

COHERENT INC

Form 10-K

November 27, 2018

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UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

WASHINGTON, D.C. 20549

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FORM 10-K

(Mark One)

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

For the Fiscal Year Ended September 29, 2018

or

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

Commission File Number: 001-33962

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COHERENT, INC.

Delaware

94-1622541

(State or other jurisdiction of  
incorporation or organization)

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

5100 Patrick Henry Drive, Santa Clara, California 95054

(Address of principal executive offices) (Zip Code)

Registrant's telephone number, including area code: (408) 764-4000

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

Title of each class	Name of each exchange on which registered
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Common Stock, \$0.01 par value	The NASDAQ Stock Market LLC Nasdaq Global Select Market
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Securities registered pursuant to Section 12(g) of the Act: None

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

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934 (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 every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§229.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files. Yes  No

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

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

Large accelerated filer <input checked="" type="checkbox"/>	Accelerated filer <input type="checkbox"/>	Non-accelerated filer <input type="checkbox"/>	Smaller reporting company <input type="checkbox"/>	Emerging growth company <input type="checkbox"/>
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Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes  No

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As of November 23, 2018, 24,379,270 shares of common stock were outstanding. The aggregate market value of the voting shares (based on the closing price reported on the NASDAQ Global Select Market on March 31, 2018) of Coherent, Inc., held by nonaffiliates was approximately \$3,089,114,531. For purposes of this disclosure, shares of common stock held by persons who own 5% or more of the outstanding common stock and shares of common stock held by each officer and director have been excluded in that such persons may be deemed to be "affiliates" as that term is defined under the Rules and Regulations of the Exchange Act. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

**DOCUMENT INCORPORATED BY REFERENCE**

Portions of the registrant's Proxy Statement for the registrant's 2019 Annual Meeting of Stockholders are incorporated by reference into Part III of the Form 10-K to the extent stated herein. The Proxy Statement or an amended report on Form 10-K will be filed within 120 days of the registrant's fiscal year ended September 29, 2018.

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## SPECIAL NOTE REGARDING FORWARD LOOKING STATEMENTS

This annual report contains certain forward-looking statements. These forward-looking statements include, without limitation, statements relating to:

- expansion into, and financial returns from, new markets;
- maintenance and development of current and new customer relationships;
- enhancement of market position through existing or new technologies;
- timing of new product introductions and shipments;
- optimization of product mix;
- future trends in microelectronics, scientific research and government programs, OEM components and instrumentation and materials processing;
- utilization of vertical integration;
- adoption of our products or lasers generally;
- applications and processes that will use lasers, including the suitability of our products;
- capitalization on market trends;
- alignment with current and new customer demands;
- positioning in the marketplace and gains of market share;
- design and development of products, services and solutions;
- control of supply chain and partners;
- protection of intellectual property rights;
- compliance with environmental and safety regulations;
- net sales and operating results, including expected decreases in fiscal 2019 and subsequent expected recovery in fiscal 2020;
- effect of global economic conditions, including in particular resulting from U.S. and Chinese trade policies;
- capital spending;
- order volumes;
- fluctuations in backlog, including potential for cancellation or rescheduling of orders;
- variations in stock price;
- growth in our operations;
- trends in our revenues, particularly as a result of seasonality;
- controlling our costs;
- sufficiency and management of cash, cash equivalents and investments;
- acquisition efforts, payment methods for acquisitions and utilization of technology from our acquisitions, and potential synergies and benefits, including completion of post-acquisition integration and restructuring processes, in particular with respect to our acquisition of Rofin Sinar Technologies, Inc.;
- sales by geography;
- effect of legal claims;
- expectations regarding the payment of future dividends;

- effect of competition on our financial results;
- plans to renew leases when they expire;
- compliance with standards;
- effect of our internal controls;
- optimization of financial results;
- repatriation of funds;
- accounting for goodwill and intangible assets, inventory valuation, warranty reserves and taxes; and
- impact from our use of financial instruments.

In addition, we include forward-looking statements under the "Our Strategy" and "Future Trends" headings set forth below in "Business".

You can identify these and other forward-looking statements by the use of the words such as "may," "will," "could," "would," "should," "expects," "plans," "anticipates," "estimates," "intends," "potential," "projected," "continue," "our observation," or the negative of such terms, or other comparable terminology. Forward-looking statements also include the assumptions underlying or relating to any of the foregoing statements.

Our actual results could differ materially from those anticipated in these forward-looking statements as a result of various factors, including those set forth below in "Business," "Management's Discussion and Analysis of Financial Condition and Results of Operations" and under the heading "Risk Factors." All forward-looking statements included in this document are based on information available to us on the date hereof. We undertake no obligation to update these forward-looking statements as a result of events or circumstances or to reflect the occurrence of unanticipated events or non-occurrence of anticipated events, except to the extent required by law.

## PART I

### ITEM 1. BUSINESS

#### GENERAL

##### Business Overview

Our fiscal year ends on the Saturday closest to September 30. Fiscal years 2018, 2017 and 2016 ended on September 29, September 30, and October 1, respectively, and are referred to in this annual report as fiscal 2018, fiscal 2017 and fiscal 2016 for convenience. Each of fiscal 2018, 2017 and 2016 included 52 weeks.

We are one of the world's leading providers of lasers, laser-based technologies and laser-based system solutions in a broad range of commercial, industrial and scientific applications. We design, manufacture, service and market lasers and related accessories for a diverse group of customers. Since inception in 1966, we have grown through internal expansion and through strategic acquisitions of complementary businesses, technologies, intellectual property, manufacturing processes and product offerings.

We are organized into two reporting segments: OEM Laser Sources ("OLS") and Industrial Lasers & Systems ("ILS"), based on the organizational structure of the company and how the chief operating decision maker ("CODM") receives and utilizes information provided to allocate resources and make decisions. This segmentation reflects the go-to-market strategies and synergies for our broad portfolio of laser technologies and products. While both segments deliver cost-effective, highly reliable photonics solutions, the OLS business segment is focused on high performance laser sources and complex optical sub-systems typically used in microelectronics manufacturing, medical diagnostics and therapeutic medical applications, as well as in scientific research. Our ILS business segment delivers high performance laser sources, sub-systems and tools primarily used for industrial laser materials processing, serving important end markets like automotive, machine tool, consumer goods and medical device manufacturing.

Income from continuing operations is the measure of profit and loss that our CODM uses to assess performance and make decisions. Income from continuing operations represents the sales less the cost of sales and direct operating expenses incurred within the operating segments as well as allocated expenses such as shared sales and manufacturing costs. We do not allocate to our operating segments certain operating expenses, which we manage separately at the corporate level. These unallocated costs include stock-based compensation and corporate functions (certain advanced research and development, management, finance, legal and human resources) and are included in Corporate and other. Management does not consider unallocated Corporate and other costs in its measurement of segment performance. We were originally incorporated in California on May 26, 1966 and reincorporated in Delaware on October 1, 1990. Our common stock is listed on the NASDAQ Global Select Market and we are a member of the Standard & Poor's MidCap 400 Index and the Russell 1000 Index.

Additional information about Coherent, Inc. (referred to herein as the Company, we, our, or Coherent) is available on our web site at [www.coherent.com](http://www.coherent.com). We make available, free of charge on our web site, access to our annual report on Form 10-K, our quarterly reports on Form 10-Q, our current reports on Form 8-K and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended (the "Exchange Act"), as soon as reasonably practicable after we file or furnish them electronically with the Securities and Exchange Commission ("SEC"). Information contained on our web site is not part of this annual report or our other filings with the SEC. Any product, product name, process, or technology described in these materials is the property of Coherent.

#### RECENT EVENTS

On October 28, 2018, our board of directors authorized a stock repurchase program authorizing the Company to repurchase up to \$250.0 million of our common stock through December 31, 2019, with a limit of no more than \$75.0 million per quarter.

On March 8, 2018, we acquired privately held O.R. Lasertechnologie GmbH and certain assets of its U.S.-based affiliate (collectively "OR Laser") for approximately \$47.4 million, excluding transaction costs. OR Laser produces laser-based material processing equipment for a variety of uses, including additive manufacturing, welding, cladding, marking, engraving and drilling. See Note 3, "Business Combinations" in the Notes to Consolidated Financial Statements under Item 15 of this annual report.

On February 6, 2018, our board of directors authorized a stock repurchase program authorizing the Company to repurchase up to \$100.0 million of our common stock from time to time through January 31, 2019. During the three and nine

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months ended June 30, 2018, we repurchased and retired 574,946 shares of outstanding common stock under this program at an average price of \$173.91 per share for a total of \$100.0 million.

During fiscal 2018, we made payments on our senior secured term loan facility ("Euro Term Loan") of a total of 141.7 million Euros, including voluntary payments of a total of 135.0 million Euros.

On November 7, 2016, we completed our acquisition of Rofin Sinar Technologies, Inc. ("Rofin") pursuant to the Merger Agreement dated March 16, 2016. Rofin was one of the world's leading developers and manufacturers of high-performance industrial laser sources and laser-based solutions and components. As a condition of the acquisition, we were required to divest and hold separate Rofin's low power CO<sub>2</sub> laser business based in Hull, United Kingdom (the "Hull Business"), and reported this business separately as a discontinued operation until its divestiture. We completed the divestiture of the Hull Business on October 11, 2017, after receiving approval for the terms of the sale from the European Commission. On April 27, 2018, we completed the sale of several entities that we acquired in our acquisition of Rofin. See Note 18, "Discontinued Operations and Sale of Assets Held for Sale" in the Notes to Consolidated Financial Statements

#### INDUSTRY BACKGROUND

The word "laser" is an acronym for "light amplification by stimulated emission of radiation." A laser emits an intense coherent beam of light with some unique and highly useful properties. Most importantly, a laser is orders of magnitude brighter than any lamp. As a result of its coherence, the beam can be focused to a very small and intense spot, useful for applications requiring very high power densities including cutting and other materials processing procedures. The laser's high spatial resolution is also useful for microscopic imaging and inspection applications. Laser light can be monochromatic—all of the beam energy is confined to a narrow wavelength band. Some lasers can be used to create ultrafast output—a series of pulses with pulse durations as short as attoseconds (10<sup>-18</sup> seconds).

There are many types of lasers and one way of classifying them is by the material or medium used to create the lasing action. This can be in the form of a gas, liquid, semiconductor, solid state crystal or fiber. Lasers can also be classified by their output wavelength: ultraviolet, visible, infrared or wavelength tunable. We manufacture all of these laser types. There are also many options in terms of pulsed output versus continuous wave, pulse duration, output power, beam dimensions, etc. In fact, each application has its own specific requirements in terms of laser performance. The broad technical depth at Coherent enables us to offer a diverse set of product lines characterized by lasers targeted at growth opportunities and key applications. In all cases, we aim to be the supplier of choice by offering a high-value combination of superior technical performance and high reliability.

Photonics has taken its place alongside electronics as a critical enabling technology for the twenty-first century. Photonics based solutions are entrenched in a broad array of industries that include microelectronics, flat panel displays, machine tool, automotive, and medical diagnostics, with adoption continuing in ever more diverse applications. Growth in these applications stems from two sources. First, there are many applications where the laser is displacing conventional technology because it can do the job faster, better or more economically (e.g. sheet metal cutting). Second, there are new applications where the laser is the enabling tool that makes the work possible, as in the conversion of amorphous silicon into poly crystalline silicon at low temperatures, where lasers are used in the manufacturing of high resolution flexible OLED displays found in the latest smart phones, tablets and laptop computers.

Key laser applications include: semiconductor inspection; manufacturing of advanced printed circuit boards ("PCBs"); flat panel display manufacturing; solar cell production; medical and bio-instrumentation; materials processing; metal cutting and welding; industrial process and quality control; marking; imaging and printing; graphic arts and display; and research and development. For example, ultraviolet ("UV") lasers are enabling the continuous move towards miniaturization, which drives innovation and growth in many markets. In addition, the advent of industrial grade ultrafast lasers continues to open up new applications for laser processing.

Coherent occupies a unique position in the industry thanks to the breadth and depth of our product and technology portfolio, which includes lasers, optics, laser beam delivery components and laser systems. Working closely with our customers we have developed specialized solutions that include lasers, delivery and process optics in complete assemblies (sub-systems or "rails"), and for certain applications and markets we have also developed parts handling and automation to build complete laser production systems or tools.

#### OUR STRATEGY

We strive to develop innovative and proprietary products and solutions that meet the needs of our customers and that are based on our core expertise in lasers and optical technologies. In pursuit of our strategy, we intend to:

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Leverage our technology portfolio and application engineering to lead the proliferation of photonics into broader markets—We will continue to identify opportunities in which our technology portfolio and application engineering can be used to offer innovative solutions and gain access to new markets. We plan to utilize our expertise to increase our market share in the mid to high power material processing applications.

Streamline our manufacturing structure and improve our cost structure—We will focus on optimizing the mix of products that we manufacture internally and externally. We will utilize vertical integration where our internal manufacturing process is considered proprietary and seek to leverage external sources when the capabilities and cost structure are well developed and on a path towards commoditization.

Focus on long-term improvement of adjusted EBITDA, in dollars and as a percentage of net sales—We define adjusted EBITDA as operating income adjusted for depreciation, amortization, stock-based compensation expense, major restructuring costs and certain other non-operating income and expense items, such as costs related to our acquisition of Rofin. Key initiatives for EBITDA improvements include utilization of our Asian manufacturing locations, optimizing our supply chain and continued leveraging of our infrastructure.

Optimize our leadership position in existing markets—There are a number of markets where we have historically been at the forefront of technological development and product deployment and from which we have derived a substantial portion of our revenues. We plan to optimize our financial returns from these markets.

Maintain and develop additional strong collaborative customer and industry relationships—We believe that the Coherent brand name and reputation for product quality, technical performance and customer satisfaction will help us to further develop our loyal customer base. We plan to maintain our current customer relationships and develop new ones with customers who are industry leaders and work together with these customers to design and develop innovative product systems and solutions as they develop new technologies.

Develop and acquire new technologies and market share—We will continue to enhance our market position through our existing technologies and develop new technologies through our internal research and development efforts, as well as through the acquisition of additional complementary technologies, intellectual property, manufacturing processes and product offerings.

#### APPLICATIONS

Our products address a broad range of applications that we group into the following markets: Microelectronics, Materials Processing, OEM Components and Instrumentation and Scientific and Government Programs.

The following table sets forth, for the periods indicated, the percentages of total net sales by market application:

	Fiscal 2018	Fiscal 2017	Fiscal 2016			
	Percentage of total net sales	Percentage of total net sales	Percentage of total net sales			
Consolidated:						
Microelectronics	54.5 %	51.9 %	53.1 %			
Materials processing	27.4 %	29.7 %	14.5 %			
OEM components and instrumentation	11.6 %	11.8 %	18.8 %			
Scientific and government programs	6.5 %	6.6 %	13.6 %			
Total	100.0 %	100.0 %	100.0 %			

#### Microelectronics

Nowhere is the trend towards miniaturization and higher performance more prevalent than in the Microelectronics market where smart phones, tablets, personal computers ("PC's"), televisions ("TV's") and "wearables" are driving advances in displays, integrated circuits and PCBs. In response to market demands and consumer expectations, semiconductor and device manufacturers are continually seeking to improve their process and design technologies in order to manufacture smaller, more powerful and more reliable devices at lower cost. New laser applications and new laser technologies are a key element in delivering higher resolution and higher precision at lower manufacturing cost. We support three major markets in the microelectronics industry: (1) flat panel display ("FPD") manufacturing, (2) advanced packaging and interconnects ("API") and (3) semiconductor front-end ("SEMI").



#### Microelectronics—flat panel display manufacturing

The high-volume consumer market is driving the production of FPDs in applications such as mobile phones, tablets, laptop computers, TVs and wearables. There are several types of established and emerging displays based on quite different technologies, including liquid crystal ("LCD") and organic light emitting diodes ("OLED"). Each of these technologies utilize laser applications in their manufacturing process to enable improved yields, higher process speed, improved battery life, lower cost and/or superior display brightness, resolution and refresh rates.

Several display types require a high-density pattern of silicon thin film transistors ("TFTs"). If this silicon is polycrystalline as opposed to amorphous, the display performance is greatly enhanced. In the past, these polysilicon layers could only be produced on expensive special glass at high temperatures. However, excimer-based processes, such as excimer laser annealing ("ELA") have allowed high-volume production of low-temperature polysilicon ("LTPS") on conventional glass substrates as well as flexible displays based on plastic substrates. Our excimer lasers provide a unique solution for LTPS because they are the only industrial-grade excimer lasers optimized for this application. The current state-of-the-art product for this application is our excimer Vyper laser and Linebeam systems. These systems deliver power ranges of 1200W to 3600W, depending on the system, enabling a critical manufacturing process step with Generation 4, 5, 5.5 and 6 substrates. These systems are integral to the manufacturing process on all leading LTPS-based smart phone displays, with the highest commercially available pixel densities of greater than 300 pixels per inch (ppi), with the current trends going to even higher ppi (~500 ppi) for high end smart phones, and hold the potential for deployment in tablet, laptop and OLED TV displays. Excimer based LTPS is also enabling flexible OLED displays which have recently undergone rapid growth as they have been adopted into smart phones.

A modern flat panel display incorporates a number of different layers, some of which are thin films that need to be cut or structured. As film thicknesses decrease over time, lasers are becoming the tool of choice to process these materials. Our DIAMOND CO<sub>2</sub> and Rapid series ultrafast lasers are used for cutting FPD films.

We have developed a proprietary technology for cutting of brittle materials such as glass and sapphire without debris and with zero kerf called SMART Cleave™, which is used for cutting brittle materials used in displays. This technology uses ultrafast lasers coupled with proprietary optics.

Our AVIA, Rapid, Monaco and DIAMOND CO<sub>2</sub> and CO lasers are also used in other production processes for FPDs. These processes include drilling, cutting, patterning, marking and yield improvement.

#### Microelectronics—advanced packaging and interconnects

After a wafer is patterned, there are then a host of other processes, referred to as back-end processing, which finally result in a packaged encapsulated silicon chip. Ultimately, these chips are then assembled into finished products. The advent of high-speed logic and high-memory content devices has caused chip manufacturers to look for alternative technologies to improve performance and lower process costs. This search includes new types of materials, such as low-k and thinner silicon. Our AVIA, Rapid, Monaco and Matrix lasers provide economical methods of cutting and scribing these wafers while delivering higher yields than traditional mechanical methods.

There are similar trends in chip packaging and PCB manufacturing requiring more compact packaging and denser interconnects. In many cases, lasers present enabling technologies. For instance, lasers are now the only economically practical method for drilling microvias in chip substrates and in both rigid and flexible PCBs. These microvias are tiny interconnects that are essential for enabling high-density circuitry commonly used in smart phones, tablets and advanced computing systems. Our DIAMOND CO<sub>2</sub> and AVIA diode pumped solid state ("DPSS") lasers are the lasers of choice in this application. The ability of these lasers to operate at very high repetition rates translates into faster drilling speeds and increased throughput in microvia processing applications. In addition, multi-layer circuit boards require more flexible production methods than conventional printing technologies can offer, which has led to widespread adoption of laser direct imaging ("LDI"). Our Paladin laser is used for this application.

#### Microelectronics—semiconductor front-end

The term "front-end" refers to the production of semiconductor devices which occurs prior to packaging.

As semiconductor device geometries decrease in size, devices become increasingly susceptible to smaller defects during each phase of the manufacturing process and these defects can negatively impact yield. One of the semiconductor industry's responses to the increasing vulnerability of semiconductor devices to smaller defects has been to use defect detection and inspection techniques that are closely linked to the manufacturing process.

Detecting the presence of defects is only the first step in preventing their recurrence. After detection, defects must be examined in order to identify their size, shape and the process step in which the defect occurred. This examination is called

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defect classification. Identification of the sources of defects in the lengthy and complex semiconductor manufacturing process has become essential for maintaining high yield production. Semiconductor manufacturing has become an around-the-clock operation and it is important for products used for inspection, measurement and testing to be reliable and to have long lifetimes. Our Azure, Paladin, Excimer and ion lasers are used to detect and characterize defects in semiconductor chips.

#### Materials processing

The materials processing segment is comprised of four major markets: (1) automotive, (2) machine tool, (3) medical device and (4) consumer goods, as well a number of smaller markets. It is the most diverse of all the segments we serve and a large cross section of our products are used in this segment. Our sales in this segment include laser sources, laser sources with beam delivery optics (laser rails), beam delivery components, laser diagnostic equipment and complete laser systems (tools). At a high level, the drivers for laser deployment within the materials processing segment are faster processing with higher yields, processing of new and novel materials, more environmentally friendly processes and higher precision. With the broadest product portfolio in the laser industry, we offer solutions for almost any application on any material to our customers. The most common applications include cutting, welding, joining, drilling, perforating, scribing, engraving and marking.

Lasers are used in a number of applications in the automotive industry, from fine processing of high precision parts to marking, as well as cutting of metals and welding large components such as gear boxes and car bodies. We serve this industry with a number of our products including ultrafast, DPSS, CO<sub>2</sub>, diode and fiber lasers as well as rails and tools in the areas of marking, scribing, cutting and welding.

In the machine tool industry lasers have been the solution of choice for cutting metal for some time. Traditionally this was a market for high power CO<sub>2</sub> lasers, but with the advent of high power fiber lasers, a transition away from CO<sub>2</sub> took place in many applications. That transition is substantially done since fiber lasers are used in the majority of metal cutting applications. We serve this market with our high power fiber and CO<sub>2</sub> lasers. As a fully vertically integrated fiber and laser diode supplier, we are able to produce all key components in-house. We have a complete line of high power fiber lasers in power levels up to 10 kW. We offer lasers with different performance points in terms of power levels and beam profiles to address specific applications, including single mode lasers and advanced beam shaping options, e.g. the ARM advanced high power fiber laser where the beam parameters can be optimized to reach higher quality welds and translate into higher customer yields. Additive manufacturing or 3D printing is another growing market where lasers have seen rapid growth. We serve this market with laser selective laser melting (SLM) systems for 3D printing of metal parts called Laser Creator as well as CO<sub>2</sub> and DPSS lasers.

The medical device market is characterized by its need for high precision manufacturing with high levels of quality control which lends itself very well to laser manufacturing. Applications include fine cutting and welding in addition to corrosive resistant marking. We serve this market with a number of lasers as well as a portfolio of tools.

In the consumer goods market, we serve a large variety of applications in packaging, digital printing, jewelry, textiles, security and consumer electronics. We serve these industries with almost all of our products from lasers to laser tools. As a consequence, this broad segment represents a stable and growing market for us.

In summary, we serve the materials processing segment with a very broad product portfolio. Laser sources include the Diamond series mid-power CO and CO<sub>2</sub> lasers; the DC series of high power CO<sub>2</sub> lasers; Highlight FL high power fiber lasers; the DF series of high power diode laser systems; the Diamond mid-power and Q-Switched fiber; the COMPACT, MINI and EVOLUTION series of low and mid power diode lasers; the AViA, Matrix, Flare, Helios and LDP DPSS lasers; the Monaco and Rapid series of ultrafast lasers; and the SLS, KLS, FLS and NA series of lamp pumped lasers. Laser tools include the Performance, Select and Integral series of manual welding systems; the UW and MPS series of modular and highly configurable laser processing systems; the EasyMark, EasyJewel, LabelMarker Advanced and Combiline laser marking systems; the META laser cutting tools; and the PWS mini welding system. Laser rails, i.e. laser sources combined with software, beam delivery, processing heads, process monitoring, pattern recognition and vision, include the PowerLine series for marking; the StarFiber for welding and cutting; the PWS welding system; the QFS laser scribing system; and the PerfoLas and StarShape CO<sub>2</sub> laser based systems.

#### OEM components and instrumentation

Instrumentation is one of our more mature commercial applications. Representative applications within this market include bio-instrumentation, medical OEMs, graphic arts and display, machine vision and defense applications. We

also support the laser-based instrumentation market with a range of laser-related components, including diode lasers and optical fibers. Our OEM component business includes sales to other, less integrated laser manufacturers participating in OEM markets such as materials processing, scientific, and medical.

Bio-instrumentation

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Laser applications for bio-instrumentation include bio-agent detection for point source and standoff detection of pathogens or other bio-toxins; confocal microscopy for biological imaging that allows researchers and clinicians to visualize cellular and subcellular structures and processes with an incredible amount of detail; DNA sequencing where lasers provide automation and data acquisition rates that would be impossible by any other method; drug discovery—genomic and proteomic analyses that enable drug discovery to proceed at very high throughput rates; and flow cytometry for analyzing single cells or populations of cells in a heterogeneous mixture, including blood samples. Our OBIS, Flare, Galaxy, Sapphire, BioRay and Genesis lasers are used in several bio-instrumentation applications.

#### Medical Therapy

We sell a variety of components and lasers to medical laser companies for use in end-user applications such as ophthalmology, aesthetic, surgical, therapeutic and dentistry. Our DIAMOND series CO<sub>2</sub> lasers are widely used in ophthalmic, aesthetic and surgical markets. We have a leading position in Lasik and photorefractive keratectomy surgery methods with our ExciStar XS excimer laser platform. We also provide ultrafast lasers for use in cataract surgery and optical fibers for surgical applications.

The unique ability of our optically pumped semiconductor lasers ("OPSL") technology to match a wavelength to an application has led to the development of a high-power yellow (577nm) laser for the treatment of eye related diseases, such as Age Related Macular Degeneration and retinal diseases associated with diabetes. The 577nm wavelength was designed to match the peak in absorption of oxygenated hemoglobin thereby allowing treatment to occur at a lower power level, and thus reducing stress and heat-load placed on the eye with traditional green-based (530nm) solid state lasers. Other applications where our OBIS, Genesis and Sapphire series of lasers are used include the retinal scanning market in diagnostic imaging systems as well as new ground breaking in-vivo imaging.

#### Scientific research and government programs

We are widely recognized as a technology innovator and the scientific market has historically provided an ideal "test market" for our leading-edge innovations. These have included ultrafast lasers, DPSS lasers, continuous-wave ("CW") systems, excimer gas lasers and water-cooled ion gas lasers. Our portfolio of lasers that address the scientific research market is broad and includes our Chameleon, Chameleon Discovery, COMPexPro, Astrella, Revolution, Fidelity, Legend, Libra, Monaco, Vitara, Mephisto, Mira, Genesis and Verdi lasers. Many of the innovations and products pioneered in the scientific marketplace have become commercial successes for both our OEM customers and us.

We have a large installed base of scientific lasers which are used in a wide range of applications spanning virtually every branch of science and engineering. These applications include biology and life science, engineering, physical chemistry and physics. Most of these applications require the use of ultrafast lasers that enable the generation of pulses short enough to be measured in femto- or attoseconds (10<sup>-15</sup> to 10<sup>-18</sup> seconds). Because of these very short pulse durations, ultrafast lasers enable the study of fundamental physical and chemical processes with temporal resolution unachievable with any other tool. These lasers also deliver very high peak power and large bandwidths, which can be used to generate many exotic effects. Some of these are now finding their way into mainstream applications, such as microscopy or materials processing. The use of ultrafast lasers such as the Chameleon, Fidelity and Monaco in microscopy is now a common occurrence in bio-imaging labs, and they have become a crucial tool in modern neuroscience research.

#### FUTURE TRENDS

##### Microelectronics

Lasers are widely used in mass production microelectronics applications largely because they enable entirely new application capabilities that cannot be realized by any other known means. These laser-based fabrication and testing methods provide a level of precision, typically on a micrometer and nanometer level, that are unique, faster, are touch free, deliver superior end products, increase yields, and/or reduce production costs. We anticipate this trend to continue, driven primarily by the increasing sophistication and miniaturization of consumer electronic goods and their convergence via the internet, resulting in increasing demand for better displays, more bandwidth and memory, and all packaged into devices which are lighter, thinner and consume less power. Although this market follows the macro-economic trends and carries inherent risks, we believe that we are well positioned to continue to capitalize on the current market trends.

Excimer laser based LTPS is a key technology for producing high resolution OLED displays in general and flexible OLED displays in particular.

Demand for CO<sub>2</sub>, Avia, Matrix, Rapid, Monaco, Helios and direct diode lasers correlate with the need for related FPD touch panel, film cutting, light guide technology, repair and frit welding applications.

The trend for thinner and lighter devices is impacting the glass substrates used in today's mobile devices requiring thinner glass with higher degrees of mechanical strength and scratch resistance. Mechanical means of cutting these glass and sapphire pieces are no longer adequate to meet future requirements and we expect lasers to play an increased role. Our CO, CO<sub>2</sub>, Monaco and Rapid lasers together with our proprietary SmartCleave technology are well positioned to take advantage of this trend.

Semiconductor devices look set to continue Moore's Law, shrinking device geometries for at least another decade, as well as expanding vertically into new 3D structures. As a result we believe our many UV laser sources (such as Azure, Paladin, Avia, Rapid, ExiStar and Matrix) will continue to find increasing adoption, since their unique optical properties align well with the process demands of a nanometer scale world.

These same lasers, plus Monaco, Rapid, CO and CO<sub>2</sub> are also widely adopted for back end Advanced Packaging and Interconnect (API) applications. With dimension roadmaps showing a decade of dimension shrink on PCBs, interconnects, Silicon & LED scribe widths and wafer thickness, we believe that our portfolio of lasers aligns well with these demands as well as new processes that could be enabled by our lasers, to meet the increasing demands and decreasing tolerances of these markets.

While we anticipate investment in OLED technology to continue, we expect a softening of the demand in fiscal 2019 and a recovery from anticipated 2019 demand levels in fiscal 2020, with additional vendors supplying OLED displays for consumer products.

#### Materials processing

The materials processing segment is the most diverse of all the segments we serve and a large cross section of our products are used in this segment. We sell laser sources, laser rails, beam delivery components, laser diagnostic equipment and complete laser tools. There are many drivers at play, but at a high level they involve faster processing with higher yields, processing of new materials, more environmentally friendly processes and higher precision.

The automotive industry is undergoing rapid changes that present opportunities for further use of lasers. Trends such as reduction in emissions from lighter cars and electric vehicles require new materials and new processes for welding, cutting and drilling. We believe this will lead to further adoption of lasers and tools based on high power fiber and diode lasers, as well as ultrafast and CO<sub>2</sub> lasers. For example, the trend toward lighter weight cars requires more aluminum welding, an application in which our ARM laser technology offers competitive advantages versus alternative solutions. We see similar opportunities for electric vehicle and battery applications.

We expect to see continued growth for high power fiber lasers in the machine tool industry used in metal cutting applications. In addition, we see additional opportunities in newer applications such as laser cladding and heat treatment.

In the consumer goods market, we serve a large variety of applications in packaging, digital printing, jewelry, textiles, security and consumer electronics. We serve these industries with almost all of our products from lasers to laser tools. As a consequence, this broad segment represents a stable and growing market for us.

We supply the medical device market with a variety of lasers and laser tools in applications such as fine cutting and welding as well as marking. This market is set to continue to grow in the foreseeable future as the population becomes older and advanced medical procedures spread outside the traditional markets in US, Europe and Japan.

In 3D printing we expect continued growth, particularly in the area of metal additive manufacturing where we supply SLM tools.

#### OEM components and instrumentation

The bio instrumentation market's most important areas: microscopy, flow cytometry and DNA sequencing, are all enjoying solid research funding on a worldwide basis with some local variations. In this field, our OPSL technology gives us differentiated products at a number of important wavelengths. This advantage coupled with strong focus on meeting our customers' demands for more compact and cost effective sources has resulted in growth for us in this market and we expect that to continue. Our OPSL technology resulted in the first truly continuous wave solid-state UV laser which enables the use of UV in a clinical as well as a research environment.

In the medical therapeutic area, we see stable business with several opportunities for growth. We supply excimer lasers used in refractive eye surgery and are actively involved in further developments in laser vision correction including the use of ultrafast lasers in applications such as laser cataract surgery where higher precision and use of advanced implants enable better and more reliable patient outcomes. We also have opportunities in dental procedures

for both hard and soft tissue ablation, with greatly improved patient comfort and outcome. In the area of photocoagulation, our Genesis OPSL yellow lasers are being used

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since the wavelength is particularly suitable for the treatment of blood vessels. We are an OEM supplier of CO<sub>2</sub> and semiconductor lasers to the major manufacturers of equipment used in the latest aesthetic procedures.

Scientific research and government programs

Worldwide scientific funding is expected to be relatively stable, with some regions growing and others just holding their current level. Bright spots include the strong push in neuroscience to better understand how the brain functions. Lasers play a very important role in imaging brain structure as well as tracking activity in animal brains using techniques such as optogenetics. We believe that our current and upcoming products are well positioned to take advantage of this exciting opportunity. In physics and chemistry applications, our recent product introductions of high performance and industrially hardened ultrafast products have been very well received. While this is a very competitive market, we expect that our new products will position us for growth.

MARKET APPLICATIONS

We design, manufacture and market lasers, laser tools, precision optics and related accessories for a diverse group of customers. The following table lists our major markets and the Coherent technologies serving these markets.\*

Market	Application	Technology		
Microelectronics	Flat panel display	CO, CO <sub>2</sub>		
		DPSS		
	Advanced packaging and interconnects	Excimer		
		Ultrafast		
Materials processing	Semiconductor front-end	Semiconductor		
		Laser Rails		
		CO, CO <sub>2</sub>		
		DPSS		
	Metal cutting, drilling, joining, cladding, surface treatment and additive manufacturing	Excimer	Ultrafast	
			Laser Rails	
		Laser marking and coding	CO <sub>2</sub>	
			DPSS	
			OPSL	
			Excimer	
Non-metal cutting, drilling	Ion	Laser Marking		
		Tools		
	Semiconductor	Laser Machine		
		Tools		
OEM components and instrumentation	Bio-Instrumentation	Ultrafast		
		Laser Rails		
	Graphic arts and display	Components	CO <sub>2</sub>	
			DPSS	
		Medical therapy (OEM)	Ultrafast	Excimer
				Semiconductor

Scientific research and government programs All scientific applications

Ultrafast  
Excimer  
OPSL  
Semiconductor  
DPSS  
Excimer  
OPSL  
Ultrafast

\*Coherent sells its laser measurement and control products into a number of these applications. In addition to products we provide, we invest routinely in the core technologies needed to create substantial differentiation for our products in the marketplace. Our semiconductor, crystal, fiber and large form factor optics facilities all maintain an external customer base providing value-added solutions. We direct significant engineering efforts to produce unique solutions targeted for internal consumption. These investments, once integrated into our broader product portfolio,

provide our customers with uniquely differentiated solutions and the opportunity to substantially enhance the performance, reliability and capability of the products we offer.

#### TECHNOLOGIES

##### Diode-pumped solid-state lasers (DPSS)

DPSS lasers use semiconductor lasers to pump a crystal to produce a laser beam. By changing the energy, optical components and the types of crystals used in the laser, different wavelengths and types of laser light can be produced. The efficiency, reliability, longevity and relatively low cost of DPSS lasers make them ideally suited for a wide range of OEM and end-user applications, particularly those requiring 24-hour operations. Our DPSS systems are compact and self-contained sealed units. Unlike conventional tools and other lasers, our DPSS lasers require minimal maintenance since they do not have internal controls or components that require adjusting and cleaning to maintain consistency. They are also less affected by environmental changes in temperature and humidity, which can alter alignment and inhibit performance in many systems.

We manufacture a variety of types of DPSS lasers for different applications including semiconductor inspection; advanced packaging and interconnects; laser pumping; spectroscopy; bio-agent detection; DNA sequencing; drug discovery; flow cytometry; forensics; computer-to-plate printing; entertainment lighting (display); medical; rapid prototyping and marking, welding, engraving, cutting and drilling.

##### Fiber Lasers, Fiber Components and Fiber Assemblies

Fiber lasers use semiconductor lasers to pump a doped optical fiber to produce a laser beam. The unique features of a fiber laser make them suitable for producing high power, continuous wave laser beams. Our fiber laser design has several unique features including a modular design for improved serviceability and diode bar based pumping. Due to packaging efficiency, diode bars reduce the overall cost of a fiber laser. Some of the most critical components inside a fiber laser include the gain fiber itself and the diodes providing the pump power. We plan to continue to drive cost reduction in our diode laser pumps and demonstrate the scalability of the platform and as a result, expect to be well positioned as a fiber laser supplier. This platform addresses the large growing high power metal cutting and joining market.

We are the world's leading OEM supplier of Active Fiber for fiber lasers - selected for our combination of high performance and consistent quality. In addition, we are a volume supplier of Specialty Passive Fiber, High Power Fiber Cables, Fiber Switches, Fiber-to-Fiber Couplers and OEM Medical Fiber Assemblies. We produce our Medical assemblies in high volume in one of our ISO 13485 certified plants. In addition, many of the fiber components offered in the broader market, such as Fiber Bragg Gratings and Fiber Combiners, have Coherent fiber in them.

##### Gas lasers (CO, CO<sub>2</sub>, Excimer, Ion)

The breadth of our gas laser portfolio is industry leading, encompassing CO, CO<sub>2</sub>, excimer and ion laser technologies. Gas lasers derive their name from the use of one or more gases as a lasing medium. They collectively span an extremely diverse and useful emission range, from the very deep ultraviolet to the far infrared. This diverse range of available wavelengths, coupled with high optical output power, and an abundance of other attractive characteristics, makes gas lasers extremely useful and popular for a variety of microelectronics, scientific, medical therapeutic and materials processing applications.

##### Optically Pumped Semiconductor Lasers ("OPSL")

Our OPSL platform is a surface emitting semiconductor laser that is energized or pumped by a semiconductor laser. The use of optical pumping circumvents inherent power scaling limitations of electrically pumped lasers, enabling very high powered devices. A wide range of wavelengths can be achieved by varying the semiconductor materials used in the device and changing the frequency of the laser beam using techniques common in solid state lasers. The platform leverages high reliability technologies developed for telecommunications and produces a compact, rugged, high power, single-mode laser.

Our OPSL products are well suited to a wide range of applications, including the bio-instrumentation, medical therapeutics and graphic arts and display markets.

##### Semiconductor lasers

High power edge emitting semiconductor diode lasers use the same principles as widely-used CD and DVD lasers, but produce significantly higher power levels. The advantages of this type of laser include smaller size, longer life, enhanced reliability and greater efficiency. We manufacture a wide range of discrete semiconductor laser products



with wavelengths ranging from 650nm to over 1000nm and output powers ranging from 1W to over 100W, with highly integrated products in the kW range. These products are available in a variety of industry standard form factors including the following: bare die,

packaged and fiber coupled single emitters and bars, monolithic stacks and fully integrated modules with microprocessor controlled units that contain power supplies and active coolers.

Our semiconductor lasers are used internally as the pump lasers in DPSS, fiber and OPSL products that are manufactured by us, as well as a wide variety of external medical, OEM, military and industrial applications, including aesthetic (hair removal, cosmetic dentistry), graphic arts, counter measures, rangefinders, target designators, cladding, hardening, brazing and welding.

#### Ultrafast ("UF") Lasers

Ultrafast lasers are lasers generating light pulses with durations of a few femtoseconds ( $10^{-15}$  seconds) to a few tens of picoseconds ( $10^{-12}$  seconds). These types of lasers are used for medical, advanced microelectronics and materials processing applications as well as scientific research. UF laser oscillators generate a train of pulses at 50-100 MHz, with peak powers of tens of kilowatts, and UF laser amplifiers generate pulses at 1-2000 kHz, with peak powers up to several Terawatts.

The extremely short duration of UF laser pulses enables temporally resolving fast events like the dynamics of atoms or electrons. In addition, the high peak power enables so-called non-linear effects where several photons can be absorbed by a molecule at the same time. This type of process enables applications like multi-photon excitation microscopy or ablation of materials with high precision and minimal thermal damage. The use of our ultrafast lasers in applications outside science has been growing rapidly over the last several years, particularly in microelectronics and materials processing applications.

#### Integrated Laser Solutions: Rails and Tools

In most cases, our lasers are integrated into machine tools or systems to perform a specific task, e.g. manufacturing of electronic components or performing a procedure on a patient. Inside the tool the laser is typically combined with delivery optics and beam steering devices, such as galvos, to deliver the laser beam to the workpiece. In addition to offering laser sources, we also offer solutions comprising beam delivery optics, mechanics and control electronics including software. We believe that these 'sub-systems' or 'rails' allow us to leverage our expertise in laser processing and optical design into superior solutions for our customers, with applications that can offer higher value and/or faster time to market. We have developed proprietary hardware, firmware and software in this area. Rail products often include vision systems, process monitoring and monitoring of the system itself. Our rail products include: PowerLine series for marking; the StarFiber for welding and cutting; the PWS welding system; the QFS laser scribing system; and the PerfoLas and StarShape CO<sub>2</sub> laser based systems.

In select cases we also offer complete laser systems or 'tools' which include the laser rail as well as a material handling system inside a class 1 laser safety housing, ready to be used in production or development environments. Our laser tools products include: the Laser Creator 3D metal printing system; the Performance, Select and Integral series of manual welding systems; the Exact and MPS series of modular and highly configurable laser processing systems; the EasyMark, EasyJewel, LabelMarker Advanced and Combiline laser marking systems; the META laser cutting tools; and the PWS mini welding system.

#### SALES AND MARKETING

We primarily market our products in the United States through a direct sales force. We sell internationally through direct sales personnel located in Canada, France, Israel, Germany, Italy, Japan, the Netherlands, China, South Korea, Taiwan, Singapore, Spain and the United Kingdom, as well as through independent representatives in certain jurisdictions around the world. Our foreign sales are made principally to customers in South Korea, China, Germany, Japan and other European and Asia-Pacific countries. Foreign sales accounted for 84% of our net sales in fiscal 2018, 83% of our net sales in fiscal 2017 and 76% of our net sales in fiscal 2016. Sales made to independent representatives and distributors are generally priced in U.S. dollars. A large portion of foreign sales that we make directly to customers are priced in local currencies and are therefore subject to currency exchange fluctuations. Foreign sales are also subject to other normal risks of foreign operations such as protective tariffs, export and import controls and political instability.

We had one customer, Advanced Process Systems Corporation, who contributed more than 10% of revenue during fiscal 2018, 2017 and 2016. We had another major customer, Japanese Steel Works, Ltd., who contributed more than 10% of revenue during fiscal 2016.

To support our sales efforts we maintain and continue to invest in a number of applications centers around the world, where our applications experts work closely with customers on developing laser processes to meet their manufacturing needs. The applications span a wide range, but are mostly centered around the materials processing and microelectronics markets. Locations include several facilities in the US, Europe and Asia.

We maintain customer support and field service staff in major markets within the United States, Europe, Japan, China, South Korea, Taiwan and other Asia-Pacific countries. This organization works closely with customers, customer groups and

independent representatives in servicing equipment, training customers to use our products and exploring additional applications of our technologies.

We typically provide parts and service warranties on our lasers, laser-based systems, optical and laser components and related accessories and services. The length of warranties offered on our products and services varies, but primarily ranges from 12 to 24 months. Warranty reserves, as reflected on our consolidated balance sheets, have generally been sufficient to cover product warranty repair and replacement costs. The weighted average warranty period covered in our reserve is approximately 15 months.

#### MANUFACTURING

Since the acquisition of Rofin in November 2016, we have integrated Rofin into our organizational structure and both organizations are operating as one company with common objectives, goals and processes. Strategies are being implemented to improve operating leverage, to execute synergies and to enhance our customers' experience. Common policies and guidelines have been communicated, key management and operating processes have been implemented and ERP systems at all of Rofin's sites in Asia and North America, and certain sites in Europe, have been integrated onto our Oracle ERP and Agile planning platforms, consistent with the rest of Coherent. This integration process will continue into fiscal 2019.

#### Strategies

One of our core manufacturing strategies is to tightly control our supply of key parts, components, sub-assemblies and outsourcing partners. We primarily utilize vertical integration when we have proprietary internal capabilities that are not cost-effectively available from external sources. We believe this is essential to maintaining high quality products and enable rapid development and deployment of new products and technologies. We provide customers with products manufactured at the highest level of quality, leveraging Coherent's quality processes that are International Organization for Standardization ("ISO") certified at our principal manufacturing sites.

