Use these links to rapidly review the document
TABLE OF CONTENTS
ITEM 8

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

FORM 10-K

(Mark One)

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

For the Fiscal Year Ended October 3, 2020

or

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

Commission File Number: 001-33962

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	Trading Symbol	Name of each exchange on which registered
Common Stock, $0.01 par value	COHR	The NASDAQ Stock Market LLC Nasdaq Global Select Market

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

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

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the 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 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 ☒ Accelerated filer ☐ Non-accelerated filer ☐ Smaller reporting company ☐ Emerging growth company ☐

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

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act by the registered public accounting firm that prepared or issued its audit report. ☒

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

Use these links to rapidly review the document
TABLE OF CONTENTS
ITEM 8

As of November 25, 2020, 24,439,150 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 April 4, 2020) of Coherent, Inc., held by nonaffiliates was approximately $1,386,117,559. 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 2021 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 October 3, 2020.

TABLE OF CONTENTS

SPECIAL NOTE REGARDING FORWARD LOOKING STATEMENTS		2
RISK FACTORS SUMMARY		4
PART I		
ITEM 1.	BUSINESS	6
ITEM 1A.	RISK FACTORS	25
ITEM 1B.	UNRESOLVED STAFF COMMENTS	44
ITEM 2.	PROPERTIES	44
ITEM 3.	LEGAL PROCEEDINGS	45
ITEM 4.	MINE SAFETY DISCLOSURES	45
PART II		
ITEM 5.	MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES	46
ITEM 6.	SELECTED FINANCIAL DATA	47
ITEM 7.	MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS	48
ITEM 7A.	QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK	66
ITEM 8.	FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA	68
ITEM 9.	CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE	122
ITEM 9A.	CONTROLS AND PROCEDURES	123
ITEM 9B.	OTHER INFORMATION	125
PART III		
ITEM 10.	DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE	126
ITEM 11.	EXECUTIVE COMPENSATION	126
ITEM 12.	SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS	126
ITEM 13.	CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS AND DIRECTOR INDEPENDENCE	126
ITEM 14.	PRINCIPAL ACCOUNTING FEES AND SERVICES	126
PART IV		
ITEM 15.	EXHIBITS, FINANCIAL STATEMENT SCHEDULES	127
SIGNATURES		129

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 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 the timing and impact on fiscal 2021 revenues of recoveries in investments;
- any potential increase in future demand in the microelectronics flat panel display market;
- the timing of any buildout of OLED manufacturing capacity;
- 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. ("Rofin");
- sales by geography;

- effect of legal claims;
- expectations regarding the payment of future dividends;
- effect of competition on our financial results;
- plans with respect to leases;
- 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 the section titled "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 the sections titled "Business," "Management's Discussion and Analysis of Financial Condition and Results of Operations" and "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.

RISK FACTORS SUMMARY

You should carefully consider the information set forth below in the section titled “Risk Factors” before deciding whether to invest in our securities. Below is a summary of the principal risks associated with an investment in our securities.

- Our business, financial condition and results of operations for fiscal year 2020 and beyond have been and may continue to be materially adversely affected by the novel coronavirus ("COVID-19") pandemic and the related private and public sector responses to the pandemic.
- Our operating results and stock price have varied in the past and will continue to be subject to fluctuations based upon numerous factors, including those discussed in the section titled "Risk Factors" and throughout this report.
- Our dependence on sole source or limited source suppliers for some of the key components and materials used in our products makes us susceptible to supply shortages or price fluctuations that could adversely affect our business, particularly our ability to meet our customers' delivery requirements.
- 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.
- 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 we face any significant periods with few or no orders or our customers reschedule or cancel orders.
- 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.
- Continued volatility in the advanced packaging and semiconductor manufacturing markets could adversely affect our business, financial condition and results of operations.
- 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 of our products.
- We face risks associated with our worldwide operations and sales that could harm our financial condition and results of operations.
- We depend on skilled personnel to operate our business effectively, and if we are unable to retain existing or hire additional personnel when needed, or manage transitions among members of our leadership team, our ability to develop and sell our products could be harmed.
- The long sales cycles for many of our products may cause us to incur significant expenses without offsetting net sales.
- 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.
- 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.
- 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.
- 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.
- 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.
- Our future success depends on our ability to develop and successfully introduce new and enhanced products that meet the needs of our customers.
- 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.

- We may not be able to integrate the business of Rofin or other future acquisitions successfully with our own, realize the anticipated benefits of such acquisitions or manage our expanded operations, any of which would adversely affect our results of operations.
- 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.
- Charges to earnings resulting from the application of the purchase method of accounting to the Rofin acquisition may adversely affect our results of operations.
- Our increased level of indebtedness following the Rofin merger could adversely affect us, including by decreasing our business flexibility, and will increase our borrowing costs.
- If our goodwill or intangible assets become impaired, we may be required to record a significant charge to earnings.
- 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.
- We are exposed to credit risk and fluctuations in the market values of our investment portfolio.
- If we are unable to protect our proprietary technology, our competitive advantage could be harmed.
- Intellectual property related claims or litigation could be costly and divert the attention of our technical and management personnel. Adverse resolution of litigation may harm our operating results or financial condition.
- Our information systems are subject to attacks, interruptions and failures.
- Difficulties with our enterprise resource planning 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.
- Changes in tax rates, tax liabilities or tax accounting rules could affect future results.
- Governmental regulations, including tariffs and duties, affecting the import or export of products could negatively affect our business, financial condition and results of operations.
- 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.
- Compliance or the failure to comply with current and future environmental regulations could cause us significant expense.
- Failure to maintain effective internal controls may cause a loss of investor confidence in the reliability of our financial statements or cause us to delay filing our periodic reports with the SEC and adversely affect our stock price.
- We face particular privacy, data security and data protection risks due to laws and regulations regulating the protection or security of personal and other sensitive data.
- Violations of anti-bribery, anti-corruption, and/or international trade laws to which we are subject could negatively affect our business, financial condition and results of operations. Allegations thereof may entail significant distraction of management and allocation of resources in the investigation and remediation thereof, which could also negatively affect our business, financial condition and results of operations.
- Provisions of our charter documents and Delaware law, and our Change of Control and Leadership Change Severance Plan, may have anti-takeover effects that could prevent or delay a change in control.

PART I

ITEM 1. BUSINESS

GENERAL

Business Overview

We are one of the world's leading providers of laser solutions and optics for microelectronics, life sciences, industrial manufacturing, and scientific markets. More than a provider of lasers, we deliver systems to the world's leading brands, innovators, and researchers, all backed with a global service and support network. 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 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 tools, 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 certain operating expenses to our operating segments and we manage them 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.

Our fiscal year ends on the Saturday closest to September 30. Fiscal years 2020, 2019, and 2018 ended on October 3, September 28, and September 29, respectively, and are referred to in this annual report as fiscal 2020, fiscal 2019, and fiscal 2018 for convenience. Fiscal 2020 included 53 weeks and fiscal 2019 and 2018 included 52 weeks.

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. 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

Coronavirus pandemic (COVID-19)

In December 2019, COVID-19 was reported, and in January 2020, the World Health Organization ("WHO") declared it a Public Health Emergency of International Concern. On February 28, 2020, the WHO raised its assessment of the COVID-19 threat from high to very high at a global level due to the continued increase in the number of cases and affected countries, and on March 11, 2020, the WHO characterized COVID-19 as a pandemic. In an effort to contain COVID-19 or slow its spread, governments around the world have enacted various measures, including orders to close all businesses not deemed "essential," isolate residents in their homes or places of residence, and practice social distancing at and away from work. These actions and the global health crisis caused by COVID-19 will continue to negatively impact global business activity, which will continue to negatively affect our revenue and results of operations. Each of the regions where we generate a majority of our revenue including Asia, Europe, and North America have been and will continue to be impacted by COVID-19. The timing and extent of impact related to COVID-19 varies by country and region.

In determining the impact of the COVID-19 pandemic in relation to our net sales, we compare our actual results to our most recently published forecast and the net sales guidance range communicated in our quarterly earnings call. This forecast has been adjusted for known impacts to our bookings and net sales from COVID-19 and other factors. Using this criteria, we estimate that our sales for the following fiscal quarters were further negatively impacted by the COVID-19 pandemic: (i) for the fiscal quarter ended April 4, 2020 — $31.0 million, (ii) for the fiscal quarter ended July 4, 2020 — $9.0 million, and (iii) for the fiscal quarter ended October 3, 2020 — an immaterial amount. The effect of COVID-19 as forecasted and as further experienced was most significant in Asia during the quarter ended April 4, 2020 and began impacting Europe and North America only later in the quarter ended April 4, 2020 as the virus spread globally. In the quarter ended July 4, 2020, the global economic effect of the COVID-19 pandemic was less significant, though continued to be high in certain regions. While we believe that COVID-19 was a partial cause of the decline in revenue in the second quarter of fiscal 2020, we also had lower shipments related to ELA tools in the flat panel display market and lower shipments in materials processing applications in the second quarter of fiscal 2020 that were mostly unrelated to COVID-19.

During fiscal 2020, the global demand environment was uncertain at times given the effects of COVID-19 on many businesses, including manufacturing facilities and customer confidence around the world. While we saw a partial recovery in order volumes in China in the latter half of March and the third quarter of fiscal 2020, this coincided with declining bookings in other regions, particularly in North America, and to a lesser extent in Europe and other countries in Asia. In the fourth quarter of fiscal 2020, we saw global demand recover in all regions and begin to return to a more normalized demand trend. However, we cannot predict future resurgences of COVID-19 and the impact that it may have on future demand for our products and services, particularly given the recently announced shutdown measures taken in certain countries in Europe.

Currently, our major production facilities in Europe, Southeast Asia, and the United States remain open. At all of our locations, we have transitioned from business continuity plans to return-to-operations plans while continuing to maintain high standards of employee safety and sanitization protocols. Our Return to Operations Plans have a phased approach with the primary focus on employee safety, with a continuing requirement for "working from home" for other members of our workforce wherever possible. We have vertically integrated manufacturing, and many of the components produced at certain of our facilities supply other company facilities, are single sourced internally and are not available from third-party suppliers (for example our semiconductor diodes are manufactured in Santa Clara, California). While we do maintain a safety stock of critical components at our various locations, the scope, timing, and duration of various government restrictions to address the COVID-19 pandemic could impact our internal supply chain. We have implemented certain policy changes to help support our employees impacted by COVID-19. These measures have and will continue to increase the cost of our operations but the magnitude and length of time of this impact is difficult to quantify at this time and may continue to be difficult to estimate in the future. If our sales are reduced for an extended period or if our production output falls because of government restrictions, we may be required to reduce payroll-related costs and other expenses in the future through layoffs or furloughs, even though we have not done so to date.

We have not experienced significant supply disruption from third-party component suppliers. However, we continue to face some supply chain constraints primarily related to logistics, including available air cargo space and higher freight rates. Available cargo space on flights between the U.S. and Europe, and Europe and Asia has been and remains limited as a result of the impact from COVID-19 and government and business responses to it, and this has increased shipping time and costs. In addition, shipments between countries have been more severely impacted by COVID-19 and we are experiencing delays due to additional checks at border crossings, including within Europe and Asia. There has also been sporadic restrictions on individual travel between certain states in the United States of America as well. Government actions related to COVID-19 come on the heels of increasing trade tensions between the United States and China, which may continue. We believe we have the ability to meet the near-term demand for our products, but the situation is fluid and subject to change.

We continue to monitor the rapidly evolving conditions and circumstances as well as guidance from international and domestic authorities, including public health authorities, and we may need to take additional actions based on their recommendations. There is considerable uncertainty regarding the impact on our business stemming from current measures and potential future measures that could restrict access to our facilities, limit our manufacturing and support operations, and place restrictions on our workforce, customers, and suppliers. The measures implemented by various authorities related to the COVID-19 outbreak have caused us to change our business practices including those related to where employees work, the distance between employees in our facilities, limitations on in-person meetings between employees and with customers, suppliers, service providers, and stakeholders as well as restrictions on some shipping activities, business travel to domestic and international locations or to attend trade shows, investor conferences and other events. In March of 2020, we formed a COVID Steering Committee to, among other things, propose, discuss, and implement best practices in response to COVID-19. The COVID Steering Committee meets weekly and more often if required. All of our executive officers are members of the COVID Steering Committee as are many key senior-level employees.

