012
Total	<u>\$—</u>	<u>\$71,303</u>	<u>\$7,142</u>

Teradyne has approximately \$123.5 million of tax credit carryforwards including federal business tax credits of approximately \$28.3 million which expire in the years 2018 through 2037, alternative minimum tax credits of approximately \$6.6 million which do not expire, and state tax credits of \$88.6 million, of which \$51.4 million do not expire and the remainder expires in the years 2018 through 2037.

Teradyne's gross unrecognized tax benefits for the years ended December 31, 2017, 2016 and 2015 were as follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
	(in thousands)		
Beginning balance, as of January 1	\$ 38,958	\$36,792	\$30,418
Additions:			
Tax positions for current year	8,208	9,766	6,626
Tax positions for prior years	199	187	792
Reductions:			
Tax positions for prior years	(10,573)	(1,960)	(708)
Expiration of statutes	(325)	(3,532)	—
Settlements with tax authorities	(204)	(2,295)	(336)
Ending balance as of December 31	<u>\$ 36,263</u>	<u>\$38,958</u>	<u>\$36,792</u>

Current year and prior year additions include assessment of potential transfer pricing issues worldwide, federal and state tax credits and incentives, capitalization rules, and domestic production activities deductions. Reductions for tax positions for prior years primarily relates to the transition tax charge recorded in the fourth quarter of 2017. Of the \$36.3 million of unrecognized tax benefits as of December 31, 2017, \$24.8 million would impact the consolidated income tax rate if ultimately recognized. The remaining \$11.5 million would impact deferred taxes if recognized. Given the potential outcome of the current examination as well as the impact of the current examination on the potential expiration of the statute of limitations, it is reasonably possible that the balance of unrecognized tax benefits could significantly change within the next twelve months. However, an estimate of the range of reasonably possible adjustments cannot presently be made.

Teradyne records all interest and penalties related to income taxes as a component of income tax expense. Accrued interest and penalties related to income tax items at December 31, 2017 and 2016 amounted to \$0.3 million and \$0.4 million, respectively. For the years ended December 31, 2017, 2016, and 2015, benefit of \$0.1 million, \$0.1 million, and \$0.2 million, respectively, was recorded for interest and penalties related to income tax items.

Teradyne is subject to U.S. federal income tax, as well as income tax in multiple state, local and foreign jurisdictions. As of December 31, 2017, all material state and local income tax matters have been concluded through 2012, all material federal income tax matters have been concluded through 2013 and all material foreign income tax matters have been concluded through 2011. However, in some jurisdictions, including the United States, operating losses and tax credits may be subject to adjustment until such time as they are utilized and the year of utilization is closed to adjustment.

As of December 31, 2017, Teradyne expects to remit the earnings of non-U.S. subsidiaries to the U.S. to the extent that those earnings exceed local statutory and operational requirements. U.S. income taxes for earnings retained in non-U.S. subsidiaries to address local statutory and operational requirements have been included in the provisional transition tax included in income tax expense for the year ended December 31, 2017. Remittance of these earnings is not expected to result in material non-U.S. income tax.

R. OPERATING SEGMENT, GEOGRAPHIC AND SIGNIFICANT CUSTOMER INFORMATION

Teradyne has four operating segments (Semiconductor Test, System Test, Industrial Automation, and Wireless Test), which are its reportable segments. The Semiconductor Test segment includes operations related to the design, manufacturing and marketing of semiconductor test products and services. The System Test segment includes operations related to the design, manufacturing and marketing of products and services for defense/aerospace instrumentation test, storage test and circuit-board test. The Industrial Automation segment includes operations related to the design, manufacturing and marketing of collaborative robots. The Wireless Test segment includes operations related to the design, manufacturing and marketing of wireless test products and services. Each operating segment has a segment manager who is directly accountable to and maintains regular contact with Teradyne's chief operating decision maker (Teradyne's chief executive officer) to discuss operating activities, financial results, forecasts, and plans for the segment.

Teradyne evaluates performance using several factors, of which the primary financial measure is business segment income (loss) from operations before taxes. The accounting policies of the business segments are the same as those described in Note B: "Accounting Policies."

Segment information for the years ended December 31, 2017, 2016, and 2015 is as follows:

	Semiconductor Test	System Test	Industrial Automation	Wireless Test	Corporate And Eliminations	Consolidated
	(in thousands)					
2017						
Revenues	\$1,662,549	\$192,135	\$170,056	\$ 111,866	\$ —	\$2,136,606
Income (loss) before taxes (1)(2)	491,361	10,306	8,763	17,350	(3,368)	524,412
Total assets (3)	597,480	97,018	368,037	59,912	1,987,098	3,109,545
Property additions	87,920	5,976	7,044	4,435	—	105,375
Depreciation and amortization expense	58,901	6,646	25,711	5,392	11,425	108,075
2016						
Revenues	\$1,368,169	\$189,846	\$ 99,031	\$ 96,204	\$ —	\$1,753,250
Income (loss) before taxes (1)(2)	311,939	28,916	(16,783)	(371,409)	(7,723)	(55,060)
Total assets (3)	557,546	110,361	317,635	62,366	1,714,585	2,762,493
Property additions	70,543	3,788	6,755	4,186	—	85,272
Depreciation and amortization expense	58,087	6,551	26,869	25,921	2,581	120,009
2015						
Revenues	\$1,201,530	\$211,584	\$ 41,892	\$ 184,572	\$ —	\$1,639,578
Income (loss) before taxes (1)(2)	260,154	25,101	(7,574)	(13,830)	(10,727)	253,124
Total assets (3)	610,869	102,547	344,260	427,880	1,063,118	2,548,674
Property additions	79,052	6,228	1,465	3,133	—	89,878
Depreciation and amortization expense	64,415	4,391	14,500	53,440	4,027	140,773