Committed to quality and customer satisfaction, we design and produce many of our own components and sub-assemblies in order to retain quality and performance control. We have also outsourced certain components, sub-assemblies and finished goods where we can maintain our high quality standards while improving our cost structure.

As part of our strategy to increase our market share and customer support in Asia as well as our continuing efforts to manage costs, we have transferred the production of additional products into both of our Singapore and Malaysia factories. With the acquisition of Rofin, we now have a manufacturing footprint in Nanjing, China. We are transferring additional products and volume to Nanjing as well as consolidating our China repair activities in that facility. We have significantly increased our tube refurbishment capacity and footprint in our South Korea operations, which has allowed us to reduce service response time and inventories, providing benefits to us and to our customers. We have also increased our sourcing of materials from Asia through our International Procurement Office in Singapore, which has enabled us to reduce material costs on a global basis.

We have designed and implemented proprietary manufacturing tools, equipment and techniques in an effort to provide products that differentiate us from our competitors. These proprietary manufacturing techniques are utilized in a number of our product lines including our gas laser production, crystal growth, beam alignment as well as the wafer growth for our semiconductor, optically pumped semiconductor laser product family and fiber component and fiber laser product family.

Raw materials or sub-components required in the manufacturing process are generally available from several sources. However, we currently purchase several key components and materials, including exotic materials, crystals and optics, used in the manufacture of our products from sole source or limited source suppliers. We also purchase assemblies and turnkey solutions from contract manufacturers based on our proprietary designs. We rely on our own production and design capability to manufacture and specify certain strategic components, crystals, fibers, semiconductor lasers, lasers and laser based systems.

For a discussion of the importance to our business of, and the risks attendant to sourcing, see "Risk Factors" in item 1A — "We depend on sole source or limited source suppliers, both internal and external, for some of our key components and materials, including exotic materials, certain cutting-edge optics and crystals, used in our products, which make us susceptible to supply shortages or price fluctuations that could adversely affect our business, particularly our ability to meet our customers' delivery requirements."

Operations

Our products are manufactured at our sites in California, Oregon, Arizona, Michigan, Massachusetts, New Jersey, Connecticut and New Hampshire in the U.S.; Germany, Scotland, Finland, Sweden and Switzerland in Europe; and South Korea, China, Singapore and Malaysia in Asia. In addition, we also use contract manufacturers for the production of certain assemblies and turnkey solutions.

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Our ion gas lasers, a portion of our DPSS lasers that are used in microelectronics, scientific research and materials processing applications, semiconductor lasers, OPS lasers, fiber lasers and ultrafast scientific lasers are manufactured at our Santa Clara, California site. Our laser diode module products, laser instrumentation products, test and measurement equipment products are manufactured in Wilsonville, Oregon. We manufacture exotic crystals in East Hanover, New Jersey and both active and passive fibers are manufactured in our Salem, New Hampshire facility. Our low power CO<sub>2</sub> and CO gas lasers are manufactured in Bloomfield, Connecticut. We manufacture a portion of our DPSS lasers used in microelectronics and OEM components and instrumentation applications in Lübeck, Germany. We manufacture a portion of our DPSS lasers used in microelectronics, OEM components and instrumentation and materials processing applications in Kaiserslautern, Germany. Our excimer gas laser products are manufactured in Göttingen, Germany. We refurbish excimer tubes at our manufacturing sites in Yong-In and An-Seong, South Korea. We manufacture the fiber-based lasers and a portion of our DPSS lasers used in microelectronics and scientific research applications in Glasgow, Scotland. Our facility in Sunnyvale, California grows the aluminum-free materials that are incorporated into our semiconductor lasers. Our facility in Richmond, California manufactures large form factor optics for our Linebeam excimer laser annealing systems. We manufacture and test high-power CO<sub>2</sub>, solid-state and fiber laser macro products in Hamburg, Germany; Plymouth, Michigan; East Granby, Connecticut; Tampere, Finland; and Nanjing, China. Our laser marking products are manufactured and tested in Gunding-Munich and Gilching-Munich, Germany; and Singapore. Our micro application products are manufactured and tested in Gilching-Munich, Germany; Tampere, Finland; Plymouth, Michigan; and Belp, Switzerland. Our diode laser products are manufactured and tested in Mainz and Freiburg, Germany; Tucson, Arizona; and Nanjing, China. Coating of our Slab laser electrodes is performed in Overath, Germany. Our fiber optics and beam delivery systems are manufactured and tested in Molndal, Sweden, and power supplies are manufactured and tested in Starnberg-Munich, Germany. The Company's active and passive fibers and amplifiers are manufactured and tested in East Granby, Connecticut. Optical engines for fiber lasers, fiber lasers modules and wafer material are designed and manufactured in Tampere, Finland. In the second quarter of fiscal 2018, we acquired OR Laser and we manufacture and test the laser tools for the Metal Additive Manufacturing (3D Printing) market in Dieburg, Germany.

We have transferred several products and subassemblies for manufacture and repairs to our Singapore, Malaysia and Nanjing, China facilities and are continuing to transfer additional product manufacturing to these facilities as part of our worldwide manufacturing cost reduction strategy.

Coherent is committed to meeting internationally recognized manufacturing standards. All of our legacy Coherent facilities are ISO 9001 certified and several facilities are ISO 13485, ISO 14001, ISO 17025 and/or ISO 50001 certified depending on the products designed and manufactured at that facility. Substantially all of our legacy Rofin facilities are either ISO 9001 certified or are in the process of being certified.

#### INTELLECTUAL PROPERTY

We rely on a combination of patent, copyright, trademark and trade secret laws and restrictions on disclosure to protect our intellectual property rights. As of September 29, 2018, we held approximately 725 U.S. and foreign patents, which expire in calendar years 2018 through 2037 (depending on the payment of maintenance fees) and we have approximately 245 additional pending patent applications that have been filed. The issued patents cover various products in all of the major markets that we serve.

Some of our products are designed to include intellectual property licensed from third parties. It may be necessary in the future to seek or renew licenses relating to aspects of our products, processes and services. While we have generally been able to obtain such licenses on commercially reasonable terms in the past, there is no guarantee that such licenses could be obtained on reasonable terms in the future or at all.

For a discussion of the importance to our business of, and the risks attendant to intellectual property rights, see "Risk Factors" in Item 1A — "If we are unable to protect our proprietary technology, our competitive advantage could be harmed" and "We may, in the future, be subject to claims or litigation from third parties, for claims of infringement of their proprietary rights or to determine the scope and validity of our proprietary rights or the proprietary rights of competitors or other rights holders. These claims could result in costly litigation and the diversion of our technical and management personnel. Adverse resolution of litigation may harm our operating results or financial condition."

#### COMPETITION

Competition in the various photonics markets in which we provide products is very intense. We compete against a number of large public and private companies including IPG Photonics Corporation, Lumentum Holdings Inc., MKS Instruments, Inc., Novanta Inc., nLIGHT, Inc. and TRUMPF GmbH, as well as other smaller companies. In addition, from time to time our customers may also decide to vertically integrate and build their own photonics products. We compete globally based on our broad product offering, reliability, cost, and performance advantages for the widest range of commercial and

scientific research applications. Other considerations by our customers include warranty, global service and support and distribution.

#### BACKLOG

At fiscal 2018 year-end, our backlog of orders scheduled for shipment (within one year) was \$759.9 million compared to \$1,040.0 million at fiscal 2017 year-end. By segment, backlog for OLS was \$488.8 million and \$801.4 million, respectively, at fiscal 2018 and 2017 year-ends. Backlog for ILS was \$271.1 million and \$238.6 million, respectively, at fiscal 2018 and 2017 year-ends. The decrease in OLS backlog from fiscal 2017 to fiscal 2018 year-end was primarily due to the timing of large excimer laser annealing system shipments, net of orders, for the flat panel display market. The increase in ILS backlog from fiscal 2017 to fiscal 2018 year-end was primarily from orders in the materials processing and high power fiber laser markets. Orders used to compute backlog are generally cancellable and, depending on the notice period, are subject to rescheduling by our customers. We have not historically experienced a significant rate of cancellation or rescheduling, however the rate of cancellations or rescheduling may increase in the future. Subsequent to year-end, one customer indicated its intent to cancel three purchase orders which included orders shippable within 12 months of \$38.2 million and were included in backlog as of fiscal 2018 year-end. We reached agreement with this customer for compensation for such cancellation.

#### SEASONALITY

We have historically generally experienced decreased revenue in the first fiscal quarter compared to other quarters in our fiscal year due to the impact of time off and business closures at our facilities and those of many of our customers due to year-end holidays. For example over the past 10 years, excluding certain recovery years, our first fiscal quarter revenues have ranged 2%-12% below the fourth quarter of the prior fiscal years. This historical pattern should not be considered a reliable indicator of the Company's future net sales or financial performance.

#### EMPLOYEES

As of fiscal 2018 year-end, we had 5,418 employees. Approximately 694 of our employees are involved in research and development; 3,496 of our employees are involved in operations, manufacturing, service and quality assurance; and 1,228 of our employees are involved in sales, order administration, marketing, finance, information technology, general management and other administrative functions. Our success will depend in large part upon our ability to attract and retain employees. We face competition in this regard from other companies, research and academic institutions, government entities and other organizations. We consider our relations with our employees to be good.

#### ACQUISITIONS

On March 8, 2018, we acquired privately held OR Laser for approximately \$47.4 million, excluding transaction costs. OR Laser produces laser-based material processing equipment for a variety of uses, including additive manufacturing, welding, cladding, marking, engraving and drilling.

On November 7, 2016, we acquired Rofin, one of the world's leading developers and manufacturers of high-performance industrial laser sources and laser-based solutions and components, for approximately \$936.3 million. Rofin's operating results have been included primarily in our Industrial Lasers & Systems segment. Please refer to Note 3, "Business Combinations" and Note 19, "Subsequent Events" of Notes to Consolidated Financial Statements under Item 15 of this annual report for further discussion of recent acquisitions completed.

#### RESTRUCTURINGS AND CONSOLIDATION

In the first quarter of fiscal 2017, we began the implementation of planned restructuring activities in connection with the acquisition of Rofin. These activities to date primarily have related to exiting our legacy high power fiber laser product line, change of control payments to Rofin officers, the exiting of two product lines acquired in the acquisition of Rofin, realignment of our supply chain due to segment reorganization and consolidation of sales and distribution offices as well as certain manufacturing sites. These activities resulted in charges primarily for employee termination, other exit related costs associated with the write-off of property and equipment and inventory and early lease termination costs.

The fiscal 2018 severance related costs are primarily comprised of severance pay for employees being terminated due to the consolidation of certain manufacturing sites. The fiscal 2018 asset write-offs are primarily comprised of inventory and equipment write-offs due to the consolidation of certain manufacturing sites.

We plan to continue additional restructuring activities in fiscal 2019 related to our acquisition of Rofin.

#### GOVERNMENT REGULATION





#### Environmental regulation

Our operations are subject to various federal, state, local and foreign environmental regulations relating to the use, storage, handling and disposal of regulated materials, chemicals, various radioactive materials and certain waste products. In the United States, we are subject to the federal regulation and control of the Environmental Protection Agency. Comparable authorities are involved in other countries. Such rules are subject to change by the governing agency and we monitor those changes closely. We expect all operations to meet the legal and regulatory environmental requirements and believe that compliance with those regulations will not have a material adverse effect on our capital expenditures, earnings and competitive and financial position.

Although we believe that our safety procedures for using, handling, storing and disposing of such materials comply with the standards required by federal and state laws and regulations, we cannot completely eliminate the risk of accidental contamination or injury from these materials. In the event of such an accident involving such materials, we could be liable for damages and such liability could exceed the amount of our liability insurance coverage and the resources of our business.

We face increasing complexity in our product design and procurement operations due to the evolving nature of environmental compliance regulations and standards, as well as specific customer compliance requirements. These regulations and standards have an impact on the material composition of our products entering specific markets. Such legislation has gone into effect at various time across the worldwide markets. For example, in the European Union ("EU"), the Restriction of the use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) went into effect in 2006, and was subsequently revised in 2011 (as RoHS 2) and again in 2015 (as RoHS 2 amended) and will be in effect in 2019. The Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) went into effect in 2007, and is updated with additional substances every 6 months. China enacted the Management Methods for Controlling Pollution Caused by Electronic Information Products Regulation (China-RoHS) in 2007, which was revised and renamed in 2016 as the Administrative Measures for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products (known as China RoHS 2). Another example is the US Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (Conflict Minerals Act) which requires manufacturers to provide disclosures about the use of specified conflict minerals emanating from the DRC and nine adjoining countries (Covered Countries). In addition to these regulations and directives, we may face costs and liabilities in connection with product take-back legislation. For example, beginning in 2006 (with several subsequent revisions), the EU Waste Electrical and Electronic Equipment Directive 2012/19/EU made producers of electrical goods financially responsible for specified collection, recycling, recovery, treatment and disposal of past and future covered products. Similar laws are now pending in various jurisdictions around the world, including the United States.

#### Environmental liabilities

Our operations are subject to various laws and regulations governing the environment, including the discharge of pollutants and the management and disposal of hazardous substances. As a result of our historic as well as on-going operations, we could incur substantial costs, including remediation costs. The costs under environmental laws and the timing of these costs are difficult to predict. Our accruals for such costs and liabilities may not be adequate because the estimates on which the accruals are based depend on a number of factors including the nature of the matter, the complexity of the site, site geology, the nature and extent of contamination, the type of remedy, the outcome of discussions with regulatory agencies and other Potentially Responsible Parties (PRPs) at multi-party sites and the number and financial viability of other PRPs.

We further discuss the impact of environmental regulation under "Risk Factors" in Item 1A — "Compliance or the failure to comply with current and future environmental regulations could cause us significant expense."

#### Regulatory Compliance

Lasers that are manufactured or sold in the United States are classified under the applicable rules and regulations of the Center for Devices and Radiological Health ("CDRH") of the U.S. Food and Drug Administration ("FDA"). A similar classification system is applied in the European markets.

CDRH regulations require a self-certification procedure pursuant to which a manufacturer must submit a filing to the CDRH with respect to each product incorporating a laser, make periodic reports of sales and purchases, and comply with product labeling standards, product safety and design features and informational requirements. The CDRH is empowered to seek fines and other remedies for violations of their requirements. We believe that our products are in

material compliance with the applicable rules and regulations of CDRH relating to lasers manufactured or sold in the United States.

## ITEM 1A. RISK FACTORS

You should carefully consider the following risks when considering an investment in our common stock. These risks could materially affect our business, results of operations or financial condition, cause the trading price of our common stock to decline materially or cause our actual results to differ materially from those expected or those expressed in any forward-looking statements made by us. These risks are not exclusive, and additional risks to which we are subject include, but are not limited to, the factors mentioned under "Forward-Looking Statements" and the risk of our businesses described elsewhere in this annual report. Additionally, these risks and uncertainties described herein are not the only ones facing us. Other events that we do not currently anticipate or that we currently deem immaterial also may affect our business, results of operations or financial condition.

Our operating results, including net sales, net income (loss) and adjusted EBITDA in dollars and as a percentage of net sales, as well as our stock price have varied in the past, and our future operating results will continue to be subject to quarterly and annual fluctuations based upon numerous factors, including those discussed in this Item 1A and throughout this report. Our stock price will continue to be subject to daily variations as well. Our future operating results and stock price may not follow any past trends or meet our guidance and expectations.

Our net sales and operating results, such as adjusted EBITDA percentage, net income (loss) and operating expenses, and our stock price have varied in the past and may vary significantly from quarter to quarter and from year to year in the future. We believe a number of factors, many of which are outside of our control, could cause these variations and make them difficult to predict, including:

- general economic uncertainties in the macroeconomic and local economies facing us, our customers and the markets we serve;
- impact of government economic policies on macroeconomic conditions, including recently instituted or proposed changes in trade policies by the U.S. and any corresponding retaliatory actions by affected countries, in particular with respect to China;
- fluctuations in demand for our products or downturns in the industries that we serve;
- the ability of our suppliers, both internal and external, to produce and deliver components and parts, including sole or limited source components, in a timely manner, in the quantity, quality and prices desired;
- the timing of receipt of bookings and the timing of and our ability to ultimately convert bookings to net sales;
- the concentration of a significant amount of our backlog, and resultant net sales, with a few customers in the Microelectronics market;
- rescheduling of shipments or cancellation of orders by our customers;
- fluctuations in our product mix;
- the ability of our customers' other suppliers to provide sufficient material to support our customers' products;
- currency fluctuations and stability, in particular the Euro, the Japanese Yen, the South Korean Won, the Chinese RMB and the US dollar as compared to other currencies;
- commodity pricing;
- interpretation and impact of the recently enacted and aforementioned U.S. tax law, the Tax Cuts and Jobs Act;
- introductions of new products and product enhancements by our competitors, entry of new competitors into our markets, pricing pressures and other competitive factors;
- our ability to develop, introduce, manufacture and ship new and enhanced products in a timely manner without defects;
- our ability to manage our manufacturing capacity across our diverse product lines and that of our suppliers, including our ability to successfully expand our manufacturing capacity in various locations around the world;
- our ability to successfully and fully integrate acquisitions, such as the historical Rofin businesses, into our operations and management;
- our ability to successfully internally transfer products as part of our integration efforts;

- our reliance on contract manufacturing;
- our reliance in part upon the ability of our OEM customers to develop and sell systems that incorporate our laser products;
- our customers' ability to manage their susceptibility to adverse economic conditions;
- the rate of market acceptance of our new products;
  - the ability of our customers to pay for our products;
- expenses associated with acquisition-related activities;
- seasonal sales trends, including with respect to Rofin's historical business, which has traditionally experienced a reduction in sales during the first half of its fiscal year as compared to the second half of its fiscal year;
- jurisdictional capital and currency controls negatively impacting our ability to move funds from or to an applicable jurisdiction;
- access to applicable credit markets by us, our customers and their end customers;
- delays or reductions in customer purchases of our products in anticipation of the introduction of new and enhanced products by us or our competitors;
- our ability to control expenses;
- the level of capital spending of our customers;
- potential excess and/or obsolescence of our inventory;
- costs and timing of adhering to current and developing governmental regulations and reviews relating to our products and business, including import and export regulations in multiple jurisdictions;
- costs related to acquisitions of technology or businesses;
- impairment of goodwill, intangible assets and other long-lived assets;
- our ability to meet our expectations and forecasts and those of public market analysts and investors;
- the availability of research funding by governments with regard to our customers in the scientific business, such as universities;
- continued government spending on defense-related and scientific research projects where we are a subcontractor;
- maintenance of supply relating to products sold to the government on terms which we would prefer not to accept;
- changes in policy, interpretations, or challenges to the allowability of costs incurred under government cost accounting standards;
- our ability and the ability of our contractual counterparts to comply with the terms of our contracts;
- damage to our reputation as a result of coverage in social media, Internet blogs or other media outlets;
- managing our and other parties' compliance with contracts in multiple languages and jurisdictions;
- managing our internal and third party sales representatives and distributors, including compliance with all applicable laws;
- costs, expenses and damages arising from litigation;
- costs associated with designing around or payment of licensing fees associated with issued patents in our fields of business;
- individual employees intentionally or negligently failing to comply with our internal controls;
- government support of alternative energy industries, such as solar;

negative impacts related to the "Brexit" vote by the United Kingdom, particularly with regard to sales from our Glasgow, Scotland facility to other jurisdictions and purchases of supplies from outside the United Kingdom by such facility;

• negative impacts related to the recent independence movement in Catalonia, Spain, particularly with regard to holding and operating some of our foreign entities in an efficient manner from a tax, business and legal perspective;

• negative impacts related to government instability in any jurisdiction in which we operate, such as the recent difficulties in forming a governing coalition in Germany;

• the future impact of legislation, rulemaking, and changes in accounting, tax, defense procurement, export policies; and

• distraction of management related to acquisition, integration or divestment activities.

In addition, we often recognize a substantial portion of our sales in the last month of our fiscal quarters. Our expenses for any given quarter are typically based on expected sales and if sales are below expectations in any given quarter, the adverse impact of the shortfall on our operating results may be magnified by our inability to adjust spending quickly enough to compensate for the shortfall. We also base our manufacturing on our forecasted product mix for the quarter. If the actual product mix varies significantly from our forecast, we may not be able to fill some orders during that quarter, which would result in delays in the shipment of our products. Accordingly, variations in timing of sales, particularly for our higher priced, higher margin products, can cause significant fluctuations in quarterly operating results.

Due to these and other factors, such as varying product mix, we believe that quarter-to-quarter and year-to-year comparisons of our historical operating results may not be meaningful. You should not rely on our results for any quarter or year as an indication of our future performance. Our operating results in future quarters and years may be below public market analysts' or investors' expectations, which would likely cause the price of our stock to fall. In addition, over the past several years, U.S. and global equity markets have experienced significant price and volume fluctuations that have affected the stock prices of many technology companies both in and outside our industry. There has not always been a direct correlation between this volatility and the performance of particular companies subject to these stock price fluctuations. These factors, as well as general economic and political conditions or investors' concerns regarding the credibility of corporate financial statements, may have a material adverse effect on the market price of our stock in the future.

We depend on sole source or limited source suppliers, as well as on our own production capabilities, for some of the key components and materials, including exotic materials, certain cutting-edge optics and crystals, used in our products, which make us susceptible to supply shortages or price fluctuations that could adversely affect our business, particularly our ability to meet our customers' delivery requirements.

We currently purchase several key components and materials used in the manufacture of our products from sole source or limited source suppliers. In particular, from time-to-time our customers require us to ramp up production and/or accelerate delivery schedules of our products. Our key suppliers may not have the ability to increase their production in line with our customers' demands. This can become acute during times of high growth in our customers' businesses. Our failure to timely receive these key components and materials would likely cause delays in the shipment of our products, which would likely negatively impact both our customers and our business. Some of these suppliers are relatively small private companies that may discontinue their operations at any time and which may be particularly susceptible to prevailing economic conditions. Some of our suppliers are located in regions which may be susceptible to natural disasters, such as the flooding in Thailand and the earthquake, tsunami and resulting nuclear disaster in Japan and severe flooding and power loss in the Eastern part of the United States in recent years. We typically purchase our components and materials through purchase orders or agreed upon terms and conditions, and we do not have guaranteed supply arrangements with many of these suppliers. For certain long-lead time supplies or in order to lock-in pricing, we may be obligated to place non-cancellable purchase orders or otherwise assume liability for a large amount of the ordered supplies, which limits our ability to adjust down our inventory liability in the event of market downturns or other customer cancellations or rescheduling of their purchase orders for our products.

Some of our products, particularly in the flat panel display industry, require designs and specifications that are at the cutting-edge of available technologies and change frequently to meet rapidly evolving market demands. By their very nature, the types of components used in such products can be difficult and unpredictable to manufacture and may only be available from a single supplier, which increases the risk that we may not obtain such components in a timely

manner. Identifying alternative sources of supply for certain components could be difficult and costly, result in management distraction in assisting our current and future suppliers to meet our and our customers' technical requirements, and cause delays in shipments of our products while we identify, evaluate and test the products of alternative suppliers. Any such delay in shipment would result in a delay or cancellation of our ability to convert such order into revenues. Furthermore, financial or other difficulties faced by these suppliers or significant changes in demand for these components or materials could limit their availability. We continue to consolidate our supply base and move supplier locations. When we transition locations we may increase our inventory of such

products as a "safety stock" during the transition, which may cause the amount of inventory reflected on our balance sheet to increase. Additionally, many of our customers rely on sole source suppliers. In the event of a disruption of our customers' supply chain, orders from our customers could decrease or be delayed.

Any interruption or delay in the supply of any of these components or materials, or the inability to obtain these components and materials from alternate sources at acceptable prices and within a reasonable amount of time, or our failure to properly manage these moves, would impair our ability to meet scheduled product deliveries to our customers and could cause customers to cancel orders. Furthermore, we have historically relied exclusively on our own production capability to manufacture certain strategic components, crystals, semiconductor lasers, fiber, lasers and laser-based systems. We also manufacture certain large format optics. Because we manufacture, package and test these components, products and systems at our own facilities, and such components, products and systems are not readily available from other sources, any interruption in manufacturing would adversely affect our business. Since many of our products have lengthy qualification periods, our ability to introduce multiple suppliers for parts may be limited. In addition, our failure to achieve adequate manufacturing yields of these items at our manufacturing facilities may materially and adversely affect our operating results and financial condition.

We participate in the microelectronics market, which requires significant research and development expenses to develop and maintain products and a failure to achieve market acceptance for our products could have a significant negative impact on our business and results of operations.

The microelectronics market is characterized by rapid technological change, frequent product introductions, the volatility of product supply and demand, changing customer requirements and evolving industry standards. The nature of this market requires significant research and development expenses to participate, with substantial resources invested in advance of material sales of our products to our customers in this market. Additionally, our product offerings may become obsolete given the frequent introduction of alternative technologies. In the event either our customers' or our products fail to gain market acceptance, or the microelectronics market fails to grow, it would likely have a significant negative effect on our business and results of operations.

We participate in the flat panel display market, which has a relatively limited number of end customer manufacturers. Our backlog, timing of net sales and results of operations could be negatively impacted in the event our customers reschedule or cancel orders.

In the flat panel display market, there are a relatively limited number of manufacturers who are the end customers for our annealing products. In fiscal 2018, Advanced Process Systems Corporation, an integrator in the flat panel display market based in South Korea, contributed more than 10% of our revenue. Given macroeconomic conditions, varying consumer demand and technical process limitations at manufacturers, our customers may seek to reschedule or cancel orders. For example, in the fourth quarter of fiscal 2018, a customer requested a change of delivery date resulting in a significant order being rescheduled from the first to the second quarter of fiscal 2019. In addition, subsequent to year-end, one customer indicated its intent to cancel three purchase orders which included backlog shippable within 12 months of \$38.2 million as well as some additional orders which were unscheduled.

These larger flat panel-related systems have large average selling prices. Any rescheduling or canceling of such orders by our customers will likely have a significant impact on our quarterly or annual net sales and results of operations and could negatively impact inventory values and backlog. Additionally, challenges in meeting evolving technological requirements for these complex products by us and our suppliers could also result in delays in shipments and rescheduled or cancelled orders by our customers. This could negatively impact our backlog, timing of net sales and results of operations.

As of September 29, 2018, flat panel display systems represented 32% of our backlog, compared to 59% at September 30, 2017. Since our backlog includes higher average selling price flat panel display systems compared to other products in our backlog, any delays or cancellation of shipments could have a material adverse effect on our financial results.

We may not be able to integrate the business of Rofin successfully with our own, realize the anticipated benefits of the merger or manage our expanded operations, any of which would adversely affect our results of operations.

We have devoted, and expect to continue to devote, significant management attention and resources to integrating our business practices with those of Rofin. Such integration efforts are costly due to the large number of processes, policies, procedures, locations, operations, technologies and systems to be integrated, including purchasing,



accounting and finance, sales, service, operations, payroll, pricing, marketing and employee benefits. Integration expenses could, particularly in the short term, exceed the savings we expect to achieve from the elimination of duplicative expenses and the realization of economies of scale, which could result in significant charges to earnings that we cannot currently quantify. Potential difficulties that we may encounter as part of the integration process include the following:

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the inability to successfully combine our business with Rofin in a manner that permits the combined company to achieve the full synergies and other benefits anticipated to result from the merger;

complexities associated with managing the combined businesses, including difficulty addressing possible differences in corporate cultures and management philosophies and the challenge of integrating products, services, complex and different information technology systems (including different Enterprise Management Systems), control and compliance processes, technology, networks and other assets of each of the companies in a cohesive manner;

diversion of the attention of our management; and

the disruption of, or the loss of momentum in, our business or inconsistencies in standards, controls, procedures or policies.

Any of the foregoing could adversely affect our ability to maintain relationships with customers, suppliers, employees and other constituencies or our ability to achieve the anticipated benefits of the merger, or could reduce our earnings or otherwise adversely affect our business and financial results. For example, in the fourth quarter of fiscal 2018, difficulties in implementing our Enterprise Management Systems at one of our manufacturing sites located in Germany, which was historically part of Rofin, resulted in a shortage of manufacturing parts and shippable inventory to meet demands, resulting in a reduction of revenue for the quarter. If we are unable to timely resolve these implementation issues, or if similar difficulties arise in the future at another site, we may in the future experience a shortage of parts and inventory or otherwise be unable to meet demand, which could have a material adverse impact on our results of operations.

Following the merger, the size and complexity of the business of the combined company has increased significantly. Our future success depends, in part, upon our ability to manage this expanded business, which has and will pose substantial challenges for management, including challenges related to the management and monitoring of new operations and associated increased costs and complexity. There can be no assurances that we will be successful or that we will realize the expected synergies and benefits anticipated from the merger.

Charges to earnings resulting from the application of the purchase method of accounting to the Rofin acquisition may adversely affect our results of operations.

In accordance with generally accepted accounting principles, we have accounted for the Rofin acquisition using the purchase method of accounting. Under the purchase method of accounting, we allocated the total purchase price of Rofin's net tangible and identifiable intangible assets based upon their estimated fair values at the acquisition date. The excess of the purchase price over net tangible and identifiable intangible assets was recorded as goodwill. We have incurred and will continue to incur additional depreciation and amortization expense over the useful lives of certain of the net tangible and intangible assets acquired in connection with the acquisition. In addition, to the extent the value of goodwill or intangible assets with indefinite lives becomes impaired, we may be required to incur material charges relating to the impairment of those assets. These depreciation, amortization and potential impairment charges could have a material impact on our results of operations.

Our indebtedness following the merger is substantially greater than our indebtedness prior to the merger. This increased level of indebtedness could adversely affect us, including by decreasing our business flexibility, and will increase our borrowing costs.

In November 2016 we entered into the Credit Agreement which provided for a 670 million Euro term loan, all of which was drawn, and a \$100 million revolving credit facility, under which a 10 million Euro letter of credit was issued. As of September 29, 2018, 371.6 million Euros were outstanding under the term loan and 10.0 million Euros were outstanding under the revolving credit facility. We may incur additional indebtedness in the future by accessing the revolving credit facility and/or entering into new financing arrangements. Our ability to pay interest and repay the principal of our current indebtedness is dependent upon our ability to manage our business operations and the ongoing interest rate environment. There can be no assurance that we will be able to manage any of these risks successfully. The Credit Agreement contains customary affirmative covenants, including covenants regarding the payment of taxes and other obligations, maintenance of insurance, reporting requirements and compliance with applicable laws and regulations, and negative covenants, including covenants limiting the ability of us and our subsidiaries to, among other things, incur debt, grant liens, make investments, make certain restricted payments, transact with affiliates, and sell assets. The Credit Agreement also requires us and our subsidiaries to maintain a senior secured net leverage ratio as of the last day of each fiscal quarter of less of than or equal to 3.50 to 1.00. The Credit Agreement contains customary

events of default that include, among other things, payment defaults, cross defaults with certain other indebtedness, violation of covenants, inaccuracy of representations and warranties in any material respect, change in control of us and Coherent Holding BV & Co. K.G. (formerly Coherent Holding GmbH), judgment defaults, and bankruptcy and insolvency events. If an event of default exists, the lenders may require the immediate payment of all obligations and exercise certain other rights and remedies provided for under the Credit Agreement,

the other loan documents and applicable law. The acceleration of such obligations is automatic upon the occurrence of a bankruptcy and insolvency event of default. There can be no assurance that we will have sufficient financial resources or we will be able to arrange financing to repay our borrowings at such time.

Our substantially increased indebtedness and higher debt-to-equity ratio as a result of the merger in comparison to that prior to the merger will have the effect, among other things, of reducing our flexibility to respond to changing business and economic conditions and will increase our borrowing costs. In addition, the amount of cash required to service our increased indebtedness levels and thus the demands on our cash resources will be greater than the amount of cash flows required to service our indebtedness or that of Rofin individually prior to the merger. The increased levels of indebtedness could also reduce funds available for our investments in product development as well as capital expenditures, dividends, share repurchases and other activities and may create competitive disadvantages for us relative to other companies with lower debt levels.

Some of our laser systems are complex in design and may contain defects that are not detected until deployed by our customers, which could increase our costs and reduce our net sales.

Lasers and laser systems are inherently complex in design and require ongoing regular maintenance. The manufacture of our lasers, laser products and systems involves a highly complex and precise process. As a result of the technological complexity of our products, in particular our excimer laser annealing tools used in the flat panel display market, changes in our or our suppliers' manufacturing processes or the inadvertent use of defective materials by us or our suppliers could result in a material adverse effect on our ability to achieve acceptable manufacturing yields and product reliability. To the extent that we do not achieve and maintain our projected yields or product reliability, our business, operating results, financial condition and customer relationships would be adversely affected. We provide warranties on a majority of our product sales, and reserves for estimated warranty costs are recorded during the period of sale. The determination of such reserves requires us to make estimates of failure rates and expected costs to repair or replace the products under warranty. We typically establish warranty reserves based on historical warranty costs for each product line. If actual return rates and/or repair and replacement costs differ significantly from our estimates, adjustments to cost of sales may be required in future periods which could have an adverse effect on our results of operations.

Our customers may discover defects in our products after the products have been fully deployed and operated, including under the end user's peak stress conditions. In addition, some of our products are combined with products from other vendors, which may contain defects. As a result, should problems occur, it may be difficult to identify the source of the problem. If we are unable to identify and fix defects or other problems, we could experience, among other things:

- loss of customers or orders;
- increased costs of product returns and warranty expenses;
- damage to our brand reputation;
- failure to attract new customers or achieve market acceptance;
- diversion of development, engineering and manufacturing resources; and
- legal actions by our customers and/or their end users.

The occurrence of any one or more of the foregoing factors could seriously harm our business, financial condition and results of operations.

Continued volatility in the advanced packaging and semiconductor manufacturing markets could adversely affect our business, financial condition and results of operations.

A portion of our net sales in the microelectronics market depends on the demand for our products by advanced packaging applications and semiconductor equipment companies. These markets have historically been characterized by sudden and severe cyclical variations in product supply and demand, which have often severely affected the demand for semiconductor manufacturing equipment, including laser-based tools and systems. The timing, severity and duration of these market cycles are difficult to predict, and we may not be able to respond effectively to these cycles. The continuing uncertainty in these markets severely limits our ability to predict our business prospects or financial results in these markets.

During industry downturns, our net sales from these markets may decline suddenly and significantly. Our ability to rapidly and effectively reduce our cost structure in response to such downturns is limited by the fixed nature of many of our expenses in the near term and by our need to continue our investment in next-generation product technology and to support and service our products. In addition, due to the relatively long manufacturing lead times for some of the systems and subsystems we sell to these markets, we may incur expenditures or purchase raw materials or components for products we cannot sell.

Accordingly, downturns in the semiconductor capital equipment market may materially harm our operating results. Conversely, when upturns in these markets occur, we must be able to rapidly and effectively increase our manufacturing capacity to meet increases in customer demand that may be extremely rapid, and if we fail to do so we may lose business to our competitors and our relationships with our customers may be harmed.

Worldwide economic conditions and related uncertainties could negatively impact demand for our products and results of operations.

Volatility and disruption in the capital and credit markets, depressed consumer confidence, government economic policies, negative economic conditions, volatile corporate profits and reduced capital spending could negatively impact demand for our products. In particular, it is difficult to develop and implement strategy, sustainable business models and efficient operations, as well as effectively manage supply chain relationships in the face of such conditions including uncertainty regarding the ability of some of our suppliers to continue operations and provide us with uninterrupted supply flow. Our ability to maintain our research and development investments in our broad product offerings may be adversely impacted in the event that our future sales decline or remain flat. Spending and the timing thereof by consumers and businesses have a significant impact on our results and, where such spending is delayed or cancelled, it could have a material negative impact on our operating results. Current global economic conditions remain uncertain and challenging. Weakness in our end markets could negatively impact our net sales, gross margin and operating expenses, and consequently have a material adverse effect on our business, financial condition and results of operations.

Uncertainty in global fiscal policy has likely had an adverse impact on global financial markets and overall economic activity in recent years. Should this uncertain financial policy recur, it would likely negatively impact global economic activity. Any weakness in global economies would also likely have negative repercussions on U.S. and global credit and financial markets, and further exacerbate sovereign debt concerns in the European Union. All of these factors would likely adversely impact the global demand for our products and the performance of our investments, and would likely have a material adverse effect on our business, results of operations and financial condition.

Financial turmoil affecting the banking system and financial markets, as has occurred in recent years, could result in tighter credit markets and lower levels of liquidity in some financial markets. There could be a number of follow-on effects from a tightened credit environment on our business, including the insolvency of key suppliers or their inability to obtain credit to finance development and/or manufacture products resulting in product delays; inability of customers to obtain credit to finance purchases of our products and/or customer insolvencies; and failure of financial institutions negatively impacting our treasury functions. In the event our customers are unable to obtain credit or otherwise pay for our shipped products it could significantly impact our ability to collect on our outstanding accounts receivable. Other income and expense also could vary materially from expectations depending on gains or losses realized on the sale or exchange of financial instruments; impairment charges resulting from revaluations of debt and equity securities and other investments; interest rates; cash balances; and changes in fair value of derivative instruments. Volatility in the financial markets and any overall economic uncertainty increase the risk that the actual amounts realized in the future on our financial instruments could differ significantly from the fair values currently assigned to them. Uncertainty about global economic conditions could also continue to increase the volatility of our stock price.

In addition, political and social turmoil related to international conflicts, terrorist acts, civil unrest and mass migration may put further pressure on economic conditions in the United States and the rest of the world. Unstable economic, political and social conditions make it difficult for our customers, our suppliers and us to accurately forecast and plan future business activities. If such conditions persist, our business, financial condition and results of operations could suffer. Additionally, unstable economic conditions can provide significant pressures and burdens on individuals, which could cause them to engage in inappropriate business conduct. See "Part II, Item 9A. CONTROLS AND PROCEDURES."

Our cash and cash equivalents and short-term investments are managed through various banks around the world and volatility in the capital and credit market conditions could cause financial institutions to fail or materially harm service levels provided by such banks, both of which could have an adverse impact on our ability to timely access funds. World capital and credit markets have been and may continue to experience volatility and disruption. In some cases, the markets have exerted downward pressure on stock prices and credit capacity for certain issuers, as well as

pressured the solvency of some financial institutions. These financial institutions, including banks, have had difficulty timely performing regular services and in some cases have failed or otherwise been largely taken over by governments. We maintain our cash, cash equivalents and short-term investments with a number of financial institutions around the world. Should some or all of these financial institutions fail or otherwise be unable to timely perform requested services, we would likely have a limited ability to timely access our cash deposited with such institutions, or, in extreme circumstances the failure of such institutions could cause us to be unable to access cash for the foreseeable future. If we are unable to quickly access our funds when we need them, we may need to increase the use of our existing credit lines or access more expensive credit, if available. If we are unable

to access our cash or if we access existing or additional credit or are unable to access additional credit, it could have a negative impact on our operations, including our reported net income. In addition, the willingness of financial institutions to continue to accept our cash deposits will impact our ability to diversify our investment risk among institutions.

We are exposed to credit risk and fluctuations in the market values of our investment portfolio.

Although we have not recognized any material losses on our cash, cash equivalents and short-term investments, future declines in their market values could have a material adverse effect on our financial condition and operating results.

Given the global nature of our business, we have investments both domestically and internationally. There has recently been growing pressure on the creditworthiness of sovereign nations, particularly in Europe where a significant portion of our cash, cash equivalents and short-term investments are invested, which results in corresponding pressure on the valuation of the securities issued by such nations. Additionally, our overall investment portfolio is often concentrated in government-issued securities such as U.S. Treasury securities and government agencies, corporate notes, commercial paper and money market funds. Credit ratings and pricing of these investments can be negatively impacted by liquidity, credit deterioration or losses, financial results, or other factors. Additionally, liquidity issues or political actions by sovereign nations could result in decreased values for our investments in certain government securities. As a result, the value or liquidity of our cash, cash equivalents and short-term investments could decline or become materially impaired, which could have a material adverse effect on our financial condition and operating results. See "Item 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK."

Our future success depends on our ability to increase our sales volumes and decrease our costs to offset potential declines in the average selling prices ("ASPs") of our products and, if we are unable to realize greater sales volumes and lower costs, our operating results may suffer.

Our ability to increase our sales volume and our future success depends on the continued growth of the markets for lasers, laser systems and related accessories, as well as our ability to identify, in advance, emerging markets for laser-based systems and to manage our manufacturing capacity to meet customer demands. We cannot assure you that we will be able to successfully identify, on a timely basis, new high-growth markets in the future. Moreover, we cannot assure you that new markets will develop for our products or our customers' products, or that our technology or pricing will enable such markets to develop. Future demand for our products is uncertain and will depend to a great degree on continued technological development and the introduction of new or enhanced products. If this does not continue, sales of our products may decline and our business will be harmed.

We have in the past experienced decreases in the ASPs of some of our products. As competing products become more widely available, the ASPs of our products may decrease. If we are unable to offset any decrease in our ASPs by increasing our sales volumes, our net sales will decline. In addition, to maintain our gross margins, we must continue to reduce the cost of manufacturing our products while maintaining their high quality. From time to time, our products, like many complex technological products, may fail in greater frequency than anticipated. This can lead to further charges, which can result in higher costs, lower gross margins and lower operating results. Furthermore, as ASPs of our current products decline, we must develop and introduce new products and product enhancements with higher margins. If we cannot maintain our gross margins, our operating results could be seriously harmed, particularly if the ASPs of our products decrease significantly.

Our future success depends on our ability to develop and successfully introduce new and enhanced products that meet the needs of our customers.

Our current products address a broad range of commercial and scientific research applications in the photonics markets. We cannot assure you that the market for these applications will continue to generate significant or consistent demand for our products. Demand for our products could be significantly diminished by disrupting technologies or products that replace them or render them obsolete. Furthermore, the new and enhanced products in certain markets generally continue to be smaller in size and have lower ASPs, and therefore, we have to sell more units to maintain revenue levels. Accordingly, we must continue to invest in research and development in order to develop competitive products.

Our future success depends on our ability to anticipate our customers' needs and develop products that address those needs. Introduction of new products and product enhancements will require that we effectively transfer production



processes from research and development to manufacturing and coordinate our efforts with those of our suppliers to achieve volume production rapidly. If we fail to transfer production processes effectively, develop product enhancements or introduce new products in sufficient quantities to meet the needs of our customers as scheduled, our net sales may be reduced and our business may be harmed.

We face risks associated with our foreign operations and sales that could harm our financial condition and results of operations.

For fiscal 2018, fiscal 2017 and fiscal 2016, 84%, 83% and 76%, respectively, of our net sales were derived from customers outside of the United States. We anticipate that foreign sales, particularly in Asia, will continue to account for a significant portion of our net sales in the foreseeable future.

A global economic slowdown or a natural disaster could have a negative effect on various foreign markets in which we operate, such as the earthquake, tsunami and resulting nuclear disaster in Japan and the flooding in Thailand in recent years. Such a slowdown may cause us to reduce our presence in certain countries, which may negatively affect the overall level of business in such countries. Our foreign sales are primarily through our direct sales force. Additionally, some foreign sales are made through foreign distributors and representatives. Our foreign operations and sales are subject to a number of risks, including:

- compliance with applicable import/export regulations, tariffs and trade barriers, including recently instituted or proposed changes in trade policies by the U.S. and any corresponding retaliatory actions by affected countries, in particular with respect to China;

- longer accounts receivable collection periods;

- the impact of recessions and other economic conditions in economies outside the United States;

- unexpected changes in regulatory requirements;

- certification requirements;

- environmental regulations;

- reduced protection for intellectual property rights in some countries;

- potentially adverse tax consequences;

- political and economic instability;

- compliance with applicable United States and foreign anti-corruption laws;

- less than favorable contract terms;

- reduced ability to enforce contractual obligations;

- cultural and management differences;

- reliance in some jurisdictions on third party sales channel partners;

- preference for locally produced products; and

- shipping and other logistics complications.