The COVID-19 pandemic has significantly increased worldwide and regional economic uncertainty and decreased demand for our products in many markets we serve, which could continue for an unknown period of time. In these circumstances, there may be developments outside of our control, including the length and extent of the COVID-19 outbreak, government-imposed measures and our ability to ship as well as install products and/or service installed products that may require us to adjust our operating plans. As such, given the dynamic nature of this situation, we cannot estimate with certainty the future impacts of COVID-19 on our financial condition, results of operations or cash flows. However, we do expect that it could have an adverse impact on our revenue as well as our overall profitability and may lead to an increase in inventory provisions, allowances for credit losses, and a volatile effective tax rate driven by changes in the mix of earnings across our markets.

See the additional Risk Factor included in Part I-Item 1A of this annual report regarding the impact of COVID-19.

Goodwill and other impairment charges

Based on our internal projections and the preparation of our financial statements for the quarter ended April 4, 2020, and considering the forecasted decrease in demand due to the COVID-19 pandemic and other factors, we believed that the fair value of our ILS reporting unit might no longer have exceeded its carrying value and performed an interim goodwill impairment test on the ILS and OLS reporting units. Based on the estimated fair value of the ILS reporting unit, in the quarter ended April 4, 2020, we recorded non-cash pre-tax goodwill impairment charges of $327.2 million. In addition, we performed impairment tests on the long-lived assets allocated to the asset group of the ILS reporting unit, including intangible assets, property, plant and equipment, and ROU assets as of April 4, 2020 and recorded non-cash pre-tax charges, in the quarter ended April 4, 2020, related to the impairment intangible assets, property, plant and equipment and ROU assets of the ILS reporting unit of $33.9 million, $85.6 million and $1.8 million, respectively. See Note 8, "Goodwill and Intangible Assets" and Note 11, "Leases" in the Notes to Consolidated Financial Statements under Item 8 of this annual report.

Restructuring

In June 2019, we internally announced our plans to exit a portion of our High Power Fiber Laser ("HPFL") business and consolidate all HPFL manufacturing and engineering functions in our Tampere, Finland facility by transferring certain HPFL activities from our Hamburg, Germany facility. In conjunction with this announcement, we recorded restructuring charges in fiscal 2019 of $19.7 million. The charges primarily related to write-offs of excess inventory, which is recorded in cost of sales, and estimated severance. We recorded charges of $1.1 million in fiscal 2020, primarily related to accelerated depreciation and project management consulting.

We also vacated our leased facility in Santa Clara at the end of the lease term on July 31, 2020 and combined operations into our owned Santa Clara headquarters. We did not incur material expenses in fiscal 2019 related to this project. In fiscal 2020, we incurred costs of $1.5 million, primarily related to accelerated depreciation.

In the fourth quarter of fiscal 2020, we began a restructuring program in our ILS segment which includes management reorganizations, the planned closure of certain manufacturing sites, and the right-sizing of global sales, service, order admin, marketing communication, and certain administrative functions, among others. In the fourth quarter of fiscal 2020, we incurred costs of $2.6 million, primarily related to severance.

See Note 19, "Restructuring Charges" in the Notes to Consolidated Financial Statements under Item 8 of this annual report.

Other

In April 2020, we appointed a new President and Chief Executive Officer ("CEO"), at which time our former President and CEO, who had served in such position since 2002, transitioned to the role of special advisor to the Company. On August 20, 2020, we announced that our Executive Vice President and Chief Financial Officer will retire from the Company no later than February 28, 2021.

On February 5, 2020, our board of directors authorized a stock repurchase program authorizing the Company to repurchase up to $100.0 million of our common stock through January 31, 2021.We made no repurchases under the program during fiscal 2020.

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 welding 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.

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 tools, 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 mechanical devices because it can do the job faster, better or more economically. 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 rigid and flexible OLED displays found in the latest smartphones, 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 laser sources, critical or enabling photonics 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), and for certain applications and markets we have also developed parts handling and automation to build complete laser systems.

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:

- **Effect our Good to Great Transformation**—We were founded in 1966 and have developed critical technology and have built this company into a multinational corporation and leader in the photonics industry. We are engaged in a multi-pronged and multi-year transformation focusing on all aspects of our company. Namely, we are working to:
    - Transform the operational efficiency of all our processes
    - Reduce the complexity of our portfolio
    - Focus our investments on growth opportunities
    - Enhance the focus and alignment with our customers even further
- **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, drive free cash flow and gross margin as a percentage of sales**—We define adjusted EBITDA as operating income adjusted for depreciation, amortization, stock-based compensation expense, 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 and gross margin improvements include utilization of our Asian manufacturing locations, optimizing our supply chain and continued leveraging of our infrastructure. Our focus on free cash flow is to generate cash over the long term as it is essential to maintaining a healthy business and providing funds to help fuel growth.

- **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.

- **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.

- **Focus on our core end markets**—While we are organized around our two segments of OLS and ILS, we also take a holistic approach to aligning and driving our business to focus on our four core end markets, which have been realigned as follows beginning in fiscal 2021:

    - Microelectronics (which captures the 3 sub-markets of Display, Semiconductor, and Advanced Packaging & Interconnect);

    - Instrumentation (which captures the 3 sub-markets of Bio-Instrumentation, Therapeutics & Research);

    - Precision Manufacturing; and

    - Aerospace & Defense

APPLICATIONS

We have historically grouped our products into end markets which address a broad range of applications: Microelectronics, Materials Processing, OEM Components and Instrumentation, and Scientific and Government Programs. As noted above, we have realigned this grouping beginning with our fiscal year 2021.

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

	Fiscal 2020	Fiscal 2019	Fiscal 2018
	Percentage of total net sales	Percentage of total net sales	Percentage of total net sales
Consolidated:			
Microelectronics	43.8 %	44.2 %	54.5 %
Materials processing	27.3 %	28.3 %	27.4 %
OEM components and instrumentation	20.2 %	18.6 %	11.6 %
Scientific and government programs	8.7 %	8.9 %	6.5 %
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 smartphones, tablets, personal computers, televisions, 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 primarily support three sub-markets in the microelectronics industry: (1) flat panel display manufacturing, (2) semiconductor front-end manufacturing, and (3) advanced packaging and interconnects.

Microelectronics—flat panel display manufacturing

The high-volume consumer market is driving the production of flat panel displays in applications such as mobile phones, tablets, laptop computers, televisions and wearables. There are multiple types of established displays, liquid crystal display ("LCD") and organic light emitting diodes ("OLED"), as well as emerging displays (MicroLED) based on different technologies. 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. If this silicon is polycrystalline as opposed to amorphous, the display performance is greatly enhanced. 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 Vyper excimer laser and Linebeam systems. These systems deliver power ranges of 1200W to 3600W, depending on the system, enabling a critical manufacturing process step on substrate sizes up to Generation 6. These systems are integral to the manufacturing process on all leading LTPS-based smartphone displays and hold the potential for deployment in a variety of screens, including tablet, laptop, automotive displays, and OLED television. Excimer-based LTPS is also enabling flexible OLED displays which have undergone rapid growth as they have been adopted into smartphones.

An emerging technology related to flat panel displays is MicroLED technology. The appeal of MicroLED is reduced electrical consumption for improved battery life and higher absolute brightness relative to OLED. We are continuing to accelerate our efforts and investments in UV MicroLED solutions to help our customers develop the laser processes of record, so we can, in turn, develop the laser-based capital equipment systems needed for mass production.

We see a co-existence of the two technologies in the years to come, with flexible OLED remaining the dominant choice for mobile applications in the long term, and MicroLED becoming the preferred technology in large diagonal high end television, and devices such as watches or future smart glasses where brightness is a key advantage and battery size is at a premium. We believe we are well positioned to remain the laser solutions display industry leader for all display technologies.

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_2 and Rapid series ultrafast lasers are used for cutting flat panel display films.

We have developed a proprietary technology for cutting 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_2 and CO lasers are also used in other production processes for flat panel displays. These processes include drilling, cutting, patterning, marking, and yield improvement.

While the timing and adoption rate of an emerging display technology such as 'micro' LED (μLED) is still hard to gauge, it is likely to make use of both similar technologies such as a LTPS backplane, as well as new ones, e.g. new versions of laser lift-off (LLO) and laser induced forward transfer (LIFT). We expect that this will represent an expanding market opportunity into new display form factors for laser-based processes.

Microelectronics—semiconductor front-end manufacturing

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 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, Ion, and OPSL lasers are used to detect and characterize defects in semiconductor chips.

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 blind 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 smartphones, tablets, and advanced computing systems. Our DIAMOND CO_2 and AVIA diode pumped solid state ("DPSS") lasers are the leading lasers 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.

We also offer market-leading solutions for laser marking of wafers and ICs, such as our PowerLine laser sub-systems.

Materials Processing

Beginning in fiscal 2021, we will increase our focus on Precision Manufacturing, a subset of the Materials Processing market, where we participate well both in terms of market share and margins on all three levels of components, lasers, and systems. We will be focusing our R&D and our manufacturing capabilities towards new products that will serve higher margin, defendable markets. Examples include medical device manufacturing, semiconductor wafer marking, and precision welding. In the components space, we plan to introduce a whole new category of laser diode products that will allow us to address new applications and customers, dramatically increasing the size of our servable market.

In fiscal 2020, we primarily supported four sub-markets in the materials processing industry: (1) automotive, (2) machine tools, (3) medical device, and (4) consumer goods, as well a number of smaller sub-markets. Our sales to this highly diverse sub-market include components, laser sources, laser diagnostic equipment, and complete laser systems. At a high level, the drivers for laser deployment within the materials processing sub-market are faster processing with higher yields, processing of new and novel materials, more environmentally friendly processes, all with 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 sub-market, 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 for customers including OEMs and their customers. With the increasing production of electric vehicles, lasers are playing a key role in the manufacture and welding of batteries. We serve this sub-market with a number of our products including ultrafast, DPSS, CO_2, diode and fiber lasers as well as systems in the areas of marking, scribing, cutting and welding.

We serve the machine tools sub-market with components, laser sources, and systems in applications including cutting, welding, marking, and additive manufacturing. We offer fiber lasers with different performance points in terms of power levels and beam profiles to address specific applications. During the past 12 months we have chosen to focus on specific lasers and processes 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 deliver higher quality welds with a wide variety of metals which translate into higher customer yields and enables more cost efficient designs. As a fully vertically integrated fiber and laser diode supplier, we are able to produce all key components in-house. Other products include our full line up of CO2 lasers, DPSS, and ultrafast lasers.

The medical device sub-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 high quality and specialized marking. We serve this sub-market with a number of lasers as well as a portfolio of systems.

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

In summary, we serve the materials processing market with a very broad product portfolio. Laser sources include the Diamond series mid-power CO and CO_2 lasers; the DC series of high power CO_2 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, and Helios DPSS lasers; and the Monaco and Rapid series of ultrafast lasers. Laser tools include the Performance, Select and Integral series of manual welding systems; the Exact, UW and MPS series of modular and highly configurable laser processing systems; the EasyMark, EasyJewel, LabelMarker Advanced and Combiline laser marking systems; and the META laser cutting tools. Laser sub-systems, 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 StarShape CO_2 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 aerospace 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

Laser applications for bio-instrumentation include 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; flow cytometry for analyzing and sorting single cells or populations of cells in a heterogeneous mixture, including blood samples; and Raman spectroscopy which enables chemical analysis in a wide range of commercial applications. Our OBIS, Flare, Galaxy, Sapphire, BioRay, Genesis and CellX 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_2 lasers are widely used in dental, 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. 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.

Aerospace and defense

In fiscal 2021, we will disclose aerospace and defense as a separate market application, which was included in our OEM Components and Instrumentation market application in fiscal 2020. We serve the aerospace and defense markets with components and laser sources in a number of applications such as Directed Energy weapons, as well as technology for target designation, countermeasures, fiber optic gyroscopes, specialty large diameter optics and entire telescope payloads for intelligence, surveillance & reconnaissance. In particular, directed energy has seen rapid growth in the last couple of years, driven largely by the promise of being able to deter and repel asymmetrical threats such as drones in an effective and economical manner. We supply laser sources for directed energy applications as well as components, and recently we have seen growth in demand for optics used in space and ground-based telescopes.