- (1) Included in Corporate and Eliminations are: contingent consideration adjustments, pension and postretirement plans actuarial gains (losses), severance charges, impairment of fixed assets and expenses related to the Japan earthquake, property insurance recovery, interest income, interest expense, net foreign exchange gains (losses), and gain from the sale of an equity investment.
- (2) Included in income (loss) before taxes are charges and credits related to restructuring and other, inventory charges, goodwill impairment charges and an acquired intangible assets impairment charge.
- (3) Total assets are attributable to each segment. Corporate assets consist of cash and cash equivalents, marketable securities and certain other assets.

Included in the Semiconductor Test segment are charges in the following accounts:

	For the Year Ended December 31,		
	2017	2016	2015
	(in thousands)		
Cost of revenues—inventory charge	\$4,606	\$9,656	\$10,508
Restructuring and other—employee severance	1,779	2,860	499
Restructuring and other—impairment of fixed assets	1,124	—	—

Included in the System Test segment are charges and credits in the following accounts:

	For the Year Ended December 31,		
	2017	2016	2015
	(in thousands)		
Cost of revenues—inventory charge	\$1,918	\$630	\$8,324
Restructuring and other—employee severance	—	(49)	1,037

Included in the Industrial Automation segment are charges in the following accounts:

	For the Year Ended December 31,		
	2017	2016	2015
	(in thousands)		
Restructuring and other—employee severance	\$1,414	\$585	\$ —
Cost of revenues—inventory step-up (1)	—	—	1,567

(1) Included in the cost of revenues for the year ended December 31, 2015 is the cost for purchase accounting inventory step-up.

Included in the Wireless Test segment are charges in the following accounts:

	For the Year Ended December 31,		
	2017	2016	2015
	(in thousands)		
Cost of revenues—inventory charge	\$2,190	\$ 7,207	\$2,500
Restructuring and other—lease impairment	973	—	—
Restructuring and other—employee severance	—	2,650	—
Goodwill impairment charge	—	254,946	—
Intangible assets impairment charge	—	83,339	—

Included in the Corporate and Eliminations segment are charges and credits in the following accounts:

	For the Year Ended December 31,		
	2017	2016	2015
	(in thousands)		
Restructuring and other—Universal Robots contingent consideration adjustment	\$ 7,820	\$15,346	\$ 5,339
Restructuring and other—impairment of fixed assets and expenses related to Japan earthquake	755	5,051	—
Restructuring and other—employee severance	530	—	—
Restructuring and other—property insurance recovery	(5,064)	(5,051)	—
Cost of revenues—pension actuarial (gains) losses	(2,752)	(1,025)	8,271
Engineering and development—pension actuarial (gains) losses	(2,456)	(1,234)	4,658
Selling and administrative—pension actuarial (gains) losses	(1,416)	(944)	4,826
Restructuring and other—ZTEC contingent consideration adjustment	—	—	(1,600)
Restructuring and other—AIT contingent consideration adjustment	—	550	(1,250)
Restructuring and other—acquisition costs	—	—	1,104
Other (income) expense, net—gain from the sale of an equity investment	—	—	(5,406)

Information as to Teradyne's revenues by country is as follows:

	<u>2017</u>	<u>2016</u>	<u>2015</u>
	(in thousands)		
Revenues from customers (1):			
Taiwan	\$ 687,031	\$ 653,076	\$ 436,389
China	260,451	174,876	264,898
United States	252,516	221,948	217,386
Korea	206,819	147,882	120,224
Japan	169,093	135,978	128,228
Europe	163,715	117,671	111,903
Malaysia	124,048	103,472	76,707
Philippines	105,850	54,705	96,103
Singapore	101,085	73,172	105,216
Thailand	29,566	43,097	59,104
Rest of the World	36,432	27,373	23,420
	<u>\$2,136,606</u>	<u>\$1,753,250</u>	<u>\$1,639,578</u>

(1) Revenues attributable to a country are based on location of customer site.

In 2017 and 2016, one customer of Teradyne's Semiconductor Test segment accounted for 13% and 12 %, respectively, of total consolidated revenues. In 2016 and 2015, a different customer of Teradyne's Semiconductor Test segment accounted for 12% and 13%, respectively, of total consolidated revenues. Teradyne estimates product demand driven by a single OEM customer, combining direct sales to that customer with sales to the customer's outsourced semiconductor assembly and test providers ("OSATs"), accounted for approximately 22%, 26%, and 23% of Teradyne's consolidated revenues in 2017, 2016, and 2015, respectively.

Long-lived assets by geographic area:

	<u>United States</u>	<u>Foreign(1)</u>	<u>Total</u>
	(in thousands)		
December 31, 2017	\$198,855	\$69,592	\$268,447
December 31, 2016	\$189,195	\$64,626	\$253,821

(1) As of December 31, 2017 and 2016, long-lived assets attributable to Singapore were \$23.6 million and \$31.5 million, respectively.

S. STOCK REPURCHASE PROGRAM

In January 2015, Teradyne's Board of Directors cancelled the November 2010 stock repurchase program and authorized a new stock repurchase program for up to \$500 million of common stock. In 2015, Teradyne repurchased 15.6 million shares of common stock at an average price of \$19.20, for a total cost of \$300 million. In 2016, Teradyne repurchased 6.8 million shares of common stock at an average price of \$21.39, for a total cost of \$146 million. The cumulative repurchases as of December 31, 2016 totaled 22.5 million shares of common stock for \$446 million at an average price per share of \$19.87.