Our business could also be impacted by international conflicts, terrorist and military activity including, in particular, any such conflicts on the Korean peninsula, civil unrest and pandemic illness which could cause a slowdown in customer orders, cause customer order cancellations or negatively impact availability of supplies or limit our ability to timely service our installed base of products.

We are also subject to the risks of fluctuating foreign currency exchange rates, which could materially adversely affect the sales price of our products in foreign markets, as well as the costs and expenses of our foreign subsidiaries. While we use forward exchange contracts and other risk management techniques to hedge our foreign currency exposure, we remain exposed to the economic risks of foreign currency fluctuations.

If we are unable to protect our proprietary technology, our competitive advantage could be harmed.

Maintenance of intellectual property rights and the protection thereof is important to our business. We rely on a combination of patent, copyright, trademark and trade secret laws and restrictions on disclosure to protect our intellectual property rights. Our patent applications may not be approved, any patents that may be issued may not sufficiently protect our intellectual property and any issued patents may be challenged by third parties. Other parties may independently develop similar or competing technology or design around any patents that may be issued to us. We cannot be certain that the steps we have taken will prevent the misappropriation of our intellectual property, particularly in foreign countries where the laws may not protect our proprietary rights as fully as in the United States. Further, we may be required to enforce our intellectual property or other proprietary rights through litigation, which, regardless of success, could result in substantial costs and diversion of management's attention. Additionally, there may be existing patents of which we are unaware that could be

pertinent to our business and it is not possible for us to know whether there are patent applications pending that our products might infringe upon since these applications are often not publicly available until a patent is issued or published.

We may, in the future, be subject to claims or litigation from third parties, for claims of infringement of their proprietary rights or to determine the scope and validity of our proprietary rights or the proprietary rights of competitors or other rights holders. These claims could result in costly litigation and the diversion of our technical and management personnel. Adverse resolution of litigation may harm our operating results or financial condition.

In recent years, there has been significant litigation in the United States and around the world involving patents and other intellectual property rights. This has been seen in our industry, for example in the concluded patent-related litigation between IMRA America, Inc. ("Imra") and IPG Photonics Corporation and in Imra's concluded patent-related litigation against two of our German subsidiaries. From time to time, like many other technology companies, we have received communications from other parties asserting the existence of patent rights, copyrights, trademark rights or other intellectual property rights which such third parties believe may cover certain of our products, processes, technologies or information. In the future, we may be a party to litigation to protect our intellectual property or as a result of an alleged infringement of others' intellectual property whether through direct claims or by way of indemnification claims of our customers, as, in some cases, we contractually agree to indemnify our customers against third-party infringement claims relating to our products. These claims and any resulting lawsuit, if successful, could subject us to significant liability for damages or invalidation of our proprietary rights. These lawsuits, regardless of their success, would likely be time-consuming and expensive to resolve and would divert management time and attention. Any potential intellectual property litigation could also force us to do one or more of the following:

- stop manufacturing, selling or using our products that use the infringed intellectual property;
- obtain from the owner of the infringed intellectual property right a license to sell or use the relevant technology, although such license may not be available on reasonable terms, or at all; or
- redesign the products that use the technology.

If we are forced to take any of these actions or are otherwise a party to lawsuits of this nature, we may incur significant losses and our business may be seriously harmed. We do not have insurance to cover potential claims of this type.

If our goodwill or intangible assets become impaired, we may be required to record a significant charge to earnings. Under accounting principles generally accepted in the United States, we review our intangible assets for impairment when events or changes in circumstances indicate the carrying value may not be recoverable. Goodwill is required to be tested for impairment at least annually. Factors that may be considered in determining whether a change in circumstances indicating that the carrying value of our goodwill or other intangible assets may not be recoverable include declines in our stock price and market capitalization or future cash flows projections. A decline in our stock price, or any other adverse change in market conditions, particularly if such change has the effect of changing one of the critical assumptions or estimates we used to calculate the estimated fair value of our reporting units, could result in a change to the estimation of fair value that could result in an impairment charge. Any such material charges, whether related to goodwill or purchased intangible assets, may have a material negative impact on our financial and operating results.

We depend on skilled personnel to operate our business effectively in a rapidly changing market, and if we are unable to retain existing or hire additional personnel when needed, our ability to develop and sell our products could be harmed.

Our ability to continue to attract and retain highly skilled personnel will be a critical factor in determining whether we will be successful in the future. Recruiting and retaining highly skilled personnel in certain functions continues to be difficult. At certain locations where we operate, the cost of living is extremely high and it may be difficult to retain key employees and management at a reasonable cost. We may not be successful in attracting, assimilating or retaining qualified personnel to fulfill our current or future needs, which could adversely affect our growth and our business. Our future success depends upon the continued services of our executive officers and other key engineering, sales, marketing, manufacturing and support personnel, any of whom may leave and our ability to effectively transition to their successors. Our inability to retain or to effectively transition to their successors could harm our business and our

results of operations.

The long sales cycles for our products may cause us to incur significant expenses without offsetting net sales. Customers often view the purchase of our products as a significant and strategic decision. As a result, customers typically expend significant effort in evaluating, testing and qualifying our products before making a decision to purchase them, resulting in a lengthy initial sales cycle. While our customers are evaluating our products and before they place an order with us, we may incur substantial sales and marketing and research and development expenses to customize our products to the customers'

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needs. We may also expend significant management efforts, increase manufacturing capacity and order long lead-time components or materials prior to receiving an order. Even after this evaluation process, a potential customer may not purchase our products. As a result, these long sales cycles may cause us to incur significant expenses without ever receiving net sales to offset such expenses.

The markets in which we sell our products are intensely competitive and increased competition could cause reduced sales levels, reduced gross margins or the loss of market share.

Competition in the various photonics markets in which we provide products is very intense. We compete against a number of large public and private companies, including IPG Photonics Corporation, Lumentum Holdings Inc., MKS Instruments, Inc., Novanta Inc., nLIGHT, Inc. and TRUMPF GmbH, as well as other smaller companies. Some of our competitors are large companies that have significant financial, technical, marketing and other resources. These competitors may be able to devote greater resources than we can to the development, promotion, sale and support of their products. Some of our competitors are much better positioned than we are to acquire other companies in order to gain new technologies or products that may displace our product lines. Any of these acquisitions could give our competitors a strategic advantage. Any business combinations or mergers among our competitors, forming larger companies with greater resources, could result in increased competition, price reductions, reduced margins or loss of market share, any of which could materially and adversely affect our business, results of operations and financial condition.

Additional competitors may enter the markets in which we serve, both foreign and domestic, and we are likely to compete with new companies in the future. We may encounter potential customers that, due to existing relationships with our competitors, are committed to the products offered by these competitors. Further, our current or potential customers may determine to develop and produce products for their own use which are competitive to our products. Such vertical integration could reduce the market opportunity for our products. As a result of the foregoing factors, we expect that competitive pressures may result in price reductions, reduced margins, loss of sales and loss of market share. In addition, in markets where there are a limited number of customers, competition is particularly intense. If we fail to accurately forecast component and material requirements for our products, we could incur additional costs and incur significant delays in shipments, which could result in a loss of customers.

We use rolling forecasts based on anticipated product orders and material requirements planning systems to determine our product requirements. It is very important that we accurately predict both the demand for our products and the lead times required to obtain the necessary components and materials. We depend on our suppliers for most of our product components and materials. Lead times for components and materials that we order vary significantly and depend on factors including the specific supplier requirements, the size of the order, contract terms and current market demand for components. For substantial increases in our sales levels of certain products, some of our suppliers may need at least nine months lead-time. If we overestimate our component and material requirements, we may have excess inventory, which would increase our costs. If we underestimate our component and material requirements, we may have inadequate inventory, which could interrupt and delay delivery of our products to our customers. Any of these occurrences would negatively impact our net sales, business or operating results.

Our reliance on contract manufacturing and outsourcing may adversely impact our financial results and operations due to our decreased control over the performance and timing of certain aspects of our manufacturing.

Our manufacturing strategy includes partnering with contract manufacturers to outsource non-core subassemblies and less complex turnkey products, including some performed at international sites located in Asia and Eastern Europe. Our ability to resume internal manufacturing operations for certain products and components in a timely manner may be eliminated. The cost, quality, performance and availability of contract manufacturing operations are and will be essential to the successful production and sale of many of our products. Our financial condition or results of operation could be adversely impacted if any contract manufacturer or other supplier is unable for any reason, including as a result of the impact of worldwide economic conditions, to meet our cost, quality, performance, and availability standards. We may not be able to provide contract manufacturers with product volumes that are high enough to achieve sufficient cost savings. If shipments fall below forecasted levels, we may incur increased costs or be required to take ownership of the inventory. Also, our ability to control the quality of products produced by contract manufacturers may be limited and quality issues may not be resolved in a timely manner, which could adversely impact our financial condition or results of operations.

If we fail to effectively manage our growth or, alternatively, our spending during downturns, our business could be disrupted, which could harm our operating results.

Growth in sales, combined with the challenges of managing geographically dispersed operations, can place a significant strain on our management systems and resources, and our anticipated growth in future operations could continue to place such a strain. The failure to effectively manage our growth could disrupt our business and harm our operating results. Our ability to

successfully offer our products and implement our business plan in evolving markets requires an effective planning and management process. In economic downturns, we must effectively manage our spending and operations to ensure our competitive position during the downturn, as well as our future opportunities when the economy improves, remain intact. The failure to effectively manage our spending and operations could disrupt our business and harm our operating results.

Historically, acquisitions have been an important element of our strategy. However, we may not find suitable acquisition candidates in the future and we may not be able to successfully integrate and manage acquired businesses. Any acquisitions we make could disrupt our business and harm our financial condition.

We have in the past made strategic acquisitions of other corporations and entities, including OR Laser in March 2018 and Rofin in November 2016, as well as asset purchases, and we continue to evaluate potential strategic acquisitions of complementary companies, products and technologies. In the event of any future acquisitions, we could:

- issue stock that would dilute our current stockholders' percentage ownership;

- pay cash that would decrease our working capital;

- incur debt;

- assume liabilities; or

- incur expenses related to impairment of goodwill and amortization.

Acquisitions also involve numerous risks, including:

- problems combining the acquired operations, systems, technologies or products;

- an inability to realize expected operating efficiencies or product integration benefits;

- difficulties in coordinating and integrating geographically separated personnel, organizations, systems and facilities;

- difficulties integrating business cultures;

- unanticipated costs or liabilities, including the costs associated with improving the internal controls of the acquired company;

- diversion of management's attention from our core businesses;

- adverse effects on existing business relationships with suppliers and customers;

- potential loss of key employees, particularly those of the purchased organizations;

- incurring unforeseen obligations or liabilities in connection with acquisitions; and

the failure to complete acquisitions even after signing definitive agreements which, among other things, would result in the expensing of potentially significant professional fees and other charges in the period in which the acquisition or negotiations are terminated.

We cannot assure you that we will be able to successfully identify appropriate acquisition candidates, to integrate any businesses, products, technologies or personnel that we might acquire in the future or achieve the anticipated benefits of such transactions, which may harm our business.

Our market is unpredictable and characterized by rapid technological changes and evolving standards demanding a significant investment in research and development, and, if we fail to address changing market conditions, our business and operating results will be harmed.

The photonics industry is characterized by extensive research and development, rapid technological change, frequent new product introductions, changes in customer requirements and evolving industry standards. Because this industry is subject to rapid change, it is difficult to predict its potential size or future growth rate. Our success in generating net sales in this industry will depend on, among other things:

- maintaining and enhancing our relationships with our customers;

- the education of potential end-user customers about the benefits of lasers and laser systems; and

- our ability to accurately predict and develop our products to meet industry standards.

We cannot assure you that our expenditures for research and development will result in the introduction of new products or, if such products are introduced, that those products will achieve sufficient market acceptance or to generate sales to offset the costs of development. Our failure to address rapid technological changes in our markets could adversely affect our business and results of operations.

We are exposed to lawsuits in the normal course of business which could have a material adverse effect on our business, operating results, or financial condition.

We are exposed to lawsuits in the normal course of our business, including product liability claims, if personal injury, death or commercial losses occur from the use of our products. As a public company our stock price fluctuates for a variety of different reasons, some of which may be related to broader industry and/or market factors. As a result, from time-to-time we may be subject to the risk of litigation due to the fluctuation in stock price or other governance or market-related factors. While we typically maintain business insurance, including directors' and officers' policies, litigation can be expensive, lengthy, and disruptive to normal business operations, including the potential impact of indemnification obligations for individuals named in any such lawsuits. We may not, however, be able to secure insurance coverage on terms acceptable to us in the future. Moreover, the results of complex legal proceedings are difficult to predict. An unfavorable resolution of a particular lawsuit, including a recall or redesign of products if ultimately determined to be defective, could have a material adverse effect on our business, operating results, or financial condition.

We use standard laboratory and manufacturing materials that could be considered hazardous and we could be liable for any damage or liability resulting from accidental environmental contamination or injury.

Although most of our products do not incorporate hazardous or toxic materials and chemicals, some of the gases used in our excimer lasers and some of the liquid dyes used in some of our scientific laser products are highly toxic. In addition, our operations involve the use of standard laboratory and manufacturing materials that could be considered hazardous. Also, if a facility fire were to occur at our Sunnyvale, California site and were to spread to a reactor used to grow semiconductor wafers, it could release highly toxic emissions. We believe that our safety procedures for handling and disposing of such materials comply with all federal, state and offshore regulations and standards. However, the risk of accidental environmental contamination or injury from such materials cannot be entirely eliminated. In the event of such an accident involving such materials, we could be liable for damages and such liability could exceed the amount of our liability insurance coverage and the resources of our business which could have an adverse effect on our financial results or our business as a whole.

Compliance or the failure to comply with current and future environmental regulations could cause us significant expense.

We are subject to a variety of federal, state, local and foreign environmental regulations relating to the use, storage, discharge and disposal of hazardous chemicals used during our manufacturing process or requiring design changes or recycling of products we manufacture. If we fail to comply with any present and future regulations, we could be subject to future liabilities, the suspension of production or a prohibition on the sale of products we manufacture. In addition, such regulations could restrict our ability to expand our facilities or could require us to acquire costly equipment, or to incur other significant expenses to comply with environmental regulations, including expenses associated with the recall of any non-compliant product and the management of historical waste.

From time to time new regulations are enacted, and it is difficult to anticipate how such regulations will be implemented and enforced. We continue to evaluate the necessary steps for compliance with regulations as they are enacted. These regulations include, for example, the Registration, Evaluation, Authorization and Restriction of Chemical substances ("REACH"), the Restriction on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Directive ("RoHS") and the Waste Electrical and Electronic Equipment Directive ("WEEE") enacted in the European Union, which regulate the use of certain hazardous substances in, and require the collection, reuse and recycling of waste from, certain products we manufacture. This and similar legislation that has been or is in the process of being enacted in Japan, China, South Korea and various states of the United States may require us to re-design our products to ensure compliance with the applicable standards, for example by requiring the use of different types of materials. These redesigns or alternative materials may detrimentally impact the performance of our products, add greater testing lead-times for product introductions or have other similar effects. We believe we comply with all such legislation where our products are sold and we will continue to monitor these laws and the regulations



being adopted under them to determine our responsibilities. In addition, we are monitoring legislation relating to the reduction of carbon emissions from industrial operations to determine whether we may be required to incur any additional material costs or expenses associated with our operations. We are not currently aware of any such material costs or expenses. The SEC has promulgated rules requiring disclosure regarding the use of certain "conflict minerals" mined from the Democratic Republic of Congo and adjoining countries and procedures regarding a manufacturer's efforts to prevent the sourcing of such minerals. The implementation of such rules has required us to incur additional expense and internal resources and may continue to do so in the future, particularly in the event that only a limited pool of suppliers are available to certify that products are free from "conflict minerals." Our failure to comply with any of the foregoing regulatory requirements

or contractual obligations could result in our being directly or indirectly liable for costs, fines or penalties and third-party claims, and could jeopardize our ability to conduct business in the United States and foreign countries. Our and our customers' operations would be seriously harmed if our logistics or facilities or those of our suppliers, our customers' suppliers or our contract manufacturers were to experience catastrophic loss.

Our operations, logistics and facilities and those of our customers, suppliers and contract manufacturers could be subject to a catastrophic loss from fire, flood, earthquake, volcanic eruption, work stoppages, power outages, acts of war, pandemic illnesses, energy shortages, theft of assets, other natural disasters or terrorist activity. A substantial portion of our research and development activities, manufacturing, our corporate headquarters and other critical business operations are located near major earthquake faults in Santa Clara, California, an area with a history of seismic events. Any such loss or detrimental impact to any of our operations, logistics or facilities could disrupt our operations, delay production, shipments and net sales and result in large expenses to repair or replace the facility. While we have obtained insurance to cover most potential losses, after reviewing the costs and limitations associated with earthquake insurance, we have decided not to procure such insurance. We believe that this decision is consistent with decisions reached by numerous other companies located nearby. We cannot assure you that our existing insurance coverage will be adequate against all other possible losses.

Difficulties with our enterprise resource planning ("ERP") system and other parts of our global information technology system could harm our business and results of operation. If our network security measures are breached and unauthorized access is obtained to a customer's data or our data or our information technology systems, we may incur significant legal and financial exposure and liabilities.

Like many modern multinational corporations, we maintain a global information technology system, including software products licensed from third parties. Any system, network or Internet failures, misuse by system users, the hacking into or disruption caused by the unauthorized access by third parties or loss of license rights could disrupt our ability to timely and accurately manufacture and ship products or to report our financial information in compliance with the timelines mandated by the SEC. Any such failure, misuse, hacking, disruptions or loss would likely cause a diversion of management's attention from the underlying business and could harm our operations. In addition, a significant failure of our global information technology system could adversely affect our ability to complete an evaluation of our internal controls and attestation activities pursuant to Section 404 of the Sarbanes-Oxley Act of 2002.

Our information systems are subject to attacks, interruptions and failures.

As part of our day-to-day business, we store our data and certain data about our customers in our global information technology system. While our system is designed with access security, if a third party gains unauthorized access to our data, including any regarding our customers, such a security breach could expose us to a risk of loss of this information, loss of business, litigation and possible liability. Our security measures may be breached as a result of third-party action, including intentional misconduct by computer hackers, employee error, malfeasance or otherwise. Additionally, third parties may attempt to fraudulently induce employees or customers into disclosing sensitive information such as user names, passwords or other information in order to gain access to our customers' data or our data, including our intellectual property and other confidential business information, or our information technology systems. Because the techniques used to obtain unauthorized access, or to sabotage systems, change frequently and generally are not recognized until launched against a target, we may be unable to anticipate these techniques or to implement adequate preventative measures. Any unauthorized access could result in a loss of confidence by our customers, damage our reputation, disrupt our business, lead to legal liability and negatively impact our future sales. Additionally, such actions could result in significant costs associated with loss of our intellectual property, impairment of our ability to conduct our operations, rebuilding our network and systems, prosecuting and defending litigation, responding to regulatory inquiries or actions, paying damages or taking other remedial steps.

Changes in tax rates, tax liabilities or tax accounting rules could affect future results.

As a global company, we are subject to taxation in the United States and various other countries and jurisdictions. Significant judgment is required to determine our worldwide tax liabilities. A number of factors may affect our future effective tax rates including, but not limited to:

• interpretation and impact of the recently enacted and aforementioned U.S. tax law, the Tax Cuts and Jobs Act (the "Tax Act");

changes in our current and future global structure based on the Rofin acquisition and restructuring that involved significant movement of U.S. and foreign entities, and our ability to maintain favorable tax treatment as a result of various Rofin restructuring efforts and business activities;

the outcome of discussions with various tax authorities regarding intercompany transfer pricing arrangements;

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- changes that involve other acquisitions, restructuring or an increased investment in technology outside of the United States to better align asset ownership and business functions with revenues and profits;
- changes in the composition of earnings in countries or states with differing tax rates;
- the resolution of issues arising from tax audits with various tax authorities, and in particular, the outcome of the German tax audits of Coherent and Rofin tax returns for fiscal 2010 - 2016;
- adjustments to estimated taxes upon finalization of various tax returns;
- increases in expenses not deductible for tax purposes, including impairments of goodwill in connection with acquisitions;
- our ability to meet the eligibility requirements for tax holidays of limited time tax-advantage status;
- changes in available tax credits;
- changes in share-based compensation;
- changes in other tax laws or the interpretation of such tax laws, including the Base Erosion Profit Shifting ("BEPS") action plan implemented by the Organization for Economic Co-operation and Development ("OECD"); and
- changes in generally accepted accounting principles.

As indicated above, we are engaged in discussions with various tax authorities regarding the appropriate level of profitability for Coherent entities and this may result in changes to our worldwide tax liabilities. In addition, we are subject to regular examination of our income tax returns by the Internal Revenue Service ("IRS") and other tax authorities. We regularly assess the likelihood of favorable or unfavorable outcomes resulting from these examinations to determine the adequacy of our provision for income taxes. Although we believe our tax estimates are reasonable, there can be no assurance that any final determination will not be materially different from the treatment reflected in our historical income tax provisions and accruals, which could materially and adversely affect our operating results and financial condition.

From time to time the United States, foreign and state governments make substantive changes to tax rules and the application of rules to companies. For example, the Tax Act has a significant impact on the taxation of Coherent including the U.S. tax treatment of our foreign operations. The recent U.S. tax law changes are subject to further interpretations from the U.S. federal and state governments and regulatory organizations, such as the Treasury Department and/or the Internal Revenue Service. Updated guidance and interpretations could change the provisional tax liabilities or the accounting treatment of them. We may pay the transition tax calculated under the Tax Act over a period of up to eight years.

Changing laws, regulations and standards relating to corporate governance and public disclosure may create uncertainty regarding compliance matters.

Federal securities laws, rules and regulations, as well as the rules and regulations of self-regulatory organizations such as NASDAQ and the NYSE, require companies to maintain extensive corporate governance measures, impose comprehensive reporting and disclosure requirements, set strict independence and financial expertise standards for audit and other committee members and impose civil and criminal penalties for companies and their chief executive officers, chief financial officers and directors for securities law violations. These laws, rules and regulations have increased and will continue to increase the scope, complexity and cost of our corporate governance, reporting and disclosure practices, which could harm our results of operations and divert management's attention from business operations. Changing laws, regulations and standards relating to corporate governance and public disclosure may create uncertainty regarding compliance matters. New or changed laws, regulations and standards are subject to varying interpretations in many cases. As a result, their application in practice may evolve over time. We are committed to maintaining high standards of ethics, corporate governance and public disclosure. Complying with evolving interpretations of new or changed legal requirements may cause us to incur higher costs as we revise current practices, policies and procedures, and may divert management time and attention from revenue generating to compliance activities. If our efforts to comply with new or changed laws, regulations and standards differ from the activities intended by regulatory or governing bodies due to ambiguities related to practice, our reputation may also be harmed.

Governmental regulations, including tariffs and duties, affecting the import or export of products could negatively affect our business, financial condition and results of operations.

The United States, Germany, the European Union, the United Kingdom, China, South Korea and many other foreign governments impose tariffs and duties on the import and export of products, including some of those which we sell. In particular, given our worldwide operations, we pay duties on certain products when they are imported into the United States for

repair work as well as on certain of our products which are manufactured by our foreign subsidiaries. These products can be subject to a duty on the product value. Additionally, the United States and various foreign governments have imposed tariffs, controls, export license requirements and restrictions on the import or export of some technologies, especially encryption technology. From time to time, government agencies have proposed additional regulation of encryption technology, such as requiring the escrow and governmental recovery of private encryption keys. Governmental regulation of encryption technology and regulation of imports or exports, or our failure to obtain required import or export licenses or other approvals for our products, could harm our international and domestic sales and adversely affect our net sales.

The U.S. has recently instituted or proposed changes in trade policies that include the negotiation or termination of trade agreements, the imposition of higher tariffs on imports into the United States, including, in particular, on Chinese goods, economic sanctions on individuals, corporations or countries and other government regulations affecting trade between the United States and other countries where we conduct our business. These policy changes and proposals could require time-consuming and expensive alterations to our business operations and may result in greater restrictions and economic disincentives on international trade, which could negatively impact our competitiveness in jurisdictions around the world as well as lead to an increase in costs in our supply chain. Given that we are a multinational corporation, with manufacturing located both in the United States and internationally, we may face additional susceptibility to negative impacts from these tariffs or change in trade policies regarding our inter-company trade practices. For example, we have recently seen a drop in export demand for our Chinese customers particularly in the materials processing space. As a result, some of these customers are reevaluating expansion plans and delaying and, in limited cases, cancelling orders. In addition, new tariffs and other changes in U.S. trade policy could trigger retaliatory actions by affected countries, and certain foreign governments, including the Chinese government (which has imposed retaliatory tariffs on a range of U.S. goods including certain photonics products), have instituted or are considering imposing trade sanctions on certain U.S. manufactured goods. Such changes by the United States and other countries have the potential to adversely impact U.S. and worldwide economic conditions, our industry and the global demand for our products, and as a result, could negatively affect our business, financial condition and results of operations.

As a multinational corporation, we may be subject to audits by tax, export and customs authorities, as well as other government agencies. For example, we were audited in South Korea for customs duties and value added tax for the period from March 2009 to March 2014. We were liable for additional payments, duties, taxes and penalties of \$1.6 million, which we paid in the second quarter of fiscal 2016. Any future audits could lead to assessments that could have a material adverse effect on our business or financial position, results of operations, or cash flows.

In addition, compliance with the directives of the Directorate of Defense Trade Controls ("DDTC") may result in substantial expenses and diversion of management's attention. Any failure to adequately address the directives of DDTC could result in civil fines or suspension or loss of our export privileges, any of which could have a material adverse effect on our business or financial position, results of operations, or cash flows.

Failure to maintain effective internal controls may cause a loss of investor confidence in the reliability of our financial statements or to cause us to delay filing our periodic reports with the SEC and adversely affect our stock price.

The SEC, as directed by Section 404 of the Sarbanes-Oxley Act of 2002, adopted rules requiring public companies to include a report of management on internal control over financial reporting in their annual reports on Form 10-K that contain an assessment by management of the effectiveness of our internal control over financial reporting. In addition, our independent registered public accounting firm must attest to and report on the effectiveness of our internal control over financial reporting. Although we test our internal control over financial reporting in order to ensure compliance with the Section 404 requirements, our failure to maintain adequate internal controls over financial reporting could result in an adverse reaction in the financial marketplace due to a loss of investor confidence in the reliability of our financial statements or a delay in our ability to timely file our periodic reports with the SEC, which ultimately could negatively impact our stock price.

Provisions of our charter documents and Delaware law, and our Change-of-Control Severance Plan, may have anti-takeover effects that could prevent or delay a change in control.

Provisions of our certificate of incorporation and bylaws, as well as the terms of our Change-of-Control Severance Plan, may discourage, delay or prevent a merger or acquisition, make a merger or acquisition more costly for a potential acquirer, or make removal of incumbent directors or officers more difficult. These provisions may discourage takeover attempts and bids for our common stock at a premium over the market price. These provisions include:

- the ability of our Board of Directors to alter our bylaws without stockholder approval;
- limiting the ability of stockholders to call special meetings; and

establishing advance notice requirements for nominations for election to our Board of Directors or for proposing matters that can be acted on by stockholders at stockholder meetings.

We are subject to Section 203 of the Delaware General Corporation Law, which prohibits a publicly-held Delaware corporation from engaging in a merger, asset or stock sale or other transaction with an interested stockholder for a period of three years following the date such person became an interested stockholder, unless prior approval of our board of directors is obtained or as otherwise provided. These provisions of Delaware law also may discourage, delay or prevent someone from acquiring or merging with us without obtaining the prior approval of our board of directors, which may cause the market price of our common stock to decline. In addition, we have adopted a change of control severance plan, which provides for the payment of a cash severance benefit to each eligible employee based on the employee's position. If a change of control occurs, our successor or acquirer will be required to assume and agree to perform all of our obligations under the change of control severance plan which may discourage potential acquirers or result in a lower stock price.

#### ITEM 1B. UNRESOLVED STAFF COMMENTS

Not Applicable.

#### ITEM 2. PROPERTIES

Our corporate headquarters is located in Santa Clara, California. At fiscal 2018 year-end, our manufacturing locations were as follows (all acreage and square footage is approximate) (unless otherwise indicated, each property is utilized jointly by our two segments):

	Description	Use	Term*
Santa Clara, CA	8.5 acres of land, 200,000 square feet	Corporate headquarters, manufacturing, R&D	Owned
Santa Clara, CA	90,120 square feet	Office	Leased through July 2020
Sunnyvale, CA (1)	24,159 square feet	Office, manufacturing, R&D	Leased through December 2023
Richmond, CA (2)	37,952 square feet	Office, manufacturing, R&D	Leased through November 2022
Richmond, CA (2)	30,683 square feet	Office, manufacturing, R&D	Leased through November 2022
Richmond, CA (2)	11,500 square feet	Warehouse	Leased through November 2019
Bloomfield, CT (1)	72,996 square feet	Office, manufacturing, R&D	Leased through December 2022
East Hanover, NJ (2)	29,932 square feet	Office, manufacturing, R&D	Leased through January 2025



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Mount Olive, NJ (2)	88,000 square feet	Office, manufacturing, R&D	Leased through June 2028
Wilsonville, OR (2)	41,250 square feet	Office, manufacturing, R&D	Leased through December 2023
Salem, NH (1)	44,153 square feet	Office, manufacturing, R&D	Leased through October 2024
East Granby, CT (1)	68,135 square feet	Office, manufacturing, R&D	Leased through January 2027
Plymouth, MI (1)	52,128 square feet	Office, manufacturing, R&D	Leased through May 2022
Göttingen, Germany (2)	14.2 acres of land, several buildings totaling 238,744 square feet	Office, manufacturing, R&D	Owned
Hamburg, Germany (1)	4.6 acres of land, 119,724 square feet	Office, manufacturing, R&D	Owned
Mainz, Germany (1)	1.2 acres of land, 46,984 square feet	Office, manufacturing, R&D	Owned
Mainz, Germany (1)	47,619 square feet	Office, manufacturing, R&D	Leased through September 2022
Overath, Germany (1)	2.5 acres of land, 22,948 square feet	Office, manufacturing, R&D	Owned **
Gilching, Germany (1)	4.2 acres of land, 125,012 square feet	Office, manufacturing, R&D	Owned
Freiburg, Germany (1)	12,686 square feet	Office, manufacturing, R&D	Leased through September 2019
Gunding, Germany (1)	81,913 square feet	Office, manufacturing, R&D	Leased through February 2019
Starnberg, Germany (1)	19,375 square feet	Office, manufacturing, R&D	Leased through May 2021
Lübeck, Germany (2)	49,989 square feet	Office, manufacturing, R&D	Leased through December 2020
Lübeck, Germany (2)	22,583 square feet	Manufacturing, R&D	Leased through October 2020 with option to purchase building
Lübeck, Germany (2)	8,095 square feet	Office, manufacturing, R&D	Leased through April 2019
Lübeck, Germany (2)	7,578 square feet	Warehouse	Leased through April 2019
Kaiserslautern, Germany (2)	33,740 square feet	Office, manufacturing, R&D	Leased through September 2019
Dieburg, Germany (1)	37,947 square feet	Office, manufacturing, R&D	Leased through January 2032
Tampere, Finland (1)	4.9 acres of land, 50,074 square feet	Office, manufacturing, R&D	Owned
Pamplona, Spain (1)	0.3 acres of land, 24,654 square feet	Office, manufacturing	Owned
Gothenburg, Sweden (1)	49,514 square feet	Office, manufacturing, R&D	Leased through August 2020
Belp, Switzerland (1)	12,981 square feet	Office, manufacturing, R&D	Leased through February 2021
Glasgow, Scotland (2)	2.0 acres of land, 31,600 square feet	Office, manufacturing, R&D	Owned
Nanjing, China (1)	3.0 acres of land, 86,397 square feet		Owned **

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Ansung, South Korea (1)	60,257 square feet	Office, manufacturing, R&D	Office, manufacturing	Leased through September 2027
YongIn-Si, South Korea (2)	33,074 square feet		Office, manufacturing	Leased through November 2021 (early exit planned)
Kallang Sector, Singapore	42,723 square feet		Office, manufacturing	Leased through January 2022
Penang, Malaysia	21,356 square feet		Office, manufacturing	Leased through August 2020

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(1) This facility is utilized primarily by our ILS operating segment.

(2) This facility is utilized primarily by our OLS operating segment.

\* We currently plan to renew leases on buildings as they expire, as necessary.

\*\* Building sold subsequent to September 29, 2018 and is being leased back through October 2022 (Overath) and November 2023 (Nanjing).

We maintain other sales and service offices under varying leases expiring from fiscal 2019 through 2023 in Japan, China, Taiwan, South Korea, Canada, France, Italy, Germany, Belgium, Spain, the United Kingdom and the Netherlands.

We consider our facilities to be both suitable and adequate to provide for current and near term requirements and that the productive capacity in our facilities is substantially being utilized or we have plans to utilize it.

### ITEM 3. LEGAL PROCEEDINGS

We are subject to legal claims and litigation arising in the ordinary course of business, such as product liability, employment or intellectual property claims, including, but not limited to, the matters described below. On May 14, 2013, IMRA America ("Imra") filed a complaint for patent infringement against two of our subsidiaries in the Regional Court of Düsseldorf, Germany, captioned *In re IMRA America Inc. versus Coherent Kaiserslautern GmbH et. al.* 4b O 38/13. The complaint alleged that the use of certain of the Company's lasers infringed upon EP Patent No. 754,103, entitled "Method For Controlling Configuration of Laser Induced Breakdown and Ablation," issued November 5, 1997. The patent, now expired in all jurisdictions, is owned by the University of Michigan and licensed to Imra. The complaint sought unspecified compensatory damages and the cost of court proceedings and sought to permanently enjoin the Company from infringing the patent in the future. Following the filing of the infringement suit, our subsidiaries filed a separate nullity action with the Federal Patent Court in Munich, Germany requesting that the court hold that the patent was invalid based on prior art. On October 1, 2015, the Federal Patent Court ruled that the German portion of the patent was invalid. Imra appealed this decision to the Federal Court of Justice, the highest civil jurisdiction court in Germany. On March 27, 2018, the Federal Court of Justice dismissed Imra's appeal effectively ending the case in favor of Coherent.

Although we do not expect that such legal claims and litigation will ultimately have a material adverse effect on our consolidated financial position, results of operations or cash flows, an adverse result in one or more matters could negatively affect our results in the period in which they occur.

The United States and many foreign governments impose tariffs and duties on the import and export of certain products we sell or regulate the export of certain products we sell. From time to time our customs compliance, product classifications, duty calculations and payments are reviewed or audited by government agencies. For example, one of the company's German subsidiaries is currently under review by applicable German authorities regarding certain historical exports of products. Historically these reviews, even where violations have been cited and fines or other actions have been taken, have not resulted in materially negative consequences to the company. In the future any results of such matters could, however, have materially negative effects on the company.

#### Income Tax Audits

We are subject to taxation and file income tax returns in the U.S. federal jurisdiction and in many state and foreign jurisdictions. Our most significant tax jurisdictions are the U.S. and Germany. For U.S. federal and German income tax purposes, all years prior to fiscal 2015 and 2010, respectively, are closed to examination. In our other major foreign jurisdictions and our major state jurisdictions, the years prior to fiscal 2012 and 2014, respectively, are closed. Earlier years in our various jurisdictions may remain open for adjustment to the extent that we have tax attribute carryforwards from those years.

In the U.S., a legacy Rofin entity is under audit for fiscal 2016. In Germany, various Coherent and legacy Rofin entities are under audit for the years 2010 through 2016. The timing and the resolution of income tax examinations is highly uncertain, and the amounts ultimately paid, if any, upon resolution of the issues raised by the taxing authorities may differ materially from the amounts accrued for each year. Management believes that it has adequately provided for any adjustments that may result from tax examinations. We regularly engage in discussions and negotiations with tax authorities regarding tax matters in various jurisdictions. Although the timing of resolution, settlement and closure of audits is not certain, we do not believe it is reasonably possible that our unrecognized tax benefits will materially

change in the next 12 months.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

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PART II

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

Our common stock is listed on the NASDAQ Global Select Market exchange with the ticker symbol of COHR. The number of stockholders of record as of November 23, 2018 was 526. While we paid a cash dividend in fiscal 2013 and may elect to pay dividends in the future, we have no present intention to declare cash dividends. Our line of credit agreement, signed on November 7, 2016, includes certain restrictions on our ability to pay cash dividends. There were no sales of unregistered securities in fiscal 2018.

There were no stock repurchases during the fourth quarter of fiscal 2018.

Refer to Note 11 "Stock Repurchases" of our Notes to Consolidated Financial Statements under Item 15 of this annual report for discussion on repurchases during fiscal 2018 and 2016.

**COMPANY STOCK PRICE PERFORMANCE**

The following graph shows a five-year comparison of cumulative total stockholder return, calculated on a dividend reinvestment basis and based on a \$100 investment, from September 28, 2013 through September 29, 2018 comparing the return on our common stock with the Russell 1000 Index, the Russell 2000 Index and the Nasdaq Composite Index. Prior to fiscal 2017, we were a member of the Russell 2000 Index and have historically included the Russell 2000 Index here. During fiscal 2017, we moved to the Russell 1000 Index. In the future, we will only include the then current index. The stock price performance shown on the following graph is not necessarily indicative of future price performance.

**COMPARISON OF FIVE-YEAR CUMULATIVE TOTAL RETURN AMONG COHERENT, INC., THE RUSSELL 1000 INDEX, THE RUSSELL 2000 INDEX, AND THE NASDAQ COMPOSITE INDEX.**

## INDEXED RETURNS

Company Name / Index	Base	Years Ending				
	Period	9/27/2014	10/3/2015	10/1/2016	9/30/2017	9/29/2018
Coherent, Inc.	100	102.64	89.17	180.27	383.51	280.81
Russell 1000 Index	100	119.02	119.59	135.19	160.25	188.72
Russell 2000 Index	100	105.55	106.49	121.46	146.65	169.00
Nasdaq Composite Index	100	120.77	127.50	145.65	180.15	225.49

The information contained above under the caption "Company Stock Price Performance" shall not be deemed to be "soliciting material" or to be "filed" with the SEC, nor will such information be incorporated by reference into any future SEC filing except to the extent that we specifically incorporate it by reference into such filing.

## ITEM 6. SELECTED FINANCIAL DATA

The information set forth below is not necessarily indicative of results of future operations and should be read in conjunction with Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations" and the Consolidated Financial Statements and Notes to Consolidated Financial Statements included elsewhere in this annual report.

We derived the consolidated statement of operations data for fiscal 2018, 2017 and 2016 and the consolidated balance sheet data as of fiscal 2018 and 2017 year-end from our audited consolidated financial statements, and accompanying notes, contained in this annual report. The consolidated statements of operations data for fiscal 2015 and 2014 and the consolidated balance sheet data as of fiscal 2016, 2015 and 2014 year-end are derived from our audited consolidated financial statements which are not included in this annual report.

Consolidated financial data	Fiscal 2018 (1)	Fiscal 2017 (2)	Fiscal 2016 (3)	Fiscal 2015 (4)	Fiscal 2014
	(in thousands, except per share data)				
Net sales	\$1,902,573	\$1,723,311	\$857,385	\$802,460	\$794,639
Gross profit	\$830,691	\$750,269	\$381,392	\$335,399	\$313,390
Net income from continuing operations	\$247,360	\$208,644	\$87,502	\$76,409	\$59,106
Net income per share from continuing operations:					
Basic	\$10.07	\$8.52	\$3.62	\$3.09	\$2.39
Diluted	\$9.95	\$8.42	\$3.58	\$3.06	\$2.36
Shares used in computation:					
Basic	24,572	24,487	24,142	24,754	24,760
Diluted	24,851	24,777	24,415	24,992	25,076
Total assets *	\$2,259,969	\$2,337,800	\$1,161,148	\$968,947	\$999,375
Long-term obligations	\$420,711	\$589,001	\$—	\$—	\$—
Other long-term liabilities *	\$151,956	\$166,390	\$48,826	\$49,939	\$62,407
Stockholders' equity	\$1,314,464	\$1,163,264	\$910,828	\$796,418	\$819,649

\*In November 2015, the FASB issued amended guidance that clarifies that in a classified statement of financial position, an entity shall classify deferred tax liabilities and assets as noncurrent amounts. The new guidance superseded ASC 740-10-45-5 which required the valuation allowance for a particular tax jurisdiction be allocated between current and noncurrent deferred tax assets for that tax jurisdiction on a pro rata basis. We elected to early adopt the standard retrospectively in fiscal 2016, which resulted in the reclassification of current deferred income tax assets to non-current deferred income tax assets and non-current deferred income tax liabilities on our consolidated balance sheets for fiscal 2017, 2016 and 2015. The impact of the reclassifications to deferred tax assets and liabilities for fiscal 2014 were immaterial.

(1) Includes \$2.9 million of after-tax restructuring charges, \$0.8 million impairment and other charges, \$0.7 million of after-tax acquisition costs, \$0.6 million of after-tax amortization of purchase accounting step-up, \$26.7 million of

tax charges due to the U.S. Tax Cuts and Jobs Act transition tax and deferred tax remeasurement, \$3.3 million tax charge due to an increase in valuation allowances against deferred tax assets and \$12.8 million of tax benefit from the adoption of new rules for accounting for excess tax benefits and tax deficiencies for employee stock-based compensation.

Includes \$19.0 million of after-tax amortization of purchase accounting step-up, \$17.4 million of after tax costs related to the acquisition of Rofin, \$8.4 million of after-tax restructuring charges, a charge of \$1.9 million after-tax for the impairment of net assets of several entities held for sale, \$1.8 million after-tax interest expense on the (2) commitment of our term loan to finance the acquisition of Rofin, a \$7.1 million after-tax gain on our hedge of our foreign exchange risk related to the commitment of our term loan and the issuance of debt to finance the acquisition of Rofin, a \$3.4 million after-tax gain on our sale of previously owned Rofin shares and a benefit of \$1.4 million from the closure of R&D tax audits.

Includes \$6.4 million of after tax costs related to the acquisition of Rofin, a \$1.4 million after-tax loss on our hedge (3) of our foreign exchange risk related to the commitment of our term loan to finance the acquisition of Rofin, \$0.8 million after-tax interest expense on the commitment of our term loan to finance the acquisition of Rofin and a benefit of \$1.2 million from the renewal of the R&D tax credit for fiscal 2015.

Includes a charge of \$1.3 million after tax for the impairment of our investment in SiOnyx, a \$1.3 million after-tax (4) charge for an accrual related to an ongoing customs audit, a benefit of \$1.1 million from the renewal of the R&D tax credit for fiscal 2014 and \$1.3 million gain on our purchase of Tinsley in the fourth quarter of fiscal 2015.

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

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our Consolidated Financial Statements and related notes included under Item 15 of this annual report. This discussion contains forward-looking statements, which involve risks and uncertainties. Our actual results could differ materially from those anticipated in the forward-looking statements as a result of certain factors, including but not limited to those discussed in Item 1A, "Risk Factors" and elsewhere in this annual report. Please see the discussion of forward-looking statements at the beginning of this annual report under "Special Note Regarding Forward-Looking Statements."

### KEY PERFORMANCE INDICATORS

Below is a summary of some of the quantitative performance indicators (as defined below) that are evaluated by management to assess our financial performance. Some of the indicators are non-GAAP measures and should not be considered as an alternative to any other measure for determining operating performance or liquidity that is calculated in accordance with generally accepted accounting principles.