Scientific 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 Acuity, 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^{-15} to 10^{-18} 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

Beginning in fiscal 2021, we are aligning and driving our business to focus on four core end markets, which have been realigned as follows: Microelectronics (which captures the 3 sub-markets of Display, Semiconductor and Advanced Packaging & Interconnect); Instrumentation (which captures the 3 sub-markets of Bio-Instrumentation, Therapeutics & Research); Precision Manufacturing; and Aerospace & Defense.

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, resulting in increasing demand for better displays, more bandwidth and memory, and all packaged into devices which are lighter, thinner and consume less power. We believe that we are well positioned to continue to capitalize on the current market trends.

Excimer-based LTPS is a key technology for producing high resolution rigid and flexible OLED displays as well as future display technologies like µLEDs.

Another key technology related to flat panel displays is that of the emerging MicroLED technology. The appeal of MicroLED is reduced electrical consumption for improved battery life and higher absolute brightness relative to OLED. We are continuing to accelerate our efforts and investments in UV MicroLED solutions to help our customers develop the laser processes of record, so we can, in turn, develop the laser-based capital equipment systems needed for mass production.

Demand for CO_2, Avia, Matrix, Rapid, Monaco, Helios and direct diode lasers correlate with the need for related flat panel display 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_2, 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 shrinking device geometries, 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 OPSL) 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_2 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 scribe widths and wafer thickness, driven by developments such as 5G, 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 experienced a softening of the demand in fiscal 2019 and fiscal 2020, we anticipate a resumption of investment in OLED manufacturing capacity. It is difficult to precisely determine the timing and impact of OLED investment on our fiscal 2021 and longer term revenues even as additional vendors ramp their OLED production rates.

Instrumentation

The bio instrumentation market's most important areas: flow cytometry, microscopy and DNA sequencing, are all enjoying solid growth 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 as well as integrated laser sub-systems has resulted in growth for us in this market and we expect that to continue.

In the 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. We also have opportunities in dental procedures for both hard and soft tissue applications, with greatly improved patient comfort and outcome. In the area of photocoagulation, our Genesis OPSL yellow lasers are being used since the wavelength is particularly suitable for the treatment of blood vessels. We are an OEM supplier of CO_2 and semiconductor lasers to the major manufacturers of equipment used in the latest aesthetic procedures.

Worldwide scientific funding is expected to remain relatively stable, with some regions growing and others holding their current level. Potential growth areas 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.

Precision Manufacturing

The materials processing market is the most diverse of all the markets we serve and a large cross section of our products are used in this market. Going forward, we will focus on Precision Manufacturing, a subset of the Materials Processing market, where we participate well both in terms of market share and margins on all three levels of components, lasers and systems. We will be focusing our R&D and our manufacturing capabilities towards new products that will serve higher margin, defendable markets. We sell components, laser sources and complete laser systems. 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_2 lasers. In particular, we believe our ARM laser technology offers competitive advantages versus alternative solutions.

We expect to see select opportunities for our products in the machine tools industry in a variety of broad-based applications including newer applications such as laser cladding and heat treatment.

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

We supply the medical device market with a variety of lasers and laser systems 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.

Aerospace and defense

Governments have made and continue to make investments in the development of directed energy systems, both offensive and defensive. We have a number of product offerings which support these development efforts. A key differentiator for us in this market is a US based supply chain for all critical components, many of which are vertically integrated within Coherent, which we believe is unique in the industry. Our U.S. Defense customers have made it clear that a secure, U.S. based supply chain is and will be required moving forward. Our fabrication process includes epitaxial growth for our own laser diodes and packaged diodes in the U.S. and we also supply the specialty single mode amplifier fiber, critical for every directed energy amplifier. We own several other businesses that make critical components and on July 31, 2020, we reached an agreement to purchase Electro-optics Technology, Inc., a highly specialized U.S.-based components company, which will enable us to vertically integrate and improve the performance of our directed energy amplifier technology. We expect the acquisition to close in the second quarter of fiscal 2021, after we clear all regulatory requirements.

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, based on our market applications in fiscal 2020.*

Market	Application	Technology
Microelectronics	Flat panel display	CO, CO_2 DPSS Excimer Ultrafast Semiconductor Laser Sub-systems
	Semiconductor front-end	CO_2 DPSS OPSL Excimer Ion Laser Sub-systems
	Advanced packaging and interconnects	CO, CO_2 DPSS Excimer Ultrafast Laser Sub-systems
Materials processing	Automotive	CO_2 ARM Fiber Laser Systems/ Laser Sub-systems Ultrafast
	Machine Tools	CO_2 ARM Fiber DPSS Ultrafast Laser Systems/ Laser Sub-systems
	Medical Device	CO_2 DPSS Fiber Ultrafast Excimer Laser Systems/ Laser Sub-systems Components
	Consumer Goods	CO CO_2 Fiber DPSS Ultrafast Laser Systems/ Laser Sub-systems
OEM components and instrumentation	Bio-Instrumentation	DPSS OPSL Ultrafast Semiconductor

Market	Application	Technology
	Graphic arts and display	OPSL Semiconductor
	Medical therapy (OEM)	CO, CO_2 DPSS Ultrafast Excimer OPSL Semiconductor Components
	Defense and aerospace	Fiber Laser Amplifiers Semiconductor Components
Scientific and government programs	All scientific applications	CO, CO_2 DPSS Excimer OPSL Ultrafast

*Coherent sells its laser measurement and control products into a number of these applications.

In addition to the 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 DPSS laser types for different applications including semiconductor inspection; advanced packaging and interconnects; laser pumping; spectroscopy; bio-agent detection; DNA sequencing; drug discovery; flow cytometry; 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 emphasis is on the design and manufacture of highly differentiated fiber lasers that provide advantages and/or are enabling in certain applications. For example, our ARM laser offers dynamically adjustable beam profiles that improve welding results compared to standard fiber lasers and is able to weld new composite materials.

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, amplifiers for directed energy applications 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 our fiber components in them.

Gas lasers (CO, CO_2, Excimer, Ion)

The breadth of our gas laser portfolio is industry leading, encompassing CO, CO_2, 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, therapeutic and materials processing applications. For example, the CO_2 and CO lasers are unique in their ability to process non-metal materials.

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, 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, defense and industrial applications, including aesthetic (hair removal, cosmetic dentistry), graphic arts, counter measures, rangefinders, target designators, cladding, hardening, brazing and welding.

Ultrafast ("UF") Lasers

UF 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 continued to grow as it offers unparalleled quality of results, particularly in microelectronics and materials processing applications.

Integrated Laser Solutions: Systems and Sub-systems

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 system 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' 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. Laser sub-systems often include vision systems, process monitoring and monitoring of the system itself. Our sub-system products include: PowerLine series for marking; the StarFiber for welding and cutting; the PWS welding system; the QFS laser scribing system; and the StarShape CO_2 laser-based systems.

In select cases we also offer complete laser systems which include the laser sub-system as well as a material handling system inside a class 1 laser safety enclosure, ready to be used in production or development environments. Our laser systems products include: the Performance, Select and Integral series of manual welding systems; the Exact, 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.

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 Australia, Canada, China, France, Germany, Israel, Italy, Japan, the Netherlands, South Korea, Singapore, Spain, Taiwan, 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 76% of our net sales in fiscal 2020, 76% of our net sales in fiscal 2019, and 84% of our net sales in fiscal 2018. 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 2020, 2019, and 2018.

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, Singapore, South Korea, Taiwan, Vietnam, 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 to 18 months.

MANUFACTURING

Since the acquisition of Rofin in November 2016, we have integrated Rofin into our organizational structure and both legacy organizations are operating as one company with common high level objectives, goals and processes. Strategies are being implemented to improve operating leverage, to execute synergies and to enhance our customers' experience. For example, in June 2019, we announced our plans to exit a portion of our HPFL business and consolidate all HPFL manufacturing and engineering functions in our Tampere, Finland facility by transferring certain HPFL activities from our Hamburg, Germany facility. In fiscal 2020, we reorganized our reporting structure so that all business units now report to our Executive Vice President and Chief Operating Officer. 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, including all significant manufacturing sites, have been integrated onto the same Oracle ERP and Agile planning platforms, consistent with the rest of Coherent. This integration process will continue into fiscal 2021.

Strategies

One of our core manufacturing strategies is to tightly control our supply of key parts, components, sub-assemblies, and outsourcing partners. We 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 are committed to providing customers with products manufactured at the highest level of quality and reliability by continuously improving our quality management system and adhering to processes that are International Organization for Standardization ("ISO") certified at our principal manufacturing sites.

Our commitment to Operational Excellence and continuous improvement is at the core of our Coherent Lean culture aimed at creating value for our customers. We propagate our Coherent Lean culture throughout operations by developing a common Lean system, developing lean knowledge, tools, skills, and global standardization and we empower our employees drive change through best practice sharing

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 continue to transfer the production of targeted products into both of our Singapore and Malaysia factories. Our increased our tube refurbishment capacity in our South Korea operations has allowed us to reduce service response time, carry strategic inventory, and provide benefits to us and to our customers throughout the APAC region. Our Asia material sourcing strategy driven by our International Procurement Office in Singapore continues to expand, which has enabled us to leverage spend and 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, 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 makes 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, New Jersey, Connecticut, and New Hampshire in the U.S.; Germany, Scotland, Finland, Sweden, Switzerland, and Spain in Europe; and South Korea, China, Singapore, and Malaysia in Asia. In addition, we also use contract manufacturers in southeast Asia and Eastern Europe for the production of certain assemblies and turnkey solutions.

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 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 Mount Olive, New Jersey and both active and passive fibers are manufactured in our Salem, New Hampshire facility. Our low power CO_2 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 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 high performance optical components and assemblies for the aerospace and defense industries as well as large form optics for astronomical observatories and our own Linebeam excimer laser annealing systems. We manufacture and test high-power CO_2, 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 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 (scheduled to close during fiscal 2021 by transferring the related product manufacturing to other sites); and Nanjing, China. Anodization of our Slab laser electrodes is performed in Overath, Germany. Our fiber optics and beam delivery systems are manufactured and tested in Molndal, Sweden. The Company's active and passive fibers and high power laser 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. We manufacture and test the laser tools for the Metal Additive Manufacturing (3D Printing) market in Dieburg, Germany and we manufacture critical components for diode lasers in Monrovia, California.

We have transferred several products and sub-assemblies 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 standards for the design, manufacture and service of products to industry-based requirements. All primary facilities are certified to ISO 9001 whereas others hold multiple certifications based upon the markets they serve including ISO 13485, ISO 14001, ISO 17025, ISO 45001 and/or ISO 50001.

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 October 3, 2020, we held approximately 880 U.S. and foreign patents, which expire in calendar years 2020 through 2039 (depending on the payment of maintenance fees) and we have approximately 185 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 have been and 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., II-VI Incorporated, Wuhan Raycus Fiber Laser Technologies Co., Ltd, 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 2020 year-end, our backlog of orders scheduled for shipment (within one year) was $548.0 million compared to $502.1 million at fiscal 2019 year-end. By segment, backlog for OLS was $354.5 million and $309.5 million at fiscal 2020 and 2019 year-ends, respectively. Backlog for ILS was $193.5 million and $192.6 million at fiscal 2020 and 2019 year-ends, respectively. The increase in OLS backlog from fiscal 2019 to fiscal 2020 year-end was primarily due to higher orders for excimer laser annealing systems for the flat panel display market as well as higher orders for service. The increase in ILS backlog from fiscal 2019 to fiscal 2020 year-end was primarily due to higher orders in the materials processing market partially offset by lower orders in the high power fiber laser market. 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. In the first quarter of fiscal 2019, one customer cancelled three purchase orders which included orders shippable within 12 months from fiscal 2018 year-end 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 in the first quarter of fiscal 2019.

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%-17% 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

Our workforce is distributed globally over 19 countries. As of fiscal 2020 year-end, we had approximately 4,875 employees worldwide, with approximately 827 located in the Asia-Pacific region, 2,500 in the EMEA region, and 1,548 in the Americas region. Of our total workforce, approximately 597 employees are involved in research and development; 3,120 employees are involved in operations, manufacturing, service and quality assurance; and 1,158 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.