In December 2016, Teradyne's Board of Directors cancelled the January 2015 stock repurchase program and approved a new \$500 million share repurchase authorization which commenced on January 1, 2017. The cumulative repurchases as of December 31, 2017 totaled 5.8 million shares of common stock for \$200 million at an average price per share of \$34.30.

T. SUBSEQUENT EVENTS

In January 2018, Teradyne's Board of Directors declared a quarterly cash dividend of \$0.09 per share to be paid on March 23, 2018 to shareholders of record as of February 23, 2018.

In January 2018, Teradyne's Board of Directors cancelled the December 2016 stock repurchase program and authorized a new repurchase program for up to \$1.5 billion of common stock through open market purchases or private transactions. Teradyne intends to repurchase \$750 million in 2018.

While Teradyne declared a quarterly cash dividend and authorized a share repurchase program, it may reduce or eliminate the cash dividend or share repurchase program in the future. Future cash dividends and stock repurchases are subject to the discretion of Teradyne's Board of Directors which will consider, among other things, Teradyne's earnings, capital requirements and financial condition.

SUPPLEMENTARY INFORMATION
(Unaudited)

The following sets forth certain unaudited consolidated quarterly statements of operations data for each of Teradyne's last eight quarters. In management's opinion, this quarterly information reflects all adjustments, consisting only of normal recurring adjustments, necessary for a fair statement for the periods presented. Such quarterly results are not necessarily indicative of future results of operations and should be read in conjunction with the audited consolidated financial statements of Teradyne and the notes thereto included elsewhere herein.

	2017			
	1st Quarter (1)	2nd Quarter (2)(5)	3rd Quarter (3)	4th Quarter (4)(5)
(in thousands, except per share amounts)				
Revenues:				
Products	\$373,204	\$610,356	\$412,854	\$ 388,282
Services	83,709	86,545	90,524	91,133
Total revenues	456,913	696,901	503,378	479,415
Cost of revenues:				
Cost of products	154,966	267,171	169,744	166,667
Cost of services	37,014	38,511	38,848	39,813
Total cost of revenues (exclusive of acquired intangible assets amortization shown separately below)	191,980	305,682	208,592	206,480
Gross profit	264,933	391,219	294,786	272,935
Operating expenses:				
Selling and administrative	84,906	89,131	86,244	88,006
Engineering and development	76,182	81,728	77,190	70,564
Acquired intangible assets amortization	7,952	8,166	7,028	7,384
Restructuring and other	2,511	2,288	(4,407)	8,970
Total operating expenses	171,551	181,313	166,055	174,924
Income from operations	93,382	209,906	128,731	98,011
Non-operating (income) expense:				
Interest income	(3,520)	(3,292)	(4,517)	(6,476)
Interest expense	5,402	5,509	5,372	5,380
Other (income) expense, net	(516)	812	439	1,023
Income before income taxes	92,016	206,877	127,437	98,084
Income tax provision	6,795	31,901	24,017	204,007
Net income (loss)	\$ 85,221	\$174,976	\$103,420	\$(105,923)
Net income (loss) per common share—basic	\$ 0.43	\$ 0.88	\$ 0.52	\$ (0.54)
Net income (loss) per common share—diluted	\$ 0.42	\$ 0.87	\$ 0.52	\$ (0.54)
Cash dividend declared per common share	\$ 0.07	\$ 0.07	\$ 0.07	\$ 0.07

- (1) Restructuring and other includes a \$1.3 million charge for a lease impairment of a Wireless Test facility in Sunnyvale, CA, a \$0.6 million fair value adjustment to increase the Universal Robots acquisition contingent consideration, and \$0.6 million of employee severance charges.
- (2) Restructuring and other includes a \$1.5 million charge for a fair value adjustment to increase the Universal Robots acquisition contingent consideration, and \$0.8 million of employee severance charges.

- (3) Restructuring and other includes \$5.1 million of property insurance recovery related to the Japan earthquake, a \$0.4 million credit related to previously impaired lease termination of a Wireless Test facility in Sunnyvale, CA, and a \$0.3 million credit for the decrease in the fair value of the Universal Robots contingent consideration liability, partially offset by \$0.8 million of Japan earthquake related expenses and \$0.6 million of employee severance charges.
- (4) Restructuring and other includes a \$6.0 million fair value adjustment to increase the Universal Robots acquisition contingent consideration, \$1.8 million of employee severance charges, and \$1.1 million of charges for impairment of fixed assets.
- (5) Teradyne recorded pension and post retirement net actuarial gains of \$2.8 million and \$3.8 million for the second and fourth quarter in 2017, respectively. See Note B: “Accounting Policies” for a discussion of Teradyne’s accounting policy.