	Fiscal		
	2018	2017	2016
	(Dollars in thousands)		
Net Sales—OEM Laser Sources	\$1,259,477	\$1,143,620	\$722,517
Net Sales—Industrial Lasers & Systems	\$643,096	\$579,691	\$134,868
Gross Profit as a Percentage of Net Sales—OEM Laser Sources	52.7	% 53.6	% 48.3
Gross Profit as a Percentage of Net Sales—Industrial Lasers & Systems	26.7	% 24.4	% 26.0
Research and Development Expenses as a Percentage of Net Sales	7.0	% 6.9	% 9.5
Income From Continuing Operations Before Income Taxes	\$361,555	\$302,055	\$122,896
Net Cash Provided by Operating Activities	\$236,111	\$384,116	\$105,299
Days Sales Outstanding in Receivables	67.2	63.9	69.6
Annualized Fourth Quarter Inventory Turns	2.2	2.6	2.5
Capital Spending as a Percentage of Net Sales	4.8	% 3.7	% 5.8
Net Income From Continuing Operations as a Percentage of Net Sales	13.0	% 12.1	% 10.2
Adjusted EBITDA as a Percentage of Net Sales	28.9	% 30.1	% 22.6

Definitions and analysis of these performance indicators are as follows:

#### Net Sales

Net sales include sales of lasers, laser tools, related accessories and service. Net sales for fiscal 2018 increased 10.1% in our OLS segment and increased 10.9% in our ILS segment from fiscal 2017. Net sales for fiscal 2017 increased 58.3% in our OLS segment and increased 329.8% in our ILS segment from fiscal 2016, with the majority of the increase in the ILS segment





due to Rofin net sales since the acquisition on November 7, 2016. For a description of additional reasons for changes in net sales refer to the "Results of Operations" section below.

#### Gross Profit as a Percentage of Net Sales

Gross profit as a percentage of net sales ("gross profit percentage") is calculated as gross profit for the period divided by net sales for the period. Gross profit percentage for OLS decreased to 52.7% in fiscal 2018 from 53.6% in fiscal 2017 and increased from 48.3% in fiscal 2016. Gross profit percentage for ILS increased to 26.7% in fiscal 2018 from 24.4% in fiscal 2017 and from 26.0% in fiscal 2016. For a description of the reasons for changes in gross profit refer to the "Results of Operations" section below.

#### Research and Development as a Percentage of Net Sales

Research and development as a percentage of net sales ("R&D percentage") is calculated as research and development expense for the period divided by net sales for the period. Management considers R&D percentage to be an important indicator in managing our business as investing in new technologies is a key to future growth. R&D percentage increased slightly to 7.0% in fiscal 2018 from 6.9% in fiscal 2017 and decreased from 9.5% in fiscal 2016. For a description of the reasons for changes in R&D spending refer to the "Results of Operations" section below.

#### Net Cash Provided by Operating Activities

Net cash provided by operating activities shown on our Consolidated Statements of Cash Flows primarily represents the excess of cash collected from billings to our customers and other receipts over cash paid to our vendors for expenses and inventory purchases to run our business. We believe that cash flows from operations is an important performance indicator because cash generation over the long term is essential to maintaining a healthy business and providing funds to help fuel growth. For a description of the reasons for changes in Net Cash Provided by Operating Activities refer to the "Liquidity and Capital Resources" section below.

#### Days Sales Outstanding in Receivables

We calculate days sales outstanding ("DSO") in receivables as net receivables at the end of the period divided by net sales during the period and then multiplied by the number of days in the period, using 360 days for years. DSO in receivables indicates how well we are managing our collection of receivables, with lower DSO in receivables resulting in higher working capital availability. The more money we have tied up in receivables, the less money we have available for research and development, acquisitions, expansion, marketing and other activities to grow our business. Our DSO in receivables for fiscal 2018 increased to 67.2 days from 63.9 days in fiscal 2017. The increase in DSO in receivables was primarily due to a higher concentration of sales in the last two months of fiscal 2018 compared to fiscal 2017 in Asia and Japan including higher sales of ELA tools used in the flat panel display market and the timing of collection of those receivables, as well as slower collections on receivables in the U.S.

#### Annualized Fourth Quarter Inventory Turns

We calculate annualized fourth quarter inventory turns as cost of sales during the fourth quarter annualized and divided by net inventories at the end of the fourth quarter. This indicates how well we are managing our inventory levels, with higher inventory turns resulting in more working capital availability and a higher return on our investments in inventory. Our annualized fourth quarter inventory turns for fiscal 2018 decreased to 2.2 turns from 2.6 turns in fiscal 2017 primarily as a result of increased levels of inventory due to a temporary decrease in demand for sales of our large ELA tools, slightly offset by increased service inventory demand due to the increased installed base of such tools.

#### Capital Spending as a Percentage of Net Sales

Capital spending as a percentage of net sales ("capital spending percentage") is calculated as capital expenditures for the period divided by net sales for the period. Capital spending percentage indicates the extent to which we are expanding or improving our operations, including investments in technology and equipment. Management monitors capital spending levels as this assists us in measuring our cash flows, net of capital expenditures. Our capital spending percentage increased to 4.8% in fiscal 2018 from 3.7% in fiscal 2017. Our capital spending percentage decreased to 3.7% in fiscal 2017 from 5.8% in fiscal 2016. The fiscal 2018 increase was primarily due to investments made to expand our manufacturing capacity in several manufacturing sites in Germany and South Korea, higher purchases of production-related assets and higher spending on information technology infrastructure and office consolidations to support our integration of Rofin. These increases were partially offset by higher revenues in fiscal 2018. The fiscal 2017 decrease was primarily due to the impact of higher revenues in fiscal 2017 partially offset by investments to

expand our manufacturing capacity in Göttingen, Germany, incremental capital spending due to our acquisition of Rofin in the first quarter of fiscal 2017, the upgrade of certain of our production facilities in California and higher purchases of production-related assets.

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## Adjusted EBITDA as a Percentage of Net Sales

We define adjusted EBITDA as operating income adjusted for depreciation, amortization, stock compensation expense, major restructuring costs and certain other non-operating income and expense items, such as costs related to our acquisitions. Key initiatives to reach our goals for EBITDA improvements include utilization of our Asian manufacturing locations, optimizing our supply chain and continued leveraging of our infrastructure.

We utilize a number of different financial measures, both GAAP and non-GAAP, such as adjusted EBITDA as a percentage of net sales, in analyzing and assessing our overall business performance, for making operating decisions and for forecasting and planning future periods. We consider the use of non-GAAP financial measures helpful in assessing our current financial performance and ongoing operations. While we use non-GAAP financial measures as a tool to enhance our understanding of certain aspects of our financial performance, we do not consider these measures to be a substitute for, or superior to, the information provided by GAAP financial measures. We provide adjusted EBITDA in order to enhance investors' understanding of our ongoing operations. This measure is used by some investors when assessing our performance.

Below is the reconciliation of our net income from continuing operations as a percentage of net sales to our adjusted EBITDA as a percentage of net sales:

	Fiscal		
	2018	2017	2016
Net income from continuing operations as a percentage of net sales	13.0%	12.1 %	10.2%
Income tax expense	6.0 %	5.4 %	4.1 %
Interest and other income, net	1.9 %	1.6 %	0.8 %
Depreciation and amortization	6.0 %	6.1 %	4.0 %
Purchase accounting step-up	0.1 %	1.5 %	— %
Restructuring charges	0.2 %	0.7 %	— %
Gain on business combination	— %	(0.3 )%	— %
Costs related to acquisitions	— %	1.0 %	1.1 %
Impairment and other charges	— %	0.2 %	— %
Stock-based compensation	1.7 %	1.8 %	2.4 %
Adjusted EBITDA as a percentage of net sales	28.9%	30.1 %	22.6%

## SIGNIFICANT EVENTS

## Acquisitions, divestitures and related financing

On April 27, 2018, we completed the sale of several entities that we acquired in the Rofin acquisition. See Note 18, "Discontinued Operations and Sale of Assets Held for Sale" in the Notes to Consolidated Financial Statements under Item 15 of this annual report for further discussion of the divestiture.

On March 8, 2018, we acquired privately held O.R. Lasertechnologie GmbH and certain assets of its U.S.-based affiliate (collectively "OR Laser") for approximately \$47.4 million, excluding transaction costs. OR Laser produces laser-based material processing equipment for a variety of uses, including additive manufacturing, welding, cladding, marking, engraving and drilling. See Note 3, "Business Combinations" in our Notes to Consolidated Financial Statements under Item 15 of this annual report for further discussion of the acquisition.

On November 7, 2016, we completed our acquisition of Rofin pursuant to the Merger Agreement dated March 16, 2016. Rofin was one of the world's leading developers and manufacturers of high-performance industrial laser sources and laser-based solutions and components. The acquisition was an all-cash transaction at a price of \$32.50 per share of Rofin common stock. The aggregate consideration paid by us to the former Rofin stockholders was approximately \$904.5 million, excluding related transaction fees and expenses. We also paid \$15.3 million due to the cancellation of options held by employees of Rofin. We funded the payment of the aggregate consideration with a combination of our available cash on hand and the proceeds from the Euro Term Loan described below. As a condition of the acquisition, we were required to divest and hold separate Rofin's low power CO<sub>2</sub> laser business based in Hull, United Kingdom (the "Hull Business"), and reported this business separately as a discontinued operation until its divestiture. We completed the divestiture of the Hull Business on October 11, 2017, after receiving approval for the terms of the sale from the European Commission. See Note 3, "Business Combinations" and Note 18,



"Discontinued Operations and Sale of Assets Held for Sale" in our Notes to Consolidated Financial Statements under Item 15 of this annual report for further discussion of the acquisition and divestiture, respectively.

On November 7, 2016, we entered into a Credit Agreement (the "Credit Agreement") with Barclays Bank PLC ("Barclays"), Bank of America, N.A. ("BAML") and MUFG Union Bank, N.A. ("MUFG"). The Credit Agreement provided for a 670.0 million Euro senior secured term loan facility (the "Euro Term Loan") and a \$100.0 million senior secured revolving credit facility. On November 7, 2016, the Euro Term Loan was drawn in full and its proceeds were used to finance our acquisition of Rofin and pay related fees and expenses. Also, on November 7, 2016, we used 10.0 million Euros of the capacity under the revolving credit facility for the issuance of a letter of credit.

On May 8, 2017, we entered into Amendment No. 1 and Waiver (the "Repricing Amendment") to the Credit Agreement. See Note 9, "Borrowings" in the Notes to Consolidated Financial Statements.

In relation to our acquisition of Rofin, we paid Barclays, our financial advisor, a fee of approximately \$9.5 million, \$1.0 million of which was paid upon delivery of the fairness opinion in the second quarter of fiscal 2016, and the remaining portion of which was paid upon consummation of the acquisition in the first quarter of fiscal 2017; these fees were recorded in selling, general and administrative expense in our consolidated statements of operations. We also paid Barclays, BAML and MUFG together approximately \$17.0 million and \$5.6 million for underwriting and upfront fees, respectively, upon the close of the financing on November 7, 2016; these fees are recorded as debt issuance costs on our consolidated balance sheets.

As a result of our acquisition of Rofin in the first quarter of fiscal 2017, we reorganized into two new reporting segments for the combined company based upon our organizational structure and how our Chief Operating Decision Maker receives and utilizes information provided to allocate resources and make decisions: OLS and ILS. This segmentation reflects the go-to-market strategies and synergies for our broad portfolio of laser technologies and products. While both segments deliver cost-effective, highly reliable photonics solutions, the OLS business segment, is focused on high performance laser sources and complex optical sub-systems, typically used in microelectronics manufacturing, medical diagnostics and therapeutic medical applications, as well as in scientific research. Our ILS business segment delivers high performance laser sources, sub-systems and tools primarily used for industrial laser materials processing, serving important end markets like automotive, machine tool, consumer goods and medical device manufacturing.

#### Stock Repurchases

On February 6, 2018, our board of directors authorized a stock repurchase program authorizing the Company to repurchase up to \$100.0 million of our common stock from time to time through January 31, 2019. During fiscal 2018, we repurchased and retired 574,946 shares of outstanding common stock under this program at an average price of \$173.91 per share for a total of \$100.0 million.

On October 28, 2018, our board of directors authorized a stock repurchase program authorizing the Company to repurchase up to \$250.0 million of our common stock through December 31, 2019, with a limit of no more than \$75.0 million per quarter.

#### RESULTS OF OPERATIONS—FISCAL 2018, 2017 AND 2016

Fiscal 2018, 2017 and 2016 consisted of 52 weeks.

#### Consolidated Summary

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The following table sets forth, for the years indicated, the percentage of total net sales represented by the line items reflected in our consolidated statement of operations:

	Fiscal		
	2018	2017	2016
	(As a percentage of net sales)		
Net sales	100.0 %	100.0 %	100.0 %
Cost of sales	56.3 %	56.5 %	55.5 %
Gross profit	43.7 %	43.5 %	44.5 %
Operating expenses:			
Research and development	7.0 %	6.9 %	9.5 %
Selling, general and administrative	15.4 %	16.9 %	19.7 %
Gain on business combination	— %	(0.3 )%	— %
Impairment and other charges	— %	0.2 %	— %
Amortization of intangible assets	0.6 %	0.9 %	0.4 %
Total operating expenses	23.0 %	24.6 %	29.6 %
Income from operations	20.7 %	18.9 %	14.9 %
Other income (expense), net	(1.7 )%	(1.4 )%	(0.6 )%
Income from continuing operations before income taxes	19.0 %	17.5 %	14.3 %
Provision for income taxes	6.0 %	5.4 %	4.1 %
Net income from continuing operations	13.0 %	12.1 %	10.2 %

Refer to Item 6 "Selected Financial Data" for a description of significant events that impacted the results of operations for fiscal 2018, 2017 and 2016.

#### Backlog

Backlog represents orders which we expect to be shipped within 12 months and the current portion of service contracts. Orders used to compute backlog are generally cancellable and, depending on the notice period, are subject to rescheduling by our customers without substantial penalties. We have not historically experienced a significant rate of cancellation or rescheduling, however the rate of cancellations or rescheduling may increase in the future. We had a backlog of orders shippable within 12 months of \$759.9 million at September 29, 2018, including a significant concentration in the flat panel display market (32%) for customers which are primarily located in Asia. However, subsequent to year-end, one customer indicated its intent to cancel three purchase orders which included orders shippable within 12 months of \$38.2 million and were included in backlog as of fiscal 2018 year-end. We reached agreement with this customer for compensation for such cancellation.

#### Net Sales

##### Market Application

The following table sets forth, for the periods indicated, the amount of net sales and their relative percentages of total net sales by market application (dollars in thousands):

	Fiscal 2018		Fiscal 2017		Fiscal 2016	
	Amount	Percentage of total net sales	Amount	Percentage of total net sales	Amount	Percentage of total net sales
Microelectronics	\$1,036,354	54.5 %	\$894,243	51.9 %	\$454,908	53.1 %
Materials processing	520,904	27.4 %	511,909	29.7 %	124,011	14.5 %
OEM components and instrumentation	220,823	11.6 %	203,082	11.8 %	161,573	18.8 %
Scientific and government programs	124,492	6.5 %	114,077	6.6 %	116,893	13.6 %
Total	\$1,902,573	100.0 %	\$1,723,311	100.0 %	\$857,385	100.0 %

During fiscal 2018, net sales increased by \$179.3 million, or 10%, compared to fiscal 2017, with a significant increase in the microelectronics market and smaller increases in the OEM components and instrumentation, scientific and government programs and materials processing markets. The increase is partially due to the inclusion of a full year of Rofin net sales in fiscal 2018 compared to the inclusion of Rofin's net sales only after the November 7, 2016

acquisition date in fiscal 2017, or

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approximately 11 months. In addition, net sales in fiscal 2018 include \$9.2 million of sales from the acquisition of OR Laser after the March 8, 2018 acquisition date. Given that we began to experience market softening in the fourth quarter of fiscal 2018, particularly in China, we expect fiscal 2019 revenues to be 8% to 12% lower than fiscal 2018, with the second half of fiscal 2019 expected to be stronger than the first half of fiscal 2019.

During fiscal 2018, Microelectronics sales increased \$142.1 million, or 16%, compared to fiscal 2017 primarily due to higher shipments related to ELA tools used in the flat panel display market including higher revenues from consumable parts as well as higher shipments related to semiconductor, advanced packaging and solar applications. In microelectronics, we expect that total flat panel display revenues, including both systems and services, will decrease approximately 15% to 20% in fiscal 2019 from fiscal 2018, although services revenue is expected to grow and is expected to partially offset the expected decrease in systems revenue. In addition, we have experienced and expect to experience some customer push outs and order cancellations over the next several quarters before the market begins to recover in fiscal 2020. We expect the fiscal 2020 recovery to be driven by additional investment in OLED capacity for consumer products. In semiconductor applications within the microelectronics market, we expect semiconductor capital equipment spending to decrease in fiscal 2019 as a result of decreased memory prices and the impact of trade tariffs, partially offset by strong service revenue. We also expect fiscal 2019 demand in advanced packaging applications to be similar to fiscal 2018 levels.

Materials processing sales increased \$9.0 million, or 2%, during fiscal 2018 primarily due to the inclusion of a full year of Rofin net sales in fiscal 2018, higher shipments for drilling and marking applications and the inclusion of seven months of OR Laser net sales. Market conditions in these markets began to noticeably erode in the fourth quarter of fiscal 2018. This resulted in some Chinese customers pushing out or, to a lesser extent, cancelling orders. In addition, the Chinese market was also impacted by tariffs on U.S. goods and we experienced stronger price competition for fiber laser products in certain end markets. We expect these impacts to continue into fiscal 2019.

The increase in the OEM components and instrumentation market of \$17.7 million, or 9%, during fiscal 2018 was primarily due to higher shipments for bio-instrumentation applications, which were partially offset by lower shipments for military applications. Within OEM components and instrumentation applications, we are seeing strong demand in the bio-instrumentation market, particularly in flow cytometry and sequencing applications, higher demand for consumables in the medical market, in dental applications and in eye disease management and strength in defense spending for directed-energy programs and in satellite optics.

The increase in scientific and government programs market sales of \$10.4 million, or 9%, during fiscal 2018 was primarily due to higher demand for advanced research applications used by university and government research groups, particularly in Asia and the US. We expect demand in the scientific and government programs market to continue to fluctuate from quarter to quarter.

During the fourth quarter of fiscal 2018, one of our German manufacturing sites, which we acquired as part of the Rofin acquisition, had a manufacturing parts shortage due to difficulties by operations/manufacturing personnel in using newly implemented Enterprise Management Systems. Unfortunately this shortage caused the site's inability to convert \$6 million of inventory into shippable products. As a result not only were we unable to convert certain orders into revenue, we were required to use new rather than refurbished materials for service. We have taken various remedial actions to correct the situation, including changes in processes, responsibilities and personnel. We anticipate having these remedies completed by the end of the first quarter of fiscal 2019.

During fiscal 2017, net sales increased by \$865.9 million, or 101%, compared to fiscal 2016, with significant increases in the microelectronics and materials processing markets, a smaller increase in the OEM components and instrumentation market and a decrease in the scientific and government programs market. Net sales in fiscal 2017 included \$434.9 million of Rofin net sales since the acquisition on November 7, 2016, primarily in the materials processing market. Microelectronics sales increased \$439.3 million, or 97%, primarily due to higher shipments related to ELA tools used in the flat panel display market including higher revenues from consumable parts as well as higher shipments related to advanced packaging and semiconductor applications. Materials processing sales increased \$387.9 million, or 313%, during fiscal 2017 primarily due to the addition of Rofin net sales and higher shipments for machine tools, automotive and other materials processing applications. The increase in the OEM components and instrumentation market of \$41.5 million, or 26%, during fiscal 2017 was primarily due to higher shipments for military, medical and bio-instrumentation applications, with much of the increase in military applications due to our

acquisition of Rofin. The decrease in scientific and government programs market sales of \$2.8 million, or 2%, during fiscal 2017 was primarily due to lower demand for advanced research applications used by university and government research groups in the U.S.

The timing for shipments of our higher average selling price excimer products in the flat panel display market has historically fluctuated and is in the future expected to fluctuate from quarter-to-quarter due to customer scheduling, market

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conditions, our ability to manufacture these products and/or availability of critical component parts and supplies. As a result, the timing to convert orders for these products to net sales will likely fluctuate from quarter-to-quarter.

We have historically generally experienced decreased revenue in the first fiscal quarter compared to other quarters in our fiscal year due to the impact of time off and business closures at our facilities and those of many of our customers due to year-end holidays. For example over the past 10 years, excluding certain recovery years, our first fiscal quarter revenues have ranged 2%-12% below the fourth quarter of the prior fiscal years.

In fiscal 2018, 2017 and 2016, one customer accounted for 26%, 23% and 13% of net sales, respectively. In fiscal 2016, another customer accounted for 16% of net sales.

#### Segments

We are organized into two reportable operating segments: OLS and ILS. While both segments deliver cost-effective, highly reliable photonics solutions, OLS is focused on high performance laser sources and complex optical sub-systems, typically used in microelectronics manufacturing, medical diagnostics and therapeutic medical applications, as well as in scientific research. ILS delivers high performance laser sources, sub-systems and tools primarily used for industrial laser materials processing, serving important end markets like automotive, machine tool, consumer goods and medical device manufacturing.

The following table sets forth, for the periods indicated, the amount of net sales and their relative percentages of total net sales by segment (dollars in thousands):

	Fiscal 2018			Fiscal 2017			Fiscal 2016		
	Amount	Percentage of total net sales		Amount	Percentage of total net sales		Amount	Percentage of total net sales	
OEM Laser Sources (OLS)	\$1,259,477	66.2 %		\$1,143,620	66.4 %		\$722,517	84.3 %	
Industrial Lasers & Systems (ILS)	643,096	33.8 %		579,691	33.6 %		134,868	15.7 %	
Total	\$1,902,573	100.0 %		\$1,723,311	100.0 %		\$857,385	100.0 %	

Net sales for fiscal 2018 increased \$179.3 million, or 10%, compared to fiscal 2017, with increases of \$115.9 million, or 10%, in our OLS segment and increases of \$63.4 million, or 11%, in our ILS segment. The fiscal 2018 increases in both OLS and ILS segment sales included increases due to the favorable impact of foreign exchange rates. Net sales for fiscal 2017 increased \$865.9 million, or 101%, compared to fiscal 2016, with increases of \$421.1 million, or 58%, in our OLS segment and increases of \$444.8 million, or 330%, in our ILS segment. The impact of foreign exchange rates was not significant to fiscal 2017 sales in either segment.

The increase in our OLS segment sales in fiscal 2018 was primarily due to higher shipments of ELA tools used in the flat panel display market and higher revenues from consumable parts as well as higher shipments for scientific and government programs, bio-instrumentation, semiconductor, solar and advanced packaging applications. These increases were partially offset by lower shipments for materials processing applications. The increase in our OLS segment sales in fiscal 2017 was primarily due to higher shipments of ELA tools used in the flat panel display market and higher revenues from consumable parts as well as higher shipments for semiconductor and advanced packaging applications.

The increase in our ILS segment sales from fiscal 2017 to fiscal 2018 was primarily due to higher shipments for microelectronics applications and materials processing applications including a full year of Rofin net sales and seven months of OR Laser net sales in fiscal 2018. The increase in our ILS segment sales from fiscal 2016 to fiscal 2017 was primarily due to higher shipments for materials processing, microelectronics and OEM components and instrumentation applications due to our acquisition of Rofin (\$429.2 million) as well as higher shipments to the medical, flat panel display and advanced packaging markets.

#### Gross Profit

##### Consolidated

Our gross profit percentage increased by 0.2% to 43.7% in fiscal 2018 from 43.5% in fiscal 2017 primarily due to the 1.5% favorable net impact of lower purchase accounting adjustments and lower restructuring costs (0.2%) compared to fiscal 2017 partially offset by the 1.5% unfavorable impact of higher product costs including higher warranty and installation costs and higher other costs. In fiscal 2017, we took a larger charge (1.5%) for amortization of inventory step-up related to our acquisition of Rofin compared to the charge in fiscal 2018 related to our acquisition of OR

Laser. Also contributing to the

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increase in gross profit percentage were lower restructuring charges (0.2%) for inventory write-offs, primarily in our ILS segment. This favorable net impact was partially offset by the impact from higher warranty events in both segments, with the largest impact from high power fiber lasers, unfavorable mix in the microelectronics market and unfavorable costs in certain materials processing markets partially offset by better leverage of manufacturing costs on higher volumes and favorable mix in certain materials processing markets.

Our gross profit percentage decreased by 1.0% to 43.5% in fiscal 2017 from 44.5% in fiscal 2016 primarily due to the impact of purchase accounting adjustments (4.0%) for amortization of inventory step-up and amortization of intangibles related to our acquisition of Rofin in the first quarter of fiscal 2017. Also contributing to the decrease was the impact of our acquisition of Rofin due to Rofin's margins that are lower than Coherent's historical margins (3.6% before considering purchase accounting adjustments). The decreases were partially offset by improvements in margins of Coherent historical products (6.6%) primarily due to the favorable leverage of manufacturing costs on higher volumes and favorable mix in flat panel display applications for both system sales and service, as well as the favorable impact of foreign exchange rates, lower inventory provisions for excess and obsolete inventory, reduced freight costs and lower warranty costs as a percentage of sales due to the impact of significantly higher net sales.

Our gross profit percentage has been and will continue to be affected by a variety of factors including market and product mix, pricing on volume orders, shipment volumes, our ability to manufacture advanced and more complex products, manufacturing efficiencies, excess and obsolete inventory write-downs, warranty costs, amortization of intangibles, pricing by competitors or suppliers, new product introductions, production volume, customization and reconfiguration of systems, commodity prices and foreign currency fluctuations, particularly the recent volatility of the Euro and a lesser extent, the Japanese Yen and South Korean Won.

#### OEM Laser Sources

Our OLS gross profit percentage decreased by 0.9% to 52.7% in fiscal 2018 from 53.6% in fiscal 2017 primarily due to unfavorable product margins (0.9%) and increased warranty and installation costs as a percentage of sales (0.3%) due to higher warranty events in the microelectronics and scientific and government programs markets, primarily in China, and higher installation costs for flat panel display applications. The unfavorable product margins were due to unfavorable mix within flat panel display applications for both systems and service as well as other microelectronics applications and the unfavorable impact of the stronger Euro and Won, all of which were partially offset by better leverage of manufacturing costs on higher volumes. These unfavorable impacts were partially offset by lower intangibles amortization (0.2%) as a percentage of sales and lower other costs (0.1%) due to lower inventory provisions for excess and obsolete inventory as a percentage of sales in certain business units and the impact of significantly higher sales.

Our OLS gross profit percentage increased by 5.3% to 53.6% in fiscal 2017 from 48.3% in fiscal 2016 primarily due to favorable product margins (4.1%) as a result of favorable mix within flat panel display applications for both systems and service, favorable mix in other microelectronics and materials processing applications and higher leverage of manufacturing costs on higher volumes, as well as the favorable impact of the weaker Euro and stronger Yen and Won compared to fiscal 2016. Also contributing to the increase in gross profit percentage as a percentage of sales due to the impact of significantly higher sales volumes were lower other costs (0.7%) due to lower inventory provisions for excess and obsolete inventory and reduced freight and duty costs in certain business units, lower intangibles amortization (0.3%) and lower installation and warranty costs (0.2%).

#### Industrial Lasers & Systems

Our ILS gross profit percentage increased by 2.3% to 26.7% in fiscal 2018 from 24.4% in fiscal 2017 primarily due to 4.4% lower amortization of inventory step-up (4.5% in fiscal 2017 related to our acquisition of Rofin compared to 0.1% in fiscal 2018 related to our acquisition of OR Laser) as well as lower restructuring charges (0.7%) related to the implementation of planned restructuring activities in connection with the acquisition of Rofin, which were primarily related to the exit from our preexisting high power fiber laser product line net of higher service inventory write-offs. Partially offsetting the improvement, intangibles amortization increased as a percentage of sales (0.5%) due to the inclusion in fiscal 2018 of a full year of amortization for the Rofin acquisition and seven months of amortization related to the OR Laser acquisition. Excluding the 4.6% favorable net impact of lower purchase accounting adjustments and lower restructuring costs, gross profit percentage decreased 2.6% compared to fiscal 2017 primarily due to unfavorable product margins including warranty costs (2.6%) as a percentage of sales. The unfavorable product

margins were due to higher warranty events in materials processing applications, primarily high power fiber lasers, and the impact from unfavorable product costs in certain materials processing applications partially offset by the better leverage of manufacturing costs on higher volumes and favorable mix.

Our ILS gross profit percentage decreased by 1.6% to 24.4% in fiscal 2017 from 26.0% in fiscal 2016 primarily due to the impact of purchase accounting adjustments (11.1%) for amortization of intangibles and inventory step-up related to our

acquisition of Rofin in the first quarter of fiscal 2017 and restructuring costs (1.1%) related to the implementation of planned restructuring activities in connection with our acquisition of Rofin, which were primarily related to the exit from our preexisting high power fiber laser product line and other Rofin product lines. The decreases in gross profit percentage were partially offset by the favorable impact of Rofin's margins before considering purchase accounting adjustments. Rofin's high-power fiber laser and global tools businesses have higher margins than Coherent's legacy ILS businesses.

#### Operating Expenses

The following table sets forth, for the periods indicated, the amount of operating expenses and their relative percentages of total net sales by the line items reflected in our consolidated statement of operations (dollars in thousands):

	Fiscal 2018		2017		2016			
	Amount	Percentage of total net sales	Amount	Percentage of total net sales	Amount	Percentage of total net sales	Amount	Percentage of total net sales
	(Dollars in thousands)							
Research and development	\$132,586	7.0 %	\$119,166	6.9 %	\$81,801	9.5 %		
Selling, general and administrative	293,632	15.4 %	292,084	16.9 %	169,138	19.7 %		
Gain on business combination	—	— %	(5,416 )	(0.3 )%	—	— %		
Impairment and other charges	766	— %	2,916	0.2 %	—	— %		
Amortization of intangible assets	10,690	0.6 %	16,024	0.9 %	2,839	0.4 %		
Total operating expenses	\$437,674	23.0 %	\$424,774	24.6 %	\$253,778	29.6 %		

#### Research and development

Fiscal 2018 research and development ("R&D") expenses increased \$13.4 million, or 11%, from fiscal 2017, and increased slightly to 7.0% of sales, compared to 6.9% in fiscal 2017. The increase was primarily due to \$8.3 million higher spending on R&D activities, the inclusion of a full year of Rofin R&D expenses (\$3.2 million) in fiscal 2018 and \$1.4 million in incremental spending due to the acquisition of OR Laser in the second quarter of fiscal 2018. The higher spending on R&D activities includes higher spending on headcount and materials as well as the unfavorable impact of foreign exchange rates (primarily the stronger Euro), which was partially offset by lower restructuring charges for our exit from our preexisting Coherent high power fiber laser product line in the first quarter of fiscal 2017. On a segment basis, as compared to the prior year, OLS R&D spending increased \$6.5 million primarily due to higher net spending on R&D activities including the unfavorable impact of foreign exchange rates. ILS R&D spending increased \$6.4 million primarily due to the inclusion of a full year of Rofin R&D expenses, higher spending on R&D activities including the unfavorable impact of foreign exchange rates and the acquisition of OR Laser, which was partially offset by lower restructuring costs. Corporate and other R&D spending increased \$0.5 million primarily due to higher headcount spending in our Advanced Research Business unit.

Fiscal 2017 R&D expenses increased \$37.4 million, or 46%, from fiscal 2016, but decreased to 6.9% of sales, compared to 9.5% in fiscal 2016. The increase in R&D expenses was primarily due to the addition of Rofin R&D expenses (\$32.0 million, excluding \$0.7 million of restructuring costs for severance) since the acquisition on November 7, 2016, \$2.2 million higher project spending, including higher variable compensation and lower reimbursements from customers, and \$2.1 million of restructuring costs related to the exit from our preexisting Coherent high power fiber laser product line in the first quarter of fiscal 2017. There were also increases of \$0.8 million for higher stock-based compensation expense including \$0.4 million related to a charge recorded in the first quarter of fiscal 2017 due to the acceleration of Rofin options and \$0.3 million higher charges for increases in deferred compensation plan liabilities. On a segment basis, as compared to the prior year period, OLS R&D spending increased \$7.4 million primarily due to higher net spending on projects. ILS R&D spending increased \$27.7 million primarily due to our acquisition of Rofin and restructuring costs, partially offset by lower project spending. Corporate and other R&D spending increased \$2.3 million due to higher project spending in our advanced research business unit, higher stock-based compensation expense and higher charges for increases in deferred compensation plan liabilities.

#### Selling, general and administrative

Fiscal 2018 selling, general and administrative ("SG&A") expenses increased \$1.5 million, or 1%, from fiscal 2017. The increase was primarily due to the inclusion of a full year of Rofin SG&A expenses (\$8.0 million) in fiscal 2018 and \$5.1 million higher other variable spending (including the unfavorable impact of foreign exchange rates) on consulting and infrastructure related to integration activities and in support of higher sales, which was partially offset by lower restructuring costs due to lower severance costs and a gain on the sale of a building in the third quarter of fiscal 2018. In addition, SG&A



expenses increased due to \$2.4 million higher incremental spending from the acquisition of OR Laser in the second quarter of fiscal 2018, \$1.2 million higher stock-based compensation expense, \$1.1 million higher charges for increases in deferred compensation plan liabilities and \$0.6 million higher payroll spending primarily due to the unfavorable impact of foreign exchange rates and higher spending on salaries, benefits and commissions net of lower variable compensation. The increase in stock-based compensation expense was due to higher expense for new grants offset by the \$3.4 million charge recorded in the first quarter of fiscal 2017 due to the acceleration of Rofin options. The increases were offset by \$16.9 million lower financial advisory, consulting and legal costs related to acquisitions. On a segment basis, as compared to the prior year, OLS SG&A expenses increased \$7.1 million primarily due to higher payroll and other variable spending (including the unfavorable impact of foreign exchange rates) as well as spending relating to a historical Rofin business unit that is included in our OLS segment. ILS SG&A spending increased \$8.6 million primarily due to the inclusion of a full year of Rofin expenses, the unfavorable impact of foreign exchange rates, the acquisition of OR Laser and higher other variable spending partially offset by lower payroll spending including lower severance restructuring and variable compensation costs. Corporate and other SG&A spending decreased \$14.1 million primarily due to lower financial advisory, consulting and legal costs related to our acquisition of Rofin partially offset by higher stock-based compensation expense, higher charges for increases in deferred compensation plan liabilities and higher payroll spending including higher spending on benefits net of lower variable compensation.

Fiscal 2017 SG&A expenses increased \$122.9 million, or 73%, from fiscal 2016. The increase was primarily due to the addition of Rofin SG&A expenses (\$75.2 million excluding \$2.6 million restructuring costs for severance) following the acquisition in the first quarter of fiscal 2017, \$15.5 million higher other spending on legal, consulting and infrastructure related to integration activities and the debt repricing as well as other variable spending in support of higher sales, \$11.1 million higher payroll spending for variable compensation, commissions and salaries and benefits and \$7.7 million higher financial advisory, consulting and legal costs related to our acquisition of Rofin. SG&A expense also increased due to \$8.6 million higher stock-based compensation expense, including \$3.4 million related to a charge recorded in the first quarter of fiscal 2017 due to the acceleration of Rofin options, as well as higher expense for new grants, \$3.4 million of restructuring costs (primarily severance) and \$1.4 million higher charges for increases in deferred compensation plan liabilities. On a segment basis, as compared to the prior year period, OLS SG&A segment expenses increased \$22.4 million primarily due to higher payroll and other variable spending as well as spending relating to a historical Rofin business unit which is included in our OLS segment. ILS SG&A spending increased \$74.3 million primarily due to our acquisition of Rofin (\$78.7 million) and higher payroll and other variable spending. Corporate and other SG&A spending increased \$26.2 million primarily due to higher financial advisory, consulting and legal costs related to our acquisition of Rofin, higher stock-based compensation expense, higher charges for increases in deferred compensation plan liabilities and higher payroll spending.

#### Gain on business combination

On November 7, 2016, we acquired Rofin at a price of \$32.50 per share of Rofin common stock (See Note 3, "Business Combinations" in the Notes to Consolidated Financial Statements). We recognized a gain of \$5.4 million in our consolidated statements of operations in the first quarter of fiscal 2017 on the increase in fair value from the date of purchase for the shares of Rofin we owned prior to the acquisition.

#### Impairment and other charges

In the fourth quarter of fiscal 2017, management decided to sell several entities that we acquired in the Rofin acquisition. Although the sale was not completed as of the end of fiscal 2017, we recorded a non-cash impairment charge of \$2.9 million to operating expense in our results of operations in the fourth quarter of fiscal 2017 to reduce our carrying value in these entities to fair value. We completed the sale of these entities on April 27, 2018. In fiscal 2018, we recorded additional charges of \$0.3 million related to the impairment and sale of these entities. See Note 18, "Discontinued Operations and Sale of Assets Held for Sale" in the Notes to Consolidated Financial Statements. In addition, in fiscal 2018, we recorded impairment charges of \$0.5 million to reduce the carrying value of a building to its fair value.

#### Amortization of intangible assets

Amortization of intangible assets decreased \$5.3 million, or 33%, from fiscal 2017 to fiscal 2018 primarily due to the completion of the amortization of backlog intangibles from our acquisition of Rofin in fiscal 2017 (\$5.5 million

lower), which was partially offset by the inclusion of a full year of Rofin amortization expenses in fiscal 2018, the unfavorable impact of foreign exchange rates and amortization of intangibles related to our acquisition of OR Laser in the second quarter of fiscal 2018.

Amortization of intangible assets increased \$13.2 million, or 464%, from fiscal 2016 to fiscal 2017 primarily due to our acquisition of Rofin in the first quarter of fiscal 2017.

Other income (expense), net

Other income (expense), net, changed by \$8.0 million to other expense of \$31.5 million in fiscal 2018 from other expense of \$23.4 million in fiscal 2017. The higher expenses were primarily due to \$15.9 million lower foreign exchange net gains (higher net losses) resulting primarily from a gain in the first quarter of fiscal 2017 of \$11.3 million on forward contracts associated with our foreign exchange risk related to the commitment and issuance of our Euro Term Loan to finance the acquisition of Rofin, the impact of changing rates on cash conversions and higher points on forward contracts due to higher hedge volumes. The lower foreign exchange gains were offset by \$8.5 million lower interest expense due to lower interest on the Euro Term Loan resulting from our paydown of principal and an interest rate reduction, which were partially offset by higher amortization of debt issuance costs related to the Euro Term loan.

Other income (expense), net, changed by \$18.7 million to other expense of \$23.4 million in fiscal 2017 from other expense of \$4.7 million in fiscal 2016. The higher expenses were primarily due to higher interest expense of \$33.0 million partially offset by \$11.0 million higher foreign exchange gains and \$3.2 million higher gains, net of expenses, on our deferred compensation plan assets, including a death benefit of \$1.3 million. Interest expense increased due to interest on the Euro Term Loan and interest on the commitment of the Euro Term Loan to fund our acquisition of Rofin as well as amortization of debt issuance costs related to the Euro Term Loan. The higher foreign exchange gains were primarily due to a gain of \$11.3 million on forward contracts associated with our foreign exchange risk related to the commitment of our Euro Term Loan and the issuance of the Euro Term Loan to finance our acquisition of Rofin partially offset by the impact of changing rates on cash conversions.

#### Income taxes

On December 22, 2017, the Tax Cuts and Jobs Act (the "Tax Act") was enacted. The Tax Act changes are broad and complex. The final impact of the Tax Act may materially differ from the provisional estimates provided. Among other things, this may be due to changes in interpretations of the Tax Act, any legislative action to address questions that arise because of the Tax Act and any changes in accounting standards for income taxes or related interpretations in response to the Tax Act. Additionally, long-standing international tax policies that determine each country's jurisdiction to tax cross-border international trade are evolving as a result of the Base Erosion and Profit Shifting reporting requirements ("BEPS") recommended by the G8, G20 and Organization for Economic Cooperation and Development ("OECD"). As these and other tax laws and related regulations change, our financial results could prospectively be materially impacted. Given the unpredictability of these possible changes and their potential interdependency, it is very difficult to assess whether the overall effect of such potential tax changes would be cumulatively positive or negative for our earnings and cash flow. Such changes could, however, adversely impact our financial results.

As discussed in Note 15, "Income Taxes" in the Notes to Consolidated Financial Statements, the Tax Act resulted in a provisional charge of \$26.7 million for the year ended September 29, 2018. This is comprised of an estimated deemed repatriation tax charge of \$17.8 million less a previously recorded deferred tax liability of \$20.3 million for anticipated repatriation of our investment in a foreign subsidiary, plus an estimated deferred tax remeasurement charge of \$15.5 million and an accrual for foreign withholding taxes and state income taxes of \$13.7 million on certain foreign earnings not considered permanently reinvested.

The effective tax rate on income from continuing operations before income taxes for fiscal 2018 of 31.6% was higher than the effective U.S. federal blended tax rate of 24.5% primarily due to the Tax Act's one-time mandatory deemed repatriation transition tax, the impact of income subject to foreign tax rates that are higher than the U.S. tax rates, the remeasurement of deferred tax assets and liabilities based on the newly enacted U.S. federal tax rate of 21.0%, an accrual for foreign withholding taxes and state income taxes on certain foreign earnings not considered permanently reinvested, stock-based compensation not deductible for tax purposes and limitations on the deductibility of compensation under Internal Revenue Code ("IRC") Section 162(m). These amounts are partially offset by the excess tax benefits from stock award exercises and restricted stock unit vesting, the benefit of foreign tax credits, the benefit of federal research and development tax credits, the benefit of a domestic manufacturing deduction under IRC Section 199 and the Singapore tax exemption.

As a result of the adoption of the new accounting standard on share-based compensation in fiscal 2018, our effective tax rate will increase or decrease based upon the tax effect of the difference between the share-based compensation expenses and the benefits taken on the Company's tax returns. We recognize excess tax benefits on a discrete basis

and therefore anticipate the effective tax rate to vary from quarter to quarter depending on our share price in each period.

The effective tax rate on income from continuing operations before income taxes for fiscal 2017 of 30.9% was lower than the statutory rate of 35.0%. This was primarily due to differences related to the benefit of income subject to foreign tax rates that are lower than U.S. tax rates including the Singapore tax exemption, the benefit of foreign tax credits and federal research and development tax credits, the benefit of a domestic manufacturing deduction under IRC Section 199 and the release of certain tax reserves due to audit settlement. These amounts are partially offset by Rofin transaction costs not deductible for tax

purposes, tax costs of Rofin restructuring, ASC 740-10 (formerly FIN48) tax liabilities for transfer pricing, stock-based compensation not deductible for tax purposes and limitations on the deductibility of compensation under IRC Section 162(m).

The effective tax rate on income from continuing operations before income taxes for fiscal 2016 of 28.8% was lower than the statutory rate of 35.0%. This was primarily due to differences related to the benefit of income subject to foreign tax rates that are lower than U.S. tax rates including the Singapore tax exemption, the benefit of foreign tax credits and the benefit of federal research and development tax credits including renewal of the federal research and development tax credits for fiscal 2015. These amounts are partially offset by deemed dividend inclusions under the Subpart F tax rules, stock-based compensation not deductible for tax purposes and limitations on the deductibility of compensation under IRC Section 162(m).

In October 2016, Coherent Singapore received an amended Pioneer Status tax exemption from the Singapore authorities effective from fiscal 2012 through fiscal 2021. The tax holiday continues to be conditional upon our meeting certain revenue, business spending and employment thresholds. The impact of this tax exemption decreased Singapore income taxes by approximately \$2.5 million, \$1.1 million and \$0.7 million in fiscal 2018, 2017 and 2016, respectively.