Our human capital is governed by various federal, state and local regulations. We monitor all key employment activities, such as hiring, termination and pay practices to ensure compliance with established regulations across the world. We embrace diversity and inclusion and strive to provide an environment rich with diverse skills, backgrounds and perspectives. Within the United States we conduct a yearly review of employees and establish hiring goals for minority, female, disabled and military veteran candidates. Our recruitment programs are regionally focused and hiring is done at a local level to ensure compliance with specific regulations. To ensure diversity within our workforce we advertise job openings and source candidates broadly to attract a diverse candidate pool. As a leader in our industry we are able to attract a strong candidate pool and have been successful in filing vacancies to ensure business continuity. In fiscal 2020 we had 350 new hires, 155 of which were within the EMEA region, 134 of which were within the Americas region and 61 of which were in the Asia-Pacific region. During fiscal 2020, we also conducted a worldwide organizational health survey designed to assess employee engagement, leadership, work environment and culture. We had a response rate of 77% of our total worldwide employee base, which is one indicator of a high-level of employee engagement.

We track and report internally on key talent metrics including workforce demographics, talent pipeline, diversity data, and engagement of our employees. We believe in investing in professional development programs to ensure we provide opportunities for individuals to advance their careers either in a technical track or move to a leadership position. We offer many of our in-class training programs digitally so that more employees can benefit from self-development during a period when many of our employees are working remotely. Additional focus is placed on the development of our future leaders and we leverage a talent review process where high-potential and high-performing employees are assessed for future leadership roles as part of our succession management process for critical leadership positions. As employee turnover is an indicator of employee satisfaction we closely monitor turnover globally and benchmark locally. Coherent has a very stable and committed workforce. This translates into very low voluntary turnover when compared to benchmark data. Our 12 month rolling average for voluntary turnover at the end of fiscal 2020 stood at 5.2%, substantially less than benchmark data. Our employee average tenure globally is more than 10 years.

ACQUISITIONS

On October 5, 2018, we acquired privately held 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.

On October 5, 2018, we acquired certain assets of Quantum for approximately $7.0 million, excluding transaction costs.

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.

Please refer to Note 4, "Business Combinations" of Notes to Consolidated Financial Statements under Item 8 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. The activities to date under this plan primarily 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.

In June 2019, we internally announced our plans to exit a portion of our HPFL business and consolidate all HPFL manufacturing and engineering functions in our Tampere, Finland facility by transferring certain HPFL activities from our Hamburg, Germany facility. In conjunction with this announcement, we recorded restructuring charges in fiscal 2019 of $19.7 million. The charges primarily related to write-offs of excess inventory, which is recorded in cost of sales, and estimated severance. We recorded charges of $1.1 million in fiscal 2020, primarily related to accelerated depreciation and project management consulting.

We also vacated our leased facility in Santa Clara at the end of the lease term on July 31, 2020 and combined operations into our owned Santa Clara headquarters. We did not incur material expenses in fiscal 2019 related to this project. In fiscal 2020, we incurred costs of $1.5 million, primarily related to accelerated depreciation.

In the fourth quarter of fiscal 2020, we began a restructuring program in our ILS segment which includes management reorganizations, the planned closure of certain manufacturing sites, and the right-sizing of global sales, service, order admin, marketing communication and certain administrative functions, among others. In the fourth quarter of fiscal 2020, we incurred costs of $2.6 million, primarily related to severance.

See Note 19, "Restructuring Charges" in the Notes to Consolidated Financial Statements under Item 8 of this annual report.

GOVERNMENT REGULATION

We are required to comply, and it is our policy to comply, with numerous regulations that are normal and customary to businesses in our industry and that operate in our markets and operating locations. These regulations relate to, among other things, healthcare, environmental protection, antitrust, anti-corruption, marketing, fraud and abuse (including anti-kickback and false claims laws), export control, product safety and efficacy, employment, privacy, governmental contracts and regulatory matters specific to the defense industry and other areas.

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. We also 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. 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 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.

In addition, certain portions of our business contract with numerous U.S. government agencies and entities or with entities whose projects are funded therefrom. We also contract with similar government authorities outside of the U.S., subject in all cases to applicable law. Consequently, we must comply with and are affected by regulations relating to the formation, administration, and performance of such U.S. government and other contracts governing such matters.

Exports of certain or our products are subject to export controls imposed by the U.S. government and administered by the U.S. Departments of State and Commerce. In certain instances, these regulations may require pre-shipment authorization from the administering department. For products subject to the Export Administration Regulations ("EAR") administered by the Department of Commerce’s Bureau of Industry and Security, the requirement for a license is dependent on the type and end use of the product, the final destination, the identity of the end user and whether a license exception might apply. Virtually all exports of products subject to the International Traffic in Arms Regulations ("ITAR") administered by the Department of State’s Directorate of Defense Trade Controls, require a license. Certain of our products are subject to EAR and to ITAR. Products and the associated technical data developed and manufactured in our foreign locations are subject to export controls of the applicable foreign nation. We further discuss the impact of such regulations under "Risk Factors" in Item 1A – "Governmental regulations, including tariffs and duties, affecting the import or export of products could negatively affect our business, financial condition and results of operations."

We are subject to laws concerning our business operations and marketing activities in foreign countries where we conduct business. For example, we are subject to the U.S. Foreign Corrupt Practices Act (the "FCPA"), U.S. export control and trade sanction laws, and similar anti-corruption and international trade laws in certain foreign countries, such as the U.K. Bribery Act. We further discuss the impact of such regulations under "Risk Factors" in Item 1A – "Violations of anti-bribery, anti-corruption, and/or international trade laws to which we are subject could negatively affect our business, financial condition and results of operations."

Aspects of our operations and business are subject to privacy, data security and data protection regulations, which impact the way we use and handle data and operate our products and services. We further discuss the impact of such regulations under "Risk Factors" in Item 1A – "We may face particular privacy, data security and data protection risks due to laws and regulations regulating the protection or security of personal and other sensitive data."

ITEM 1A. RISK FACTORS

You should carefully consider the followings 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.

RISKS RELATED TO COVID-19 PANDEMIC

Our business, financial condition and results of operations for fiscal year 2020 and beyond have been and may continue to be materially adversely affected by the COVID-19 pandemic and the related private and public sector responses to the pandemic.

The full extent to which the COVID-19 pandemic will impact our financial condition and operating results will depend on future developments that are highly uncertain and cannot be accurately predicted, including COVID-19 infections intensifying or returning in various geographic areas as is currently happening in Europe and the United States, new medical and other information that may emerge concerning COVID-19, and the actions by governmental entities or others to address it, contain it or treat its impact.

COVID-19 poses the risk that we or our employees, suppliers, distributors, customers and others may be restricted or prevented from conducting business activities for indefinite or intermittent periods of time, including as a result of employee health and safety concerns, shutdowns, shelter-in-place ("SiP") orders, travel restrictions and other actions and restrictions that may be prudent or required by governmental authorities. Even after governmental entities have lifted SiP orders, there is a risk that such orders will be reinstated, making it difficult to predict the long term financial impact of this virus on the Company. Examples of this have been seen across the globe, including most recently in the actions by several European governments.

To date, many (but not all) of our business operations and those of our suppliers, distributors and customers have been classified as essential or otherwise permitted to operate in jurisdictions in which facility closures have been mandated; however, we can give no assurance that this will not change in the future or that we, our suppliers, distributors and customers will continue to be permitted to conduct business in each of the jurisdictions in which we operate.

In addition, we have modified our business practices for the continued health and safety of our employees - including, among other things, implementing a remote work policy to the fullest extent possible, a limited travel policy, the distribution of and mandatory wearing of personal protection equipment, reorganizing and adjusting the timing of manufacturing personnel shifts, temperature monitoring for entering our facilities, and a social distancing policy - and we may take further actions, or be required to take further actions, that are in the best interests of our employees. Our suppliers, distributors and customers have also implemented such measures, which has resulted in, and we expect it will continue to result in, disruptions or delays and higher costs. The implementation of health and safety practices by us or our suppliers, distributors or customers could impact customer demand, supplier deliveries, our productivity, and costs, which could have a material adverse impact on our business, financial condition and results of operations.

While we currently believe we have sufficient liquidity to manage the financial impact of the COVID-19 pandemic, we can give no assurance that this will continue to be the case if the pandemic is prolonged or if there is an extended impact on us or the economy generally. Further, the pandemic has caused significant uncertainty and volatility in the credit markets. If our liquidity or access to capital becomes significantly constrained, or if costs of capital increase significantly as result of volatility in the capital markets, a reduction in our creditworthiness or other factors, then our financial condition, results of operations and cash flows could be materially adversely affected.

We have invested and will continue to invest significant time and resources in managing the impact of the COVID-19 pandemic on our business. Our focus on managing and mitigating such impact may cause us to divert or delay the application of resources toward existing or new initiatives or investments, which could have a material adverse impact on our results of operations.

Please refer to "Coronavirus pandemic (COVID-19)" under "Significant Events" "Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations" for additional discussion of the risks related to the COVID-19 pandemic and its impact on the Company.

COMPANY AND OPERATIONAL RISKS

Our operating results and stock price have varied in the past and will continue to be subject to fluctuations in the future based upon numerous factors, including those discussed in this Item 1A and throughout this report.

Our operating results, including net sales, operating expenses, 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 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, particularly as COVID-19 continues to adversely affect the global economy;
- impact of government economic policies on macroeconomic conditions, such as recently instituted, proposed or threatened changes in trade policies by the U.S. and any corresponding retaliatory actions by affected countries, in particular with respect to China, as well as trade restrictions instituted by the Japanese government affecting the export to South Korea of certain products and materials used in the manufacture of flat panel displays and in the semiconductor industry;
- fluctuations in demand for our products or downturns in the industries that we serve, particularly the continued build-out of "phase 2" of the capacity for the manufacture of OLED and the increased use of the installed base of our products in such manufacturing;
- 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 U.S. Dollar as compared to other currencies;
- commodity pricing;
- interpretation and impact of the U.S. Tax Cuts and Jobs Act and the Coronavirus Aid, Relief, and Economic Security Act (the "CARES Act");
- introductions of new products and product enhancements by our competitors, entry of new competitors into our markets, pricing pressures and other competitive factors;
- the increasing focus by companies in China to vertically integrate and consolidate their supply chains fully with products manufactured in China;
- 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 the manufacturing of products and related operations as part of our integration and internal reorganization efforts and to realize anticipated benefits (including savings) therefrom;
- 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, including the costs of acquiring businesses or technologies;
- 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;
- the impact of rising Chinese consumer debt and eroding consumer confidence and spending in China;
- 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;
- 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 vendor directly or as 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;
- changes in the method of determining the London Interbank Offered Rate ("LIBOR"), the Euro Interbank Offered Rate ("EURIBOR"), or the replacement of LIBOR or EURIBOR with an alternative reference rate, may adversely affect interest rates on our outstanding variable rate indebtedness;
- 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;
- the impact of market fluctuations on assets and liabilities in our deferred compensation plans;
- 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 United Kingdom's withdrawal from the European Union, or "Brexit", including uncertainties regarding the terms of applicable trade treaties between the United Kingdom and other countries, particularly with regard to any potential negative effects on our 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 and 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, 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, and the ongoing COVID-19 pandemic could exacerbate such fluctuations. 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 makes 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. From time-to-time our customers require us to ramp up production and/or accelerate delivery schedules of our products, and 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 may be particularly susceptible to prevailing economic conditions. Some of our suppliers are located in regions susceptible to natural and man-made disasters, such as Thailand which has experienced severe flooding, Japan which has experienced earthquakes, tsunamis and a resulting nuclear disaster, and the Eastern part of the United States and California which have experienced severe flooding, wildfires and/or power loss. In addition, our suppliers have been adversely affected by the COVID-19 pandemic and the related imposition of government restrictions to mitigate the spread of the virus. 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.

Like most other multinational companies, we are also highly dependent upon the ability to ship products to customers and to receive shipments of supplies from suppliers. The COVID-19 pandemic and resulting government policies have resulted in variable limitations on our ability to receive supplies and ship our products to customers. In the event of a disruption in the worldwide or regional shipping infrastructure, our access to supplies and our ability to deliver products to customers would correspondingly be negatively impacted. Any such disruption would likely materially and adversely affect our operating results and financial condition.