	2016			
	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
	(1)(5)	(2)(5)	(3)(5)	(4)(5)
	(in thousands, except per share amounts)			
Revenues:				
Products	\$358,139	\$ 456,832	\$334,610	\$303,667
Services	72,855	74,960	75,865	76,322
Total revenues	430,994	531,792	410,475	379,989
Cost of revenues:				
Cost of products	167,555	215,795	148,266	127,481
Cost of services	33,107	33,127	34,850	33,502
Total cost of revenues (exclusive of acquired intangible assets amortization shown separately below)	200,662	248,922	183,116	160,983
Gross profit	230,332	282,870	227,359	219,006
Operating expenses:				
Selling and administrative	79,174	81,425	78,794	76,289
Engineering and development	73,464	76,109	71,400	70,052
Acquired intangible assets amortization	19,994	16,244	8,487	7,923
Acquired intangible assets impairment	—	83,339	—	—
Goodwill impairment	—	254,946	—	—
Restructuring and other	1,587	2,608	12,177	5,570
Total operating expenses	174,219	514,671	170,858	159,834
Income (loss) from operations	56,113	(231,801)	56,501	59,172
Non-operating (income) expense:				
Interest income	(1,642)	(1,666)	(2,892)	(3,095)
Interest expense	710	691	633	1,604
Other (income) expense, net	(147)	(9)	(921)	1,779
Income (loss) before income taxes	57,192	(230,817)	59,681	58,884
Income tax provision (benefit)	7,206	(7,271)	(4,113)	(7,461)
Net income (loss)	\$ 49,986	\$(223,546)	\$ 63,794	\$ 66,345
Net income (loss) per common share—basic	\$ 0.24	\$ (1.10)	\$ 0.32	\$ 0.33
Net income (loss) per common share—diluted	\$ 0.24	\$ (1.10)	\$ 0.31	\$ 0.33
Cash dividend declared per common share	\$ 0.06	\$ 0.06	\$ 0.06	\$ 0.06

- (1) Restructuring and other includes a \$1.2 million fair value adjustment to increase the Universal Robots acquisition contingent consideration.

- (2) Restructuring and other includes \$4.2 million for an impairment of fixed assets, \$0.9 million for expenses related to an earthquake in Kumamoto, Japan, and a \$1.4 million fair value adjustment to increase contingent consideration liability, of which \$0.8 million was related to Universal Robots and \$0.6 million was related to AIT, partially offset by \$5.1 million of property insurance recovery related to the Japan earthquake.
- (3) Restructuring and other includes an \$8.0 million fair value adjustment to increase the Universal Robots acquisition contingent consideration.
- (4) Restructuring and other includes a \$5.4 million fair value adjustment to increase the Universal Robots acquisition contingent consideration.
- (5) Teradyne recorded pension and post retirement net actuarial (gains) losses of \$(1.2) million, \$(0.7) million, \$0.7 million and \$(2.0) million for the first, second, third, and fourth quarter in 2016, respectively. See Note B: “Accounting Policies” for a discussion of Teradyne’s accounting policy.

Item 9: *Changes in and disagreements with accountants on accounting and financial disclosure*

None.

Item 9A: *Controls and procedures*

Disclosure Controls and Procedures

As of the end of the period covered by this report, our management, with the participation of our CEO and CFO, evaluated the effectiveness of our disclosure controls and procedures pursuant to Rule 13a-15(b) promulgated under the Exchange Act. Based upon that evaluation, our CEO and CFO concluded that, as of the end of the period covered by this report, our disclosure controls and procedures were effective in ensuring that material information required to be disclosed by us in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC’s rules and forms, including ensuring that such material information is accumulated and communicated to our management, including our CEO and CFO, as appropriate to allow timely decisions regarding required disclosure.

Changes in Internal Control Over Financial Reporting

There was no change in our internal control over financial reporting during the fourth fiscal quarter ended December 31, 2017 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

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 Exchange Act Rule 13a-15(f). Under the supervision and with the participation of our management, including our CEO and CFO, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework in *Internal Control—Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on our evaluation under the framework in *Internal Control—Integrated Framework (2013)*, our management concluded that our internal control over financial reporting was effective as of December 31, 2017.

The effectiveness of our internal control over financial reporting as of December 31, 2017 has been audited by PricewaterhouseCoopers LLP, our independent registered public accounting firm, as stated in their report which is included under Item 8 of this Annual Report.

Inherent Limitations on Effectiveness of Controls

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.

Item 9B: *Other Information*

None.

PART III

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

Certain information relating to our directors and executive officers, committee information, reports and charters, executive compensation, security ownership of certain beneficial owners and management and related stockholder matters, and certain relationships and related transactions is incorporated by reference herein from our definitive proxy statement in connection with our Annual Meeting of Shareholders to be held on May 8, 2018. The proxy statement will be filed with the SEC not later than 120 days after the close of the fiscal year. For this purpose, the Compensation Committee Report included in such proxy statement is specifically not incorporated herein. Also see “Item 1: Business—Our Executive Officers.”

Item 11: *Executive Compensation*

Certain information relating to our directors and executive officers, executive compensation, security ownership of certain beneficial owners and management and related stockholder matters, and certain relationships and related transactions is incorporated by reference herein from our definitive proxy statement in connection with our Annual Meeting of Shareholders to be held on May 8, 2018. The proxy statement will be filed with the SEC not later than 120 days after the close of the fiscal year. For this purpose, the Compensation Committee Report included in such proxy statement is specifically not incorporated herein.

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

Certain information relating to our directors and executive officers, executive compensation, security ownership of certain beneficial owners and management and related stockholder matters, and certain relationships and related transactions is incorporated by reference herein from our definitive proxy statement in connection with our Annual Meeting of Shareholders to be held May 8, 2018. The proxy statement will be filed with the SEC not later than 120 days after the close of the fiscal year. For this purpose, the Compensation Committee Report included in such proxy statement is specifically not incorporated herein. Also see “Item 7: Management’s Discussion and Analysis of Financial Condition and Results of Operations—Equity Compensation Plans.”