## FINANCIAL CONDITION

### Liquidity and capital resources

At September 29, 2018, we had assets classified as cash and cash equivalents and short-term investments, in an aggregate amount of \$310.6 million, compared to \$475.6 million at September 30, 2017. This decrease was primarily due to the paydown of debt of \$173.3 million and the repurchase of \$100.0 million of our common stock in fiscal 2018. In addition, at September 29, 2018, we had \$13.6 million of restricted cash. At September 29, 2018, approximately \$215.7 million of our cash and securities was held in certain of our foreign subsidiaries and branches, \$191.2 million of which was denominated in currencies other than the U.S. dollar. At September 29, 2018, we had approximately \$214.9 million of cash held by foreign subsidiaries including certain entities where we intend to permanently reinvest our accumulated earnings and our current plans do not demonstrate a need for these funds to support our domestic operations. If, however, a portion of these funds are needed for and distributed to our operations in the United States, we may be subject to additional foreign withholding taxes and certain state taxes. The amount of the U.S. and foreign taxes due would depend on the amount and manner of repatriation, as well as the location from where the funds are repatriated. We historically asserted our intention to indefinitely reinvest foreign earnings. However, we have reevaluated our historic assertion as a result of the enactment of the Tax Act and no longer consider certain historic foreign earnings to be indefinitely reinvested in our foreign subsidiaries. We actively monitor the third-party depository institutions that hold these assets, primarily focusing on the safety of principal and secondarily maximizing yield on these assets. We diversify our cash and cash equivalents and investments among various financial institutions, money market funds, sovereign debt and other securities in order to reduce our exposure should any one of these financial institutions or financial instruments fail or encounter difficulties. To date, we have not experienced any material loss or lack of access to our invested cash, cash equivalents or short-term investments. However, we can provide no assurances that access to our invested cash, cash equivalents or short-term investments will not be impacted by adverse conditions in the financial markets.

See ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK below for more information about risks and trends related to foreign currencies.

### Sources and Uses of Cash

Historically, our primary source of cash has been provided by operations. Other sources of cash in the past three fiscal years include proceeds from our Euro Term Loan used to finance our acquisition of Rofin, proceeds received from the sale of our stock through our employee stock purchase plan as well as borrowings under our domestic line of credit. Our historical uses of cash have primarily been for acquisitions of businesses and technologies, the repurchase of our common stock, capital expenditures and debt issuance costs. Supplemental information pertaining to our historical sources and uses of cash is presented as follows and should be read in conjunction with our Consolidated Statements of Cash Flows and notes thereto (in thousands):



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	Fiscal		
	2018	2017	2016
Net cash provided by operating activities	\$236,111	\$384,116	\$105,299
Purchases of property and equipment	(90,757 )	(63,774 )	(49,327 )
Acquisition of businesses, net of cash acquired	(45,448 )	(740,481 )	—
Proceeds from sale of discontinued operation (the Hull Business)	25,000	—	—
Proceeds from sales of other entities	6,250	—	—
Borrowings, net of repayments	(173,252 )	539,149	20,000
Issuance of shares under employee stock plans	10,574	8,111	7,849
Repurchase of common stock	(100,000 )	—	—
Net settlement of restricted common stock	(36,320 )	(15,717 )	(5,443 )
Debt issuance costs	—	(26,367 )	(5,202 )

Net cash provided by operating activities decreased by \$148.0 million in fiscal 2018 compared to fiscal 2017 and increased by \$278.8 million in fiscal 2017 compared to fiscal 2016. The decrease in cash provided by operating activities in fiscal 2018 was primarily due to lower cash flows from deferred revenue, income taxes payable and payroll accruals as well as the timing of shipments of large systems, which were partially offset by higher net income and higher cash flows due to non-cash expenses for amortization, stock-based compensation and depreciation. The increase in cash provided by operating activities in fiscal 2017 was primarily due to higher net income, higher cash flows due to higher non-cash expenses for amortization, stock-based compensation and depreciation, higher income taxes payable, higher deferred revenue and higher cash flows from the timing of shipments of large systems from inventory partially offset by lower cash flows from accounts receivable. We believe that our existing cash, cash equivalents and short term investments combined with cash to be provided by operating activities and amounts available under our revolving credit facility will be adequate to cover our working capital needs and planned capital expenditures for at least the next 12 months to the extent such items are known or are reasonably determinable based on current business and market conditions. However, we may elect to finance certain of our capital expenditure requirements through other sources of capital. We continue to follow our strategy to further strengthen our financial position by using available cash flow to fund operations.

We intend to continue to consider acquisition opportunities at valuations we believe are reasonable based upon market conditions. However, we cannot accurately predict the timing, size and success of our acquisition efforts or our associated potential capital commitments. Furthermore, we cannot assure you that we will be able to acquire businesses on terms acceptable to us. We expect to fund future acquisitions, if any, through additional borrowings (as in our acquisition of Rofin), existing cash balances and cash flows from operations (as in our acquisition of OR Laser). If required, we will consider the issuance of securities. The extent to which we will be willing or able to use our common stock to make acquisitions will depend on its market value at the time and the willingness of potential sellers to accept it as full or partial payment.

On November 7, 2016, we entered into a Credit Agreement with Barclays, as administrative agent and an L/C Issuer, BAML as an L/C Issuer, and MUFG as an L/C Issuer (the "Credit Agreement") that provided for a 670.0 million Euro senior secured term loan facility (the "Euro Term Loan") and a \$100.0 million senior secured revolving credit facility ("Revolving Credit Facility") with a \$30.0 million letter of credit sublimit and a \$10.0 million swing line sublimit. We borrowed the full 670.0 million Euros under the Euro Term Loan and its proceeds were used to finance our acquisition of Rofin and pay related fees and expenses. On November 7, 2016, we also used 10.0 million Euros of the capacity under the Revolving Credit Facility for the issuance of a letter of credit. We were in compliance with all covenants at September 29, 2018. See Note 9, "Borrowings" in the Notes to Consolidated Financial Statements.

The aggregate consideration paid by us to the former Rofin stockholders in the first quarter of fiscal 2017 was approximately \$904.5 million, excluding related transaction fees and expenses. We also paid \$15.3 million due to the cancellation of options held by employees of Rofin. We incurred approximately \$26.4 million of debt issuance costs in fiscal 2017. In fiscal 2017, we made debt principal payments \$178.1 million, including voluntary prepayments of \$170.7 million, recorded interest expense on the Euro Term Loan of \$23.5 million, recorded \$7.2 million amortization of debt issuance costs and recorded interest expense of \$2.7 million for the commitment of the Euro Term Loan. In

fiscal 2018, we made debt principal payments \$170.1 million, including voluntary prepayments of \$162.1 million, recorded interest expense on the Euro Term Loan of \$14.9 million and recorded \$9.6 million amortization of debt issuance costs.

In relation to our acquisition of Rofin, we paid Barclays, our financial advisor, a fee of approximately \$9.5 million, \$1.0 million of which was paid upon delivery of the fairness opinion in the second quarter of fiscal 2016, and the remaining portion



of which was paid upon consummation of the acquisition in the first quarter of fiscal 2017; these fees were recorded as SG&A expense.

On March 8, 2018, we acquired privately held OR Laser for approximately \$47.4 million, excluding transaction costs. On April 27, 2018, we completed the sale of several entities that we acquired in the Rofin acquisition for approximately \$6.3 million.

On February 6, 2018, our board of directors authorized a stock repurchase program authorizing the Company to repurchase up to \$100.0 million of our common stock from time to time through January 31, 2019. During fiscal 2018, we repurchased and retired 574,946 shares of outstanding common stock under this program at an average price of \$173.91 per share for a total of \$100.0 million. See Note 12, "Stock Repurchases" in the Notes to Consolidated Financial Statements.

On October 28, 2018, our board of directors authorized a stock repurchase program authorizing the Company to repurchase up to \$250.0 million of our common stock through December 31, 2019, with a limit of no more than \$75.0 million per quarter. See Note 11, "Stock Repurchases" in the Notes to Consolidated Financial Statements.

On October 5, 2018, we completed two small acquisitions totaling approximately \$19.0 million. See Note 19, "Subsequent Events" in the Notes to Consolidated Financial Statements.

Additional sources of cash available to us were international currency lines of credit and bank credit facilities totaling \$26.5 million as of September 29, 2018, of which \$18.5 million was unused and available. These unsecured international credit facilities were used in Europe and Japan during fiscal 2018. As of September 29, 2018, we had utilized \$8.0 million of the international credit facilities as guarantees in Europe.

Our ratio of current assets to current liabilities increased to 3.3:1 at September 29, 2018 compared to 3.1:1 at September 30, 2017. The increase in our ratio was primarily due to lower deferred income and higher inventories, which were partially offset by lower cash and cash equivalents. Our cash and cash equivalents, short-term investments and working capital are as follows (in thousands):

	Fiscal	
	2018	2017
Cash and cash equivalents	\$310,495	\$443,066
Short-term investments	120	32,510
Working capital	865,664	892,519

#### Contractual Obligations and Off-Balance Sheet Arrangements

We have no off-balance sheet arrangements as defined by Regulation S-K of the Securities Act of 1933. The following summarizes our contractual obligations at September 29, 2018 and the effect such obligations are expected to have on our liquidity and cash flow in future periods (in thousands):

	Total	Less than 1 year	1 to 3 years	3 to 5 years	More than 5 years
Operating lease payments	\$78,692	\$20,210	\$29,373	\$15,643	\$13,466
Asset retirement obligations	6,600	1,305	1,278	1,368	2,649
Debt principal, interest and fees	498,471	21,883	43,045	40,293	393,250
Pension obligations	51,499	2,044	4,033	5,446	39,976
Purchase commitments for inventory	126,081	122,895	3,186	—	—
Purchase obligations-other	15,576	15,359	63	154	—
Total	\$776,919	\$183,696	\$80,978	\$62,904	\$449,341

Because of the uncertainty as to the timing of such payments, we have excluded cash payments related to our contractual obligations for our deferred compensation plans aggregating \$41.7 million at September 29, 2018. As of September 29, 2018, we had gross unrecognized tax benefits of \$70.3 million which includes penalties and interest of \$4.4 million. Approximately \$36.3 million has been recorded as a noncurrent liability. At this time, we are unable to make a reasonably reliable estimate of the timing of payments in individual years in connection with these tax liabilities; therefore, such amounts are not included in the above contractual obligation table.



#### Changes in financial condition

Cash provided by operating activities in fiscal 2018 was \$236.1 million, which included net income of \$247.4 million, depreciation and amortization of \$122.9 million, stock-based compensation expense of \$32.7 million and net decreases in deferred tax assets of \$16.6 million, partially offset by cash used by operating assets and liabilities of \$187.1 million (primarily increases in inventories, increases in accounts receivable, decreases in deferred income and decreases in accrued payroll). Cash provided by operating activities in fiscal 2017 was \$384.1 million, which included net income of \$207.1 million, depreciation and amortization of \$111.4 million, cash provided by operating assets and liabilities of \$54.8 million (primarily increases in taxes payable, deferred income and accounts payable net of increases in accounts receivable and inventories) and stock-based compensation expense of \$26.3 million, partially offset by increases in net deferred tax assets of \$19.8 million.

Cash used in investing activities in fiscal 2018 was \$67.7 million, which included \$86.4 million, net of proceeds from dispositions, used to acquire property and equipment and to purchase and upgrade buildings and \$45.4 million net of cash acquired to purchase OR Laser partially offset by \$32.3 million net sales of available-for-sale securities, \$25.0 million proceeds from the sale of discontinued operations and \$6.3 million proceeds from the sale of other entities.

Cash used in investing activities in fiscal 2017 of \$810.3 million included \$740.5 million net of cash acquired to purchase Rofin, \$61.8 million, net of proceeds from dispositions, used to acquire property and equipment and to purchase and upgrade buildings and \$7.2 million net purchases of available-for-sale securities.

Cash used in financing activities in fiscal 2018 was \$299.0 million, which included \$173.3 million net debt payments, \$100.0 million repurchases of our common stock and \$36.3 million outflows due to net settlement of restricted stock units partially offset by \$10.6 million generated from our employee purchase plans. Cash provided by financing activities in fiscal 2017 was \$506.0 million, which included \$539.1 million net borrowings and \$8.1 million generated from our employee purchase plans partially offset by \$26.4 million of debt issuance costs and \$15.7 million outflows due to net settlement of restricted stock units.

Changes in exchange rates in fiscal 2018 resulted in a decrease in cash balances of \$2.4 million. Changes in exchange rates in fiscal 2017 resulted in an increase in cash balances of \$22.9 million.

#### RECENT ACCOUNTING PRONOUNCEMENTS

See Note 2, "Significant Accounting Policies" in the Notes to Consolidated Financial Statements for a full description of recent accounting pronouncements, including the respective dates of adoption or expected adoption and effects on our consolidated financial position, results of operations and cash flows.

#### APPLICATION OF CRITICAL ACCOUNTING POLICIES

Our discussion and analysis of financial condition and results of operations are based upon our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States of America and pursuant to the rules and regulations of the SEC. The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. We have identified the following as the items that require the most significant judgment and often involve complex estimation: revenue recognition, business combinations, accounting for long-lived assets (including goodwill and intangible assets), inventory valuation, warranty reserves and accounting for income taxes.

##### Revenue Recognition

We recognize revenue when all four revenue recognition criteria have been met: persuasive evidence of an arrangement exists, the product has been delivered or the service has been rendered, the price is fixed or determinable and collection is probable. Revenue from product sales is recorded when all of the foregoing conditions are met and risk of loss and title passes to the customer. Our products typically include a warranty and the estimated cost of product warranty claims (based on historical experience) is recorded at the time the sale is recognized. Sales to customers are generally not subject to any price protection or return rights.

The majority of our sales are made to original equipment manufacturers ("OEMs"), distributors, representatives and end-users in the non-scientific market. Sales made to these customers do not require installation of the products by us and are not subject to other post-delivery obligations, except in occasional instances where we have agreed to perform

installation or provide training. In those instances, we defer revenue related to installation services or training until these services have been rendered. We allocate revenue from multiple element arrangements to the various elements based upon fair values or a selling price hierarchy, as more fully described in Note 2, "Significant Accounting Policies - Revenue Recognition," in our consolidated financial statements.

Should changes in conditions cause management to determine these criteria are not met for certain future transactions, revenue recognized for any reporting period could be adversely affected. Failure to obtain anticipated orders due to delays or cancellations of orders could have a material adverse effect on our revenue. In addition, pressures from customers to reduce our prices or to modify our existing sales terms may have a material adverse effect on our revenue in future periods.

Our sales to distributors, representatives and end-user customers typically do not have customer acceptance provisions and only certain of our sales to OEM customers and integrators have customer acceptance provisions. Customer acceptance is generally limited to performance under our published product specifications. For the few product sales that have customer acceptance provisions because of higher than published specifications, (1) the products are tested and accepted by the customer at our site or the customer accepts the results of our testing program prior to shipment to the customer, or (2) the revenue is deferred until customer acceptance occurs.

Sales to end-users in the scientific market typically require installation and, thus, involve post-delivery obligations; however our post-delivery installation obligations are not essential to the functionality of our products. We defer revenue related to installation services until completion of these services.

For most products, training is not provided; therefore, no post-delivery training obligation exists. However, when training is provided to our customers, it is typically priced separately and recognized as revenue as these services are provided.

For multiple element arrangements which include extended maintenance contracts, we allocate and defer the amount of consideration equal to the separately stated price and recognize revenue on a straight-line basis over the contract period.

#### Business Combinations

We include the results of operations of the businesses that we acquire as of the respective dates of acquisition. We allocate the fair value of the purchase price of our business acquisitions to the tangible assets acquired, liabilities assumed, and intangible assets acquired, based on their estimated fair values. The excess of the purchase price over the fair values of these identifiable assets and liabilities is recorded as goodwill. Additional information existing as of the acquisition date, but unknown to us at that time, may become known during the remainder of the measurement period, not to exceed 12 months from the acquisition date, which may result in changes to the amounts and allocations recorded.

#### Long-Lived Assets and Goodwill

We evaluate long-lived assets and amortizable intangible assets whenever events or changes in business circumstances or our planned use of assets indicate that their carrying amounts may not be fully recoverable or that their useful lives are no longer appropriate. Reviews are performed to determine whether the carrying values of the assets are impaired based on comparison to the undiscounted expected future cash flows identifiable to such long-lived and amortizable intangible assets. If the comparison indicates that impairment exists, the impaired asset is written down to its fair value.

We have determined that our reporting units are the same as our operating segments as each constitutes a business for which discrete financial information is available and for which segment management regularly reviews the operating results. We make this determination in a manner consistent with how the operating segments are managed. Based on this analysis, we have identified two reporting units which are our reportable segments: OLS and ILS.

Goodwill is tested for impairment on an annual basis and between annual tests in certain circumstances, and written down when impaired (See Note 7, "Goodwill and Intangible Assets" in the Notes to Consolidated Financial Statements). We generally perform our annual impairment tests during the fourth quarter of each fiscal year using the opening balance sheet as of the first day of the fourth fiscal quarter, with any resulting impairment recorded in the fourth quarter of the fiscal year.

In January 2017, the FASB issued amended guidance that simplifies the subsequent measurement of goodwill by eliminating Step 2 from the goodwill impairment test. Under the amendments in this update, an entity should perform its annual, or interim, goodwill impairment test by comparing the fair value of a reporting unit with its carrying amount and recognize an impairment charge for the amount by which the carrying amount exceeds the reporting unit's fair value. The new standard will become effective for our fiscal year beginning October 2, 2021. We elected to early adopt the standard in the fourth quarter of fiscal 2017 for our fiscal 2017 impairment tests.

In fiscal 2018, 2017 and 2016, we conducted a qualitative assessment of the goodwill in the OLS reporting unit during the fourth quarter of each fiscal year using the opening balance sheet as of the first day of the fourth quarter and concluded that it was more likely than not that the fair value of the reporting unit exceeded its carrying amount. In assessing the qualitative factors, we considered the impact of these key factors: macroeconomic conditions, fluctuations in foreign currency, market and industry conditions, our operating and competitive environment, regulatory and political developments, the overall financial performance of our reporting units including cost factors and budgeted-to-actual revenue results. We also considered our market capitalization, stock price performance and the significant excess calculated in the prior year between estimated fair

value and the carrying value of OLS. Based on our assessment, goodwill in the OLS reporting unit was not impaired as of the first day of the fourth quarter of fiscal 2018, 2017 or 2016. As such, it was not necessary to perform the goodwill impairment test at that time in any of those fiscal years.

In fiscal 2018, we conducted a qualitative assessment of the goodwill in the ILS reporting unit during the fourth quarter of fiscal 2018 using the opening balance sheet as of the first day of the fourth quarter and concluded that it was more likely than not that the fair value of the reporting unit exceeded its carrying amount. In assessing the qualitative factors, we considered the impact of these key factors: macroeconomic conditions, fluctuations in foreign currency, market and industry conditions, our operating and competitive environment, regulatory and political developments, the overall financial performance of our reporting units including cost factors and budgeted-to-actual revenue results. We also considered our market capitalization, stock price performance and the significant excess calculated in the prior year between estimated fair value and the carrying value of ILS. Based on our assessment, goodwill in the ILS reporting unit was not impaired as of the first day of the fourth quarter of fiscal 2018 and as such, it was not necessary to perform the goodwill impairment test at that time.

For our ILS reporting unit, we elected to bypass the qualitative assessment in fiscal 2017 and 2016 and proceeded directly to performing the first step of goodwill impairment. Accordingly, we performed the Step 1 test during the fourth quarter of fiscal 2017 and 2016. We determined the fair value of the reporting unit for the Step 1 test using a 50-50% weighting of the Income (discounted cash flow) approach and Market (market comparable) approach. The Income approach utilizes the discounted cash flow model to provide an estimation of fair value based on the cash flows that a business expects to generate. These cash flows are based on forecasts developed internally by management which are then discounted at an after tax rate of return required by equity and debt market participants of a business enterprise. This rate of return or cost of capital is weighted based on the capitalization of comparable companies. The Market approach determines fair value by comparing the reporting units to comparable companies in similar lines of business that are publicly traded. Total Enterprise Value (TEV) multiples such as TEV to revenues and TEV to earnings (if applicable) before interest and taxes of the publicly traded companies are calculated. These multiples are then applied to the reporting unit's operating results to obtain an estimate of fair value. Each of these two approaches captures aspects of value in each reporting unit. The Income approach captures our expected future performance, and the Market approach captures how investors view the reporting units through other competitors. We believe these valuation approaches are proven valuation techniques and methodologies for our industry and are widely accepted by investors. As neither was perceived by us to deliver any greater indication of value than the other, and neither approach individually computed a fair value less than the carrying value of the segment, we weighted each of the approaches equally. Management completed and reviewed the results of the Step 1 analysis and concluded that an impairment charge was not required as the estimated fair value of the ILS reporting unit was substantially in excess of its carrying value.

At September 29, 2018, we had \$442.9 million of goodwill (\$100.7 million OLS and \$342.2 million in ILS), \$142.3 million of purchased intangible assets and \$311.8 million of property and equipment on our consolidated balance sheet.

#### Inventory Valuation

We record our inventory at the lower of cost (computed on a first-in, first-out basis) or net realizable value. We write-down our inventory to its estimated market value based on assumptions about future demand and market conditions. Inventory write-downs are generally recorded within guidelines set by management when the inventory for a device exceeds 12 months of its demand or when management has deemed parts are no longer active or useful. If actual market conditions are less favorable than those projected by management, additional inventory write-downs may be required which could materially affect our future results of operations. Due to rapidly changing forecasts and orders, additional write-downs for excess or obsolete inventory, while not currently expected, could be required in the future. In the event that alternative future uses of fully written down inventories are identified, we may experience better than normal profit margins when such inventory is sold. Differences between actual results and previous estimates of excess and obsolete inventory could materially affect our future results of operations. We write-down our demo inventory by amortizing the cost of demo inventory over periods ranging from 24 to 36 months after such inventory is placed in service.

#### Warranty Reserves

We provide warranties on the majority of our product sales and allowances for estimated warranty costs are recorded during the period of sale. The determination of such allowances requires us to make estimates of product return rates and expected costs to repair or replace the products under warranty. We currently establish warranty reserves based on historical warranty costs for each product line. The weighted average warranty period covered is approximately 15 months. If actual return rates and/or repair and replacement costs differ significantly from our estimates, adjustments to cost of sales may be required in future periods.

Income Taxes

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As part of the process of preparing our consolidated financial statements, we are required to estimate our income tax provision (benefit) in each of the jurisdictions in which we operate. This process involves us estimating our current income tax provision (benefit) together with assessing temporary differences resulting from differing treatment of items for tax and accounting purposes. These differences result in deferred tax assets and liabilities, which are included within our consolidated balance sheets.

We record a valuation allowance to reduce our deferred tax assets to an amount that more likely than not will be realized. While we have considered future taxable income and ongoing prudent and feasible tax planning strategies in assessing the need for the valuation allowance, in the event we were to determine that we would be able to realize our deferred tax assets in the future in excess of our net recorded amount, an adjustment to the allowance for the deferred tax asset would increase income in the period such determination was made. Likewise, should we determine that we would not be able to realize all or part of our net deferred tax asset in the future, an adjustment to the valuation allowance for the deferred tax asset would be charged to income in the period such determination was made.

During fiscal 2018, we increased our valuation allowance on deferred tax assets by \$5.0 million to \$33.7 million, primarily due to the increase in California research and development tax credits and net operating losses generated from Rofin China which are not expected to be recognized. The Company had U.S. federal deferred tax assets related to research and development credits and other tax attributes that can be used to offset federal taxable income in future periods. These credit carryforwards will expire if they are not used within certain time periods. As of September 29, 2018, management determined that there is sufficient positive evidence to conclude that it is more likely than not sufficient taxable income will exist in the future allowing us to recognize these deferred tax assets.

We historically asserted our intention to indefinitely reinvest foreign earnings. However, we have reevaluated our historic assertion as a result of the enactment of the Tax Act and no longer consider certain historic foreign earnings to be indefinitely reinvested in our foreign subsidiaries. As a result of this change in assertion, we recorded a \$13.7 million tax expense for foreign withholding taxes and state income taxes in the fourth quarter of fiscal 2018. We will continue to assert an indefinite reinvestment of certain historic foreign earnings and profits of \$488.0 million and may be subject to additional foreign withholding taxes and certain state income taxes upon repatriation. We also have not recognized any deferred taxes for outside basis differences in our foreign subsidiaries.

## ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

### Market risk disclosures

We are exposed to market risk related to changes in interest rates and foreign currency exchange rates. We do not use derivative financial instruments for speculative or trading purposes.

### Interest rate sensitivity

A portion of our investment portfolio is composed of fixed income securities. These securities are subject to interest rate risk and will fall in value if market interest rates increase. If interest rates were to increase immediately (whether due to changes in overall market rates or credit worthiness of the issuers of our individual securities) and uniformly by 10% from levels at fiscal 2018 year-end, the fair value of the portfolio, based on quoted market prices in active markets involving similar assets, would decline by an immaterial amount due to their short-term maturities. We have the ability to generally hold our fixed income investments until maturity and therefore we would not expect our operating results or cash flows to be affected to any significant degree by the effect of a sudden change in market interest rates on our securities portfolio. If necessary, we may sell short-term investments prior to maturity to meet our liquidity needs.

At fiscal 2018 year-end, the fair value of our available-for-sale debt securities was \$0.1 million, all of which was classified as short-term investments. At fiscal 2017 year-end, the fair value of our available-for-sale debt securities was \$69.5 million, \$37.0 million of which was classified as cash and cash equivalents and \$32.5 million of which was classified as short-term investments. There were no gross unrealized gains and losses on available-for-sale debt securities at fiscal 2018 or 2017 year-end.

We are exposed to market risks related to fluctuations in interest rates related to our Euro Term Loan. As of September 29, 2018, we owed \$430.6 million on this loan with an interest rate of 2.75%. We performed a sensitivity analysis on the outstanding portion of our debt obligation as of September 29, 2018. Should the current average interest rate increase or decrease by 10%, the resulting annual increase or decrease to interest expense would be

approximately \$1.2 million as of September 29, 2018.

Foreign currency exchange risk

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We maintain operations in various countries outside of the United States and have foreign subsidiaries that manufacture and sell our products in various global markets. The majority of our sales are transacted in U.S. dollars. However, we do generate revenues in other currencies, primarily the Euro, the Japanese Yen, the South Korean Won and the Chinese Renminbi. Additionally, we have operations in different countries around the world with costs incurred in the foregoing currencies and other local currencies, such as British Pound Sterling, Singapore Dollars, Malaysian Ringgit, Swiss Franc and Canadian Dollar. As a result, our earnings, cash flows and cash balances are exposed to fluctuations in foreign currency exchange rates. For example, because of our significant manufacturing operations in Europe, a weakening Euro is advantageous and a strengthening Euro is disadvantageous to our financial results. We attempt to limit these exposures through financial market instruments. We utilize derivative instruments, primarily forward contracts with maturities of two months or less, to manage our exposure associated with anticipated cash flows and net asset and liability positions denominated in foreign currencies. Gains and losses on the forward contracts are mitigated by gains and losses on the underlying instruments. We do not use derivative financial instruments for trading purposes.

On occasion, we enter into currency forward exchange contracts to hedge specific anticipated foreign currency denominated transactions generally expected to occur within the next 12 months. These cash flow hedges are designated for hedge accounting treatment and gains and losses on these contracts are recorded in accumulated other comprehensive income in stockholder's equity and reclassified into earnings at the time that the related transactions being hedged are recognized in earnings. See Note 6, "Derivative Instruments and Hedging Activities" to our Consolidated Financial Statements under Item 15 of this annual report.

We do not anticipate any material adverse effect on our consolidated financial position, results of operations or cash flows resulting from the use of these instruments. There can be no assurance that these strategies will be effective or that transaction losses can be minimized or forecasted accurately. While we model currency valuations and fluctuations, these may not ultimately be accurate. If a financial counterparty to any of our hedging arrangements experiences financial difficulties or is otherwise unable to honor the terms of the foreign currency hedge, we may experience material financial losses. In the current economic environment, the risk of failure of a financial party remains high.

At September 29, 2018, approximately \$215.7 million of our cash, cash equivalents and short-term investments were held outside the U.S. in certain of our foreign operations, \$191.2 million of which was denominated in currencies other than the U.S. dollar.

A hypothetical 10% change in foreign currency rates on our forward contracts would not have a material impact on our results of operations, cash flows or financial position.

The following table provides information about our foreign exchange forward contracts at September 29, 2018. The table presents the weighted average contractual foreign currency exchange rates, the value of the contracts in U.S. dollars at the contract exchange rate as of the contract maturity date and fair value. The U.S. fair value represents the fair value of the contracts valued at September 29, 2018 rates.

Forward contracts to sell (buy) foreign currencies (in thousands, except contract rates):

	Average Contract Rate	U.S. Notional Contract Value	U.S. Fair Value
Non-Designated - For US Dollars:			
Euro	1.1747	\$(117,888)	\$1,511
Japanese Yen	110.7279	\$27,473	\$(637 )
British Pound	1.2925	\$4,521	\$40
South Korean Won	1,112.2323	\$29,142	\$82
Chinese Renminbi	6.8399	\$45,285	\$(267 )
Singapore Dollar	1.3611	\$(30,127 )	\$131
Malaysian Ringgit	4.1356	\$1,413	\$(1 )
Canadian Dollar	1.2929	\$(813 )	\$3
Swiss Franc	0.9732	\$(3,278 )	\$10

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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See Item 15-(a) for an index to the Consolidated Financial Statements and Supplementary Financial Information, which are attached hereto and incorporated by reference herein. The financial statements and notes thereto can be found beginning on page 67 of this annual report.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

Not applicable.

## ITEM 9A. CONTROLS AND PROCEDURES

### Management's Evaluation of Disclosure Controls and Procedures

We have evaluated the effectiveness of the design and operation of our disclosure controls and procedures, as such term is defined in Rule 13a-15(e) under the Securities Exchange Act of 1934, as of the end of the period covered by this annual report ("Evaluation Date"). The controls evaluation was conducted under the supervision and with the participation of management, including our Chief Executive Officer and Chief Financial Officer. Based on this evaluation, our Chief Executive Officer and Chief Financial Officer concluded as of the Evaluation Date that our disclosure controls and procedures were effective in providing reasonable assurance that information required to be disclosed by us in reports that we file or submit under the Securities Exchange Act of 1934, as amended, is (i) recorded, processed, summarized and reported within the time periods specified in the Securities and Exchange Commission's rules and forms and (ii) accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosures.

### Management's Report on Internal Control Over Financial Reporting

Management, including our Chief Executive Officer and Chief Financial Officer, is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the Company.

Management assessed the effectiveness of our internal control over financial reporting as of September 29, 2018, utilizing the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO") in Internal Control-Integrated Framework (2013). Based on the assessment by management, we determined that our internal control over financial reporting was effective as of September 29, 2018. The effectiveness of our internal control over financial reporting as of September 29, 2018 has been audited by Deloitte & Touche LLP, our independent registered public accounting firm, as stated in their report which appears below.

### Inherent Limitations Over Internal Controls

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 ("GAAP"). Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness for 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. Our internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of the financial statements for external purposes in accordance with GAAP. Our 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 our assets;
- (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 our receipts and expenditures are being made only in accordance with authorizations of our management and directors; and
- (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of our assets that could have a material effect on the financial statements.

Management, including our CEO and CFO, does not expect that our internal controls will prevent or detect all errors and all fraud. A control system, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. Further, the design of a control system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of internal controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected. Also, any evaluation of the effectiveness of controls in future periods are subject to the risk that those internal controls may become inadequate because of changes in business conditions, or that the degree of compliance with the policies or procedures may deteriorate.

### Changes in Internal Control Over Financial Reporting

In November 2016, we completed the acquisition of Rofin-Sinar Technologies, Inc. ("Rofin"). We continue to integrate Rofin into our systems and control environment as of September 29, 2018. We believe that we have taken the necessary steps to monitor and maintain appropriate internal control over financial reporting during this integration. There have been no changes

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in our internal control over financial reporting that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting during the three months ended September 29, 2018.

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and the Board of Directors of Coherent, Inc.

Opinion on Internal Control over Financial Reporting

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

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated financial statements as of and for the year ended September 29, 2018, of the Company and our report dated November 27, 2018, expressed an unqualified opinion on those consolidated financial statements.

Basis for Opinion

The Company’s management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management’s Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company’s internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB. We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.

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

/s/ DELOITTE & TOUCHE LLP

San Jose, California

November 27, 2018

ITEM 9B. OTHER INFORMATION

Not applicable.

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PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

Information regarding (i) our directors will be set forth under the caption "Proposal One—Election of Directors—Nominees," (ii) compliance with Section 16(a) of the Securities Act of 1933 will be set forth under the caption "Section 16(a) Beneficial Ownership Reporting Compliance," (iii) the process for stockholders to nominate directors will be set forth under the caption "Proposal One—Election of Directors—Process for Recommending Candidates for Election to the Board of Directors," (iv) our audit committee and audit committee financial expert will be set forth under the caption "Proposal One—Election of Directors—Board Meetings and Committees—Audit Committee" and (v) our executive officers will be set forth under the caption "Our Executive Officers" in our proxy statement for use in connection with our upcoming Annual Meeting of Stockholders to be held in 2019 (the "2019 Proxy Statement") and is incorporated herein by reference or will be included in a Form 10-K/A as an amendment to this Form 10-K. The 2019 Proxy Statement or Form 10-K/A will be filed with the SEC within 120 days after the end of our fiscal year.

Business Conduct Policy

We have adopted a worldwide Business Conduct Policy that applies to the members of our Board of Directors, executive officers and other employees. This policy is posted on our Website at [www.coherent.com](http://www.coherent.com) and may be found as follows:

1. From our main Web page, first click on "Company".
2. Next, click on "Business Conduct Policies".

We intend to satisfy the disclosure requirement under Item 5.05 of Form 8-K regarding an amendment to, or waiver from, a provision of this Business Conduct Policy by posting such information on our Website, at the address and location specified above.

Stockholders may request free printed copies of our worldwide Business Conduct Policy from:

Coherent, Inc.

Attention: Investor Relations

5100 Patrick Henry Drive

Santa Clara, California 95054

ITEM 11. EXECUTIVE COMPENSATION

Information regarding (i) executive officer and director compensation will be set forth under the captions "Election of Directors—Director Compensation" and "Executive Officers and Executive Compensation" and (ii) compensation committee interlocks will be set forth under the caption "Executive Officers and Executive Compensation—Compensation Committee Interlocks and Insider Participation and Committee Independence" in our 2019 Proxy Statement and is incorporated herein by reference or will be included in a Form 10-K/A as an amendment to this Form 10-K.

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

Information regarding (i) equity compensation plan information will be set forth under the caption "Equity Compensation Plan Information" and (ii) security ownership of certain beneficial owners and management will be set forth under the caption "Security Ownership of Certain Beneficial Owners and Management" in our 2019 Proxy Statement and is incorporated herein by reference or will be included in a Form 10-K/A as an amendment to this Form 10-K.

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

The information required under this item will be set forth under the caption "Certain Relationships and Related Party Transactions" in our 2019 Proxy Statement and is incorporated herein by reference or will be included in a Form 10-K/A as an amendment to this Form 10-K.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

The information required by this item is included under the caption "Ratification of the Appointment of Deloitte & Touche LLP as Independent Registered Public Accounting Firm-Principal Accounting Fees and Services" in our 2019 Proxy Statement and is incorporated herein by reference or will be included in a Form 10-K/A as an amendment to this Form 10-K.

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## PART IV

## ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

## (a) 1. Index to Consolidated Financial Statements

The following Consolidated Financial Statements of Coherent, Inc. and its subsidiaries are filed as part of this annual report on Form 10-K:

<u>Report of Independent Registered Public Accounting Firm</u>	<u>70</u>
<u>Consolidated Balance Sheets—September 29, 2018 and September 30, 2017</u>	<u>71</u>
<u>Consolidated Statements of Operations—Years ended September 29, 2018, September 30, 2017 and October 1, 2016</u>	<u>72</u>
<u>Consolidated Statements of Comprehensive Income—Years ended September 29, 2018, September 30, 2017 and October 1, 2016</u>	<u>73</u>
<u>Consolidated Statements of Stockholders' Equity—Years ended September 29, 2018, September 30, 2017 and October 1, 2016</u>	<u>74</u>
<u>Consolidated Statements of Cash Flows—Years ended September 29, 2018, September 30, 2017 and October 1, 2016</u>	<u>75</u>
<u>Notes to Consolidated Financial Statements</u>	<u>77</u>
<u>Quarterly Financial Information (Unaudited)</u>	<u>121</u>

2. Consolidated Financial Statement Schedules

Financial statement schedules have been omitted because they are either not required, not applicable or the information required to be set forth therein is included in the Consolidated Financial Statements hereto.

3. Exhibits

Exhibit  
Numbers

- 2.1\* Merger Agreement, dated as of March 16, 2016, by and among the Company, Rembrandt Merger Sub Corp. and Rofin-Sinar Technologies Inc. (Previously filed as Exhibit 2.1 to Form 8-K filed on March 16, 2016)
- 3.1\* Restated and Amended Certificate of Incorporation. (Previously filed as Exhibit 3.1 to Form 10-K for the fiscal year ended September 29, 1990)
- 3.2\* Certificate of Amendment of Restated and Amended Certificate of Incorporation of Coherent, Inc. (Previously filed as Exhibit 3.2 to Form 10-K for the fiscal year ended September 28, 2002)
- 3.3\* Bylaws of Coherent, Inc. as amended and restated on January 28, 2018. (Previously filed as Exhibit 3.1 to the Company's Current Report on Form 8-K filed on January 31, 2018)
- 10.1\*‡ Form of Indemnification Agreement. (Previously filed as Exhibit 10.18 to Form 10-K for the fiscal year ended October 2, 2010)
- 10.2\*‡ Amended and Restated Employee Stock Purchase Plan. (Previously filed as Exhibit 10.1 to Form S-8 filed on June 12, 2012)
- 10.3\*‡ Change of Control Severance Plan, as amended and restated effective December 11, 2014. (Previously filed as Exhibit 10.1 to Form 8-K filed on December 17, 2014)
- 10.4\*‡ Variable Compensation Plan, as amended. (Previously filed as Exhibit 10.7 to Form 10-K for the fiscal year ended October 1, 2011)
- 10.5\*‡ Supplementary Retirement Plan. (Previously filed as Exhibit 10.5 to Form 10-Q for the fiscal quarter ended April 1, 2006)
- 10.6\*‡ 2005 Deferred Compensation Plan. (Previously filed as Exhibit 10.1 to Form 10-Q for the fiscal quarter ended December 31, 2011)
- 10.7\*‡ 2011 Equity Incentive Plan. (Previously filed as Exhibit 10.1 to Form S-8 filed on May 6, 2011)
- 10.8\*‡ 2011 Equity Incentive Plan-Form of RSU Agreement for members of the Board of Directors. (Previously filed as Exhibit 10.1 to Form 10-Q for the fiscal quarter ended July 2, 2011)
- 10.9\*‡ 2011 Equity Incentive Plan-Form of Option Agreement for members of the Board of Directors. (Previously filed as Exhibit 10.1 to Form 10-Q for the fiscal quarter ended July 2, 2011)
- 10.10\*‡ 2011 Equity Incentive Plan-Form of Time-Based RSU Agreement. (Previously filed as Exhibit 10.23 to Form 10-K for the fiscal year ended October 1, 2011)
- 10.11‡ 2011 Equity Incentive Plan-Form of Performance RSU Agreement.
- 10.12‡ 2011 Equity Incentive Plan-Form of Global RSU Agreement.
- 10.13‡ 2011 Equity Incentive Plan-Form of Global Performance RSU Agreement.
- 10.14\*‡ Offer letter with Kevin Palatnik. (Previously filed as Exhibit 10.3 to Form 10-Q for the fiscal quarter ended January 2, 2016)
- 10.15\*‡ Offer letter with Thomas Merk. (Previously filed as Exhibit 10.3 to Form 10-Q filed for the fiscal quarter ended December 31, 2016)
- 10.16\*‡ Managing director agreement with Thomas Merk. (Previously filed as Exhibit 10.4 to Form 10-Q for the fiscal quarter ended December 31, 2016)
- 10.17\* Credit Agreement, dated as of November 7, 2016, by and among Coherent, Inc., Coherent Holding GmbH, the guarantors from time to time party thereto, the lenders from time to time party thereto, Barclays Bank PLC, as Administrative Agent and L/C Issuer, Bank of America, N.A., as L/C Issuer, and The Bank of Tokyo-Mitsubishi UJF, Ltd., as L/C Issuer. (Previously filed as Exhibit 10.1 to Form 8-K filed November 8, 2016)



- 10.18\* Amendment No. 1 and Waiver to Credit Agreement, dated as of May 8, 2017, by and among Coherent, Inc., Coherent Holding GmbH, the Guarantors party thereto, the Lenders party thereto and Barclays Bank PLC, as Administrative Agent. (Previously filed as Exhibit 10.1 to Form 8-K filed on May 9, 2017)
- 10.19\* Amendment No. 2 to Credit Agreement, dated as of July 5, 2017, by and among Coherent, Inc., Coherent Holding GmbH, the Guarantors party thereto and Barclays Bank PLC as Administrative Agent. (Previously filed as Exhibit 10.2 to Form 10-Q for the fiscal quarter ended July 1, 2017)
- 21.1 Subsidiaries
- 23.1 Consent of Independent Registered Public Accounting Firm
- 24.1 Power of Attorney (see signature page)
- 31.1 Certification of Chief Executive Officer pursuant to Exchange Act Rule 13a-14(a)/15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
- 31.2 Certification of Chief Financial Officer pursuant to Exchange Act Rule 13a-14(a)/15d-14(a), as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
- 32.1\*\* Certification of Chief Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
- 32.2\*\* Certification of Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
- 101.INS XBRL Instance.
- 101.SCH XBRL Taxonomy Extension Schema.
- 101.CAL XBRL Taxonomy Extension Calculation Linkbase.
- 101.DEF XBRL Taxonomy Extension Definition Linkbase.
- 101.LAB XBRL Taxonomy Extension Label Linkbase.
- 101.PRE XBRL Taxonomy Extension Presentation Linkbase.

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\* These exhibits were previously filed with the Commission as indicated and are incorporated herein by reference.

‡ Identifies management contract or compensatory plans or arrangements required to be filed as an exhibit.

\*\* Furnished herewith.







#### STATEMENT OF MANAGEMENT RESPONSIBILITY

Management is responsible for the preparation, integrity, and objectivity of the Consolidated Financial Statements and other financial information included in the Company's 2018 Annual Report on Form 10-K. The Consolidated Financial Statements have been prepared in conformity with U.S. generally accepted accounting principles and reflect the effects of certain estimates and judgments made by management. It is critical for investors and other readers of the Consolidated Financial Statements to have confidence that the financial information that we provide is timely, complete, relevant and accurate.

Management, with oversight by the Company's Board of Directors, has established and maintains a corporate culture that requires that the Company's affairs be conducted to the highest standards of business ethics and conduct.

Management also maintains a system of internal controls that is designed to provide reasonable assurance that assets are safeguarded and that transactions are properly recorded and executed in accordance with management's authorization. This system is regularly monitored through direct management review, as well as extensive audits conducted by internal auditors throughout the organization.

Our Consolidated Financial Statements as of and for the year ended September 29, 2018 have been audited by Deloitte & Touche LLP, an independent registered public accounting firm. Their audit was conducted in accordance with the standards of the Public Company Accounting Oversight Board (United States) and included an integrated audit under such standards.

The Audit Committee of the Board of Directors meets regularly with management, the internal auditors and the independent registered public accounting firm to review accounting, reporting, auditing and internal control matters. The Audit Committee has direct and private access to both internal and external auditors.

See Item 9A for Management's Report on Internal Control Over Financial Reporting.

We are committed to enhancing shareholder value and fully understand and embrace our fiduciary oversight responsibilities. We are dedicated to ensuring that our high standards of financial accounting and reporting as well as our underlying system of internal controls are maintained. Our culture demands integrity and we have the highest confidence in our processes, internal controls, and people, who are objective in their responsibilities and operate under the highest level of ethical standards.

/s/ JOHN R. AMBROSEO

/s/ KEVIN S. PALATNIK

John R. Ambroseo

Kevin S. Palatnik

President and Chief Executive Officer

Executive Vice President and Chief Financial Officer

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Stockholders of Coherent, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Coherent, Inc. and its subsidiaries (the "Company") as of September 29, 2018 and September 30, 2017, and the related consolidated statements of operations, comprehensive income, stockholders' equity, and cash flows for each of the three years in the period ended September 29, 2018 and the related notes (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of September 29, 2018 and September 30, 2017, and the results of its operations and its cash flows for each of the three years in the period ended September 29, 2018, in conformity with accounting principles generally accepted in the United States of America.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of September 29, 2018, based on the criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated November 27, 2018, expressed an unqualified opinion on the Company's internal control over financial reporting.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB. We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the 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 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 financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ DELOITTE & TOUCHE LLP

San Jose, California  
November 27, 2018

We have served as the Company's auditor since 1976.