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 we face any significant periods with few or no orders or our customers reschedule or cancel orders.

In the flat panel display market, it is unclear when the timing will be, or whether it will occur at all, for any further build-out of fabs for the manufacture of OLED screens, and there are a relatively limited number of manufacturers who are the end customers for our annealing products. In fiscal 2020, 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, we may see fluctuations in orders, including periods with no or few orders, and 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, in the first quarter of fiscal 2019, one customer cancelled 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 significant periods with few or no orders or 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 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.

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 laser 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, especially during the ongoing COVID-19 pandemic, 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.

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 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 average selling prices ("ASPs") of some of our products. As competing products become more widely available or lower-cost products come to market, 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.

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

For fiscal 2020, 2019 and 2018, 76%, 76%, and 84%, respectively, of our net sales were derived from customers outside of the United States. We anticipate that international 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 international markets in which we operate, such as the earthquake, tsunami and resulting nuclear disaster in Japan and the flooding in Thailand. 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 international sales are primarily through our direct sales force. Additionally, some international sales are made through international distributors and representatives. Currently, the COVID-19 pandemic is having a significant adverse effect on the global economy, which is affecting the various markets in which we operate.

Our international 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, including, for example, recent dips in the manufacturing Purchasing Managers’ Index ("PMI") as well as the Institute of Supply Management ("ISM") data in the Eurozone, in particular in Germany;
- unexpected changes in regulatory requirements and compliance with applicable regulatory requirements;
- product certification requirements;
- environmental regulations;
- reduced protection for intellectual property rights in some countries;
- potentially adverse tax consequences;
- political and economic instability, such as the current situation between the governments of Japan and South Korea, which has led to the imposition of trade restrictions by the Japanese government affecting the export to South Korea of certain products and materials used in the manufacture of flat panel displays and in the semiconductor industry;
- 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 pandemics, any of 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 international subsidiaries, particularly if we have a significant amount of manufacturing costs denominated in one currency, e.g. the Euro, compared to the sales of those same products to customers denominated in another currency, e.g. the U.S. Dollar. 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.

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, or manage transitions among members of our leadership team, 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, as well as our ability to effectively transition to their successors. Most recently, we appointed a new President and Chief Executive Officer in April 2020, at which time our former President and CEO, who had served in such position since 2002, transitioned to the role of special advisor to the Company. This transition may be disruptive to our business, and if we are unable to execute an orderly transition and successfully integrate our new CEO into our management team, our revenue, operating results and financial condition may be adversely affected. In addition, our Chief Financial Officer has announced his retirement from the Company no later than February 28, 2021. Any future changes to our executive and senior management teams, including hires or departures, could cause further disruption to our business and have a negative impact on our operating performance, while these operational areas are in transition. We can provide no assurance that we will be able to find suitable successors to key roles as transitions occur or that any identified successor will be successfully integrated into our management team. Our inability to do so, or to retain other key employees or effectively transition to their successors, or any delay in filling any such positions, could harm our business and our results of operations.

The long sales cycles for many of 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' 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., II-VI Incorporated, Wuhan Raycus Fiber Laser Technologies Co., Ltd, 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. For example, in recent years there have been a growing number of companies in China that, in some cases aided by government subsidies, are targeting our markets and are exerting significant price pressure in certain of our product markets, in particular the HPFL products used in the metal cutting market in China, which led to our decision to exit this market. These companies will likely in the future be able to expand into broader product markets, which may result in additional competitive pressures on us. We may also 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. We expect that the volatility and uncertainty created by the COVID-19 pandemic in the markets we serve will exacerbate these issues, and 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 sub-assemblies 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 COVID-19 pandemic and the negative effect it is having on the global economy, 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.

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.

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. Ongoing restrictions resulting from the COVID-19 pandemic have had a negative impact on the work on some of our research and development programs due to the inability of some personnel being able to work in applicable regional labs.

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.

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, pandemics such as COVID-19, 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.

ACQUISITION RISKS

We may not be able to integrate the business of Rofin or other future acquisitions successfully with our own, realize the anticipated benefits of such acquisitions 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:

- 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;
- the disruption of, or the loss of momentum in, our business; and
- 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 that quarter. If similar difficulties arise in the future and we are unable to resolve them in a timely manner, we may 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. The execution of these consolidation projects could result in temporary loss of productivity or operational efficiency, interruptions in manufacturing or other unforeseen challenges while the projects are ongoing. Moreover, there can be no assurances that we will be successful in realizing the anticipated savings in connection with these consolidations or with our broader efforts to manage our expanded business or that we will realize the expected synergies and benefits anticipated from the merger.

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 both large and smaller strategic acquisitions of other corporations and entities, including Ondax in October 2018, 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 other long-lived assets, as we incurred in the quarter ending April 4, 2020 totaling $451.0 million.

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.

FINANCIAL RISKS

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. These depreciation, amortization and potential impairment charges could have a material impact on our results of operations. 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. For example, in the quarter ended April 4, 2020, the worldwide spread of COVID-19 created significant volatility, uncertainty and disruption to the global economy, representing an indicator to test our goodwill for impairment. The former operations of Rofin are largely included in our ILS segment. As a result of that test, we recorded a non-cash pre-tax charge, in the quarter ended April 4, 2020, related to the ILS reporting unit of $327.2 million, reducing the goodwill balance of the reporting unit to zero. In addition, we performed impairment tests on the long-lived assets allocated to the asset group of the ILS reporting unit, including intangible assets, property, plant and equipment and right-of-use ("ROU") assets as of April 4, 2020 and recorded non-cash pre-tax charges, in the quarter ended April 4, 2020, related to the impairment intangible assets, property, plant and equipment and ROU assets of the ILS reporting unit of $33.9 million, $85.6 million and $1.8 million, respectively.

Our indebtedness following the Rofin 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 a credit agreement (the "Credit Agreement"), which provided for a 670.0 million Euro term loan (the "Euro Term Loan", all of which was drawn, and a $100.0 million revolving credit facility (the "Revolving Credit Facility"), under which a 10 million Euro letter of credit was issued. As of October 3, 2020, 358.2 million Euros were outstanding under the Euro Term Loan. As of October 3, 2020, the Revolving Credit Facility had been used for guarantees of 10.0 million Euros as well as borrowings of $10.0 million. 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 Rofin 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.

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. For example, in the quarter ended April 4, 2020, the worldwide spread of COVID-19 created significant volatility, uncertainty and disruption to the global economy, representing an indicator to test our goodwill for impairment. As a result of that test, we recorded a non-cash pre-tax charge, in the quarter ended April 4, 2020, related to the ILS reporting unit of $327.2 million, reducing the goodwill balance of the reporting unit to zero. In addition, we performed impairment tests on the long-lived assets allocated to the asset group of the ILS reporting unit, including intangible assets, property, plant and equipment and ROU assets as of April 4, 2020 and recorded non-cash pre-tax charges, in the quarter ended April 4, 2020, related to the impairment intangible assets, property, plant and equipment and ROU assets of the ILS reporting unit of $33.9 million, $85.6 million and $1.8 million, respectively.

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 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."

INTELLECTUAL PROPERTY AND CYBERSECURITY RISKS

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 have been and 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. In addition to paying possibly significant monetary damages, 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.

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.

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.

LEGAL, TAX, REGULATORY AND COMPLIANCE RISKS

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 laws, the Tax Act and the CARES 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;
- 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 for fiscal 2011-2016 and the appeals of the South Korean fiscal 2014-2017 tax audits through the Competent Authority process between South Korea, Germany and the United States;
- 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 and any challenges by tax authorities regarding the timing of benefits derived from those holidays;
- 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 action plan implemented by the Organization for Economic Co-operation and Development;
- changes in generally accepted accounting principles; and
- significant fluctuations in business activities due to the COVID-19 pandemic.

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 Tax Act is subject to further interpretation by the U.S. federal and state governments and regulatory organizations, legislative updates or new regulations, or changes in accounting standards for income taxes. These actions may have a material impact on our financial results.

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 U.S., Germany, the European Union, the United Kingdom, China, South Korea, Japan 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 U.S. and various foreign governments have imposed tariffs, controls, export license requirements and restrictions on the import or export of some technologies, especially those related to the power and performance of our products and 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.

Exports of certain of our products are subject to export controls imposed by the U.S. government and administered by the U.S. Departments of State and Commerce. In certain instances, these regulations may require pre-shipment authorization from the administering department. For products subject to the EAR, the requirement for a license is dependent on the type and end use of the product, the final destination, the identity of the end user and whether a license exception might apply. Virtually all exports of products subject to ITAR require a license. Certain of our products are subject to EAR and to ITAR. Products and the associated technical data developed and manufactured in our foreign locations are subject to export controls of the applicable foreign nation. Given the current global political climate, obtaining export licenses can be difficult and time-consuming and may result in substantial expenses and diversion of management’s attention. Failure (i) to obtain the required export licenses could reduce our revenue and/or (ii) to adequately address these directives could result in substantial payments, fines, penalties or damages - including the 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. For example, German authorities are currently investigating an export compliance matter involving one of our German subsidiaries involving four former employees (whose employment was terminated following our discovery of this matter) and while we do not believe that the final resolution of this matter will be material to our consolidated financial position, results of operations or cash flows, the German government investigation is ongoing and it is possible that substantial payments, fines, penalties or damages could result.

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. In addition, the Japanese government has recently instituted trade restrictions affecting the export to South Korea of certain products and materials used in the manufacture of flat panel displays and in the semiconductor industry. 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 reduction in demand from our Chinese customers particularly in the materials processing space. 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), some of which 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.

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.

Failure to maintain effective internal controls may cause a loss of investor confidence in the reliability of our financial statements or 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.

We may face particular privacy, data security and data protection risks due to laws and regulations regulating the protection or security of personal and other sensitive data.

We may face particular privacy, data security and data protection risks due to laws and regulations regulating the protection or security of personal and other sensitive data, including in particular several laws and regulations that have recently been enacted or adopted or are likely to be enacted or adopted in the future. For instance, effective May 25, 2018, the European General Data Protection Regulation ("GDPR") imposed additional obligations and risk upon our business and increased substantially the penalties to which we could be subject in the event of any non-compliance. GDPR requires companies to satisfy requirements regarding the handling of personal data (generally, of EU residents), including its use, protection and the rights of affected persons regarding their data. Failure to comply with GDPR requirements could result in fines of up to 20 million Euro or 4% of global annual revenues, whichever is higher. We have taken extensive measures to ensure compliance with GDPR and to minimize the risk of incurring any penalties and we continue to adapt to the developing interpretation and enforcement of GDPR as well as emerging best practice standards. For example, we have introduced an international Data Protection Organization, a European Data Protection Policy, a system for Data Protection Management and Documentation and implemented an international Intra Group Data Transfer Agreement including the EU Standard Contractual Clauses. In addition, several other jurisdictions around the world have recently enacted privacy laws or regulations similar to GDPR. For instance, California enacted the California Consumer Privacy Act ("CCPA"), which became effective January 1, 2020 and which gives consumers many of the same rights as those available under GDPR. Several laws similar to the CCPA have been proposed in the United States at both the federal and state level. Like GDPR, other similar laws and regulations, as well as any associated inquiries or investigations or any other government actions, may be costly to comply with, result in negative publicity, increase our operating costs, require significant management time and attention, and subject us to remedies that may harm our business.

Violations of anti-bribery, anti-corruption, and/or international trade laws to which we are subject could negatively affect our business, financial condition and results of operations.

We are subject to laws concerning our business operations and marketing activities in foreign countries where we conduct business. For example, we are subject to the FCPA, U.S. export control and trade sanction laws, and similar anti-corruption and international trade laws in certain foreign countries, such as the U.K. Bribery Act. The FCPA generally prohibits U.S. companies and their officers, directors, employees, and intermediaries from making improper payments to foreign officials for the purpose of obtaining or retaining business abroad or otherwise obtaining favorable treatment. The FCPA also requires that U.S. public companies maintain books and records that fairly and accurately reflect transactions and maintain an adequate system of internal accounting controls. There can be no assurance that our employees, contractors, sales channel partners and agents will not take actions in violation of our policies and procedures, which are designed to ensure compliance with such laws. Violations of such laws and/or our policies and procedures by our employees, contractors, sales channel partners and agents could result in sanctions including civil and criminal fines, disgorgement of profits and suspension or debarment of our ability to contract with government agencies or receive export licenses and could also result in the termination of our relationships with customers and suppliers as well as financial reporting problem which could negatively affect our business, financial condition and results of operations.