Item 13: *Certain Relationships and Related Transactions, and Director Independence*

Certain information relating to our directors and executive officers, executive compensation, security ownership of certain beneficial owners and management and related stockholder matters, and certain relationships and related transactions is incorporated by reference herein from our definitive proxy statement in connection with our Annual Meeting of Shareholders to be held on May 8, 2018. The proxy statement will be filed with the SEC not later than 120 days after the close of the fiscal year. For this purpose, the Compensation Committee Report included in such proxy statement is specifically not incorporated herein.

Item 14: *Principal Accountant Fees and Services*

Certain information relating to audit fees and other of Teradyne’s independent registered public accounting firm is incorporated by reference herein from our definitive proxy statement in connection with our Annual Meeting of Shareholders to be held on May 8, 2018. The proxy statement will be filed with the SEC not later than 120 days after the close of the fiscal year. For this purpose, the Audit Committee Report included in such proxy statement is specifically not incorporated herein.

PART IV

Item 15: *Exhibits and Financial Statement Schedule.*

15(a)(1) Financial Statements

The following consolidated financial statements are included in Item 8:

	<u>Page</u>
Report of Independent Registered Public Accounting Firm	45
Consolidated Balance Sheets as of December 31, 2017 and 2016	47
Consolidated Statements of Operations for the years ended December 31, 2017, 2016 and 2015	48
Consolidated Statements of Comprehensive Income (Loss) for the years ended December 31, 2017, 2016 and 2015	49
Consolidated Statements of Shareholders' Equity for the years ended December 31, 2017, 2016 and 2015	50
Consolidated Statements of Cash Flows for the years ended December 31, 2017, 2016 and 2015	51

15(a)(2) Financial Statement Schedule

The following consolidated financial statement schedule is included in Item 15(c):

Schedule II—Valuation and Qualifying Accounts

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

15(a)(3) Listing of Exhibits

The Exhibits which are filed with this report or which are incorporated by reference herein are set forth in the Exhibit Index.

15(c) Financial Statement Schedules

TERADYNE, INC.

SCHEDULE II—VALUATION AND QUALIFYING ACCOUNTS

<u>Column A</u>	<u>Column B</u>	<u>Column C</u>	<u>Column D</u>	<u>Column E</u>	<u>Column F</u>
<u>Description</u>	<u>Balance at Beginning of Period</u>	<u>Additions Charged to Cost and Expenses</u>	<u>Other</u>	<u>Deductions</u>	<u>Balance at End of Period</u>
	(in thousands)				
Valuation reserve deducted in the balance sheet from the asset to which it applies:					
Accounts receivable:					
2017 Allowance for doubtful accounts	\$2,356	\$ 4	\$—	\$141	\$2,219
2016 Allowance for doubtful accounts	\$2,407	\$—	\$—	\$ 51	\$2,356
2015 Allowance for doubtful accounts	\$2,491	\$—	\$—	\$ 84	\$2,407

<u>Column A</u>	<u>Column B</u>	<u>Column C</u>	<u>Column D</u>	<u>Column E</u>	<u>Column F</u>
<u>Description</u>	<u>Balance at Beginning of Period</u>	<u>Additions Charged to Cost and Expenses</u>	<u>Other</u>	<u>Deductions</u>	<u>Balance at End of Period</u>
	(in thousands)				
Valuation reserve deducted in the balance sheet from the asset to which it applies:					
Inventory:					
2017 Inventory reserve	\$116,016	\$ 8,844	\$ (126)	\$21,838	\$102,896
2016 Inventory reserve	\$119,376	\$17,493	\$4,417	\$25,270	\$116,016
2015 Inventory reserve	\$111,252	\$21,332	\$1,680	\$14,888	\$119,376

<u>Column A</u>	<u>Column B</u>	<u>Column C</u>	<u>Column D</u>	<u>Column E</u>	<u>Column F</u>
<u>Description</u>	<u>Balance at Beginning of Period</u>	<u>Additions Charged to Cost and Expenses</u>	<u>Other</u>	<u>Deductions</u>	<u>Balance at End of Period</u>
	(in thousands)				
Valuation reserve deducted in the balance sheet from the asset to which it applies:					
Deferred taxes:					
2017 Valuation allowance	\$48,369	\$15,571	\$—	\$21	\$63,919
2016 Valuation allowance	\$43,039	\$ 5,413	\$—	\$83	\$48,369
2015 Valuation allowance	\$41,737	\$ 1,322	\$—	\$20	\$43,039

Item 16: Form 10-K Summary

Not applicable.

EXHIBIT INDEX

The following designated exhibits are, as indicated below, either filed herewith or have heretofore been filed with the Securities and Exchange Commission and are referred to and incorporated by reference to such filings.