COHERENT, INC. AND SUBSIDIARIES  
CONSOLIDATED BALANCE SHEETS  
(In thousands, except par value)

	September 29, 2018	September 30, 2017
<b>ASSETS</b>		
Current assets:		
Cash and cash equivalents	\$ 310,495	\$ 443,066
Restricted cash	858	1,097
Short-term investments	120	32,510
Accounts receivable—net of allowances of \$4,568 and \$6,890, respectively	355,208	305,668
Inventories	486,741	414,807
Prepaid expenses and other assets	85,080	70,268
Assets held for sale	—	44,248
Total current assets	1,238,502	1,311,664
Property and equipment, net	311,793	278,850
Goodwill	442,940	417,694
Intangible assets, net	142,293	190,027
Non-current restricted cash	12,692	12,924
Other assets	111,749	126,641
Total assets	\$ 2,259,969	\$ 2,337,800
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
Current liabilities:		
Current portion of long-term obligations	\$ 5,072	\$ 5,078
Accounts payable	70,292	75,860
Income taxes payable	114,145	103,206
Other current liabilities	183,329	235,001
Total current liabilities	372,838	419,145
Long-term obligations	420,711	589,001
Other long-term liabilities	151,956	166,390
Commitments and contingencies (Note 10)		
Stockholders' equity:		
Common stock, Authorized—500,000 shares, par value \$.01 per share:		
Outstanding—24,299 shares and 24,631 shares, respectively	242	245
Additional paid-in capital	78,700	171,403
Accumulated other comprehensive income	2,833	19,906
Retained earnings	1,232,689	971,710
Total stockholders' equity	1,314,464	1,163,264
Total liabilities and stockholders' equity	\$ 2,259,969	\$ 2,337,800
See accompanying Notes to Consolidated Financial Statements.		

COHERENT, INC. AND SUBSIDIARIES  
CONSOLIDATED STATEMENTS OF OPERATIONS

(In thousands, except per share data)

	Year Ended		
	September 29, 2018	September 30, 2017	October 1, 2016
Net sales	\$1,902,573	\$1,723,311	\$857,385
Cost of sales	1,071,882	973,042	475,993
Gross profit	830,691	750,269	381,392
Operating expenses:			
Research and development	132,586	119,166	81,801
Selling, general and administrative	293,632	292,084	169,138
Gain on business combination	—	(5,416)	) —
Impairment and other charges	766	2,916	—
Amortization of intangible assets	10,690	16,024	2,839
Total operating expenses	437,674	424,774	253,778
Income from operations	393,017	325,495	127,614
Other income (expense):			
Interest income	1,571	1,090	1,143
Interest expense	(25,847)	) (34,362)	) (1,346)
Other—net	(7,186)	) 9,832	) (4,515)
Total other expense, net	(31,462)	) (23,440)	) (4,718)
Income from continuing operations before income taxes	361,555	302,055	122,896
Provision for income taxes	114,195	93,411	35,394
Net income from continuing operations	247,360	208,644	87,502
Loss from discontinued operations, net of income taxes	(2)	) (1,522)	) —
Net income	\$247,358	\$207,122	\$87,502
Basic net income (loss) per share:			
Income per share from continuing operations	\$10.07	\$8.52	\$3.62
Loss per share from discontinued operations, net of income taxes	\$—	) \$(0.06)	) \$—
Net income per share	\$10.07	\$8.46	\$3.62
Diluted net income (loss) per share:			
Income per share from continuing operations	\$9.95	\$8.42	\$3.58
Loss per share from discontinued operations, net of income taxes	\$—	) \$(0.06)	) \$—
Net income per share	\$9.95	\$8.36	\$3.58
Shares used in computation:			
Basic	24,572	24,487	24,142
Diluted	24,851	24,777	24,415

See accompanying Notes to Consolidated Financial Statements.

COHERENT, INC. AND SUBSIDIARIES  
 CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME

(In thousands)

	Year Ended		
	September 2018	September 30, 2017	October 1, 2016
Net income	\$247,358	\$ 207,122	\$ 87,502
Other comprehensive income (loss): <sup>(1)</sup>			
Translation adjustment, net of taxes <sup>(2)</sup>	(18,065 )	24,923	1,731
Net loss on derivative instruments, net of taxes <sup>(3)</sup>	—	—	(28 )
Changes in unrealized gains (losses) on available-for-sale securities, net of taxes <sup>(4)</sup>	(4 )	(3,330 )	2,510
Defined benefit pension plans, net of taxes <sup>(5)</sup>	996	3,613	—
Other comprehensive income (loss), net of tax	(17,073 )	25,206	4,213
Comprehensive income	\$230,285	\$ 232,328	\$ 91,715

(1) Reclassification adjustments were not significant during fiscal 2018, 2017 and 2016.

(2) Tax expenses (benefits) of \$0, \$(326) and \$279 were provided on translation adjustments during fiscal 2018, 2017 and 2016, respectively.

(3) Tax expenses (benefits) of \$0, \$0 and \$(17) were provided on net gain (loss) on derivative instruments during fiscal 2018, 2017 and 2016, respectively.

(4) Tax expenses (benefits) of \$(2), \$(1,876) and \$1,399 were provided on changes in unrealized gains (losses) on available-for-sale securities during fiscal 2018, 2017 and 2016, respectively.

(5) Tax expenses of \$202, \$1,747 and \$0 were provided on changes in defined benefit pension plans during fiscal 2018, 2017 and 2016, respectively.

COHERENT, INC. AND SUBSIDIARIES  
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

Three Years in the Period Ended September 29, 2018

(In thousands)

	Common Stock Shares	Common Stock Par Value	Add. Paid-in Capital	Accum. Other Comp. Income (Loss)	Retained Earnings	Total
Balances, October 3, 2015	23,970	\$ 238	\$128,607	\$(9,513)	\$677,086	\$796,418
Common stock issued under stock plans, net of shares withheld for employee taxes	354	4	2,402	—	—	2,406
Stock-based compensation	—	—	20,289	—	—	20,289
Net income	—	—	—	—	87,502	87,502
Other comprehensive income, net of tax	—	—	—	4,213	—	4,213
Balances, October 1, 2016	24,324	242	151,298	(5,300)	764,588	910,828
Common stock issued under stock plans, net of shares withheld for employee taxes	307	3	(7,609)	—	—	(7,606)
Tax impact from employee stock options	—	—	1,628	—	—	1,628
Purchase of non-controlling interest	—	—	(528)	—	—	(528)
Stock-based compensation	—	—	26,614	—	—	26,614
Net income	—	—	—	—	207,122	207,122
Other comprehensive income, net of tax	—	—	—	25,206	—	25,206
Balances, September 30, 2017	24,631	245	171,403	19,906	971,710	1,163,264
Common stock issued under stock plans, net of shares withheld for employee taxes	243	3	(25,749)	—	—	(25,746)
Repurchases of common stock	(575)	(6)	(99,994)	—	—	(100,000)
Cumulative effect of change in accounting principle (Note 2)	—	—	—	—	13,621	13,621
Stock-based compensation	—	—	33,040	—	—	33,040
Net income	—	—	—	—	247,358	247,358
Other comprehensive loss, net of tax	—	—	—	(17,073)	—	(17,073)
Balances, September 29, 2018	24,299	\$ 242	\$78,700	\$2,833	\$1,232,689	\$1,314,464

See accompanying Notes to Consolidated Financial Statements



COHERENT, INC. AND SUBSIDIARIES  
CONSOLIDATED STATEMENTS OF CASH FLOWS  
(In thousands)

	Year Ended		
	September 30, 2018	September 30, 2017	October 1, 2016
Cash flows from operating activities:			
Net income	\$247,358	\$ 207,122	\$ 87,502
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	53,342	43,689	25,905
Amortization of intangible assets	60,039	60,556	8,450
Gain on business combination	—	(5,416)	) —
Impairment and other charges	766	2,916	—
Deferred income taxes	16,607	(19,752)	) (9,770)
Amortization of debt issuance cost	9,565	7,202	—
Stock-based compensation	32,738	26,272	20,157
Excess tax benefits from stock-based compensation arrangements	—	(1,628)	) —
Non-cash restructuring charges	1,246	6,439	—
Non-cash pension benefit	980	5,360	—
Other non-cash expense	559	1,443	963
Changes in assets and liabilities, net of effect of acquisitions:			
Accounts receivable	(47,020)	) (52,516)	) (17,525)
Inventories	(78,123)	) (11,419)	) (55,708)
Prepaid expenses and other assets	(6,695)	) (4,367)	) (4,855)
Other long-term assets	(7,692)	) (2,762)	) (1,552)
Accounts payable	(9,736)	) 8,276	9,735
Income taxes payable/receivable	474	66,820	7,384
Other current liabilities	(42,820)	) 47,458	30,661
Other long-term liabilities	4,523	3,314	3,952
Cash flows from discontinued operations	—	(4,891)	) —
Net cash provided by operating activities	236,111	384,116	105,299
Cash flows from investing activities:			
Purchases of property and equipment	(90,757)	) (63,774)	) (49,327)
Proceeds from dispositions of property and equipment	4,405	1,953	555
Purchases of available-for-sale securities	(54,442)	) (32,449)	) (180,842)
Proceeds from sales and maturities of available-for-sale securities	86,786	25,218	333,058
Acquisition of businesses, net of cash acquired	(45,448)	) (740,481)	) —
Proceeds from sale of discontinued operation	25,000	—	—
Proceeds from sale of other entities	6,250	—	—
Other	470	—	—
Cash flows from discontinued operations	—	(755)	) —
Net cash provided by (used in) investing activities	(67,736)	) (810,288)	) 103,444

(continued)

COHERENT, INC. AND SUBSIDIARIES  
CONSOLIDATED STATEMENTS OF CASH FLOWS (Continued)  
(In thousands)

	Year Ended		
	September 29, 2018	September 30, 2017	October 1, 2016
Cash flows from financing activities:			
Short-term borrowings	\$89,092	\$ 8,863	\$54,792
Repayments of short-term borrowings	(90,751 )	(30,819 )	(34,792 )
Proceeds from long-term borrowings	—	740,685	—
Repayments of long-term borrowings	(171,593 )	(179,580 )	—
Cash paid to subsidiaries' minority shareholders	—	(816 )	—
Issuance of common stock under employee stock option and purchase plans	10,574	8,111	7,849
Excess tax benefits from stock-based compensation arrangements	—	1,628	—
Repurchase of common stock	(100,000 )	—	—
Net settlement of restricted common stock	(36,320 )	(15,717 )	(5,443 )
Debt issuance costs	—	(26,367 )	(5,202 )
Net cash provided by (used in) financing activities	(298,998 )	505,988	17,204
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(2,419 )	22,924	(2,207 )
Net increase (decrease) in cash, cash equivalents and restricted cash	(133,042 )	102,740	223,740
Cash, cash equivalents and restricted cash, beginning of year	457,087	354,347	130,607
Cash, cash equivalents and restricted cash, end of year	\$324,045	\$ 457,087	\$354,347
Supplemental disclosure of cash flow information:			
Cash paid during the year for:			
Interest	\$16,282	\$ 27,160	\$149
Income taxes	\$101,924	\$ 57,517	\$43,884
Cash received during the year for:			
Income taxes	\$5,203	\$ 2,513	\$6,126
Noncash investing and financing activities:			
Unpaid property and equipment purchases	\$6,176	\$ 3,197	\$3,492
Use of previously owned equity shares in acquisition	\$—	\$ 20,685	\$—
The following table provides a reconciliation of cash, cash equivalents and restricted cash reported within the consolidated balance sheets that sum to the total of the same amounts shown in the consolidated statements of cash flows.			
	September 29, 2018	September 30, 2017	October 1, 2016
Cash and cash equivalents	\$ 310,495	\$ 443,066	\$ 354,347
Restricted cash, current	858	1,097	—
Restricted cash, non-current	12,692	12,924	—
Total cash, cash equivalents, and restricted cash shown in the consolidated statement of cash flows	\$ 324,045	\$ 457,087	\$ 354,347

(concluded)

See accompanying Notes to Consolidated Financial Statements

COHERENT, INC. AND SUBSIDIARIES  
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. DESCRIPTION OF BUSINESS

Founded in 1966, Coherent, Inc. provides lasers, laser-based technologies and laser-based system solutions in a broad range of commercial, industrial and scientific research applications. Coherent designs, manufactures, services and markets lasers and related accessories for a diverse group of customers. Headquartered in Santa Clara, California, the Company has worldwide operations including research and development, manufacturing, sales, service and support capabilities.

2. SIGNIFICANT ACCOUNTING POLICIES

Fiscal Year

Our fiscal year ends on the Saturday closest to September 30. Fiscal years 2018, 2017 and 2016 ended on September 29, 2018, September 30, 2017 and October 1, 2016, respectively, and are referred to in these financial statements as fiscal 2018, fiscal 2017, and fiscal 2016 for convenience. Fiscal 2018, 2017 and 2016 include 52 weeks. The fiscal years of the majority of our international subsidiaries end on September 30. Accordingly, the financial statements of these subsidiaries as of that date and for the years then ended have been used for our consolidated financial statements. Management believes that the impact of the use of different year-ends is immaterial to our consolidated financial statements taken as a whole.

Use of Estimates

The preparation of consolidated financial statements in conformity with Generally Accepted Accounting Principles ("GAAP") requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Basis of Presentation

The consolidated financial statements include the accounts of Coherent, Inc. and its direct and indirect subsidiaries (collectively, the "Company", "we", "our", "us" or "Coherent"). Intercompany balances and transactions have been eliminated.

Business Combinations

We include the results of operations of the businesses that we acquire as of the respective dates of acquisition. We allocate the fair value of the purchase price of our business acquisitions to the tangible assets acquired, liabilities assumed, and intangible assets acquired, based on their estimated fair values. The excess of the purchase price over the fair values of these identifiable assets and liabilities is recorded as goodwill.

On November 7, 2016, we acquired Rofin-Sinar Technologies, Inc. and its direct and indirect subsidiaries ("Rofin"). On March 8, 2018, we acquired privately held O.R. Lasertechnologie GmbH and certain assets of its U.S.-based affiliate (collectively "OR Laser"). The significant accounting policies of Rofin and OR Laser have been aligned to conform to those of Coherent, and the consolidated financial statements include the results of Rofin and OR Laser as of their acquisition dates.

Fair Value of Financial Instruments

The carrying amounts of certain of our financial instruments including accounts receivable, accounts payable and accrued liabilities approximate fair value due to their short maturities. Short-term investments are comprised of available-for-sale securities, which are carried at fair value. Other non-current assets include trading securities and life insurance contracts related to our deferred compensation plans; trading securities are carried at fair value and life insurance contracts are carried at cash surrender values, which due to their ability to be converted to cash at that amount, approximate their fair values. Foreign exchange contracts are stated at fair value based on prevailing financial market information. Short-term and long-term debt is carried at amortized cost, which approximates its fair value based on borrowing rates currently available to us for loans with similar terms.

Cash Equivalents

All highly liquid investments with maturities of three months or less at the time of purchase are classified as cash equivalents. At fiscal 2018 year-end, cash and cash equivalents included cash and money market funds.

Concentration of Credit Risk

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

Financial instruments that may potentially subject us to concentrations of credit risk consist principally of cash equivalents, short-term investments and accounts receivable. At fiscal 2018 year-end, the majority of our short-term investments were in U.S. Treasury and agency obligations. Cash equivalents and short-term investments are maintained with several financial institutions and may exceed the amount of insurance provided on such balances. At September 29, 2018, we held cash and cash equivalents and short-term investments outside the U.S. in certain of our foreign operations totaling approximately \$215.7 million, \$191.2 million of which was denominated in currencies other than the U.S. dollar. The majority of our accounts receivable are derived from sales to customers for commercial applications. We perform ongoing credit evaluations of our customers' financial condition and limit the amount of credit extended when deemed necessary but generally require no collateral. In certain instances, we may require customers to issue a letter of credit. We maintain reserves for potential credit losses. Our products are broadly distributed and there was one customer who accounted for 16.4% and 19.0% of accounts receivable at fiscal 2018 and fiscal 2017 year-end, respectively. We had another customer who accounted for 16.7% and 10.0% of accounts receivable at fiscal 2018 and fiscal 2017 year-end, respectively.

Derivative Financial Instruments

Our primary objective for holding derivative financial instruments is to manage currency exchange rate risk. Principal currencies hedged include the Euro, South Korean Won, Japanese Yen, Chinese Renminbi, Singapore Dollar, British Pound, Malaysian Ringgit, Swiss Franc and Canadian Dollar. Our derivative financial instruments are recorded at fair value, on a gross basis, and are included in other current assets and other current liabilities.

Our accounting policies for derivative financial instruments are based on whether they meet the criteria for designation as a cash flow hedge. Changes in the fair value of these cash flow hedges that are highly effective are recorded in accumulated other comprehensive income and reclassified into earnings in the same line item on the consolidated statements of operations as the impact of the hedged transaction during the period in which the hedged transaction affects earnings. The ineffective portion of cash flow hedges are recognized immediately in other income and expenses. Derivatives that we designate as cash flow hedges are classified in the consolidated statements of cash flows in the same section as the underlying item, primarily within cash flows from operating activities. The changes in fair value of derivative instruments that are not designated as hedges are recognized immediately in other income (expense).

We formally document all relationships between hedging instruments and hedged items, as well as the risk management objective and strategy for undertaking various hedge transactions. This process includes linking all derivatives that are designated as cash-flow hedges to specific forecasted transactions. We also assess, both at the hedge's inception and on an ongoing basis, whether the derivatives that are used in hedging transactions are highly effective in offsetting changes in cash flows of the hedged items.

Accounts Receivable Allowances

Accounts receivable allowances reflect our best estimate of probable losses inherent in our accounts receivable balances, including both losses for uncollectible accounts receivable and sales returns. We regularly review allowances by considering factors such as historical experience, credit quality, the age of the accounts receivable balances and current economic conditions that may affect a customer's ability to pay.

Activity in accounts receivable allowance is as follows (in thousands):

	Fiscal		
	2018	2017	2016
Beginning balance	\$6,890	\$2,420	\$3,015
Additions charged to expenses	1,980	4,190	2,084
Accruals related to acquisitions	37	4,390	—
Deductions from reserves	(4,339 )	(4,110 )	(2,679 )
Ending balance	\$4,568	\$6,890	\$2,420

Inventories



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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

Inventories are stated at the lower of cost (first-in, first-out or weighted average cost) or net realizable value.

Inventories are as follows (in thousands):

	Fiscal year-end	
	2018	2017
Purchased parts and assemblies	\$ 137,566	\$ 114,285
Work-in-process	186,240	159,784
Finished goods	162,935	140,738
Total inventories	\$ 486,741	\$ 414,807

## Property and Equipment

Property and equipment are stated at cost and are depreciated or amortized using the straight-line method. Cost, accumulated depreciation and amortization, and estimated useful lives are as follows (dollars in thousands):

	Fiscal year-end		Useful Life
	2018	2017	
Land	\$ 17,655	\$ 18,550	
Buildings and improvements	165,535	159,111	5-40 years
Equipment, furniture and fixtures	359,721	335,953	3-10 years
Leasehold improvements	89,399	51,300	shorter of asset life or lease term
	632,310	564,914	
Accumulated depreciation and amortization	(320,517 )	(286,064 )	
Property and equipment, net	\$ 311,793	\$ 278,850	

## Asset Retirement Obligations

The fair value (the present value of estimated cash flows) of a liability for an asset retirement obligation is recognized in the period in which it is incurred if a reasonable estimate of fair value can be made. The fair value of the liability is added to the carrying amount of the associated asset and this additional carrying amount is depreciated over the life of the asset. All of our existing asset retirement obligations are associated with commitments to return the property to its original condition upon lease termination at various sites and costs to clean up and dispose of certain fixed assets at our Sunnyvale, California site. We estimated that as of fiscal 2018 year-end, gross expected future cash flows of \$6.6 million would be required to fulfill these obligations.

The following table reconciles changes in our asset retirement liability for fiscal 2018 and 2017 (in thousands):

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

Asset retirement liability as of October 1, 2016	\$2,796
Payment of asset retirement obligations	(175 )
Adjustment to asset retirement obligations recognized	213
Additional asset retirement obligations due to acquisition	2,325
Accretion recognized	151
Changes due to foreign currency exchange	72
Asset retirement liability as of September 30, 2017	5,382
Adjustment to asset retirement obligations recognized	(123 )
Additional asset retirement obligations due to acquisition	466
Accretion recognized	156
Changes due to foreign currency exchange	(79 )
Asset retirement liability as of September 29, 2018	\$5,802

At September 29, 2018, \$1,273 and \$4,529 of the asset retirement liability are included in Other current liabilities and Other long-term liabilities on our consolidated balance sheets, respectively. At September 30, 2017, the asset retirement liability is included in Other long-term liabilities on our consolidated balance sheets.

Long-lived Assets

We evaluate the carrying value of long-lived assets, including intangible assets, whenever events or changes in business circumstances or our planned use of long-lived assets indicate that their carrying amounts may not be fully recoverable or that their useful lives are no longer appropriate. Reviews are performed to determine whether the carrying values of long-lived assets are impaired based on a comparison to the undiscounted expected future net cash flows. If the comparison indicates that impairment exists, long-lived assets that are classified as held and used are written down to their respective fair values. When long-lived assets are classified as held for sale, they are written down to their respective fair values less costs to sell. Significant management judgment is required in the forecast of future operating results that is used in the preparation of expected undiscounted cash flows. For fiscal 2018 and 2017, we recorded impairment charges of \$0.3 million and \$2.9 million, respectively, on the net assets of several entities acquired in the acquisition of Rofin to write them down to reflect our best estimate of fair value, less costs to sell (See Note 18, "Discontinued Operations and Sale of Assets Held for Sale"). In addition, in fiscal 2018, we recorded an impairment charge of \$0.5 million to reduce the carrying value of a building to its fair value. In fiscal 2016, there were no significant asset impairments recorded.

Goodwill

Goodwill is tested for impairment on an annual basis and between annual tests in certain circumstances, and written down when impaired (See Note 7, "Goodwill and Intangible Assets"). In testing for impairment, we have the option to first assess qualitative factors to determine whether it is more likely than not (that is, a likelihood of more than 50%) that the fair value of a reporting unit is less than its carrying amount. Moreover, an entity can bypass the qualitative assessment for any reporting unit in any period and proceed directly to the impairment test, and then resume performing the qualitative assessment in any subsequent period. In both our fiscal 2018 and 2017 annual testing, we performed a qualitative assessment of the goodwill for our OLS reporting unit using the opening balance sheet as of the first day of the fourth quarter and noted no impairment. For the ILS reporting unit, in our fiscal 2018 annual testing, we performed a qualitative assessment of the goodwill using the opening balance sheet as of the first day of the fourth quarter and noted no impairment. For the ILS reporting unit, in our fiscal 2017 annual testing, we elected to bypass the qualitative assessment and proceed directly to performing the goodwill impairment test. Accordingly, we performed our impairment test using the opening balance sheet as of the first day of the fourth quarter and noted no impairment in fiscal 2017.

Intangible Assets

Intangible assets, including acquired existing technology, customer relationships, trade name and patents are amortized on a straight-line basis over their estimated useful lives, currently 3 year to 15 years (See Note 7, "Goodwill



and Intangible Assets").  
Warranty Reserves

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

We provide warranties on the majority of our product sales and reserves for estimated warranty costs are recorded during the period of sale. The determination of such reserves requires us to make estimates of product return rates and expected costs to repair or replace the products under warranty. We currently establish warranty reserves based on historical warranty costs for each product line. The weighted average warranty period covered is approximately 15 months. If actual return rates and/or repair and replacement costs differ significantly from our estimates, adjustments to cost of sales may be required in future periods.

Components of the reserve for warranty costs during fiscal 2018, 2017 and 2016 were as follows (in thousands):

	Fiscal		
	2018	2017	2016
Beginning balance	\$36,149	\$15,949	\$15,308
Additions related to current period sales	58,865	41,365	21,859
Warranty costs incurred in the current period	(51,935 )	(31,825 )	(21,393 )
Accruals resulting from acquisitions	179	14,314	—
Adjustments to accruals related to foreign exchange and other	(3,038 )	(3,654 )	175
Ending balance	\$40,220	\$36,149	\$15,949

**Loss Contingencies**

We are subject to the possibility of various loss contingencies arising in the ordinary course of business. We consider the likelihood of loss or impairment of an asset, or the incurrence of a liability, as well as our ability to reasonably estimate the amount of loss, in determining loss contingencies. An estimated loss contingency is accrued when it is probable that an asset has been impaired or a liability has been incurred and the amount of loss can be reasonably estimated. If we determine that a loss is possible and the range of the loss can be reasonably determined, then we disclose the range of the possible loss. We regularly evaluate current information available to us to determine whether an accrual is required, an accrual should be adjusted or a range of possible loss should be disclosed.

**Revenue Recognition**

When a sales arrangement contains multiple elements, such as products and/or services, we allocate revenue to each element based on a selling price hierarchy. Using the selling price hierarchy, we determine the selling price of each deliverable using vendor specific objective evidence ("VSOE"), if it exists, and otherwise third-party evidence ("TPE"). If neither VSOE nor TPE of selling price exists, we use estimated selling price ("ESP"). We generally expect that we will not be able to establish TPE due to the nature of the markets in which we compete, and, as such, we typically will determine selling price using VSOE or if not available, ESP.

Our basis for establishing VSOE of a deliverable's selling price consists of standalone sales transactions when the same or similar product or service is sold separately. However, when services are never sold separately, such as product installation services, VSOE is based on the product's estimated installation hours based on historical experience multiplied by the standard service billing rate. In determining VSOE, we require that a substantial majority of the selling price for a product or service fall within a reasonably narrow price range, as defined by us. We also consider the geographies in which the products or services are sold, major product and service groups, and other environmental variables in determining VSOE. Absent the existence of VSOE and TPE, our determination of a deliverable's ESP involves evaluating several factors based on the specific facts and circumstances of these arrangements, which include pricing strategy and policies driven by geographies, market conditions, competitive landscape, correlation between proportionate selling price and list price established by management having the relevant authority, and other environmental variables in which the deliverable is sold.

For multiple element arrangements which include extended maintenance contracts, we allocate and defer the amount of consideration equal to the separately stated price and recognize revenue on a straight-line basis over the contract period.

We recognize revenue when all four revenue recognition criteria have been met: persuasive evidence of an arrangement exists, the product has been delivered or the service has been rendered, the price is fixed or determinable

and collection is reasonably assured. Revenue from product sales is recorded when all of the foregoing conditions are met and risk of loss and title passes to the customer. Sales to customers are generally not subject to any price protection or return rights.

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COHERENT, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

The majority of our sales are made to original equipment manufacturers ("OEMs"), distributors, representatives and end-users in the non-scientific market. Sales made to these customers do not require installation of the products by us and are not subject to other post-delivery obligations, except in occasional instances where we have agreed to perform installation or provide training. In those instances, we defer revenue related to installation services or training until these services have been rendered. We allocate revenue from multiple element arrangements to the various elements based upon relative fair values.

Our sales to distributors, representatives and end-user customers typically do not have customer acceptance provisions and only certain of our sales to OEM customers and integrators have customer acceptance provisions. Customer acceptance is generally limited to performance under our published product specifications. For the few product sales that have customer acceptance provisions because of higher than published specifications, (1) the products are tested and accepted by the customer at our site or the customer accepts the results of our testing program prior to shipment to the customer, or (2) the revenue is deferred until customer acceptance occurs.

Sales to end-users in the scientific market typically require installation and, thus, involve post-delivery obligations; however, our post-delivery installation obligations are not essential to the functionality of our products. We defer revenue related to installation services until completion of these services.

For most products, training is not provided; therefore, no post-delivery training obligation exists. However, when training is provided to our customers, it is typically priced separately and is recognized as revenue as these services are provided.

We record taxes collected on revenue-producing activities on a net basis.

Research and Development

Research and development expenses include salaries, contractor and consultant fees, supplies and materials, as well as costs related to other overhead such as depreciation, facilities, utilities and other departmental expenses. The costs we incur with respect to internally developed technology and engineering services are included in research and development expenses as incurred as they do not directly relate to any particular licensee, license agreement or license fee.

We treat third party and government funding of our research and development activity, where we are the primary beneficiary of such work conducted, as a reduction of research and development cost. Research and development reimbursements of \$3.2 million, \$2.9 million and \$2.7 million were offset against research and development costs in fiscal 2018, 2017 and 2016, respectively.

Foreign Currency Translation

The functional currencies of our foreign subsidiaries are generally their respective local currencies. Accordingly, gains and losses from the translation of the financial statements of the foreign subsidiaries are reported as a separate component of accumulated other comprehensive income ("OCI"). Foreign currency transaction gains and losses are included in earnings.

Comprehensive Income (Loss)

Comprehensive income (loss) is defined as the change in equity of a business enterprise during a period from transactions and other events and circumstances from non-owner sources. Accumulated other comprehensive income (net of tax) at fiscal 2018 year-end is substantially comprised of accumulated translation adjustments of \$(1.8) million and deferred actuarial gains on pension plans of \$4.6 million. Accumulated other comprehensive income (net of tax) at fiscal 2017 year-end is substantially comprised of accumulated translation adjustments of \$16.3 million and deferred actuarial gains on pension plans of \$3.6 million.

Earnings Per Share

Basic earnings per share is computed based on the weighted average number of shares outstanding during the period, excluding unvested restricted stock. Diluted earnings per share is computed based on the weighted average number of shares outstanding during the period increased by the effect of dilutive employee stock awards, including stock options, restricted stock awards and stock purchase plan contracts, using the treasury stock method.



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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

The following table presents information necessary to calculate basic and diluted earnings per share (in thousands, except per share data):

	Fiscal		
	2018	2017	2016
Weighted average shares outstanding—basic	24,572	24,487	24,142
Dilutive effect of employee stock awards	279	290	273
Weighted average shares outstanding—diluted	24,851	24,777	24,415
Net income from continuing operations	\$247,360	\$208,644	\$87,502
Loss from discontinued operations, net of income taxes	(2 )	(1,522 )	—
Net income	\$247,358	\$207,122	\$87,502

There were 103,547, 505 and 323 potentially dilutive securities excluded from the dilutive share calculation for fiscal 2018, 2017 and 2016, respectively, as their effect was anti-dilutive.

**Stock-Based Compensation**

We recognize compensation expense for all shared based payment awards based on the fair value of such awards. We value restricted stock units using the intrinsic value method, which is based on the fair market value price on the grant date. We use a Monte Carlo simulation model to estimate the fair value of performance restricted stock units. We amortize the fair value of stock awards on a straight-line basis over the requisite service periods of the awards, which are generally the vesting periods. See Note 12, "Employee Stock Award and Benefit Plans" for a description of our stock-based employee compensation plans and the assumptions we use to calculate the fair value of stock-based employee compensation.

**Shipping and Handling Costs**

We record costs related to shipping and handling of net sales in cost of sales for all periods presented. Shipping and handling fees billed to customers are included in net sales. Custom duties billed to customers are recorded in cost of sales.

**Income Taxes**

As part of the process of preparing our consolidated financial statements, we are required to estimate our income tax provision (benefit) in each of the jurisdictions in which we operate. This process involves us estimating our current income tax provision (benefit) together with assessing temporary differences resulting from differing treatment of items for tax and accounting purposes. These differences result in deferred tax assets and liabilities, which are included within our consolidated balance sheets.

We account for uncertain tax issues pursuant to ASC 740-10 Income Taxes, which creates a single model to address accounting for uncertainty in tax positions by prescribing a minimum recognition threshold that a tax position is required to meet before being recognized in the financial statements. This standard provides a two-step approach for evaluating tax positions. The first step, recognition, occurs when a company concludes (based solely on the technical aspects of the matter) that a tax position is more likely than not to be sustained upon examination by a taxing authority. The second step, measurement, is only considered after step one has been satisfied and measures any tax benefit at the largest amount that is deemed more likely than not to be realized upon ultimate settlement of the uncertainty. These determinations involve significant judgment by management. Tax positions that fail to qualify for initial recognition are recognized in the first subsequent interim period that they meet the more likely than not standard or when they are resolved through negotiation or litigation with factual interpretation, judgment and certainty. Tax laws and regulations themselves are complex and are subject to change as a result of changes in fiscal policy, changes in legislation, evolution of regulations and court filings. Therefore, the actual liability for U.S. or foreign taxes may be materially different from our estimates, which could result in the need to record additional tax liabilities or potentially to reverse previously recorded tax liabilities.

We record a valuation allowance to reduce our deferred tax assets to an amount that more likely than not will be realized. While we have considered future taxable income and ongoing prudent and feasible tax planning strategies in assessing the need for the valuation allowance, in the event we were to determine that we would be able to realize our deferred tax assets in the future in excess of our net recorded amount, an adjustment to the allowance for the deferred tax asset would increase income in

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

the period such determination was made. Likewise, should we determine that we would not be able to realize all or part of our net deferred tax asset in the future, an adjustment to the allowance for the deferred tax asset would be charged to income in the period such determination was made.

We historically asserted our intention to indefinitely reinvest foreign earnings. However, we have reevaluated our historic assertion as a result of enactment of the Tax Cuts and Jobs Act (the “Tax Act”) and no longer consider certain historic foreign earnings to be indefinitely reinvested in our foreign subsidiaries. As a result of this change in assertion, we recorded a \$13.7 million tax expense for foreign withholding taxes and state income taxes in the fourth quarter of fiscal 2018. We will continue to assert an indefinite reinvestment of certain historic foreign earnings and profits of \$488.0 million and may be subject to additional foreign withholding taxes and certain state income taxes upon repatriation. We also have not recognized any deferred taxes for outside basis differences in our foreign subsidiaries.

**Adoption of New Accounting Pronouncements**

In October 2016, the Financial Accounting Standards Board (the “FASB”) issued amended guidance that improves the accounting for the income tax consequences of intra-entity transfers of assets other than inventory. Under the new guidance, an entity should recognize the income tax consequences of an intra-entity transfer of an asset other than inventory when the transfer occurs. The new standard is required to be adopted in the first quarter of our fiscal 2019. We elected to early adopt the amended guidance in the first quarter of fiscal 2018. The effect of adoption is a decrease in our opening retained earnings by \$6.1 million with a comparable decrease to our non-current prepaid income tax balance.

In March 2016, the FASB issued amended guidance that simplifies several aspects of the accounting for employee share-based payment transactions, including the accounting for income taxes, forfeitures and statutory tax withholding requirements, as well as classification in the statement of cash flows. Under the new guidance, an entity recognizes all excess tax benefits and tax deficiencies as income tax expense or benefit in the income statement. This change eliminates the notion of the additional paid-in capital pool and significantly reduces the complexity and cost of accounting for excess tax benefits and tax deficiencies. Upon our adoption in the first quarter of fiscal 2018, we recognized a windfall tax benefit as a cumulative effect adjustment increase to our opening retained earnings of \$19.8 million together with a comparable increase in deferred tax assets. With adoption occurring at the beginning of fiscal 2018, we recognized excess tax benefits from stock award exercises and restricted stock unit vesting as a discrete tax benefit, which reduced the provision for income taxes for fiscal 2018 by \$12.8 million. The adoption also changed the calculation of fully diluted shares outstanding for fiscal 2018. The excess tax benefits have been excluded from the calculation of assumed proceeds in our calculation of diluted weighted average shares under the new standard. Our diluted weighted average shares outstanding for fiscal 2018 increased by 71,010 shares due to adoption of the new standard. Additionally, effective in the first quarter of fiscal 2018, excess tax benefits are classified as an operating activity in the statement of cash flows instead of as a financing activity where they were previously presented. We adopted this guidance on a prospective basis and, accordingly, prior periods have not been adjusted. We have elected to not estimate forfeitures expected to occur to determine the amount of compensation cost to be recognized in each period. The remaining provisions of this amended guidance did not have a material impact on our consolidated financial statements.

**Recently Issued Accounting Pronouncements**

In August 2018, the Securities and Exchange Commission (“SEC”) adopted amendments to certain disclosure requirements in Securities Act Release No. 33-10532, Disclosure Update and Simplification. The amendments became effective on November 5, 2018. The SEC staff subsequently indicated that it would not object if a filer’s first presentation of changes in shareholders’ equity is included in its Form 10-Q for the quarter that begins after the final rule’s effective date. Among the amendments is the requirement to present the changes in shareholders’ equity in the interim financial statements (either in a separate statement or footnote) in quarterly reports on Form 10-Q. The analysis should present a reconciliation of the beginning balance to the ending balance of each period for which a



consolidated statement of operations is required to be filed. We will include the first presentation of changes in stockholders' equity on Form 10-Q in our first quarter of fiscal 2019.

In August 2018, the FASB issued amended guidance to align the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software (and hosting arrangements that include an internal use software license). The accounting for the service element of a hosting arrangement that is a service contract is not affected by the amendments. According to the amendments, the entity shall determine which implementation costs to capitalize as an asset related to the service contract and which costs to expense. It requires the entity (customer) to expense the capitalized implementation costs of

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COHERENT, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

a hosting arrangement that is a service contract over the term of the hosting arrangement. The new standard will become effective for our fiscal 2021, which begins on October 4, 2020. We are currently assessing the impact of this amended guidance.

In August 2018, the FASB issued amended guidance to modify the disclosure requirements for defined benefit pension plans and other postretirement plans. The new standard will become effective for our fiscal 2021, which begins on October 4, 2020. We are currently assessing the impact of this amended guidance.

In August 2018, the FASB issued amended guidance to modify the disclosure requirements on fair value measurements in Topic 820, Fair Value Measurement, based on the concepts in the Concepts Statement, including the consideration of costs and benefits. The new standard will become effective for our fiscal 2021, which begins on October 4, 2020. We are currently assessing the impact of this amended guidance.

In June 2018, the FASB issued amended guidance to expand the scope of Topic 718 to include share-based payment transactions for acquiring goods and services from non-employees. The amendments specify that Topic 718 applies to all share-based payment transactions in which a grantor acquires goods or services to be used or consumed in a grantor's own operations by issuing share-based payment awards. The new standard will become effective for our fiscal 2020, which begins on September 29, 2019. We are currently assessing the impact of this amended guidance.

In February 2018, the FASB issued amended guidance to allow a reclassification from accumulated other comprehensive income to retained earnings for stranded tax effects resulting from the Tax Cuts and Jobs Act. Consequently, the amendments eliminate the stranded tax effects resulting from the Tax Cuts and Jobs Act and will improve the usefulness of information reported to financial statement users. However, because the amendments only relate to the reclassification of the income tax effects of the Tax Cuts and Jobs Act, the underlying guidance that requires that the effect of a change in tax laws or rates be included in income from continuing operations is not affected. The amendments also require certain disclosures about stranded tax effects. The new standard will become effective for our fiscal 2020, which begins on September 29, 2019. We are currently assessing the impact of this amended guidance.

In August 2017, the FASB issued amended guidance to address the current limitation on how an entity can designate the hedged risk in certain cash flow and fair value hedging relationships pursuant to U.S. GAAP. This amendment better aligns an entity's risk management activities and financial reporting for hedging relationships through changes to both designation and measurement guidance for qualifying hedging relationships and the presentation of hedge results. The amendment made specific improvements on hedge accounting for risk components in hedging relationships involving nonfinancial risk and interest rate risk for cash flow hedges of forecasted purchases or sales of a nonfinancial asset, cash flow hedges of interest rate risk of variable-rate financial instruments and fair value hedges of interest rate risk. Upon adoption, for cash flow and net investment hedges existing, an entity should apply a cumulative-effect adjustment related to eliminating the separate measurement of ineffectiveness to other comprehensive income with a corresponding adjustment to the opening balance of retained earnings as of the beginning of the fiscal year that an entity adopts the amendment. The amended presentation and disclosure guidance is required only prospectively. The new standard will become effective for our fiscal 2020 which begins on September 29, 2019. We are currently assessing the impact of this amended guidance.

In February 2016, the FASB issued accounting guidance that modifies lease accounting for lessees to increase transparency and comparability by recording lease assets and liabilities for operating leases and disclosing key information about leasing arrangements. The new standard will become effective for our fiscal 2020, which begins on September 29, 2019. We will adopt the new guidance utilizing the modified retrospective transition method. We have reviewed the requirements of this standard and have formulated a plan for implementation. We are currently working on accumulating a complete population of leases from all of our locations and have selected a software repository to track all of our lease agreements and to assist in the reporting and disclosure requirements required by the standard. We will continue to assess and disclose the impact that this new guidance will have on our consolidated financial statements, disclosures and related controls, when known.

In May 2014, the FASB issued ASU 2014-09, Revenue from Contracts with Customers ("ASU 2014-09"), which outlines a single, comprehensive model for entities to use in accounting for revenue arising from contracts with customers. The core principle of ASU 2014-09 is to recognize revenue when promised goods or services are transferred to customers in an amount that reflects the consideration that is expected to be received for those goods or services. ASU 2014-09 defines a five-step process to achieve this core principle and, accordingly, we expect more judgment and estimates may be required within the revenue recognition process than is required under the previous revenue recognition standard, including identifying performance obligations in the contract, estimating the amount of variable consideration to include in the transaction price and allocating the transaction price to each separate performance obligation. ASU 2014-09 is effective for us beginning on the first day of fiscal 2019, which is September 30, 2018. ASU 2014-09 permits two methods of adoption: retrospectively to each prior

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

reporting period presented (the full retrospective method), or retrospectively with the cumulative effect of initially applying the guidance recognized at the date of initial application (the modified retrospective method). We elected to adopt ASU 2014-09 using the modified retrospective method and will apply the standard to contracts that are not completed as of September 30, 2018 and all new contracts entered into by the Company subsequent to September 30, 2018. All prior period financial statements and disclosures will be presented in accordance with Topic 605.

We have completed our analysis of open revenue contracts as of September 30, 2018. We have concluded that the adoption of the new standard will not have a material impact on the timing or amount of revenue recognized primarily as a result of a majority of our sales of products and services are not bundled and therefore revenue will be recorded at the point-in-time when control transfers, which reflects the same timing of revenue recognition under ASC 605. In the preparation for the adoption of ASU 2014-09, we have implemented internal controls to enable the preparation of financial information and related disclosures in accordance with this standard.

## 3. BUSINESS COMBINATIONS

## Fiscal 2018 Acquisitions

## OR Laser

On March 8, 2018, we acquired OR Laser for approximately \$47.4 million, excluding transaction costs. OR Laser produces laser-based material processing equipment for a variety of uses, including additive manufacturing, welding, cladding, marking, engraving and drilling. OR Laser's operating results have been included in our Industrial Lasers & Systems segment. See Note 16, "Segment and Geographic Information."

Our allocation of the purchase price is as follows (in thousands):

## Tangible assets:

Cash	\$1,936
Accounts receivable	3,973
Inventories	2,360
Prepaid expenses and other assets	630
Property and equipment	1,515
Liabilities assumed	(5,119 )
Deferred tax liabilities	(4,517 )

## Intangible assets:

Existing technology	14,100
Non-competition	200
Backlog	100
Customer relationships	700
Trademarks	50
Goodwill	31,456
Total	\$47,384

Results of operations for the business have been included in our consolidated financial statements subsequent to the date of acquisition and pro forma results of operations in accordance with authoritative guidance for prior periods have not been presented because the effect of the acquisition was not material to our prior period consolidated financial results.

The identifiable intangible assets are being amortized over their respective preliminary useful lives of 1 to 8 years. The fair value of the acquired intangibles was determined using the income approach. In performing these valuations, the key underlying probability-adjusted assumptions of the discounted cash flows were projected revenues, gross margin expectations and operating cost estimates. The valuations were based on the information that was available as of the acquisition date and the



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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 3. BUSINESS COMBINATIONS (Continued)

expectations and assumptions that have been deemed reasonable by our management. There are inherent uncertainties and management judgment required in these determinations. This acquisition resulted in a purchase price that exceeded the estimated fair value of tangible and intangible assets, which was allocated to goodwill.