RISKS RELATED TO OWNERSHIP OF OUR COMMON STOCK

Provisions of our charter documents and Delaware law, and our Change of Control and Leadership Change 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 and Leadership Change 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.

GENERAL RISK FACTORS

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. Global economic conditions have become more uncertain and challenging as the effects of the COVID-19 pandemic continue to have a significant adverse effect on the global economy. Weakness in our end markets has negatively impacted our bookings, net sales, gross margin and operating expenses, and, if it continues, would 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 continue to occur or recur, it would likely continue to, and may in the future, 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."

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.

ITEM 1B. UNRESOLVED STAFF COMMENTS

Not Applicable.

ITEM 2. PROPERTIES

Our corporate headquarters is located in Santa Clara, California. At fiscal 2020 year-end, our principal 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
Richmond, CA (2)	several buildings totaling 68,635 square feet	Office, manufacturing, R&D	Leased through November 2022
Sunnyvale, CA (1)	two buildings totaling 28,299 square feet	Office, manufacturing, R&D	Leased through December 2023
Bloomfield, CT (1)	88,396 square feet	Office, manufacturing, R&D	Leased through February 2027
East Granby, CT (1)	68,135 square feet	Office, manufacturing, R&D	Leased through January 2027
Plymouth, MI (1)	54,080 square feet	Office, manufacturing, R&D	Leased through May 2022
Mount Olive, NJ (2)	88,000 square feet	Office, manufacturing, R&D	Leased through June 2028
Tampere, Finland (1)	4.9 acres of land, 50,074 square feet	Office, manufacturing, R&D	Owned
Gilching, Germany (1)	4.2 acres of land, 125,012 square feet	Office, manufacturing, R&D	Owned
Göttingen, Germany (2)	14.2 acres of land, several buildings totaling 211,648 square feet	Office, manufacturing, R&D	Owned
Lübeck, Germany (2)	several buildings totaling 89,761 square feet	Office, manufacturing, R&D	Leased through March 2022
Lübeck, Germany (2)	7.4 acres of land	Future office, manufacturing, R&D	Owned (construction of new building in process)
Mainz, Germany (1)	1.2 acres of land, 46,984 square feet	Office, manufacturing, R&D	Owned
Mainz, Germany (1)	several buildings totaling 46,193 square feet	Office, manufacturing, R&D	Leased primarily through September 2022
Glasgow, Scotland (2)	2.0 acres of land, 68,220 square feet	Office, manufacturing, R&D	Owned
Kallang Sector, Singapore	42,722 square feet	Office, manufacturing	Leased through January 2022
An-Seong, South Korea (2)	60,257 square feet	Office, manufacturing	Leased through October 2027

(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.

We maintain other manufacturing, sales and service offices under varying leases expiring from fiscal 2021 through 2032 in Belgium, Canada, China, France, Germany, Israel, Italy, Japan, Malaysia, the Netherlands, South Korea, Spain, Sweden, Switzerland, Taiwan, the United Kingdom, the United States and Vietnam.

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 contract-related, product sales and servicing, real estate, product liability, regulatory matters, employment or intellectual property claims.

Although we do not expect that such 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, or in future periods.

The United States and many foreign governments impose tariffs and duties on the import and export of certain products we sell and purchase. From time to time our customs compliance, product classifications, duty calculations and payments are reviewed or audited by government agencies. Any adverse result in such a review or audit could negatively affect our results in the period in which they occur, or in future periods.

German authorities are currently investigating an export compliance matter involving one of our German subsidiaries involving four former employees (whose employment was terminated following our discovery of this matter). While under German law the subsidiary can be held liable for certain infringements by its employees of German export control laws, we believe that this matter involves less than approximately 1.5 million Euros in transactions in the period currently under investigation and do not believe that the final resolution of this matter will be material to our consolidated financial position, results of operations or cash flows. However, the German government investigation is ongoing and it is possible that substantial payments, fines, penalties or damages could result. Even though we do not currently expect this matter to be material to our consolidated financial position, results of operations or cash flows, circumstances could change as the investigation progresses.

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 2017 and 2011, respectively, are closed to examination. In our other major foreign jurisdictions and our major state jurisdictions, the years prior to fiscal 2014 and 2016, 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 Germany, various Coherent and legacy Rofin entities are under audit for the years 2011 through 2016. The South Korean tax authorities also performed an audit focused on intercompany transfer pricing arrangements for fiscal years 2014 through 2017. In May 2019, the South Korean tax authorities issued transfer pricing assessments for taxes, royalties and sales commissions, which we are in the process of appealing and contesting through the Competent Authority process between South Korea, Germany and the United States. Accordingly, there is no change to our tax position at the time of filing of this annual report. We are continuing to monitor and evaluate this situation. In October 2020, the South Korean tax authorities advised us that they are performing an internal review of our initial and second High-Tech tax exemptions approved in fiscal 2013 and 2016, respectively. The tax authorities requested information to further substantiate the timing of the benefits of our exemptions and this review is currently ongoing.

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.

PART II

ITEM 5. MARKET FOR 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 25, 2020 was 481. 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. The credit agreement includes certain restrictions on our ability to pay cash dividends.

There were no sales of unregistered securities in fiscal 2020.

On February 5, 2020, we announced that our board of directors authorized a stock repurchase program authorizing the Company to repurchase up to $100.0 million of our common stock through January 31, 2021. There were no stock repurchases during the fourth quarter of fiscal 2020. As of October 3, 2020, $100.0 million remained available for repurchase under this program.

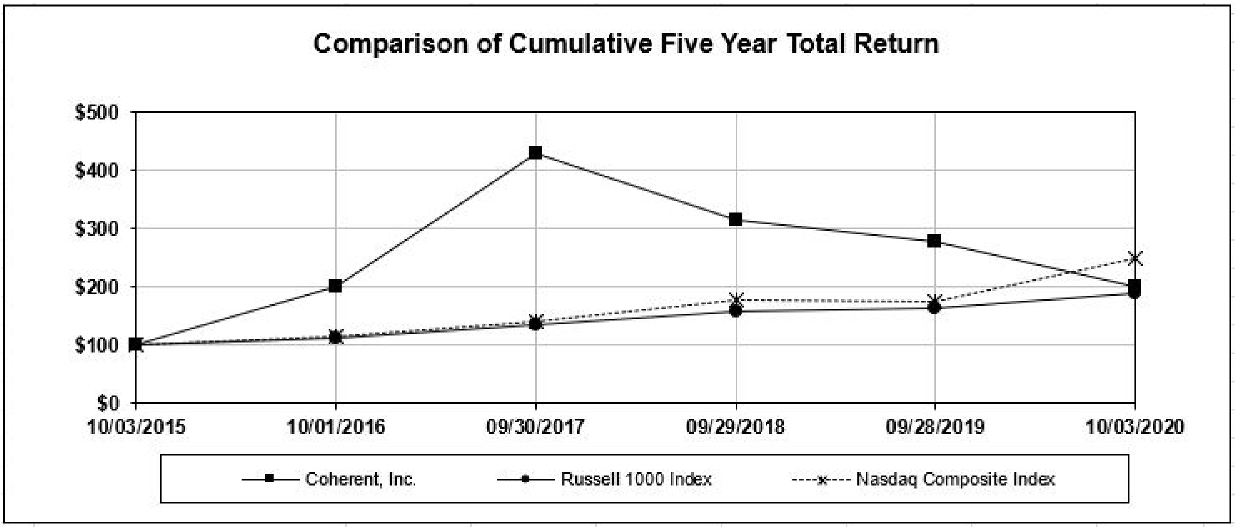
Refer to Note 14 "Stock Repurchases" of our Notes to Consolidated Financial Statements under Item 8 of this annual report for discussion on repurchases during fiscal 2020, 2019 and 2018.

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 October 3, 2015 through October 3, 2020 comparing the return on our common stock with the Russell 1000 Index and the Nasdaq Composite 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 AND THE NASDAQ COMPOSITE INDEX.



	INDEXED RETURNS					
	Base Period	Years Ending				
Company Name / Index	10/3/2015	10/1/2016	9/30/2017	9/29/2018	9/28/2019	10/3/2020
Coherent, Inc.	100	202.16	430.08	314.90	277.14	201.17
Russell 1000 Index	100	113.04	134.00	157.81	163.06	189.77
Nasdaq Composite Index	100	114.24	141.30	176.86	176.46	248.56

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 2020, 2019, and 2018 and the consolidated balance sheet data as of fiscal 2020 and 2019 year-end from our audited consolidated financial statements, and accompanying notes, contained in this annual report. The consolidated statements of operations data for fiscal 2017 and 2016 and the consolidated balance sheet data as of fiscal 2018, 2017, and 2016 year-end are derived from our audited consolidated financial statements which are not included in this annual report.

Consolidated financial data	Fiscal 2020 (1)	Fiscal 2019 (2)	Fiscal 2018 (3)	Fiscal 2017 (4)	Fiscal 2016 (5)
	(in thousands, except per share data)				
Net sales	$ 1,228,999	$ 1,430,640	$ 1,902,573	$ 1,723,311	$ 857,385
Gross profit	$ 410,874	$ 486,465	$ 830,691	$ 750,269	$ 381,392
Net income (loss) from continuing operations	$ (414,139)	$ 53,825	$ 247,360	$ 208,644	$ 87,502
Net income (loss) per share from continuing operations:					
Basic	$ (17.18)	$ 2.23	$ 10.07	$ 8.52	$ 3.62
Diluted	$ (17.18)	$ 2.22	$ 9.95	$ 8.42	$ 3.58
Shares used in computation:					
Basic	24,105	24,118	24,572	24,487	24,142
Diluted	24,105	24,279	24,851	24,777	24,415
Total assets *	$ 1,827,496	$ 2,083,169	$ 2,259,969	$ 2,337,800	$ 1,161,148
Long-term obligations	$ 411,140	$ 392,238	$ 420,711	$ 589,001	$ —
Other long-term liabilities *	$ 221,074	$ 165,881	$ 151,956	$ 166,390	$ 48,826
Stockholders' equity	$ 927,224	$ 1,284,736	$ 1,314,464	$ 1,163,264	$ 910,828

*In February 2016, the FASB issued accounting guidance (ASC 842) 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. We adopted ASC 842 in the first quarter of fiscal 2020 utilizing the optional transition method by applying the new standard to leases existing at the date of initial application and not restating comparative periods. The adoption of the standard resulted in the recognition of operating lease assets of $90.4 million, with corresponding operating lease liabilities of $93.5 million on our consolidated balance sheet, primarily related to real estate leases.

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(1) Includes $423.2 million of after-tax charges for goodwill and other impairment (goodwill and other long-lived assets), $2.1 million of after-tax restructuring charges (net of the gain on the sale-leaseback of our Hamburg facility), $0.7 million after-tax of accelerated compensation for our former CEO, $0.6 million non-recurring income tax net expense and $0.9 million of excess tax benefits for employee stock-based compensation.

(2) Includes $16.0 million of after-tax restructuring charges, $0.4 million of after-tax amortization of purchase accounting step-up, $1.1 million of benefit from amounts received on a resolved asset recovery matter, $1.7 million non-recurring income tax net expense and $2.5 million of excess tax benefits for employee stock-based compensation.

(3) 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.

(4) 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, an after-tax charge of \$1.9 million for the impairment of net assets of several entities held for sale, \$1.8 million after-tax interest expense on the commitment of the Euro 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 the Euro 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.

(5) Includes \$6.4 million of after tax costs related to the acquisition of Rofin, a \$1.4 million after-tax loss on our hedge of our foreign exchange risk related to the commitment of the Euro Term Loan to finance the acquisition of Rofin, \$0.8 million after-tax interest expense on the commitment of the Euro 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.

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 8 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."

We have applied the FAST Act Modernization and Simplification of Regulation S-K, which limits the discussion to the two most recent fiscal years. This discussion and analysis deals with comparisons of material changes in the consolidated financial statements for fiscal 2020 and fiscal 2019. For the comparison of fiscal 2019 and fiscal 2018, see the Management's Discussion and Analysis of Financial Condition and Results of Operations in Part II, Item 7 of our 2019 Annual Report on Form 10-K, filed with the Securities and Exchange Commission on November 26, 2019.