Exhibit No.	Description	SEC Document Reference
2.1	Share Sale and Purchase Agreement by and among Teradyne Holdings Denmark ApS, Teradyne Inc. and the shareholders of Universal Robots A/S dated May 13, 2015.	Exhibit 2.1 to Teradyne’s Quarterly Report on Form 10-Q for the quarter ended July 5, 2015.
3.1	Restated Articles of Organization, as amended.	Exhibit 3.01 to Teradyne’s Quarterly Report on Form 10-Q for the quarter ended July 2, 2000.
3.2	Amended and Restated By-laws, as amended.	Exhibit 3.1 to Teradyne’s Quarterly Report on Form 10-Q for the quarter ended September 30, 2007.
4.1	Indenture dated as of December 12, 2016, between Teradyne Inc and Wilmington Trust, National Association, as trustee	Exhibit 4.1 to Teradyne’s Current Report on Form 8-K filed on December 12, 2016
10.1†	Standard Manufacturing Agreement entered into as of November 24, 2003 by and between Teradyne and Solectron.	Exhibit 10.1 to Teradyne’s Quarterly Report on Form 10-Q for the quarter ended September 30, 2007.
10.2†	Amendment 1 to Standard Manufacturing Agreement, dated as of January 18, 2007, by and between Teradyne and Solectron.	Exhibit 10.2 to Teradyne’s Quarterly Report on Form 10-Q for the quarter ended September 30, 2007.
10.3†	Second Amendment to Standard Manufacturing Agreement, dated as of August 27, 2007, by and between Teradyne and Solectron.	Exhibit 10.3 to Teradyne’s Quarterly Report on Form 10-Q for the quarter ended September 30, 2007.
10.4	Fifth Amendment to Standard Manufacturing Agreement, dated as of July 17, 2009, by and between Teradyne and Flextronics Corporation.	Exhibit 10.4 to Teradyne’s Annual Report on Form 10-K for the fiscal year ended December 31, 2009.
10.5†	Sixth Amendment to Standard Manufacturing Agreement, dated as of July 27, 2009, by and between Teradyne and Flextronics Corporation.	Exhibit 10.5 to Teradyne’s Annual Report on Form 10-K for the fiscal year ended December 31, 2009.
10.6	Addendum to Standard Manufacturing Agreement (Authorized Purchase Agreement)—Revised July 1, 2010.	Exhibit 10.6 to Teradyne’s Annual Report on Form 10-K for the fiscal year ended December 31, 2010.
10.7	Eighth Amendment to Standard Manufacturing Agreement, dated as of April 13, 2012, by and between Teradyne and Flextronics Sales & Marketing North Asia (L) LTD.	Exhibit 10.7 to Teradyne’s Annual Report on Form 10-K for the fiscal year ended December 31, 2012.
10.8†	Ninth Amendment to Standard Manufacturing Agreement, dated as of September 17, 2012, by and between Teradyne and Flextronics Sales & Marketing North Asia (L) LTD.	Exhibit 10.8 to Teradyne’s Annual Report on Form 10-K for the fiscal year ended December 31, 2012.

Exhibit No.	Description	SEC Document Reference
10.9	2006 Equity and Cash Compensation Incentive Plan, as amended.*	Exhibit 10.9 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2016.
10.10	Form of Performance-Based Restricted Stock Unit Agreement for Executive Officers under 2006 Equity and Cash Compensation Incentive Plan.*	Filed herewith.
10.11	Form of Time-Based Restricted Stock Unit Agreement for Executive Officers under 2006 Equity and Cash Compensation Incentive Plan.*	Filed herewith.
10.12	Form of Restricted Stock Unit Agreement for Directors under 2006 Equity and Cash Compensation Incentive Plan.*	Exhibit 10.12 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2016.
10.13	1996 Employee Stock Purchase Plan, as amended.*	Appendix B to Teradyne's Notice and Proxy Statement on Schedule 14A filed April 11, 2013.
10.14	Sub-Plan to the 1996 Employee Stock Purchase Plan for participants located in the European Union /European Economic Area.	Filed herewith.
10.15	Form of Executive Officer Stock Option Agreement under 2006 Equity and Cash Compensation Incentive Plan, as amended.*	Filed herewith.
10.16	Deferral Plan for Non-Employee Directors, as amended.*	Exhibit 10.2 to Teradyne's Quarterly Report on form 10-Q for the quarter ended September 28, 2008.
10.17	Supplemental Savings Plan, as amended and restated.*	Exhibit 10.18 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2008.
10.18	Supplemental Executive Retirement Plan, as restated.*	Exhibit 10.19 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2008.
10.19	Agreement Regarding Termination Benefits dated January 22, 2014 between Teradyne and Mark Jagiela.*	Exhibit 10.24 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2013.
10.20	Employment Agreement dated August 9, 2004 between Teradyne and Gregory R. Beecher.*	Exhibit 10.40 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended July 4, 2004.
10.21	Employment Agreement dated May 7, 2004 between Teradyne and Mark Jagiela.*	Exhibit 10.37 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended July 4, 2004.
10.22	Amended and Restated Executive Officer Change in Control Agreement dated December 30, 2008 between Teradyne and Gregory R. Beecher, as amended.*	Exhibit 10.28 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2012.

Exhibit No.	Description	SEC Document Reference
10.23	Executive Officer Change in Control Agreement dated January 22, 2014 between Teradyne and Mark Jagiela, as amended.*	Exhibit 10.29 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2013.
10.24	Amended and Restated Executive Officer Change in Control Agreement dated May 26, 2009 between Teradyne and Charles J. Gray, as amended.*	Exhibit 10.30 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2012.
10.25	Employment Agreement dated July 24, 2009 between Teradyne and Charles J. Gray.*	Exhibit 10.1 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended April 4, 2010.
10.26	Amended and Restated Executive Officer Change in Control Agreement dated June 30, 2012 between Teradyne and Walter G. Vahey, as amended.*	Exhibit 10.32 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2012.
10.27	Employment Agreement dated February 6, 2013 between Teradyne and Walter G. Vahey.*	Exhibit 10.33 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2012.
10.28	Executive Officer Change in Control Agreement dated September 1, 2014 between Teradyne, Inc. and Bradford Robbins.*	Exhibit 10.1 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended September 28, 2014.
10.29	Employment Agreement dated September 1, 2014 between Teradyne, Inc. and Bradford Robbins.*	Exhibit 10.2 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended September 28, 2014.
10.30	Executive Change in Control Agreement dated February 8, 2016 between Teradyne, Inc. and Greg Smith.	Exhibit 10.1 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended April 3, 2016.
10.31	Employment Agreement dated February 8, 2016 between Teradyne, Inc. and Greg Smith.	Exhibit 10.2 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended April 3, 2016.
10.32	Form of Indemnification Agreement.*	Exhibit 10.24 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2006.
10.33	Nextest Systems Corporation 1998 Equity Incentive Plan, as amended.	Exhibit 10.33 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2008.
10.34	Nextest Systems Corporation 2006 Equity Incentive Plan.	Exhibit 10.34 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2008.
10.35	Eagle Test Systems, Inc. 2003 Stock Option and Grant Plan.	Exhibit 10.35 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2008.
10.36	Eagle Test Systems, Inc. 2006 Stock Option and Incentive Plan.	Exhibit 10.36 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2008.