We believe the amount of goodwill relative to identifiable intangible assets relates to several factors including: (1) potential buyer-specific synergies related to the development of new technologies related primarily to the additive manufacturing business and (2) the potential to leverage our sales force to attract new customers and revenue and cross-sell to existing customers.

None of the goodwill from this purchase is deductible for tax purposes.

We expensed \$0.6 million of acquisition-related costs as selling, general and administrative expenses in our consolidated statement of operations in fiscal 2018.

## Fiscal 2017 Acquisitions

## Rofin

On November 7, 2016, we completed our acquisition of Rofin pursuant to the Merger Agreement dated March 16, 2016. Rofin was one of the world's leading developers and manufacturers of high-performance industrial laser sources and laser-based solutions and components. Rofin's operating results have been included primarily in our Industrial Lasers & Systems segment. See Note 16, "Segment and Geographic Information."

As a condition of the acquisition, we were required to divest and hold separate Rofin's low power CO<sub>2</sub> laser business based in Hull, United Kingdom (the "Hull Business"), and had reported this business separately as a discontinued operation until its divestiture. We completed the divestiture of the Hull Business on October 11, 2017, after receiving approval for the terms of the sale from the European Commission. See Note 18, "Discontinued Operations and Sale of Assets Held for Sale."

The total purchase consideration has been allocated to the tangible and identifiable intangible assets acquired and liabilities assumed based on a valuation analysis.

The total purchase consideration allocated to net assets acquired was approximately \$936.3 million and consisted of the following (in thousands):

Cash consideration to Rofin's shareholders	\$904,491
Cash settlement paid for Rofin employee stock options	15,290
Total cash payments to Rofin shareholders and option holders	919,781
Add: fair value of previously owned Rofin shares	20,685
Less: post-merger stock compensation expense	(4,152 )
Total purchase price to allocate	\$936,314

The acquisition was an all-cash transaction at a price of \$32.50 per share of Rofin common stock. We funded the payment of the aggregate consideration with a combination of our available cash on hand and the proceeds from the Euro Term Loan described in Note 9, "Borrowings." The total payment of \$15.3 million due to the cancellation of options held by employees of Rofin was allocated between total estimated merger consideration of \$11.1 million and post-merger stock-based compensation expense of \$4.2 million based on the portion of the total service period of the underlying options that had not been completed by the merger date.

We recognized a gain of \$5.4 million in the first quarter of fiscal 2017 on the increase in fair value from the date of purchase for the shares of Rofin we owned before the acquisition.

Under the acquisition method of accounting, the total estimated acquisition consideration is allocated to the acquired tangible and intangible assets and assumed liabilities of Rofin based on their fair values as of the acquisition date. Any excess of the acquisition consideration over the fair value of assets acquired and liabilities assumed is allocated to goodwill. We concluded that all such goodwill will not be deductible for tax purposes.

Our allocation of the purchase price is as follows (in thousands):



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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 3. BUSINESS COMBINATIONS (Continued)

Cash, cash equivalents and short-term investments	\$ 163,425
Accounts receivable	90,877
Inventory	189,869
Prepaid expenses and other assets	15,362
Assets held for sale, current	29,545
Property and equipment	125,723
Other assets	31,854
Intangible assets:	
Existing technology	169,029
In-process research and development	6,000
Backlog	5,600
Customer relationships	39,209
Trademarks	5,699
Patents	300
Goodwill	298,170
Current portion of long-term obligations	(3,633 )
Current liabilities held for sale	(7,001 )
Accounts payable	(21,314 )
Other current liabilities	(68,242 )
Long-term debt	(11,641 )
Other long-term liabilities	(122,517 )
Total	\$936,314

The fair value write-up of acquired finished goods and work-in-process inventory was \$26.4 million, which was amortized over the expected period during which the acquired inventory was sold, or 6 months. Accordingly, for fiscal 2017, we recorded \$26.4 million of incremental cost of sales associated with the fair value write-up of inventory acquired in the merger with Rofin. The fair value write-up of inventory acquired was fully amortized in fiscal 2017. The fair value write-up of acquired property, plant and equipment of \$36.0 million will be amortized over the useful lives of the assets, ranging from 3 to 31 years. Property, plant and equipment is valued at its value-in-use, unless there was a known plan to dispose of the asset.

The acquired existing technology, backlog, trademarks and patents are being amortized on a straight-line basis, which approximates the economic use of the asset, over their estimated useful lives of 3 to 5 years, 6 months, 3 years, and 5 years, respectively. Customer relationships are being amortized on an accelerated basis utilizing free cash flows over periods ranging from 5 to 10 years. The useful lives of in-process research and development will be defined in the future upon further evaluation of the status of these applications. The fair value of the acquired intangibles was determined using the income approach. In performing these valuations, the key underlying probability-adjusted assumptions of the discounted cash flows were projected revenues, gross margin expectations and operating cost estimates. The valuations were based on the information that was available as of the acquisition date and the expectations and assumptions that have been deemed reasonable by our management. There are inherent uncertainties and management judgment required in these determinations. This acquisition resulted in a purchase price that exceeded the estimated fair value of tangible and intangible assets, which was allocated to goodwill.

We believe the amount of goodwill relative to identifiable intangible assets relates to several factors including: (1) potential buyer-specific synergies related to market opportunities for a combined product offering and (2) potential to leverage our sales force to attract new customers and revenue and cross sell to existing customers.

In-process research and development ("IPR&D") consists of two projects that had not yet reached technological feasibility as of the date of the acquisition. Acquired IPR&D assets are initially recognized at fair value and are classified as indefinite-





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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 3. BUSINESS COMBINATIONS (Continued)

lived assets until the successful completion or abandonment of the associated research and development efforts. The value assigned to IPR&D was determined by considering the value of the products under development to the overall development plan, estimating the resulting net cash flows from the projects when completed and discounting the net cash flows to their present value. During the development period, these assets will not be amortized as charges to earnings; instead these assets will be subject to periodic impairment testing. Upon successful completion of the development process for the acquired IPR&D projects, the assets would then be considered finite-lived intangible assets and amortization of the assets will commence. One project was completed in December 2017 and amortization for that project began in the quarter ended March 31, 2018. The other project has not been completed as of September 29, 2018 and is not expected to be completed in fiscal 2019.

We expensed \$17.6 million of acquisition-related costs as selling, general and administrative expenses in our consolidated statements of operations during fiscal 2017.

None of the goodwill was deductible for tax purposes.

The results of this acquisition were included in our consolidated operations beginning on November 7, 2016. The amount of continuing Rofin net sales and net loss from continuing operations included in our consolidated statements of operations for fiscal 2017 was approximately \$434.9 million and \$48.1 million, respectively.

## Unaudited Pro Forma Information

The following unaudited pro forma financial information presents our combined results of operations as if the acquisition of Rofin and the related issuance of our Euro Term Loan had occurred on October 4, 2015. The unaudited pro forma financial information is not necessarily indicative of what our consolidated results of operations actually would have been had the acquisition been completed on October 4, 2015. In addition, the unaudited pro forma financial information does not attempt to project the future results of operations of the combined company. The actual results may differ significantly from the pro forma results presented here due to many factors.

In Thousands	Fiscal 2017	Fiscal 2016
Total net sales	\$1,798,539	\$1,339,202
Net income	\$233,012	\$5,813
Net income per share:		
Basic	\$9.52	\$0.24
Diluted	\$9.40	\$0.24

The unaudited pro forma financial information above includes the net income of Rofin's low power CO<sub>2</sub> laser business based in Hull, United Kingdom, which is recorded as a discontinued operation in fiscal 2017. See Note 18, "Discontinued Operations and Sale of Assets Held for Sale."

The unaudited pro forma financial information above reflects the following material adjustments:

- Incremental amortization and depreciation expense related to the estimated fair value of identifiable intangible assets and property, plant and equipment from the purchase price allocation.

- The exclusion of amortization of inventory step-up to its estimated fair value from fiscal 2017 and the addition of the amortization to fiscal 2016.

- The exclusion of revenue adjustments as a result of the reduction in customer deposits and deferred revenue related to its estimated fair value from fiscal 2017 and the addition of these adjustments to fiscal 2016.

- Incremental interest expense and amortization of debt issuance costs related to our Euro Term Loan and Revolving Credit Facility (as defined in Note 9, "Borrowings").

- The exclusion of acquisition costs incurred by both Coherent and Rofin from fiscal 2017 and the addition of these costs to fiscal 2016.

- The exclusion of a stock-based compensation charge related to the acceleration of Rofin options from fiscal 2017 and the addition of this charge to fiscal 2016.

- The exclusion of a gain on business combination for our previously owned shares of Rofin from fiscal 2017 and the addition of this gain to fiscal 2016.
- The exclusion of a foreign exchange gain on forward contracts related to our debt commitment and debt issuance from

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 3. BUSINESS COMBINATIONS (Continued)

fiscal 2017 and the addition of this gain to fiscal 2016.

¶The estimated tax impact of the above adjustments.

## 4. FAIR VALUES

We measure our cash equivalents and marketable securities at fair value. The fair values of our financial assets and liabilities are determined using quoted market prices of identical assets or quoted market prices of similar assets from active markets. We recognize transfers between levels within the fair value hierarchy, if any, at the end of each quarter. There were no transfers between levels during the periods presented. As of September 29, 2018 and September 30, 2017, we did not have any assets or liabilities valued based on Level 3 valuations.

We measure the fair value of outstanding debt obligations for disclosure purposes on a recurring basis. As of September 29, 2018, the current and long-term portion of long-term obligations of \$5.1 million and \$420.7 million, respectively, are reported at amortized cost. As of September 30, 2017, the current and long-term portion of long-term obligations of \$5.1 million and \$589.0 million, respectively, are reported at amortized cost. These outstanding obligations are classified as Level 2 as they are not actively traded and are valued using a discounted cash flow model that uses observable market inputs. Based on the discounted cash flow model, the fair value of the outstanding debt approximates amortized cost.

Financial assets and liabilities measured at fair value as of September 29, 2018 and September 30, 2017 are summarized below (in thousands):

	Aggregate Fair Value	Quoted Prices in Active Markets for Identical Assets	Significant Other Observable Inputs	Aggregate Fair Value	Quoted Prices in Active Markets for Identical Assets	Significant Other Observable Inputs
	Fiscal year-end 2018	(Level 1)	(Level 2)	Fiscal year-end 2017	(Level 1)	(Level 2)
<b>Assets:</b>						
<b>Cash equivalents:</b>						
Money market fund deposits	\$56,285	\$ 56,285	\$ —	\$61,811	\$ 61,811	\$ —
U.S. Treasury and agency obligations <sup>(1)</sup>	—	—	—	14,986	—	14,986
Commercial paper <sup>(1)</sup>	—	—	—	21,991	—	21,991
<b>Short-term investments:</b>						
U.S. Treasury and agency obligations <sup>(1)</sup>	120	—	120	21,087	—	21,087
Corporate notes and obligations <sup>(1)</sup>	—	—	—	11,423	—	11,423
<b>Prepaid and other assets:</b>						
Foreign currency contracts <sup>(2)</sup>	1,007	—	1,007	1,270	—	1,270
Money market fund deposits — Deferred comp and supplemental plan <sup>(3)</sup>	522	522	—	285	285	—
Mutual funds — Deferred comp and supplemental plan <sup>(3)</sup>	21,862	21,862	—	17,585	17,585	—
<b>Total</b>	<b>\$79,796</b>	<b>\$ 78,669</b>	<b>\$ 1,127</b>	<b>\$150,438</b>	<b>\$ 79,681</b>	<b>\$ 70,757</b>
<b>Liabilities:</b>						
<b>Other current liabilities:</b>						
Foreign currency contracts <sup>(2)</sup>	(1,879 )	—	(1,879 )	(1,475 )	—	(1,475 )
<b>Total</b>	<b>\$77,917</b>	<b>\$ 78,669</b>	<b>\$ (752 )</b>	<b>\$148,963</b>	<b>\$ 79,681</b>	<b>\$ 69,282</b>



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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 4. FAIR VALUES (Continued)

Valuations are based upon quoted market prices in active markets involving similar assets. The market inputs used to value these instruments generally consist of market yields, reported trades, broker/dealer quotes or alternative pricing sources with reasonable levels of price transparency. Pricing sources include industry standard data providers, security master files from large financial institutions, and other third party sources which are input into a distribution-curve-based algorithm to determine a daily market value. This creates a "consensus price" or a weighted average price for each security.

The principal market in which we execute our foreign currency contracts is the institutional market in an over-the-counter environment with a relatively high level of price transparency. The market participants usually are large commercial banks. Our foreign currency contracts' valuation inputs are based on quoted prices and quoted pricing intervals from public data sources and do not involve management judgment. See Note 6, "Derivative Instruments and Hedging Activities."

The fair value of mutual funds is determined based on quoted market prices. Securities traded on a national exchange are stated at the last reported sales price on the day of valuation; other securities traded in over-the-counter markets and listed securities for which no sale was reported on that date are stated as the last quoted bid price.

## 5. SHORT-TERM INVESTMENTS

We consider all highly liquid investments with maturities of three months or less at the time of purchase to be cash equivalents. Investments classified as available-for-sale are reported at fair value with unrealized gains and losses, net of related income taxes, recorded as a separate component of OCI in stockholders' equity until realized. Interest and amortization of premiums and discounts for debt securities are included in interest income. Gains and losses on securities sold are determined based on the specific identification method and are included in other income (expense). Cash, cash equivalents and short-term investments consist of the following (in thousands):

	Fiscal 2018 year-end			
	Cost Basis	Unrealized Gains	Unrealized Losses	Fair Value
Cash and cash equivalents	\$310,495	\$ —	—\$	—\$310,495
Short-term investments:				
Available-for-sale securities:				
U.S. Treasury and agency obligations	120	—	—	120
Total short-term investments	\$120	\$ —	—\$	—\$120

	Fiscal 2017 year-end			
	Cost Basis	Unrealized Gains	Unrealized Losses	Fair Value
Cash and cash equivalents	\$443,066	\$ —	\$ —	\$443,066
Short-term investments:				
Available-for-sale securities:				
U.S. Treasury and agency obligations	21,074	13	—	21,087
Corporate notes and obligations	11,390	34	(1 )	11,423
Total short-term investments	\$32,464	\$ 47	\$ (1 )	\$32,510

There were no unrealized gains or losses at September 29, 2018. None of the \$1,000 in unrealized losses at September 30, 2017 were considered to be other-than-temporary impairments.

The amortized cost and estimated fair value of available-for-sale investments in debt securities as of September 29, 2018 and September 30, 2017 classified as short-term investments on our consolidated balance sheets, were as follows

(in thousands):

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 5. SHORT-TERM INVESTMENTS (Continued)

	Fiscal year-end		Fiscal year-end	
	2018	2017	2018	2017
	Amortized Cost	Estimated Fair Value	Amortized Cost	Estimated Fair Value
Investments in available-for-sale debt securities due in less than one year	\$ 120	\$ 120	\$ 30,214	\$ 30,251
Investments in available-for-sale debt securities due in one to five years <sup>(1)</sup>	\$ —	\$ —	\$ 2,250	\$ 2,259

(1) Classified as short-term investments because these securities are highly liquid and can be sold at any time. During fiscal 2018, we received proceeds totaling \$26.9 million from the sale of available-for-sale securities and realized no gross gains or losses. During fiscal 2017, we received proceeds totaling \$0.1 million from the sale of available-for-sale securities and realized no gross gains or losses.

## 6. DERIVATIVE INSTRUMENTS AND HEDGING ACTIVITIES

We maintain operations in various countries outside of the United States and have foreign subsidiaries that manufacture and sell our products in various global markets. The majority of our sales are transacted in U.S. dollars. However, we do generate revenues in other currencies, primarily the Euro, Japanese Yen, South Korean Won and Chinese Renminbi (RMB). As a result, our earnings, cash flows and cash balances are exposed to fluctuations in foreign currency exchange rates. We attempt to limit these exposures through financial market instruments. We utilize derivative instruments, primarily forward contracts with maturities of two months or less, to manage our exposure associated with anticipated cash flows and net asset and liability positions denominated in foreign currencies. Gains and losses on the forward contracts are mitigated by gains and losses on the underlying instruments. We do not use derivative financial instruments for speculative or trading purposes. The credit risk amounts represent the Company's gross exposure to potential accounting loss on derivative instruments that are outstanding or unsettled if all counterparties failed to perform according to the terms of the contract, based on then-current currency rates at each respective date.

On August 1, 2016, we purchased forward contracts totaling 670.0 million Euros, with a value date of November 30, 2016, to limit our foreign exchange risk related to the commitment of our Euro Term Loan (denominated in Euros) in an amount of the Euro equivalent of \$750.0 million to finance the U.S. dollar payment for our acquisition of Rofin. In the fourth quarter of fiscal 2016, we recognized an unrealized loss of \$2.2 million on these forward contracts. In the first quarter of fiscal 2017, we settled these forward contracts at a net gain of \$9.1 million, resulting in a realized gain of \$11.3 million in the first quarter of fiscal 2017.

## Non-Designated Derivatives

The outstanding notional contract and fair value asset (liability) amounts of non-designated hedge contracts, with maximum maturity of two months, are as follows (in thousands):



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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 6. DERIVATIVE INSTRUMENTS AND HEDGING ACTIVITIES (Continued)

	U.S. Notional Contract Value		U.S. Fair Value	
	Fiscal 2018 year-end	Fiscal 2017 year-end	Fiscal 2018 year-end	Fiscal 2017 year-end
Euro currency hedge contracts				
Purchase	\$126,589	\$109,641	\$(1,554)	\$(1,397)
Sell	\$(8,701 )	\$—	\$43	\$—
South Korean Won currency hedge contracts				
Purchase	\$2,778	\$—	\$27	\$—
Sell	\$(31,920 )	\$(28,996 )	\$(109 )	\$551
Chinese RMB currency hedge contracts				
Purchase	\$5,852	\$—	\$(33 )	\$—
Sell	\$(51,137 )	\$(13,744 )	\$300	\$128
Japanese Yen currency hedge contracts				
Sell	\$(27,473 )	\$(25,126 )	\$637	\$591
Singapore Dollar currency hedge contracts				
Purchase	\$30,127	\$3,668	\$(131 )	\$(4 )
Other foreign currency hedge contracts				
Purchase	\$4,091	\$—	\$(13 )	\$—
Sell	\$(5,934 )	\$(2,971 )	\$(39 )	\$(74 )

The fair value of our derivative instruments is included in prepaid expenses and other assets and in other current liabilities in our Consolidated Balance Sheets. See Note 4, "Fair Values."

During fiscal 2018, 2017 and 2016, we recognized a loss of \$5.5 million, a gain of \$17.8 million and a loss of \$10.5 million, respectively, in other income (expense) for derivative instruments not designated as hedging instruments.

**Master Netting Arrangements**

To mitigate credit risk in derivative transactions, we enter into master netting arrangements that allow each counterparty in the arrangements to net settle amounts of multiple and separate derivative transactions under certain conditions. We present the fair value of derivative assets and liabilities within the our consolidated balance sheet on a gross basis even when derivative transactions are subject to master netting arrangements and may otherwise qualify for net presentation. The impact of netting derivative assets and liabilities is not material to our financial position for any of the periods presented. Our derivative contracts do not contain any credit risk related contingent features and do not require collateral or other security to be furnished by us or the counterparties.

**7. GOODWILL AND INTANGIBLE ASSETS**

Goodwill is tested for impairment on an annual basis and between annual tests if events or circumstances indicate that an impairment loss may have occurred, and we write down these assets when impaired. We perform our annual impairment tests during the fourth quarter of each fiscal year using the opening balance sheet as of the first day of the fourth quarter, with any resulting impairment recorded in the fourth quarter of the fiscal year.

As a result of the acquisition of RoFin in the first quarter of fiscal 2017, we reorganized our prior two reporting segments (Specialty Laser Systems and Commercial Lasers and Components) into two new reporting segments for the combined company: OEM Laser Sources ("OLS") and Industrial Lasers & Systems ("ILS"). This segment reorganization was based upon

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 7. GOODWILL AND INTANGIBLE ASSETS (Continued)

the organizational structure of the combined company and how the chief operating decision maker ("CODM") receives and utilizes information provided to allocate resources and make decisions.

In our fiscal 2018 annual testing, we performed a qualitative assessment of the goodwill for our OLS and ILS reporting units during the fourth quarter of fiscal 2018 using the opening balance sheet as of the first day of the fourth quarter and concluded that it was more likely than not that the fair value of the reporting units exceeded their carrying amounts. In assessing the qualitative factors, we considered the impact of these key factors: macroeconomic conditions, fluctuations in foreign currency, market and industry conditions, our operating and competitive environment, regulatory and political developments, the overall financial performance of the reporting unit including cost factors and budgeted-to-actual revenue results. We also considered our market capitalization, stock price performance and the significant excess between the estimated fair value and carrying value of the OLS and ILS reporting units. Based on our assessment, goodwill in the OLS and ILS reporting units was not impaired as of the first day of the fourth quarter of fiscal 2018. As such, it was not necessary to perform the goodwill impairment test at that time. Between the completion of our assessment and the end of the fourth quarter of fiscal 2018, we noted no indications of impairment or triggering events with either reporting unit to cause us to review goodwill for potential impairment.

The changes in the carrying amount of goodwill by segment for fiscal 2018 and 2017 are as follows (in thousands):

	Industrial Lasers & Systems (1)	OEM Laser Sources (2)	Total
Balance as of October 1, 2016	\$4,443	\$97,015	\$101,458
Additions (see Note 3)	296,502	1,668	298,170
Translation adjustments and other	14,571	3,495	18,066
Balance as of September 30, 2017	315,516	102,178	417,694
Additions (see Note 3)	31,456	—	31,456
Translation adjustments and other	(4,764 )	(1,446 )	(6,210 )
Balance as of September 29, 2018	\$342,208	\$100,732	\$442,940

(1) Gross amount of goodwill for our ILS segment was \$355.2 million at September 29, 2018 and \$328.5 million at September 30, 2017, respectively. At both September 29, 2018 and September 30, 2017, the accumulated impairment loss for the ILS reporting unit was \$13.0 million reflecting an impairment charge in fiscal 2009.

(2) Gross amount of goodwill for our OLS segment was \$109.5 million and \$110.9 million at September 29, 2018 and September 30, 2017, respectively. At both September 29, 2018 and September 30, 2017, the accumulated impairment loss for the OLS reporting unit was \$8.7 million reflecting impairment charges in fiscal 2003 and fiscal 2009.

We evaluate long-lived assets and amortizable intangible assets whenever events or changes in business circumstances or our planned use of assets indicate that their carrying amounts may not be fully recoverable or that their useful lives are no longer appropriate. Reviews are performed to determine whether the carrying values of assets are impaired based on comparison to the undiscounted expected future cash flows identifiable to such long-lived and amortizable intangible assets. If the comparison indicates that impairment exists, the impaired asset is written down to its fair value.

In fiscal 2018 and 2017, we did not have any impairment of intangible assets as a result of the impairment analysis.

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 7. GOODWILL AND INTANGIBLE ASSETS (Continued)

The components of our amortizable intangible assets are as follows (in thousands):

	Fiscal year-end 2018			Fiscal year-end 2017		
	Gross Carrying Amount	Accumulated Amortization	Net	Gross Carrying Amount	Accumulated Amortization	Net
Existing technology	\$201,759	\$(94,376)	\$107,383	\$208,341	\$(66,793)	\$141,548
Patents	—	—	—	330	(58)	272
Customer relationships	50,359	(22,383)	27,976	51,687	(14,259)	37,428
Trade name	5,888	(3,818)	2,070	6,171	(1,824)	4,347
In-process research and development	4,864	—	4,864	6,432	—	6,432
Total	\$262,870	\$(120,577)	\$142,293	\$272,961	\$(82,934)	\$190,027

For accounting purposes, when an intangible asset is fully amortized, it is removed from the disclosure schedule.

The weighted average remaining amortization periods for existing technology, customer lists and trade names are approximately 2.5 years, 6.9 years and 1.1 years, respectively. Amortization expense for intangible assets during fiscal 2018, 2017, and 2016 was \$60.0 million, \$60.6 million and \$8.5 million, respectively. The change in accumulated amortization also includes \$2.6 million (decrease) and \$4.8 million (increase) of foreign exchange impact for fiscal 2018 and fiscal 2017, respectively.

Estimated amortization expense for the next five fiscal years and all years thereafter are as follows (in thousands):

	Estimated Amortization Expense
2019	\$ 55,924
2020	48,560
2021	17,054
2022	5,697
2023	3,055
Thereafter	7,139
Total (excluding IPR&D)	\$ 137,429

## 8. BALANCE SHEET DETAILS

Prepaid expenses and other assets consist of the following (in thousands):

	Fiscal year-end	
	2018	2017
Prepaid and refundable income taxes	\$37,884	\$28,712
Other taxes receivable	16,930	15,327
Prepaid expenses and other assets	30,266	26,229
Total prepaid expenses and other assets	\$85,080	\$70,268

Other assets consist of the following (in thousands):

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 8. BALANCE SHEET DETAILS (Continued)

	Fiscal year-end	
	2018	2017
Assets related to deferred compensation arrangements (see Note 12)	\$37,370	\$31,008
Deferred tax assets	64,858	82,691
Other assets	9,521	12,942
Total other assets	\$111,749	\$126,641

Other current liabilities consist of the following (in thousands):

	Fiscal year-end	
	2018	2017
Accrued payroll and benefits	\$55,704	\$72,327
Accrued expenses and other	36,859	34,215
Warranty reserve (see Note 2)	40,220	36,149
Current liabilities held for sale (see Note 18)	—	7,021
Customer deposits	19,933	20,052
Deferred revenue	30,613	65,237
Total other current liabilities	\$183,329	\$235,001

Other long-term liabilities consist of the following (in thousands):

	Fiscal year-end	
	2018	2017
Long-term taxes payable	\$36,336	\$35,866
Deferred compensation (see Note 12)	40,895	34,160
Deferred tax liabilities	26,339	45,373
Deferred revenue	5,091	4,765
Asset retirement obligations liability (see Note 2)	4,529	5,382
Defined benefit plan liabilities (see Note 13)	37,528	39,454
Other long-term liabilities	1,238	1,390
Total other long-term liabilities	\$151,956	\$166,390

## 9. BORROWINGS

With the March 8, 2018 acquisition of OR Laser, we assumed several term loans having an aggregate principal amount of \$1.9 million as of March 31, 2018. In fiscal 2018, after the acquisition date, we paid off \$1.2 million of principal on these loans. The remaining aggregate principal amount was \$0.6 million at September 29, 2018.

On November 4, 2016, we repaid the outstanding balance, plus accrued interest, on our former domestic line of credit and terminated the \$50.0 million credit facility with Union Bank of California. We assumed two term loans having an aggregated principal amount of \$15.3 million as of November 7, 2016 and several lines of credit totaling approximately \$18.1 million with the completion of the Rofin acquisition.

On November 7, 2016 (the "Closing Date"), we entered into a Credit Agreement by and among us, Coherent Holding BV & Co. K.G. (formerly Coherent Holding GmbH), as borrower (the "Borrower"), and certain of our direct and indirect subsidiaries from time to time party thereto, as guarantors, the lenders from time to time party thereto, Barclays Bank PLC, as administrative agent and an L/C Issuer, Bank of America, N.A., as an L/C Issuer, and MUFG Union Bank, N.A., as an L/C Issuer (the "Credit Agreement"). The Credit Agreement provided for a 670.0 million Euro senior secured term loan facility (the "Euro Term Loan") and a \$100.0 million senior secured revolving credit facility ("Revolving Credit Facility") with a \$30.0 million letter of credit sublimit and a \$10.0 million swing line sublimit. The Borrower may increase the aggregate revolving commitments or borrow incremental term loans in an aggregate principal amount not to exceed the sum of \$150.0 million and



## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 9. BORROWINGS (continued)

an amount that would not cause the senior secured net leverage ratio to be greater than 2.75 to 1.00, subject to certain conditions, including obtaining additional commitments from the lenders then party to the Credit Agreement or new lenders. On November 7, 2016, the Borrower borrowed the full 670.0 million Euros under the Euro Term Loan and its proceeds were used to finance the acquisition of Rofin and pay related fees and expenses. On November 7, 2016, we also used 10.0 million Euros of the capacity under the Revolving Credit Facility for the issuance of a letter of credit. The terms of the Credit Agreement require the Borrower to prepay the term loans in certain circumstances, including from excess cash flow beyond a threshold amount, from the receipt of proceeds from certain dispositions or from the incurrence of certain indebtedness, and from extraordinary receipts resulting in net cash proceeds in excess of \$10.0 million in any fiscal year. The Borrower has the right to prepay loans under the Credit Agreement in whole or in part at any time without premium or penalty, subject to customary breakage costs. Revolving loans may be borrowed, repaid and reborrowed until the fifth anniversary of the Closing Date, at which time all outstanding revolving loans must be repaid. The Euro Term Loan matures on the seventh anniversary of the Closing Date, at which time all outstanding principal and accrued and unpaid interest on the Euro Term Loan must be repaid.

In fiscal 2018 and fiscal 2017, we made voluntary principal payments of 135.0 million Euros and 150.0 million Euros, respectively, on the Euro Term Loan. As of September 29, 2018 and September 30, 2017, the outstanding principal amount of the Euro Term Loan was 371.6 million Euros and 513.3 million Euros, respectively. As of each of September 29, 2018 and September 30, 2017, the outstanding principal amount of the Revolving Credit Facility was 10.0 million Euro.

Loans under the Credit Agreement bear interest, at the Borrower's option, at a rate equal to either (i)(x) in the case of calculations with respect to U.S. Dollars or certain other alternative currencies, the London interbank offered rate (the "LIBOR") or (y) in the case of calculations with respect to the Euro, the euro interbank offered rate ("EURIBOR" and, together with LIBOR, the "Eurocurrency Rate") or (ii) a base rate (the "Base Rate") equal to the highest of (x) the federal funds rate, plus 0.50%, (y) the prime rate then in effect and (z) the Eurocurrency Rate for loans denominated in U.S. dollars applicable to a one-month interest period, plus 1.0%, in each case, plus an applicable margin. The applicable margin for Euro Term Loan borrowed as Eurocurrency Rate loans, is 3.50% initially, and following the first anniversary of the Closing Date ranges from 3.50% to 3.00% depending on the consolidated total gross leverage ratio at the time of determination. For Euro Term Loan borrowed as Base Rate loans, the applicable margin initially is 2.50%, and following the first anniversary of the Closing Date ranges from 2.50% to 2.00% depending upon the consolidated total gross leverage ratio at the time of determination. The applicable margin for revolving loans borrowed as Eurocurrency Rate loans, ranges from 4.25% to 3.75%, and for revolving loans borrowed as Base Rate loans, ranges from 3.25% to 2.75%, in each case, based on the consolidated total gross leverage ratio at the time of determination. Interest on Base Rate Loans is payable quarterly in arrears. Interest on Eurocurrency Rate loans is payable at the end of the applicable interest period (or at three month intervals if the interest period exceeds three months). Interest periods for Eurocurrency Rate loans may be, at the Borrower's option, one, two, three or six months. On May 8, 2017, we entered into Amendment No. 1 and Waiver (the "Repricing Amendment") to the Credit Agreement to, among other things, (i) reduce the applicable interest rate margins with respect to the Euro Term Loans to 1.25% for Euro Term Loans maintained as Base Rate loans and 2.25% for Euro Term Loans maintained as Eurocurrency Rate loans, with stepdowns to 1.00% and 2.00%, respectively, available after May 8, 2018 if the consolidated total gross leverage ratio for Coherent and its restricted subsidiaries is less than 1.50:1.00 and (ii) extend the period during which a prepayment premium may be required for a repricing transaction until six months after the effective date of the Repricing Amendment. In connection with the execution of the Repricing Amendment, we paid arrangement fees of approximately \$0.5 million in fiscal 2017, as well as certain fees and expenses of the administrative agent and the lenders, in accordance with the terms of the Credit Agreement.

As our consolidated total gross leverage ratio for Coherent and its restricted subsidiaries was less than 1.50:1.00 as of March 31, 2018, on May 8, 2018, the applicable interest rate margins with respect to the Euro Term Loans were

stepped down to 1.00% for Euro Term Loans maintained as Base Rate loans and 2.00% for Euro Term Loans maintained as Eurocurrency Rate loans.

The Credit Agreement requires the Borrower to make scheduled quarterly payments on the Euro Term Loan of 0.25% of the original principal amount of the Euro Term Loan, with any remaining principal payable at maturity. A commitment fee accrues on any unused portion of the revolving loan commitments under the Credit Agreement at a rate of 0.375% or 0.5% depending on the consolidated total gross leverage ratio at any time of determination. The Borrower is also obligated to pay other customary fees for a credit facility of this size and type.



## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 9. BORROWINGS (continued)

On the Closing Date, we and certain of our direct and indirect subsidiaries, as guarantors, provided an unconditional guaranty of all obligations of the Borrower and the other loan parties arising under the Credit Agreement, the other loan documents and under swap contracts and treasury management agreements with the lenders or their affiliates (with certain limited exceptions). The Borrower and the guarantors have also granted security interests in substantially all of their assets to secure such obligations.

The Credit Agreement contains customary affirmative covenants, including covenants regarding the payment of taxes and other obligations, maintenance of insurance, reporting requirements and compliance with applicable laws and regulations, and negative covenants, including covenants limiting the ability of us and our subsidiaries to, among other things, incur debt, grant liens, make investments, make certain restricted payments, transact with affiliates, and sell assets. The Credit Agreement also requires us and our subsidiaries to maintain a senior secured net leverage ratio as of the last day of each fiscal quarter of less than or equal to 3.50 to 1.00. The Credit Agreement contains customary events of default that include, among other things, payment defaults, cross defaults with certain other indebtedness, violation of covenants, inaccuracy of representations and warranties in any material respect, change in control of us and the Borrower, judgment defaults, and bankruptcy and insolvency events. If an event of default exists, the lenders may require the immediate payment of all Obligations, as defined in the Credit Agreement, and may exercise certain other rights and remedies provided for under the Credit Agreement, the other loan documents and applicable law. The acceleration of such obligations is automatic upon the occurrence of a bankruptcy and insolvency event of default. We were in compliance with all covenants at September 29, 2018.

We incurred \$28.5 million of debt issuance costs related to the Euro Term Loan and \$0.5 million of debt issuance costs to the original lenders related to the Repricing Amendment, which are included in short-term borrowings and current portion of long-term obligations and long-term obligations in the consolidated balance sheets and will be amortized to interest expense over the seven year life of the Euro Term Loan using the effective interest method, adjusted to accelerate amortization related to voluntary prepayments. We incurred \$2.3 million of debt issuance costs in connection with the Revolving Credit Facility which were capitalized and included in prepaid expenses and other assets and other assets in the consolidated balance sheets and will be amortized to interest expense using the straight-line method over the contractual term of five years of the Revolving Credit Facility.

In fiscal 2018, we recognized interest expense of \$14.9 million and amortization of debt issuance costs of \$9.6 million in relation to the Euro Term Loan. In fiscal 2017, we recognized interest expense of \$23.5 million and amortization of debt issuance costs of \$7.2 million in relation to the Euro Term Loan.

Additional sources of cash available to us were international currency lines of credit and bank credit facilities totaling \$26.5 million as of September 29, 2018, of which \$18.5 million was unused and available. These unsecured international facilities were used in Europe and Japan in fiscal 2018. As of September 29, 2018, we had utilized \$8.0 million of the international credit facilities as guarantees in Europe.

Short-term borrowings and current portion of long-term obligations consist of the following (in thousands):

	Fiscal 2018 year-end	Fiscal 2017 year-end
Current portion of Euro Term Loan <sup>(1)</sup>	\$ 3,092	\$ 3,230
1.3% Term loan due 2024	1,448	1,477
1.0% State of Connecticut term loan due 2023	374	371
OR Laser loans	158	—
Total current portion of long-term obligations	\$ 5,072	\$ 5,078

(1) Net of debt issuance costs of \$4.7 million and \$4.7 million at September 29, 2018 and September 30, 2017, respectively.

Long-term obligations consist of the following (in thousands):

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 9. BORROWINGS (continued)

	Fiscal 2018 year-end	Fiscal 2017 year-end
Euro Term Loan due 2024 <sup>(1)</sup>	\$411,661	\$578,356
1.3% Term loan due 2024	7,242	8,865
1.0% State of Connecticut term loan due 2023	1,406	1,780
OR Laser loans	402	—
Total long-term obligations	\$420,711	\$589,001

(1) Net of debt issuance costs of \$11.2 million and \$20.4 million at September 29, 2018 and September 30, 2017, respectively.

Contractual maturities of our debt obligations as of September 29, 2018 are as follows (in thousands):

	Amount
2019	\$9,744
2020	9,721
2021	9,704
2022	9,694
2023	9,539
Thereafter	393,238
Total	\$441,640

## 10. COMMITMENTS AND CONTINGENCIES

## Indemnifications

In the normal course of business, we enter into agreements that contain a variety of representations and warranties and provide for general indemnification. Exposure under these agreements is unknown because claims may be made against us in the future and we may record charges in the future as a result of these indemnification obligations. As of September 29, 2018, we did not have any material indemnification claims that were probable or reasonably possible.

## Commitments

We lease many of our facilities under operating leases and recognize rent expense on a straight-line basis over the life of the leases.

Future minimum payments under our non-cancellable operating leases at September 29, 2018 are as follows (in thousands):

	Amount
2019	\$20,210
2020	16,905
2021	12,468
2022	9,419
2023	6,224
Thereafter through 2028	13,466
Total	\$78,692

Rent expense was \$22.1 million, \$16.5 million and \$12.6 million in fiscal 2018, 2017 and 2016, respectively.

As of September 29, 2018, we had total purchase commitments for inventory of approximately \$126.1 million and purchase obligations for fixed assets and services of \$15.6 million compared to \$180.0 million of purchase commitments for inventory and \$23.9 million of purchase obligations for fixed assets and services at September 30, 2017. The inventory decrease was primarily due to lower commitments to support lower shipments of large ELA tools

used in the flat panel display market.

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COHERENT, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

10. COMMITMENTS AND CONTINGENCIES (continued)

The fixed assets and services decrease was primarily due the completion of expansion of our manufacturing capacity in Göttingen, Germany.

Contingencies

We are subject to legal claims and litigation arising in the ordinary course of business, such as product liability, employment or intellectual property claims, including, but not limited to, the matters described below. On May 14, 2013, IMRA America ("Imra") filed a complaint for patent infringement against two of our subsidiaries in the Regional Court of Düsseldorf, Germany, captioned In re IMRA America Inc. versus Coherent Kaiserslautern GmbH et. al. 4b O 38/13. The complaint alleged that the use of certain of the Company's lasers infringed upon EP Patent No. 754,103, entitled "Method For Controlling Configuration of Laser Induced Breakdown and Ablation," issued November 5, 1997. The patent, now expired in all jurisdictions, is owned by the University of Michigan and licensed to Imra. The complaint sought unspecified compensatory damages and the cost of court proceedings and sought to permanently enjoin the Company from infringing the patent in the future. Following the filing of the infringement suit, our subsidiaries filed a separate nullity action with the Federal Patent Court in Munich, Germany requesting that the court hold that the patent was invalid based on prior art. On October 1, 2015, the Federal Patent Court ruled that the German portion of the patent was invalid. Imra appealed this decision to the Federal Court of Justice, the highest civil jurisdiction court in Germany. On March 27, 2018, the Federal Court of Justice dismissed Imra's appeal effectively ending the case in favor of Coherent.

Although we do not expect that such legal claims and litigation will ultimately have a material adverse effect on our consolidated financial position, results of operations or cash flows, an adverse result in one or more matters could negatively affect our results in the period in which they occur.

The United States and many foreign governments impose tariffs and duties on the import and export of certain products we sell. From time to time our customs compliance, product classifications, duty calculations and payments are reviewed or audited by government agencies.

On November 7, 2016, we entered into a Credit Agreement, which was amended on May 8, 2017. See Note 9, "Borrowings" for further discussion of the issuance of the financing.

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 11. STOCK REPURCHASES

On February 6, 2018, our board of directors authorized a stock repurchase program authorizing the Company to repurchase up to \$100.0 million of our common stock from time to time through January 31, 2019. During fiscal 2018, we repurchased and retired 574,946 shares of outstanding common stock under this program at an average price of \$173.91 per share for a total of \$100.0 million.

On October 28, 2018, our board of directors authorized a stock repurchase program authorizing the Company to repurchase up to \$250.0 million of our common stock through December 31, 2019, with a limit of no more than \$75.0 million per quarter.

## 12. EMPLOYEE STOCK AWARD AND BENEFIT PLANS

## Deferred Compensation Plans

Under our deferred compensation plans ("plans"), eligible employees are permitted to make compensation deferrals up to established limits set under the plans and accrue income on these deferrals based on reference to changes in available investment options. While not required by the plan, we choose to invest in insurance contracts and mutual funds in order to approximate the changes in the liability to the employees. These investments and the liability to the employees were as follows (in thousands):

	Fiscal year-end	
	2018	2017
Cash surrender value of life insurance contracts	\$15,830	\$13,995
Fair value of mutual and money market funds	22,384	17,870
Total assets	\$38,214	\$31,865

## Total assets, included in:

Prepaid expenses and other assets	\$844	\$856
Other assets	37,370	31,009
Total assets	\$38,214	\$31,865

	Fiscal year-end	
	2018	2017

## Total deferred compensation liability, included in:

Other current liabilities	\$844	\$856
Other long-term liabilities	40,895	34,160
Total deferred compensation liability	\$41,739	\$35,016

Life insurance premiums loads, policy fees and cost of insurance that are paid from the asset investments and gains and losses from the asset investments for these plans are recorded as components of other income or expense; such amounts were a net gain of \$4.8 million in fiscal 2018, a net gain of \$5.0 million (including a \$1.3 million death benefit) in fiscal 2017 and a net gain of \$1.7 million in fiscal 2016. Changes in the obligation to plan participants are recorded as a component of operating expenses and cost of sales; such amounts were a loss of \$5.2 million in fiscal 2018, a loss of \$3.9 million in fiscal 2017 and a loss of \$2.1 million in fiscal 2016. Liabilities associated with participant balances under our deferred compensation plans are affected by individual contributions and distributions made, as well as gains and losses on the participant's investment allocation election.

## Coherent Employee Retirement and Investment Plan

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COHERENT, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

12. EMPLOYEE STOCK AWARD AND BENEFIT PLANS (continued)

Under the Coherent Employee Retirement and Investment Plan, we match employee contributions to the plan up to a maximum of 4% of the employee's individual earnings subject to IRS limitations. Employees become eligible for participation and Company matching contributions on their first day of employment. The Company's contributions (net of forfeitures) during fiscal 2018, 2017, and 2016 were \$5.6 million, \$4.8 million and \$4.1 million, respectively.

**Employee Stock Purchase Plan**  
We have an Employee Stock Purchase Plan ("ESPP") whereby eligible employees may authorize payroll deductions of up to 10% of their regular base salary to purchase shares at the lower of 85% of the fair market value of the common stock on the date of commencement of the offering or on the last day of the six-month offering period. During fiscal 2018, 2017 and 2016, a total of 66,099 shares, 95,678 shares and 141,340 shares, respectively, were purchased by and distributed to employees at an average price of \$159.97, \$81.82 and \$46.81 per share, respectively. At fiscal 2018 year-end, we had 358,783 shares of our common stock reserved for future issuance under the plan.

**Stock Award Plans**  
We maintain a stock plan for which employees, service providers and non-employee directors are eligible participants. This plan, the 2011 Equity Incentive Plan (the "2011 Plan"), provides for a number of different equity-based grants, including options, time-based restricted stock units and performance restricted stock units. Under the 2011 Plan, Coherent may grant options and awards (time-based restricted stock units and performance restricted stock units) to purchase up to 6,747,691 shares of common stock, of which 4,780,438 shares remained available for grant at fiscal 2018 year-end. At fiscal 2018 year-end, all outstanding stock options and restricted stock units have been issued under plans approved by our shareholders.