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	
	2020	2019
Net Sales—OEM Laser Sources	$ 758,929	$ 886,676
Net Sales—Industrial Lasers & Systems	$ 470,070	$ 543,964
Gross Profit as a Percentage of Net Sales—OEM Laser Sources	46.0 %	47.3 %
Gross Profit as a Percentage of Net Sales—Industrial Lasers & Systems	14.5 %	13.3 %
Research and Development Expenses as a Percentage of Net Sales	9.4 %	8.2 %
Income (Loss) Before Income Taxes	$ (442,723)	$ 60,048
Net Cash Provided by Operating Activities	$ 206,907	$ 181,401
Free Cash Flow	$ 141,988	$ 98,118
Days Sales Outstanding in Receivables	65	67
Annualized Fourth Quarter Inventory Turns	1.9	2.1
Net Income (Loss) from Continuing Operations as a Percentage of Net Sales	(33.7)%	3.8 %
Adjusted EBITDA as a Percentage of Net Sales	12.3 %	18.1 %

Definitions and analysis of these performance indicators are as follows:

Net Sales

Net sales include sales of lasers, laser systems, related accessories and services. Net sales for fiscal 2020 decreased 14.4% in our OLS segment and decreased 13.6% in our ILS segment from fiscal 2019. For a description of the 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 46.0% in fiscal 2020 from 47.3% in fiscal 2019. Gross profit percentage for ILS increased to 14.5% in fiscal 2020 from 13.3% in fiscal 2019. 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 to 9.4% in fiscal 2020 from 8.2% in fiscal 2019. 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.

Free Cash Flow

Free cash flow represents net cash provided by operating activities reduced by purchases of property and equipment, both as reflected on our Consolidated Statements of Cash Flows. We believe that free cash flow is an important performance indicator because it is a measure of cash generation after accounting for cash outflows to support operations and our investment in capital assets. 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 free cash flow refer to the "Liquidity and Capital Resources" section below, where we discuss the reasons for changes in net cash provided by operating and investing activities.

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 a 360 day year. 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 2020 decreased to 65 days as compared to 67 days in fiscal 2019. The decrease was primarily due to improved collections of receivables for ELA tools used in the Asian flat panel display market, improved linearity with a lower concentration of sales in the last month of the quarter. These ELA tools are our highest priced products, so any changes in collection timing will have a more significant impact on overall DSO.

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 2020 decreased to 1.9 turns from 2.1 turns in fiscal 2019 due to slower consumption of inventory resulting from a shift in demand partially related to the COVID-19 pandemic and lower intangibles amortization in cost of goods sold as a result of the impairment charges recorded in the second quarter of fiscal 2020. Although our annualized inventory turns are lower than our historical turns primarily due to shifts in demand, we continue to carefully manage our inventory levels in anticipation of expected increased demand from our customers over the next 12 to 18 months.

Adjusted EBITDA as a Percentage of Net Sales

We define adjusted EBITDA as operating income adjusted for depreciation, amortization, stock compensation expense, 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 free cash flow and 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 free cash flow and adjusted EBITDA as a percentage of sales in order to enhance investors' understanding of our ongoing operations. These measures are used by some investors when assessing our performance.

Below is the reconciliation of our net cash provided by operating activities to our free cash flow:

	Fiscal	
	2020	**2019**
Net cash provided by operating activities	**$ 206,907**	$ 181,401
Less: Purchases of property and equipment	**64,919**	83,283
Free cash flow	**$ 141,988**	$ 98,118

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

	Fiscal	
	2020	2019
Net income (loss) from continuing operations as a percentage of net sales	(33.7)%	3.8 %
Income tax expense (benefit)	(2.3)%	0.4 %
Interest and other income (expense), net	1.5 %	1.7 %
Depreciation and amortization	6.3 %	8.1 %
Restructuring charges and other	0.3 %	1.6 %
Goodwill and other impairment charges (recoveries)	36.6 %	(0.1)%
Stock-based compensation	3.6 %	2.6 %
Adjusted EBITDA as a percentage of net sales	12.3 %	18.1 %

SIGNIFICANT EVENTS

Coronavirus pandemic (COVID-19)

In December 2019, COVID-19 was reported, and in January 2020, the World Health Organization ("WHO") declared it a Public Health Emergency of International Concern. On February 28, 2020, the WHO raised its assessment of the COVID-19 threat from high to very high at a global level due to the continued increase in the number of cases and affected countries, and on March 11, 2020, the WHO characterized COVID-19 as a pandemic. In an effort to contain COVID-19 or slow its spread, governments around the world have enacted various measures, including orders to close all businesses not deemed "essential," isolate residents in their homes or places of residence, and practice social distancing at and away from work. These actions and the global health crisis caused by COVID-19 will continue to negatively impact global business activity, which will continue to negatively affect our revenue and results of operations. Each of the regions where we generate a majority of our revenue including Asia, Europe and North America have been and will continue to be impacted by COVID-19. The timing and extent of impact related to COVID-19 varies by country and region.

In determining the impact of the COVID-19 pandemic in relation to our net sales, we compare our actual results to our most recently published forecast and the net sales guidance range communicated in our quarterly earnings call. This forecast has been adjusted for known impacts to our bookings and net sales from COVID-19 and other factors. Using this criteria, we estimate that our sales for the following fiscal quarters were further negatively impacted by the COVID-19 pandemic: (i) for the fiscal quarter ended April 4, 2020 — $31.0 million, (ii) for the fiscal quarter ended July 4, 2020 — $9.0 million, and (iii) for the fiscal quarter ended October 3, 2020 — an immaterial amount. The effect of COVID-19 as forecasted and as further experienced was most significant in Asia during the quarter ended April 4, 2020 and began impacting Europe and North America only later in the quarter ended April 4, 2020 as the virus spread globally. In the quarter ended July 4, 2020, the global economic effect of the COVID-19 pandemic was less significant, though continued to be high in certain regions. While we believe that COVID-19 was a partial cause of the decline in revenue in the second quarter of fiscal 2020, we also had lower shipments related to ELA tools in the flat panel display market and lower shipments in materials processing applications in the second quarter of fiscal 2020 that were mostly unrelated to COVID-19.

During fiscal 2020, the global demand environment was uncertain at times given the effects of COVID-19 on many businesses, including manufacturing facilities and customer confidence around the world. While we saw a partial recovery in order volumes in China in the latter half of March and the third quarter of fiscal 2020, this coincided with declining bookings in other regions, particularly in North America, and to a lesser extent in Europe and other countries in Asia. In the fourth quarter of fiscal 2020, we saw global demand recover in all regions and begin to return to a more normalized demand trend. However, we cannot predict future resurgences of COVID-19 and the impact that it may have on future demand for our products and services, particularly given the recently announced shutdown measures taken in certain countries in Europe.

Currently, our major production facilities in Europe, Southeast Asia and the United States remain open. At all of our locations, we have transitioned from business continuity plans to return-to-operations plans while continuing to maintain high standards of employee safety and sanitization protocols. Our Return to Operations Plans have a phased approach with the primary focus on employee safety, with a continuing requirement for "working from home" for other members of our work force wherever possible. We have vertically integrated manufacturing, and many of the components produced at certain of our facilities supply other company facilities, are single sourced internally and are not available from third-party suppliers (for example our semiconductor diodes are manufactured in Santa Clara, California). While we do maintain a safety stock of critical components at our various locations, the scope, timing and duration of various government restrictions to address the COVID-19 pandemic could impact our internal supply chain. We have implemented certain policy changes to help support our employees impacted by COVID-19. These measures have and will continue to increase the cost of our operations but the magnitude and length of time of this impact is difficult to quantify at this time and may continue to be difficult to estimate in the future. If our sales are reduced for an extended period or if our production output falls because of government restrictions, we may be required to reduce payroll-related costs and other expenses in the future through layoffs or furloughs, even though we have not done so to date.

We have not experienced significant supply disruption from third-party component suppliers. However, we continue to face some supply chain constraints primarily related to logistics, including available air cargo space and higher freight rates. Available cargo space on flights between the U.S. and Europe, and Europe and Asia has been and remains limited as a result of the impact from COVID-19 and government and business responses to it, and this has increased shipping time and costs. In addition, shipments between countries have been more severely impacted by COVID-19 and we are experiencing delays due to additional checks at border crossings, including within Europe and Asia. There has also been sporadic restrictions on individual travel between certain states in the United States of America as well. Government actions related to COVID-19 come on the heels of increasing trade tensions between the United States and China, which may continue. We believe we have the ability to meet the near-term demand for our products, but the situation is fluid and subject to change.

We continue to monitor the rapidly evolving conditions and circumstances as well as guidance from international and domestic authorities, including public health authorities, and we may need to take additional actions based on their recommendations. There is considerable uncertainty regarding the impact on our business stemming from current measures and potential future measures that could restrict access to our facilities, limit our manufacturing and support operations and place restrictions on our workforce, customers and suppliers. The measures implemented by various authorities related to the COVID-19 outbreak have caused us to change our business practices including those related to where employees work, the distance between employees in our facilities, limitations on in-person meetings between employees and with customers, suppliers, service providers, and stakeholders as well as restrictions on some shipping activities, business travel to domestic and international locations or to attend trade shows, investor conferences and other events. In March of 2020, we formed a COVID Steering Committee to, among other things, propose, discuss, and implement best practices in response to COVID-19. The COVID Steering Committee meets weekly and more often if required. All of our executive officers are members of the COVID Steering Committee as are many key senior-level employees.

The COVID-19 pandemic has significantly increased worldwide and regional economic uncertainty and decreased demand for our products in many markets we serve, which could continue for an unknown period of time. In these circumstances, there may be developments outside of our control, including the length and extent of the COVID-19 outbreak, government-imposed measures and our ability to ship as well as install products and/or service installed products that may require us to adjust our operating plans. As such, given the dynamic nature of this situation, we cannot estimate with certainty the future impacts of COVID-19 on our financial condition, results of operations or cash flows. However, we do expect that it could have an adverse impact on our revenue as well as our overall profitability and may lead to an increase in inventory provisions, allowances for credit losses, and a volatile effective tax rate driven by changes in the mix of earnings across our markets.

See the additional Risk Factor included in Part I-Item 1A of this annual report regarding the impact of COVID-19.

Goodwill and other impairment charges

Based on our internal projections and the preparation of our financial statements for the quarter ended April 4, 2020, and considering the forecasted decrease in demand due to the COVID-19 pandemic and other factors, we believed that the fair value of our ILS reporting unit might no longer have exceeded its carrying value and performed an interim goodwill impairment test on the ILS and OLS reporting units. Based on the estimated fair value of the ILS reporting unit, in the quarter ended April 4, 2020, we recorded non-cash pre-tax goodwill impairment charges of $327.2 million. In addition, we performed impairment tests on the long-lived assets allocated to the asset group of the ILS reporting unit, including intangible assets, property, plant and equipment and right of use ("ROU") assets as of April 4, 2020 and recorded non-cash pre-tax charges, in the quarter ended April 4, 2020, related to the impairment intangible assets, property, plant and equipment and ROU assets of the ILS reporting unit of $33.9 million, $85.6 million and $1.8 million, respectively. See Note 8, "Goodwill and Intangible Assets" and Note 11, "Leases" in the Notes to Consolidated Financial Statements under Item 8 of this annual report.

Restructuring

In June 2019, we internally announced our plans to exit a portion of our High Power Fiber Laser ("HPFL") business and consolidate all HPFL manufacturing and engineering functions in our Tampere, Finland facility by transferring certain HPFL activities from our Hamburg, Germany facility. In conjunction with this announcement, we recorded restructuring charges in fiscal 2019 of $19.7 million. The charges primarily related to write-offs of excess inventory, which is recorded in cost of sales, and estimated severance. We recorded charges of $1.1 million in fiscal 2020, primarily related to accelerated depreciation and project management consulting.

We also vacated our leased facility in Santa Clara at the end of the lease term on July 31, 2020 and combined operations into our owned Santa Clara headquarters. We did not incur material expenses in fiscal 2019 related to this project. In fiscal 2020, we incurred costs of $1.5 million, primarily related to accelerated depreciation.