Exhibit No.	Description	SEC Document Reference
10.37	LitePoint Corporation 2002 Stock Plan.	Exhibit 10.43 to Teradyne's Annual Report on Form 10-K for the fiscal year ended December 31, 2011.
10.38	Credit Agreement among Teradyne, Inc., Barclays Bank PLC, as the administrative agent and collateral agent, and the lenders party thereto dated April 27, 2015.	Exhibit 10.1 to Teradyne's Current Report on Form 8-K filed May 1, 2015.
10.39	Amendment No. 1 to Credit Agreement dated as of May 19, 2015 among Teradyne Inc., Barclays Bank PLC, as the administrative agent, and the lenders party thereto.	Exhibit 10.2 to Teradyne's Quarterly Report on Form 10-Q for the quarter ended July 5, 2015.
10.40	Letter Agreement, dated December 6, 2016, between Barclays Bank PLC and Teradyne, Inc., regarding the Base Warrants.	Exhibit 10.1 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.41	Letter Agreement, dated December 6, 2016, between Bank of America, N.A., and Teradyne, Inc. regarding the Base Warrants.	Exhibit 10.2 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.42	Letter Agreement, dated December 6, 2016, between Wells Fargo Bank, National Association and Teradyne, Inc. regarding the Base Warrants.	Exhibit 10.3 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.43	Letter Agreement, dated December 6, 2016, between Barclays Bank PLC and Teradyne, Inc. regarding the Base Call Option Transaction.	Exhibit 10.4 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.44	Letter Agreement, dated December 6, 2016, between Bank of America, N.A. and Teradyne, Inc. regarding the Base Call Option Transaction.	Exhibit 10.5 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.45	Letter Agreement, dated December 6, 2016, between Wells Fargo Bank, National Association and Teradyne, Inc. regarding the Base Call Option Transaction.	Exhibit 10.6 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.46	Letter Agreement, dated December 9, 2016, between Barclays Bank PLC and Teradyne, Inc., regarding the Additional Warrants	Exhibit 10.7 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.47	Letter Agreement, dated December 9, 2016, between Bank of America, N.A., and Teradyne, Inc. regarding the Additional Warrants.	Exhibit 10.8 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.48	Letter Agreement, dated December 9, 2016, between Wells Fargo Bank, National Association and Teradyne, Inc. regarding the Additional Warrants.	Exhibit 10.9 to Teradyne's Current Report on Form 8-K filed December 12, 2016.

<u>Exhibit No.</u>	<u>Description</u>	<u>SEC Document Reference</u>
10.49	Letter Agreement, dated December 9, 2016, between Barclays Bank PLC and Teradyne, Inc. regarding the Additional Call Option Transaction.	Exhibit 10.10 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.50	Letter Agreement, dated December 9, 2016, between Bank of America, N.A. and Teradyne, Inc. regarding the Additional Call Option Transaction	Exhibit 10.11 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
10.51	Letter Agreement, dated December 9, 2016, between Wells Fargo Bank, National Association and Teradyne, Inc. regarding the Additional Call Option Transaction.	Exhibit 10.12 to Teradyne's Current Report on Form 8-K filed December 12, 2016.
21.1	Subsidiaries of Teradyne.	Filed herewith.
23.1	Consent of PricewaterhouseCoopers LLP.	Filed herewith.
31.1	Rule 13a-14(a) Certification of Principal Executive Officer.	Filed herewith.
31.2	Rule 13a-14(a) Certification of Principal Financial Officer.	Filed herewith.
32.1	Section 1350 Certification of Principal Executive Officer.	Furnished herewith.
32.2	Section 1350 Certification of Principal Financial Officer.	Furnished herewith.
101.INS	XBRL Instance Document	
101.SCH	XBRL Taxonomy Extension Schema Document	
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document	
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document	
101.LAB	XBRL Taxonomy Extension Label Linkbase Document	
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document	

† -Confidential treatment granted.

* -Management contract or compensatory plan.

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 this 1st day of March, 2018.

TERADYNE, INC.