Historically, option grants to employees vested over the four years from the original grant date. Since adoption of the 2011 Plan, no stock options have been granted to employees. Some vested options made to one non-employee director under a prior stock plan remain outstanding.

Non-employee directors are automatically granted time-based restricted stock units upon first joining the Board of Directors and then upon reelection. New non-employee directors initially receive an award of restricted stock units valued at approximately \$225,000 which vest over a two year period. The annual grant for non-employee directors is a value of approximately \$225,000 in shares of restricted stock units that vest on February 15 of the calendar year following the grant.

Restricted stock awards and restricted stock units are typically subject to vesting restrictions—either time-based or market-based conditions for vesting. Until restricted stock vests, shares (including those issuable upon vesting of the applicable restricted stock unit) are subject to forfeiture if employment or service to the Company terminates prior to the release of restrictions and cannot be transferred.

¶ The service based restricted stock awards generally vest within three years from the date of grant.

The service based restricted stock unit awards are generally subject to annual vesting over three years from the date of grant, though from time-to-time, depending upon exceptional circumstances, the Company has granted restricted stock unit awards with one or two year vesting.

The performance restricted stock unit award grants are generally either subject to annual vesting over three years from the date of grant or subject to a single vest measurement three years from the date of grant, depending upon achievement of performance measurements based on the performance of the Company's total shareholder returns (as defined in the plan) compared with the performance of the Russell 1000 Index (or as otherwise determined by the Compensation and HR Committee).

**Fair Value of Stock Compensation**

We recognize compensation expense for all share-based payment awards based on the fair value of such awards. The expense is recognized on a straight-line basis per tranche over the respective requisite service period of the awards.

**Determining Fair Value**

**Employee Stock Purchase Plan**





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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 12. EMPLOYEE STOCK AWARD AND BENEFIT PLANS (continued)

Valuation and amortization method—We estimate the fair value of employee stock purchase shares using the Black-Scholes-Merton option-pricing formula. This fair value is then amortized on a straight-line basis over the purchase period.

Expected Term—The expected term represents the period of our employee stock purchase plan.

Expected Volatility—Our process for computing expected volatility considers both historical volatility and market-based implied volatility; however our estimate of expected forfeitures is based on historical employee data and could differ from actual forfeitures.

Risk-Free Interest Rate—The risk-free interest rate used in the Black-Scholes-Merton valuation method is based on the implied yield currently available on U.S. Treasury zero-coupon issues with an equivalent remaining term.

The fair values of shares purchased under the employee stock purchase plan for fiscal 2018, 2017 and 2016 were estimated using the following weighted-average assumptions:

	Employee Stock Purchase Plans					
	Fiscal					
	2018	2017	2016			
Expected life in years	0.5	0.5	0.5			
Expected volatility	50.1	% 33.0	% 35.0	%		
Risk-free interest rate	1.6	% 0.7	% 0.3	%		
Weighted average fair value per share	\$64.39	\$39.40	\$18.59			

## Time-Based Restricted Stock Units

Time-based restricted stock units are fair valued at the closing market price on the date of grant.

## Performance Restricted Stock Units

We grant performance restricted stock units to officers and certain employees. The performance restricted stock unit agreements provide for the award of performance stock units with each unit representing the right to receive one share of our common stock to be issued after the applicable award vesting period. The final number of units awarded, if any, for these performance grants will be determined as of the vesting dates, based upon our total shareholder return over the performance period compared to the applicable Russell Index and could range from no units to a maximum of twice the initial award units. The weighted average fair value for these performance units was determined using a Monte Carlo simulation model incorporating the following weighted average assumptions:

	Fiscal					
	2018	2017	2016			
Risk-free interest rate	1.7	% 1.3	% 1.2	%		
Volatility	37.0	% 31.0	% 27.0	%		
Weighted average fair value	\$315.05	\$163.17	\$74.48			

We recognize the estimated cost of these awards, as determined under the simulation model, over the related service period of approximately 3 years, with no adjustment in future periods based upon the actual shareholder return over the performance period.

## Stock Compensation Expense

The following table shows total stock-based compensation expense and related tax benefits included in the Consolidated Statements of Operations for fiscal 2018, 2017 and 2016 (in thousands):

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 12. EMPLOYEE STOCK AWARD AND BENEFIT PLANS (continued)

	Fiscal		
	2018	2017	2016
Cost of sales	\$4,403	\$3,541	\$2,558
Research and development	3,247	2,973	2,268
Selling, general and administrative	25,088	23,911	15,331
Income tax benefit	(5,073 )	(7,073 )	(4,896 )
	\$27,665	\$23,352	\$15,261

As a result of our acquisition of Rofin on November 7, 2016, we made a payment of \$15.3 million due to the cancellation of options held by employees of Rofin. The payment was allocated between total estimated merger consideration of \$11.1 million and post-merger stock-based compensation expense of \$4.2 million, recorded in the first quarter of fiscal 2017, based on the portion of the total service period of the underlying options that have not been completed by the merger date.

During fiscal 2018, \$4.7 million of stock-based compensation cost was capitalized as part of inventory for all stock plans, \$4.4 million was amortized into cost of sales and \$1.5 million remained in inventory at September 29, 2018. During fiscal 2017, \$3.6 million of stock-based compensation cost was capitalized as part of inventory for all stock plans, \$3.3 million was amortized into cost of sales and \$1.2 million remained in inventory at September 30, 2017. At fiscal 2018 year-end, the total compensation cost related to unvested stock-based awards granted to employees under our stock plans but not yet recognized was approximately \$36.0 million. We do not estimate forfeitures. This cost will be amortized on a straight-line basis over a weighted-average period of approximately 1.4 years.

The stock option exercise tax benefits, if any, are reported in the statement of cash flows. The tax benefits result from tax deductions in excess of the stock-based compensation cost recognized and are determined on a grant-by-grant basis. During fiscal 2017, we recorded approximately \$1.6 million of excess tax benefits as cash flows from financing activities. In fiscal 2016, we did not generate any excess tax benefits as cash flows from financing activities. We adopted the new accounting standard on share-based compensation in the first quarter of fiscal 2018. As a result, we recognized excess tax benefits from stock award exercises and restricted stock unit vesting as a discrete tax benefit, which reduced the provision for income taxes for fiscal 2018 by \$12.8 million.

Stock Awards Activity

At fiscal 2018, 2017 and 2016 year-end, we had 24,000, 24,000 and 33,500 shares subject to vested stock options outstanding. The vested stock options at fiscal 2018 are held by one non-employee director.

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 12. EMPLOYEE STOCK AWARD AND BENEFIT PLANS (continued)

The following table summarizes the activity of our time-based and performance restricted stock units for fiscal 2018, 2017 and 2016 (in thousands, except per share amounts):

	Time Based Restricted Stock Units		Performance Restricted Stock Units	
	Number of Shares	Weighted Average Grant Date Fair Value	Number of Shares	Weighted Average Grant Date Fair Value
Nonvested stock at October 3, 2015	394	\$ 65.17	199	\$ 67.09
Granted	270	64.42	65	74.48
Vested <sup>(1)</sup>	(192)	61.11	(57)	48.48
Forfeited	(13)	63.89	(38)	48.48
Nonvested stock at October 1, 2016	459	\$ 66.47	169	\$ 74.10
Granted	186	131.54	115	163.17
Vested <sup>(1)</sup>	(229)	66.02	(104)	77.10
Forfeited	(17)	84.79	(4)	70.57
Nonvested stock at September 30, 2017	399	\$ 118.83	176	\$ 105.34
Granted	99	254.20	78	315.05
Vested <sup>(1)</sup>	(213)	88.45	(95)	70.57
Forfeited	(6)	119.66	—	—
Nonvested stock at September 29, 2018	279	\$ 155.24	159	\$ 155.76

Service-based restricted stock units vested during each fiscal year. Performance-based restricted stock units (1) included at 100% of target goal; under the terms of the awards, the recipient may earn between 0% and 200% of the award.

Restricted Stock Units are converted into the right to receive common stock upon vesting; prior to issuance, the Company permits the employee holders to satisfy their tax withholding requirements by net settlement, whereby the Company withholds a portion of the shares to cover the applicable taxes based on the fair market value of the Company's stock at the vesting date. The number of shares withheld to cover tax payments was 131,000 in fiscal 2018, 131,000 in fiscal 2017 and 89,000 in fiscal 2016; tax payments made were \$36.3 million, \$15.7 million and \$5.4 million, respectively.

## 13. DEFINED BENEFIT PLANS

As a result of the Rofin acquisition, we have assumed all assets and liabilities of Rofin's defined benefit plans for the Rofin-Sinar Laser, GmbH ("RSL") and Rofin-Sinar Inc. ("RS Inc.") employees. The U.S. plan began in fiscal 1995 and is partially funded. Any new employees hired after January 1, 2007, are not eligible for the RS Inc. pension plan. As is the customary practice with German companies, the German pension plan is unfunded. Any new employees hired after 2000 are not eligible for the RSL pension plan. The measurement date of these pension plans is September 30. For these pension plans, actuarial gains and losses are deferred into OCI and amortized over future periods. Effective January 1, 2012, the RS Inc. defined benefit plan was amended to exclude highly compensated employees, as defined by the Internal Revenue Service, from receiving future years of service under the RS Inc. defined benefit plan. A non-qualified defined benefit plan was created to replace the benefits lost by the employees that were otherwise excluded from the qualified defined benefit plan. Effective August 31, 2018 both the RS Inc. plans were

amended to freeze all future compensation benefit accruals.

In addition, we have defined benefit plans in South Korea, Japan, Spain and Italy, covering all full-time employees with at least one year of service, and a defined benefit plan in Germany covering two individuals. As is the customary practice with European and Asian companies, the plans are unfunded, with the exception of the Spanish plan which is partially funded. We have elected to recognize all actuarial gains and losses on these plans immediately, as incurred. The measurement date of these defined benefit plans is September 30.

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 13. DEFINED BENEFIT PLANS (continued)

For financial reporting purposes, the calculation of net periodic pension costs is based upon a number of actuarial assumptions including a discount rate for plan obligations, an assumed rate of return on pension assets and an assumed rate of compensation increase for employees covered by the plan. All of these assumptions were based upon management's judgment, considering all known trends and uncertainties. Actual results that differ from these assumptions would impact future expense recognition and the cash funding requirements of our defined benefit plans. Components of net periodic cost are as follows for fiscal 2018, 2017 and 2016 (in thousands):

	Fiscal		
	2018	2017	2016
Service cost	\$2,262	\$2,077	\$872
Interest cost	1,230	1,086	97
Expected return on plan assets	(787 )	(736 )	—
Recognized net actuarial (gain) loss	240	(236 )	993
Foreign exchange impacts	(56 )	(6 )	127
Recognition of curtailment (gain) due to plan freeze	(1,236 )	—	\$—
Net periodic pension cost	\$1,653	\$2,185	\$2,089

The changes in projected benefit obligations and plan assets, as well as the ending balance sheet amounts for our defined benefit plans, are as follows (in thousands):

## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 13. DEFINED BENEFIT PLANS (continued)

	Fiscal 2018	Fiscal 2017
Change in benefit obligation:		
Projected benefit obligation at beginning of year <sup>(1)</sup>	\$52,547	\$8,621
Business combinations and acquisitions	—	46,361
Service cost	2,262	2,077
Interest cost	1,230	1,086
Actuarial gains	—	(141 )
Assumption change	(1,517 )	(3,597 )
Experience (gain) loss	596	(1,502 )
Foreign exchange rate impacts	(460 )	1,685
Benefits paid - total	(1,923 )	(2,043 )
Curtailment gain	(1,236 )	—
Projected benefit obligation at end of year	\$51,499	\$52,547
Projected benefit obligation at end of year:		
U.S. plans	\$15,754	\$17,543
Foreign plans	35,745	35,004
Projected benefit obligation at end of year	\$51,499	\$52,547
Change in plan assets:		
Fair value of plan assets at beginning of year	\$11,856	\$—
Business combinations and acquisitions	—	11,121
Actual return on plan assets	672	1,092
Employer contributions	361	—
Benefits paid - funded plan	(403 )	(357 )
Fair value of plan assets at end of year	\$12,486	\$11,856
Fair value of plan assets at end of year:		
U.S. plans	\$12,323	\$11,856
Foreign plans	163	—
Fair value of plan assets at end of year	12,486	11,856
Unfunded status at end of year	\$(39,013)	\$(40,691)
Amounts recognized in the consolidated balance sheet:		
Accrued benefit liability - current	\$(1,485 )	\$(1,238 )
Accrued benefit liability - non current	(37,528 )	(39,454 )
Accumulated other comprehensive gain (pre-tax)	(6,340 )	(5,360 )

(1) The beginning of the year balances in fiscal 2017 relate to plans held in South Korea, Japan, Italy and Germany. These were not disclosed in prior years as the net liability was not material.

The information for plans with an accumulated benefit obligation in excess of plan assets is as follows (in thousands):

COHERENT, INC. AND SUBSIDIARIES  
 NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)  
 13. DEFINED BENEFIT PLANS (continued)

	Fiscal year-end	
	2018	2017
Projected benefit obligation	\$51,499	\$52,547
Accumulated benefit obligation	47,713	47,798
Fair value of plan assets	12,486	11,856

The weighted-average rates used to determine the net periodic benefit costs are as follows:

	Fiscal	Fiscal
	2018	2017
Discount rate:		
U.S.	4.2 %	3.6 %
Foreign	1.9 %	1.7 %
Expected return on plan assets:		
U.S.	6.8 %	6.6 %
Rate of compensation increase		
U.S.	— %	3.0 %
Foreign	1.5 %	2.0 %

We recognize the over (under) funded status of the defined benefit plans in our consolidated balance sheets. We also recognize, in other comprehensive income (loss), certain gains and losses that arise for the period but are deferred under current pension accounting rules. A one percent change in the discount rate or the expected rate of return on plan assets would not have a material impact on the projected benefit obligation or the net periodic benefit cost.

Expected benefit payments for each of the next five fiscal years and the five years aggregated thereafter is as follows (in thousands):

	Amount
2019	\$2,044
2020	1,864
2021	2,169
2022	3,013
2023	2,433
2024-2028	15,477
Total	\$27,000

Our pension plan asset allocations at September 29, 2018 and September 30, 2017 by asset category are as follows:

	Allocation		
	Target	Fiscal	Fiscal
		2018	2017
Equity securities	50 %	51 %	56 %
Debt securities	50 %	49 %	44 %
Total plan assets	100 %	100 %	100 %

We employ a total return investment approach whereby a mix of equity, debt securities and government securities are used to maximize the long-term return of plan assets for a prudent level of risk. The intent of this strategy is to minimize plan expenses by maximizing investment returns within that prudent level of risk. Furthermore, equity investments are diversified across U.S. and non-U.S. stocks as well as growth, value and small and large

capitalizations. Additionally, cash balances are

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 13. DEFINED BENEFIT PLANS (continued)

maintained at levels adequate to meet near-term plan expenses and benefit payments. Investment risk is measured and monitored on an ongoing basis through semi-annual investment portfolio reviews.

Investments in our defined benefit plan are stated at fair value. Level 1 assets are valued using quoted market prices that represent the asset value of the shares held by the trusts. The level 2 assets are investments in pooled funds, which are valued using a model to reflect the valuation of their underlying assets that are publicly traded with observable values. The fair value of level 3 pension plan assets are measured by compiling the portfolio holdings and independently valuing the securities in those portfolios.

The fair values of our pension plan assets, by level within the fair value hierarchy, at September 29, 2018 are as follows:

Asset categories	Level 1	Level 2	Level 3	Total
Equity securities:				
Small cap	\$	-\$297	\$	-\$297
Mid cap	—	593	—	593
Large cap	—	2,368	—	2,368
Total market stock	—	1,067	—	1,067
International	—	1,762	—	1,762
Emerging markets	—	263	—	263
Debt securities:				
Bonds and mortgages	—	4,229	—	4,229
Inflation protected	—	593	—	593
High yield	—	606	—	606
Money market	—	708	—	708
Total plan assets	\$	-\$12,486	\$	-\$12,486

The fair values of our pension plan assets, by level within the fair value hierarchy, at September 30, 2017 are as follows:

Asset categories	Level 1	Level 2	Level 3	Total
Equity securities				
Small cap	\$	-\$304	\$	-\$304
Mid cap	—	621	—	621
Large cap	—	2,382	—	2,382
Total market stock	—	1,106	—	1,106
International	—	1,897	—	1,897
Emerging markets	—	342	—	342
Debt securities				
Bonds and mortgages	—	4,031	—	4,031
Inflation protected	—	555	—	555
High yield	—	618	—	618
Total plan assets	\$	-\$11,856	\$	-\$11,856

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 14. OTHER INCOME (EXPENSE), NET

Other income (expense) includes other-net which is comprised of the following (in thousands):

	Fiscal		
	2018	2017	2016
Foreign exchange gain (loss)	\$(11,286)	\$4,656	\$(6,310)
Gain on deferred compensation investments, net (Note 12)	4,835	4,955	1,738
Other	(735 )	221	57
Other—net	\$(7,186 )	\$9,832	\$(4,515)

## 15. INCOME TAXES

The provision for (benefit from) income taxes on income (loss) from continuing operations before income taxes consists of the following (in thousands):

	Fiscal		
	2018	2017	2016
Currently payable:			
Federal	\$1,163	\$5,617	\$(3,069 )
State	114	1,022	89
Foreign	107,487	116,022	48,039
	108,764	122,661	45,059
Deferred and other:			
Federal	26,334	1,413	(8,131 )
State	(489 )	(153 )	(439 )
Foreign	(20,414 )	(30,510 )	(1,095 )
	5,431	(29,250 )	(9,665 )
Provision for income taxes	\$114,195	\$93,411	\$35,394

The components of income (loss) from continuing operations before income taxes consist of (in thousands):

	Fiscal		
	2018	2017	2016
United States	\$65,272	\$25,540	\$(44,029 )
Foreign	296,283	276,515	166,925
Income from continuing operations before income taxes	\$361,555	\$302,055	\$122,896

The reconciliation of the income tax expense at the U.S. Federal statutory rate (24.5% in fiscal 2018 and 35.0% in each of fiscal 2017 and fiscal 2016) to actual income tax expense is as follows (in thousands):

## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 15. INCOME TAXES (continued)

	Fiscal		
	2018	2017	2016
Federal statutory tax expense	\$88,684	\$105,719	\$43,015
Valuation allowance	4,263	4,454	1,441
Foreign taxes at rates greater (less) than U.S. rates, net	8,417	(12,346 )	(5,642 )
Stock-based compensation	(8,536 )	3,969	2,161
State income taxes, net of federal income tax benefit	(373 )	398	(198 )
Research and development credit	(6,972 )	(7,884 )	(4,408 )
Deferred compensation	(560 )	(1,022 )	(428 )
Release of foreign unrecognized tax benefits	(352 )	(538 )	(4,961 )
Release of interest accrued for unrecognized tax benefits	(156 )	(78 )	(1,508 )
Reversal of Competent Authority	—	—	4,328
U.S. tax reform impact	26,653	—	—
Other	3,127	739	1,594
Provision for income taxes	\$114,195	\$93,411	\$35,394
Effective tax rate	31.6	% 30.9	% 28.8

On December 22, 2017, the Tax Act was enacted. The Tax Act contains significant changes to U.S. tax law, including lowering the U.S. corporate income tax rate to 21.0% and implementing a territorial tax system. Since we have a September year-end, the lower U.S. corporate income tax rate is phased in. Our U.S. federal blended tax rate is approximately 24.5% for fiscal 2018 and 21.0% for subsequent fiscal years.

The reduction of the U.S. corporate income tax rate adjusts our U.S. deferred tax assets and liabilities to the lower U.S. federal tax rate of 21.0%. There are also certain transitional impacts of the Tax Act. As part of the transition to the new territorial tax system, the Tax Act imposes a one-time deemed repatriation tax on our foreign subsidiaries' historical earnings. These transitional impacts resulted in a provisional net charge of \$26.7 million for fiscal 2018. This is comprised of an estimated deemed repatriation tax charge of \$17.8 million less a previously recorded deferred tax liability of \$20.3 million for anticipated repatriation of our investment in a foreign subsidiary, plus an estimated deferred tax remeasurement charge of \$15.5 million and an accrual for withholding taxes and state income taxes of \$13.7 million on certain foreign earnings not considered permanently reinvested.

The Tax Act changes are broad and complex. The final calculation of the Tax Act impact may materially differ from the above provisional estimates. Among other things, this may be due to changes in interpretations of the Tax Act, any legislative action to address questions that arise because of the Tax Act, any changes in accounting standards for income taxes or related interpretations in response to the Tax Act, or any updates or changes to estimates we have utilized to calculate the transitional impacts. The Securities Exchange Commission has issued guidance under Staff Accounting Bulletin No. 118 directing taxpayers to record impacts of the Tax Act as "provisional" when it does not have the necessary information available, prepared or analyzed (including computations) in reasonable detail to complete the accounting under ASC 740. The guidance allows for a measurement period of up to one year after the enactment date of the Tax Act to finalize the recording of the related tax impacts. Most of that activity has provisionally been recorded in our Consolidated Financial Statements in the period ended September 29, 2018, as Treasury has not issued final regulations with respect to the new law. The final regulation may change the provisional estimates. We recorded what we believe to be a reasonable estimate.

The Tax Act also includes provisions for Global Intangible Low-Taxed Income ("GILTI") wherein taxes on foreign income are imposed in excess of a deemed return on tangible assets of foreign corporations. In general, this income will effectively be taxed at a 10.5% tax rate reduced by any available current year foreign tax credits. This provision is effective for taxable years beginning after December 31, 2017, which is our fiscal 2019. Because of the complexity of the new GILTI tax rules, we continue to evaluate this provision of the Tax Act including the associated forecast of GILTI and the application of ASC 740, Income Taxes. Under U.S. GAAP, we are allowed to make an accounting

policy choice of either (1) treating taxes due on future U.S. inclusions in taxable income related to GILTI as a current-period expense when incurred (the “period cost method”) or (2) factoring such amounts into our measurement of our deferred taxes (the “deferred method”). Our selection of an accounting policy with respect to the new GILTI tax rules will depend, in part, on analyzing our global income to determine

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 15. INCOME TAXES (continued)

whether we expect to have future U.S. inclusions in taxable income related to GILTI and, if so, what the impact is expected to be. Whether we expect to have future U.S. inclusions in taxable income related to GILTI depends on not only our current structure and estimated future results of global operations, but also our intent and ability to modify our structure. We are currently in the process of analyzing our structure and, as a result, are not yet able to reasonably estimate the effect of this provision of the Tax Act. Therefore, we have not made any adjustments related to potential GILTI tax in our financial statements and have not made a policy decision regarding whether to record deferred tax on GILTI. We will make the accounting policy election after completion of the GILTI analysis in the first quarter of fiscal 2019.

The effective tax rate on income from continuing operations before income taxes for fiscal 2018 of 31.6% was higher than the effective U.S. federal blended rate of 24.5%. This was primarily due to the Tax Act's one-time mandatory deemed repatriation transition tax, the impact of income subject to foreign tax rates that are higher than the U.S. tax rates, the remeasurement of deferred tax assets and liabilities based on the newly enacted U.S. federal tax rate of 21.0%, an accrual for foreign withholding taxes and state income taxes on certain foreign earnings not considered permanently reinvested, stock-based compensation not deductible for tax purposes and limitations on the deductibility of compensation under Internal Revenue Code ("IRC") Section 162(m). These amounts are partially offset by the excess tax benefits from stock award exercises and restricted stock unit vesting, the benefit of foreign tax credits, the benefit of federal research and development tax credits, the benefit of a domestic manufacturing deduction under IRC Section 199 and the Singapore tax exemption.

In October 2016, Coherent Singapore received an amended Pioneer Status tax exemption from the Singapore authorities effective from fiscal 2012 through fiscal 2021. The tax holiday continues to be conditional upon our meeting certain revenue, business spending and employment thresholds. The impact of this tax exemption decreased Singapore income taxes by approximately \$2.5 million, \$1.1 million and \$0.7 million in fiscal 2018, fiscal 2017 and fiscal 2016, respectively.

The significant components of deferred tax assets and liabilities were (in thousands):

	Fiscal year-end	
	2018	2017
Deferred tax assets:		
Reserves and accruals not currently deductible	\$36,467	\$52,803
Operating loss carryforwards and tax credits	67,068	61,371
Deferred service revenue	2,682	2,987
Inventory capitalization	2,450	7,116
Stock-based compensation	5,267	7,839
Competent authority offset to transfer pricing tax reserves	10,585	12,948
Accumulated translation adjustment	432	—
Other	351	4,567
Total gross deferred tax assets	125,302	149,631
Valuation allowance	(33,731)	(28,745)
Total net deferred tax assets	91,571	120,886
Deferred tax liabilities:		
Gain on issuance of stock by subsidiary	—	22,378
Depreciation and amortization	39,358	60,956
U.S. tax reform impacts	13,694	—
Accumulated translation adjustment	—	234
Total gross deferred tax liabilities	53,052	83,568
Net deferred tax assets	\$38,519	\$37,318

In determining our fiscal 2018 and 2017 tax provisions under ASC Subtopic 740, we calculated the deferred tax assets and liabilities for each separate tax entity. We then considered a number of factors including the positive and negative evidence regarding the realization of our deferred tax assets to determine whether a valuation allowance should be recognized with

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 15. INCOME TAXES (continued)

respect to our deferred tax assets. We determined that a valuation allowance was appropriate for a portion of the deferred tax assets of our California and certain state research and development tax credits, foreign tax attributes and foreign net operating losses at fiscal 2018 and 2017 year-ends.

During fiscal 2018, we increased our valuation allowance on deferred tax assets by \$5.0 million to \$33.7 million, primarily due to the increase in California research and development tax credits and net operating losses generated from Rofin China, which are not expected to be recognized. The Company had U.S. federal deferred tax assets related to research and development credits, foreign tax credits and other tax attributes that can be used to offset federal taxable income in future periods. These credit carryforwards will expire if they are not used within certain time periods. As of September 29, 2018, management determined that there is sufficient positive evidence to conclude that it is more likely than not that sufficient taxable income will exist in the future allowing us to recognize these deferred tax assets.

The net deferred tax asset is classified on the consolidated balance sheets as follows (in thousands):

	Fiscal year-end	
	2018	2017
Non-current deferred income tax assets	\$64,858	\$82,691
Non-current deferred income tax liabilities	(26,339 )	(45,373 )
Net deferred tax assets	\$38,519	\$37,318

We have various tax attribute carryforwards which include the following:

Foreign federal and local gross net operating loss carryforwards are \$48.7 million, of which \$37.4 million have no expiration date and \$11.3 million have various expiration dates beginning in fiscal 2019. Among the total of \$48.7 million foreign net operating loss carryforwards, a valuation allowance of \$9.9 million has been provided for certain jurisdictions since the recovery of the carryforwards are uncertain. U.S. federal and certain state gross net operating loss carryforwards are \$8.3 million and \$30.8 million, respectively, which were acquired from our Rofin acquisition. A full valuation allowance against certain other state net operating losses of \$30.8 million has been recorded. California gross net operating loss carryforwards are \$7.4 million and are scheduled to expire beginning in fiscal 2032.

U.S. federal R&D credit carryforwards of \$33.5 million are scheduled to expire beginning in fiscal 2025. California R&D credit carryforwards of \$30.3 million have no expiration date. A total of \$25.4 million valuation allowance, before U.S. federal benefit, has been recorded against California R&D credit carryforwards of \$30.3 million since the recovery of the carryforwards is uncertain. Other states R&D credit carryforwards of \$3.4 million are scheduled to expire beginning in fiscal 2019. A valuation allowance totaling \$2.8 million, before U.S. federal benefit, has been recorded against certain state R&D credit carryforwards of \$3.4 million since the recovery of the carryforwards is uncertain.

U.S. federal foreign tax credit carryforwards of \$13.0 million are scheduled to expire beginning in fiscal 2019.

We adopted ASU No. 2016-09 in the first quarter of fiscal 2018. As a result of adopting the new standard, excess tax benefits from equity-based compensation are now reflected in the consolidated statements of operations as a component of the provision for income taxes. The adoption of ASU No. 2016-09 resulted in a decrease in our provision for income taxes of \$12.8 million for fiscal 2018 due to the recognition of excess tax benefits for options exercised and the vesting of equity awards.

We are subject to taxation and file income tax returns in the U.S. federal jurisdiction and in many state and foreign jurisdictions. Our most significant tax jurisdictions are the U.S. and Germany. For U.S. federal and German income tax purposes, all years prior to fiscal 2015 and 2010, respectively, are closed to examination. In our other major foreign jurisdictions and our major state jurisdictions, the years prior to fiscal 2012 and 2014, respectively, are closed. Earlier years in our various jurisdictions may remain open for adjustment to the extent that we have tax attribute carryforwards from those years.

In the U.S., a legacy Rofin entity is under audit for fiscal 2016. In Germany, various Coherent and legacy Rofin entities are under audit for the years 2010 through 2016. The timing and the resolution of income tax examinations is highly uncertain, and the amounts ultimately paid, if any, upon resolution of the issues raised by the taxing authorities may differ materially from

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 15. INCOME TAXES (continued)

the amounts accrued for each year. Management believes that it has adequately provided for any adjustments that may result from tax examinations. We regularly engage in discussions and negotiations with tax authorities regarding tax matters in various jurisdictions. Although the timing of resolution, settlement and closure of audits is not certain, we do not believe it is reasonably possible that our unrecognized tax benefits will materially change in the next 12 months.

A reconciliation of the change in gross unrecognized tax benefits, excluding interest and penalties, is as follows (in thousands):

	Fiscal year-end		
	2018	2017	2016
Balance as of the beginning of the year	\$47,566	\$20,442	\$22,538
Increase related to acquisitions	—	25,151	—
Tax positions related to current year:			
Additions	19,033	1,326	2,468
Reductions	—	—	—
Tax positions related to prior year:			
Additions	117	4,951	424
Reductions	—	(65 )	(3,239 )
Settlements	—	—	(1,655 )
Lapses in statutes of limitations	(700 )	(610 )	(94 )
Decrease in unrecognized tax benefits based on audit results	—	(5,217 )	—
Foreign currency revaluation adjustment	(134 )	1,588	—
Balance as of end of year	\$65,882	\$47,566	\$20,442

As of September 29, 2018, the total amount of gross unrecognized tax benefits including gross interest and penalties was \$70.3 million, of which \$50.4 million, if recognized, would affect our effective tax rate. Our total gross unrecognized tax benefit was classified as a long-term taxes payable in the consolidated balance sheets after reduction by certain deferred tax assets. We include interest and penalties related to unrecognized tax benefits within the provision for income taxes. As of September 29, 2018, the total amount of gross interest and penalties accrued was \$4.4 million and it is classified as long-term taxes payable in the consolidated balance sheets. As of September 30, 2017, we had accrued \$2.8 million for the gross interest and penalties and it is classified as long-term taxes payable in the consolidated balance sheets.

A summary of the fiscal tax years that remain subject to examination, as of September 29, 2018, for our major tax jurisdictions is:

United States—Federal	2015—forward
United States—Various States	2014—forward
Netherlands	2012—forward
Germany	2010—forward
Japan	2013—forward
South Korea	2013—forward
United Kingdom	2016—forward

## 16. SEGMENT AND GEOGRAPHIC INFORMATION

As a result of the acquisition of Rofin-Sinar Technologies Inc. ("Rofin") in the first quarter of fiscal 2017 (see discussion below), we reorganized our prior two reporting segments (Specialty Laser Systems and Commercial Lasers and Components) into two new reporting segments for the combined company: OEM Laser Sources ("OLS") and Industrial Lasers & Systems ("ILS"). This segment reorganization was based upon the organizational structure of the combined company and how the chief operating decision maker ("CODM") receives and utilizes information provided to allocate resources and make decisions. Accordingly, our segment information was restated retroactively in the first quarter of fiscal 2017. This segmentation reflects the go-to-market strategies and synergies for our broad portfolio of laser technologies and products. While both segments deliver cost-effective, highly reliable photonics solutions, the OLS business segment is focused on high performance laser sources and complex optical sub-systems, typically used in microelectronics manufacturing, medical diagnostics and therapeutic medical applications, as well as in scientific research. Our ILS business segment delivers high performance laser sources, sub-systems and tools primarily used for industrial laser materials processing, serving important end markets like automotive, machine tool, consumer goods and medical device manufacturing. Rofin's operating results have been included primarily in our ILS segment. OR Laser's operating results have been included in our ILS segment.

We have identified OLS and ILS as operating segments for which discrete financial information is available. Both units have dedicated engineering, manufacturing, product business management and product line management functions. A small portion of our outside revenue is attributable to projects and recently developed products for which a segment has not yet been determined. The associated direct and indirect costs are presented in the category of Corporate and other, along with other corporate costs as described below.

Our Chief Executive Officer has been identified as the CODM as he assesses the performance of the segments and decides how to allocate resources to the segments. Income from continuing operations is the measure of profit and loss that our CODM uses to assess performance and make decisions. As assets are not a measure used to assess the performance of the company by the CODM, asset information is not tracked or compiled by segment and is not available to be reported in our disclosures. Income from continuing operations represents the net sales less the cost of sales and direct operating expenses incurred within the operating segments as well as allocated expenses such as shared sales and manufacturing costs. We do not allocate to our operating segments certain operating expenses which we manage separately at the corporate level. These unallocated costs include stock-based compensation and corporate functions (certain research and development, management, finance, legal and human resources) and are included in the results below under Corporate and other in the reconciliation of operating results. Management does not consider unallocated Corporate and other costs in its measurement of segment performance.

The following table provides net sales and income from continuing operations for our operating segments and a reconciliation of our total income from continuing operations to income from continuing operations before income taxes (in thousands):

	Fiscal		
	2018	2017	2016
Net sales:			
OEM Laser Sources	\$1,259,477	\$1,143,620	\$722,517
Industrial Lasers & Systems	643,096	579,691	134,868
Total net sales	\$1,902,573	\$1,723,311	\$857,385
Income (loss) from continuing operations:			
OEM Laser Sources	\$469,835	\$432,839	\$197,923
Industrial Lasers & Systems	(3,687)	(26,447)	(13,869)
Corporate and other	(73,131)	(80,897)	(56,440)
Total income from continuing operations	\$393,017	\$325,495	\$127,614
Total other expense, net	(31,462)	(23,440)	(4,718)

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Income from continuing operations before income taxes \$361,555 \$302,055 \$122,896

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 16. SEGMENT AND GEOGRAPHIC INFORMATION (continued)

## Geographic Information

Our foreign operations consist primarily of manufacturing facilities and sales offices in Europe and Asia-Pacific. Sales, marketing and customer service activities are conducted through sales subsidiaries throughout the world. Geographic sales information for fiscal 2018, 2017 and 2016 is based on the location of the end customer. Geographic long-lived asset information presented below is based on the physical location of the assets at the end of each year. Sales to unaffiliated customers are as follows (in thousands):

	Fiscal		
SALES	2018	2017	2016
United States	\$309,495	\$297,699	\$204,963
Foreign countries:			
South Korea	652,313	628,369	187,908
China	235,568	162,316	63,050
Europe, other	171,936	162,162	55,351
Japan	180,223	154,985	193,418
Germany	166,926	145,835	71,427
Asia-Pacific, other	124,733	107,713	36,364
Rest of World	61,379	64,232	44,904
Total foreign countries sales	1,593,078	1,425,612	652,422
Total sales	\$1,902,573	\$1,723,311	\$857,385

Long-lived assets, which include all non-current assets other than goodwill, intangibles, non-current restricted cash and deferred taxes, by geographic region, are as follows (in thousands):

	Fiscal year-end	
LONG-LIVED ASSETS	2018	2017
United States	\$124,312	\$120,116
Foreign countries:		
Germany	168,755	159,483
Europe, other	22,962	18,681
Asia-Pacific	42,652	24,517
Total foreign countries long-lived assets	234,369	202,681
Total long-lived assets	\$358,681	\$322,797

## Major Customers

We had one major customer who accounted for 25.8%, 22.9% and 13.1% of consolidated revenue during fiscal 2018, 2017 and 2016, respectively. We had another major customer who accounted for 16.4% of consolidated revenue during fiscal 2016. Both customers purchased primarily from our OLS segment.

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 17. RESTRUCTURING CHARGES (continued)

## 17. RESTRUCTURING CHARGES

In the first quarter of fiscal 2017, we began the implementation of planned restructuring activities in connection with the acquisition of Rofin. These activities primarily relate to exiting our legacy high power fiber laser product line, change of control payments to Rofin officers, the exiting of two product lines acquired in the acquisition of Rofin, realignment of our supply chain due to segment reorganization and consolidation of sales and distribution offices as well as certain manufacturing sites. These activities resulted in charges primarily for employee termination, other exit related costs associated with the write-off of property and equipment and inventory and early lease termination costs. The following table presents our current liability as accrued on our balance sheets for restructuring charges. The table sets forth an analysis of the components of the restructuring charges and payments and other deductions made against the accrual for fiscal 2018 and fiscal 2017 (in thousands):

	Severance Related	Asset Write-Offs	Other	Total
Balances, October 1, 2016	\$ —	\$ —	\$—	\$—
Provision	5,143	6,439	742	12,324
Payments and other	(3,842 )	(6,439 )	(742 )	(11,023)
Balances, September 30, 2017	1,301	—	—	1,301
Provision	1,795	1,287	867	3,949
Payments and other	(2,260 )	(1,287 )	(581 )	(4,128 )
Balances, September 29, 2018	\$ 836	\$ —	\$286	\$1,122

At September 29, 2018, \$0.8 million of accrued severance related costs were included in other current liabilities and are expected to result in cash expenditures through the fourth quarter of fiscal 2019. The current year severance related costs are primarily comprised of severance pay for employees being terminated due to the consolidation of certain manufacturing sites. The current year asset write-offs are primarily comprised of write-offs of inventory and equipment write-offs due to the consolidation of certain manufacturing sites. The severance related costs in fiscal 2017 are primarily comprised of severance pay for employees being terminated due to the transition of activities out of Rofin including change of control payments to Rofin officers and the consolidation of sales and distribution offices. The asset write-offs in fiscal 2017 are primarily comprised of write-offs of inventory and equipment due to exiting our legacy high power fiber laser product line and inventory write-offs due to the exit of other Rofin product lines. By segment, \$2.8 million and \$11.4 million of restructuring costs were incurred in the ILS segment and \$1.1 million and \$0.9 million were incurred in the OLS segment in fiscal 2018 and 2017, respectively. Restructuring charges are recorded in cost of sales, research and development and selling, general and administrative expenses in our consolidated statements of operations.

## 18. DISCONTINUED OPERATIONS AND SALE OF ASSETS HELD FOR SALE

## Discontinued Operations

Discontinued operations are from the Hull Business that we acquired as part of our acquisition of Rofin. As a condition of the acquisition, we were required to divest and hold separate the Hull Business and reported this business separately as a discontinued operation until its divestiture. We completed the divestiture of the Hull Business on October 11, 2017, after receiving approval for the terms of the sale from the European Commission. As a result of the divestiture, we recorded a loss in discontinued operations of \$2,000 in the first quarter of fiscal 2018. The results from discontinued operations in the first quarter of fiscal 2018 to the date of divestiture (October 11, 2017) were immaterial and were not included in our consolidated results of operations.

For financial statement purposes, the results of operations for this discontinued business have been segregated from those of the continuing operations and are presented in our consolidated financial statements as discontinued operations and the net assets of the remaining discontinued business have been presented as current assets and current

liabilities held for sale.

The results of discontinued operations for fiscal 2018 and 2017 are as follows (in thousands):

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## COHERENT, INC. AND SUBSIDIARIES

## NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

## 18. DISCONTINUED OPERATIONS AND ASSETS HELD FOR SALE (Continued)

	Fiscal	
	2018	2017
Net sales	\$—	\$26,996
Cost of sales	—	19,353
Operating expenses	—	9,002
Other expense	—	220
Loss from discontinued operations	—	(1,579 )
Loss on disposal of discontinued operations	(2 )	—
Total loss on discontinued operations	(2 )	(1,579 )
Income tax expense (benefit)	—	(57 )
Net loss from discontinued operations	\$(2)	\$(1,522 )

## Assets Held for Sale

Due to the divestiture of the Hull Business on October 11, 2017, there are no assets or liabilities related to the Hull Business classified as held for sale as of September 29, 2018. Current assets and current liabilities classified as held for sale as of September 30, 2017 related to the Hull Business are as follows (in thousands):

	September 30, 2017
Cash	\$ 33
Accounts receivable	6,931
Inventories	5,586
Prepaid expenses and other assets	607
Property and equipment	10,705
Intangible assets	11,400
Total current assets held for sale	\$ 35,262
Accounts payable	\$ 1,129
Other current liabilities	4,875
Total current liabilities held for sale	\$ 6,004

In the fourth quarter of fiscal 2017, management decided to sell several entities that we acquired in the Rofin acquisition. Although the sale was not completed as of the end of fiscal 2017, we recorded a non-cash impairment charge of \$2.9 million to operating expense in our results of operations in the fourth quarter of fiscal 2017 to reduce our carrying value in these entities to fair value. On April 27, 2018, we completed the sale of these entities acquired in the Rofin acquisition in exchange for cash of \$6.3 million and we recognized a net loss of \$0.3 million in fiscal 2018 related to the sale and impairment of the entities.

Due to the sale of these entities acquired in the Rofin acquisition on April 27, 2018, there are no assets or liabilities related to these entities classified as held for sale as of September 29, 2018. Current assets and current liabilities classified as held for sale as of September 30, 2017 related to these entities are as follows (in thousands):

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COHERENT, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

18. DISCONTINUED OPERATIONS AND ASSETS HELD FOR SALE (Continued)

	September 30, 2017
Accounts receivable	\$ 1,668
Inventories	5,202
Prepaid expenses and other assets	472
Property and equipment	457
Intangible assets	1,187
Total current assets held for sale	\$ 8,986
Accounts payable	\$ 189
Other current liabilities	828
Total current liabilities held for sale	\$ 1,017



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COHERENT, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

19. SUBSEQUENT EVENTS

On October 5, 2018, we acquired privately held Ondax, Inc. ("Ondax") for approximately \$12.0 million, excluding transaction costs. Ondax develops and produces photonic components which are used on an OEM basis by the laser industry as well as incorporated into its own stabilized lasers and Raman Spectroscopy systems. We are in the process of evaluating the business combination accounting considerations, including the consideration transferred and the initial purchase price allocation.

On October 5, 2018, we acquired certain assets of Quantum Coating, Inc. for approximately \$7.0 million, excluding transaction costs and will account for the transaction as an asset purchase. We are in the process of evaluating the asset purchase accounting considerations, including the consideration transferred and the initial purchase price allocation.

On October 28, 2018, our board of directors authorized a stock repurchase program authorizing the Company to repurchase up to \$250.0 million of our common stock through December 31, 2019, with a limit of no more than \$75.0 million per quarter.

## QUARTERLY FINANCIAL INFORMATION (UNAUDITED)

Summarized quarterly financial data for the years ended September 29, 2018 and September 30, 2017 are as follows (in thousands, except per share amounts):

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Fiscal 2018:				
Net sales	\$477,565	\$481,118	\$482,342	\$461,548
Gross profit	217,023	215,430	208,336	189,902
Net income	41,901	65,302	66,970	73,185
Net income per basic share	\$1.70	\$2.64	\$2.72	\$3.02
Net income per diluted share	\$1.67	\$2.61	\$2.69	\$2.99
Fiscal 2017:				
Net sales	\$346,073	\$422,833	\$464,107	\$490,298
Gross profit	141,514	179,515	207,186	222,054
Net income	30,408	41,845	61,117	73,752
Net income per basic share	\$1.25	\$1.71	\$2.49	\$3.00
Net income per diluted share	\$1.23	\$1.69	\$2.46	\$2.96