By: /s/ GREGORY R. BEECHER

Gregory R. Beecher,
Vice President, Chief Financial Officer and
Treasurer

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>Signature</u>	<u>Title</u>	<u>Date</u>
<u> /s/ ROY A. VALLEE </u> Roy A. Vallee	Chair of the Board	March 1, 2018
<u> /s/ MARK E. JAGIELA </u> Mark E. Jagiela	Chief Executive Officer (Principal Executive Officer)	March 1, 2018
<u> /s/ GREGORY R. BEECHER </u> Gregory R. Beecher	Vice President, Chief Financial Officer and Treasurer (Principal Financial and Accounting Officer)	March 1, 2018
<u> /s/ MICHAEL A. BRADLEY </u> Michael A. Bradley	Director	March 1, 2018
<u> /s/ DANIEL W. CHRISTMAN </u> Daniel W. Christman	Director	March 1, 2018
<u> /s/ EDWIN J. GILLIS </u> Edwin J. Gillis	Director	March 1, 2018
<u> /s/ TIMOTHY E. GUERTIN </u> Timothy E. Guertin	Director	March 1, 2018
<u> /s/ MERCEDES JOHNSON </u> Mercedes Johnson	Director	March 1, 2018
<u> /s/ MARILYN MATZ </u> Marilyn Matz	Director	March 1, 2018
<u> /s/ PAUL J. TUFANO </u> Paul J. Tufano	Director	March 1, 2018

Exhibit 21.1

Present Subsidiaries

Entity Name:	State or Jurisdiction Of Incorporation	Percentage of Voting Securities Owned
Teradyne (Asia) Pte., Ltd.	Singapore	100%*
Teradyne Canada Limited	Canada	100%
Teradyne de Costa Rica S.A.	Costa Rica	100%
Teradyne GmbH	Germany	100%*
Teradyne Holdings Denmark ApS	Denmark	100%*
Teradyne (India) Engineering Private Ltd.	India	100%*
Teradyne International Holdings B.V.	The Netherlands	100%
Teradyne Italia SrL	Italy	100%*
Teradyne K.K.	Japan	100%
Teradyne Korea Ltd.	Republic of Korea	100%*
Teradyne Limited	United Kingdom	100%*
Teradyne Malaysia Sdn. Bhd.	Malaysia	100%*
Teradyne Philippines Limited	Delaware	100%*
Teradyne SAS	France	100%
Teradyne (Shanghai) Co., Ltd.	Peoples Republic of China	100%*
Teradyne Taiwan LLC	Delaware	100%*
Teradyne Thailand Ltd.	Delaware	100%*
GenRad, LLC	Delaware	100%
Herco Technology Corp.	California	100%
P.L.S.T., Inc. (f/k/a Perception Laminates, Inc.)	California	100%
Eagle Test Systems, Inc.	Delaware	100%
Nextest Systems Corporation	Delaware	100%
Nextest Systems (Philippines) Corp.	Philippines	99.9%*
LitePoint Corporation	Delaware	100%
LitePoint Europe A/S\	Denmark	100%*
LitePoint Technology Limited	Hong Kong	100%*
LitePoint Technology (Shanghai) Company Ltd.	Peoples Republic of China	100%*
LitePoint Japan K.K.	Japan	100%*
LitePoint Design Test, LLC	New Mexico	100%*
LitePoint Vietnam Limited	Socialist Republic of Vietnam	100%*
Universal Robots A/S	Denmark	100%*
Universal Robots (Spain) S.L.	Spain	100%*
Universal Robots (Singapore) Pte. Ltd.	Singapore	100%*
Universal Robots (India) Pte. Ltd.	India	100%*
Universal Robots (Shanghai) Co. Ltd.	Peoples Republic of China	100%*
Universal Robots (USA), Inc.	Delaware	100%
Universal Robots GmbH	Germany	100%*
Universal Robots Mexico, S.A. de C.V.	Mexico	100%*

* Indirect subsidiaries whose voting securities are 100% controlled by Teradyne, Inc.

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-8 (Nos. 333-188824; 333-177246; 333-159723; 333-155564; 333-149017; 333-143231; 333-134519; 333-116632; 333-101983; 333-68074; 333-56373; 333-32547; and 333-07177) of Teradyne, Inc. of our report dated March 1, 2018 relating to the consolidated financial statements, financial statement schedule and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP

Boston, Massachusetts

March 1, 2018

CERTIFICATIONS

I, Mark E. Jagiela, certify that:

1. I have reviewed this annual report on Form 10-K of Teradyne, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officers 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 officers 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 controls 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: March 1, 2018

By: /s/ MARK E. JAGIELA

Mark E. Jagiela
Chief Executive Officer

I, Gregory R. Beecher, certify that:

1. I have reviewed this annual report on Form 10-K of Teradyne, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officers 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 officers 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 controls 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: March 1, 2018

By: /s/ GREGORY R. BEECHER

Gregory R. Beecher
Chief Financial Officer

**CERTIFICATION PURSUANT TO
18 U.S.C SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Annual Report of Teradyne, Inc. (the “Company”) on Form 10-K for the period ending December 31, 2017 as filed with the Securities and Exchange Commission on the date hereof (the “Report”), I, Mark E. Jagiela, Chief Executive Officer of the Company, certify pursuant to 18 U.S.C Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to the best of my knowledge:

(1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ MARK E. JAGIELA

Mark E. Jagiela
Chief Executive Officer

March 1, 2018

**CERTIFICATION PURSUANT TO
18 U.S.C SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

In connection with the Annual Report of Teradyne, Inc. (the “Company”) on Form 10-K for the period ending December 31, 2017 as filed with the Securities and Exchange Commission on the date hereof (the “Report”), I, Gregory R. Beecher, Chief Financial Officer of the Company, certify pursuant to 18 U.S.C Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to the best of my knowledge:

(1) The Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

 /s/ GREGORY R. BEECHER

**Gregory R. Beecher
Chief Financial Officer**

March 1, 2018