In the fourth quarter of fiscal 2020, we began a restructuring program in our ILS segment which includes management reorganizations, the planned closure of certain manufacturing sites, and the right-sizing of global sales, service, order admin, marketing communication and certain administrative functions, among others. In fiscal 2020, we incurred costs of $2.6 million, primarily related to severance.

See Note 19, "Restructuring Charges" in the Notes to Consolidated Financial Statements under Item 8 of this annual report for further discussion of the restructuring charges.

Acquisitions

On October 5, 2018, we acquired privately held Ondax, Inc. ("Ondax") for approximately $12.0 million, excluding transaction costs. Ondax developed and produced 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. See Note 4, "Business Combinations" in the Notes to Consolidated Financial Statements under Item 8 of this annual report for further discussion of the acquisition.

On October 5, 2018, we acquired certain assets of Quantum Coating, Inc. ("Quantum") for approximately $7.0 million, excluding transaction costs. See Note 4, "Business Combinations" in the Notes to Consolidated Financial Statements under Item 8 of this annual report for further discussion of the acquisition.

Stock Repurchases

On February 5, 2020, our board of directors authorized a stock repurchase program authorizing the Company to repurchase up to $100.0 million of our common stock through January 31, 2021.We made no repurchases under the program during fiscal 2020.

On October 28, 2018, our board of directors authorized a stock repurchase program for 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. During fiscal 2019, we repurchased and retired 603,828 shares of outstanding common stock under this program at an average price of $128.20 per share for a total of $77.4 million. We made no repurchases under the program during fiscal 2020 and the program expired on December 31, 2019.

RESULTS OF OPERATIONS—FISCAL 2020 AND 2019

Fiscal 2020 consisted of 53 weeks and fiscal 2019 consisted of 52 weeks.

Consolidated Summary

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

	Fiscal	
	2020	2019
	(As a percentage of net sales)	
Net sales	100.0 %	100.0 %
Cost of sales	66.6 %	66.0 %
Gross profit	33.4 %	34.0 %
Operating expenses:		
Research and development	9.4 %	8.2 %
Selling, general and administrative	22.0 %	19.0 %
Goodwill and other impairment charges	36.7 %	— %
Amortization of intangible assets	0.3 %	1.0 %
Total operating expenses	68.4 %	28.2 %
Income (loss) from operations	(35.0)%	5.8 %
Other income (expense), net	(1.0)%	(1.6)%
Income (loss) before income taxes	(36.0)%	4.2 %
Provision for (benefit from) income taxes	(2.3)%	0.4 %
Net income (loss)	(33.7)%	3.8 %

Net loss for fiscal 2020 was $414.1 million ($17.18 per diluted share). This included after tax charges of $423.2 million for goodwill and other impairment, $39.1 million of after-tax stock-based compensation expense, $21.9 million of after-tax amortization of intangible assets, $2.1 million of after-tax restructuring costs (net of the gain on the sale-leaseback of our Hamburg facility), $0.7 million after-tax of accelerated compensation for our former CEO, $0.6 million non-recurring income tax net expense and $0.9 million of excess tax benefits for employee stock-based compensation.

Net income for fiscal 2019 was $53.8 million ($2.22 per diluted share). This included $44.0 million of after-tax amortization of intangible assets, $31.5 million of after-tax stock-based compensation expense, $16.0 million of after-tax restructuring costs, $0.4 million of after-tax amortization of purchase accounting step up, $1.7 million non-recurring income tax net expense, $2.5 million of excess tax benefits for employee stock-based compensation and $1.1 million of benefit from amounts received on a resolved asset recovery matter.

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. In the first quarter of fiscal 2019, one customer cancelled three purchase orders which included $38.2 million of orders shippable within 12 months of fiscal 2018 year-end and which was included in backlog as of fiscal 2018 year-end. We reached agreement with this customer for a cancellation fee of $7.0 million, which was recorded in net sales in the first quarter of fiscal 2019.

We had a backlog of orders shippable within 12 months of $548.0 million at October 3, 2020, including a concentration in the flat panel display market (26%) for customers which are primarily located in Asia.

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 2020		Fiscal 2019	
	Amount	Percentage of total net sales	Amount	Percentage of total net sales
Microelectronics	$ 538,535	43.8 %	$ 632,176	44.2 %
Materials processing	335,750	27.3 %	404,878	28.3 %
OEM components and instrumentation	248,547	20.2 %	266,788	18.6 %
Scientific and government programs	106,167	8.7 %	126,798	8.9 %
Total	$ 1,228,999	100.0 %	$ 1,430,640	100.0 %

During fiscal 2020, net sales decreased by $201.6 million, or 14%, compared to fiscal 2019, with decreases in all four markets. The decrease included lower net sales of approximately $40.0 million due to the impact from COVID-19 shelter-in place orders as well as delays in restarting non-essential manufacturing activity at many of our customers, which impacted all of our markets. In fiscal 2020, we continued to experience weaker demand in the microelectronics and materials processing markets. We finished fiscal 2020 with a positive book-to-bill ratio and increased backlog levels compared to fiscal 2019. Entering fiscal 2021, we are well-positioned with our laser-based technology to benefit from technology proliferation in rapid growth areas such as 5G, flexible OLED and MicroLED. In addition, we believe the market for laser-based medical instrumentation, devices and procedures will continue to grow with the aging population around the globe. We also anticipate that technology advances will result in increased defense spending.

During fiscal 2020, microelectronics sales decreased $93.6 million, or 15%, compared to fiscal 2019 primarily due to weaker demand resulting in lower shipments related to ELA tools used in the flat panel display market as well as lower revenues from consumable service parts and a decrease due to a non-recurring fee of $7.0 million that was recognized in fiscal 2019 related to the cancellation of orders from a customer for our ELA tools. In microelectronics, we expect future increases in ELA tool shipments as Asian manufacturers improve yields and ramp manufacturing as indicated by the fact that we have already received new orders for these products in our first quarter of fiscal 2021. In addition, it is expected that the handset market will transition to 5G technology. This technology requires more power from the battery which we expect will result in the handset manufacturers having to decide between shorter talk times or placement of larger batteries in existing form factors. Since OLED displays are much thinner than liquid crystal displays (LCD), we believe 5G will increase demand for OLED displays to accommodate larger batteries. In addition, we are seeing demand for laser solutions for MicroLED production. We believe that these technological demands will allow us to continue to maintain a leadership position in flat panel display applications. We are also seeing higher demand for semiconductor applications driven by continuous strength in cloud computing and data centers as well as in advanced packaging applications driven by 5G demand for smaller geometry, better power management and next generation printed circuit boards.

Materials processing sales decreased $69.1 million, or 17%, during fiscal 2020 primarily due to decreased sales in marking, cutting and welding applications, primarily in China and Europe, and to a lesser extent in the United States. An index which often correlates to materials processing sales is the Purchasing Managers Index (PMI). PMI is a measure of the prevailing economic trends in manufacturing. While manufacturing PMI has been in a contraction state (<50 on the index) in South Korea, Taiwan, the EUROZONE and the U.S. for a year or so, the September 2020 PMI indicated an expansion in most major economies. Additionally, other markets for sales of these applications have also been depressed (e.g. automobiles). We see some strength in non-metal applications such as packaging, medical device manufacturing (with the return of elective surgeries) and specialty semiconductor marking. Even before COVID-19, demand in the materials processing market was softening in some of the machine tools industries and the materials processing market continues to be negatively impacted by COVID-19. We are also seeing increased price and margin pressure from Chinese competitors in this market. The timing for our recovery in this market is uncertain.

The decrease in the OEM components and instrumentation market of $18.2 million, or 7%, during fiscal 2020 was primarily due to lower shipments for medical applications. We expect strength in the healthcare market over the next several years. We supply lasers and optical systems for biomedical instrumentation applications and our lasers have been used in diagnostic instruments in applications including gene sequencing, biomarker identification and vaccine development. Applications dependent on discretionary spending by consumers, including tools and components used in discretionary medical procedures, as well as certain research applications continue to be negatively impacted by COVID-19 but to a lesser extent than in mid-fiscal 2020. We are seeing indications that the market is starting to recover. We anticipate the defense market, especially amplifiers for directed energy, countermeasures as well as specialty optics for aerospace, to be a multi-year growth opportunity for us.

The decrease in scientific and government programs market sales of $20.6 million, or 16%, during fiscal 2020 was primarily due to lower demand for advanced research applications used by university and government research groups, primarily in the United States and Asia, due to the closures of universities and research institutions due to COVID-19 shelter-in-place orders during mid-fiscal 2020. We saw improved demand in the fourth quarter of fiscal 2020 as universities and research institutions began to reopen. We expect demand in the scientific and government programs market to continue to fluctuate from quarter to quarter.

The timing for shipments of our higher average selling price ELA tools in the flat panel display market has historically fluctuated and is expected to continue to fluctuate from quarter-to-quarter due to customer scheduling, market 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%-17% below the fourth quarter of the prior fiscal years.

In fiscal 2020 and 2019, one customer accounted for 17% 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 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 tools, 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 2020		Fiscal 2019	
	Amount	Percentage of total net sales	Amount	Percentage of total net sales
OEM Laser Sources (OLS)	$ 758,929	61.8 %	$ 886,676	62.0 %
Industrial Lasers & Systems (ILS)	470,070	38.2 %	543,964	38.0 %
Total	$ 1,228,999	100.0 %	$ 1,430,640	100.0 %

Net sales for fiscal 2020 decreased $201.6 million, or 14%, compared to fiscal 2019, with decreases of $127.7 million, or 14%, in our OLS segment and decreases of $73.9 million, or 14%, in our ILS segment. The fiscal 2020 decreases in both OLS and ILS segment sales included decreases due to the unfavorable impact of foreign exchange rates.

The decrease in our OLS segment sales in fiscal 2020 was primarily due to weaker demand for ELA tools resulting in lower shipments of ELA tools used in the flat panel display market and lower revenues from consumable service parts. The decrease included lower sales of approximately $26.0 million due to COVID-19. In addition, the decrease was due to a non-recurring fee of $7.0 million that was recognized in the first quarter of fiscal 2019 related to the cancellation of orders from one customer for our ELA tools. In addition, OLS sales decreased due to lower demand for advanced research applications used by university and government research groups, primarily in the United States and Asia.

The decrease in our ILS segment sales from fiscal 2019 to fiscal 2020 was primarily due to lower sales for materials processing and lower sales for medical applications within the OEM components and instrumentation market. The decrease included lower sales of approximately $14.0 million due to COVID-19.

Gross Profit

Consolidated

Our gross profit percentage decreased by 0.6% to 33.4% in fiscal 2020 from 34.0% in fiscal 2019. The decrease included a 1.2% favorable impact of lower restructuring costs, primarily related to the write-off of inventories and severance costs in the third quarter of fiscal 2019 due to our exit from a portion of our HPFL business and 1.2% lower amortization of intangibles primarily due to the impairment of ILS intangibles in the second quarter of fiscal 2020. Excluding the 2.4% favorable impact of lower restructuring costs and intangibles amortization, gross profit percentage decreased 3.0% primarily due to unfavorable product margins (2.0%), higher other costs (1.4%) and higher stock-based compensation expense (0.1%) as a percentage of sales partially offset by lower warranty and installation costs (0.5%) as a percentage of sales. The unfavorable product margins were in both segments and were primarily due to unfavorable absorption of manufacturing costs on lower volumes including the impact of idle facilities due to COVID-19 as well as unfavorable product margins in OLS as a result of lower shipments of higher margin flat panel display systems. In addition, the unfavorable impact (0.3%) of a $7.0 million non-recurring fee recognized in the first quarter of fiscal 2019 related to the cancellation of orders from one customer for our ELA tools contributed to the decrease. Other costs were higher primarily due to higher inventory provisions for excess and obsolete inventory in certain ILS business units due to lower forecasted demand and changing business conditions, net of lower inventory provisions for excess and obsolete inventory in certain OLS business units. The lower warranty and installation costs were primarily in our ILS segment and included lower warranty events with the largest impact from fiber lasers, primarily sold into China, partially offset by the impact of lower sales volumes.

Our gross profit percentage has been and will continue to be affected by a variety of factors including the impact of COVID-19, shipment volumes, product mix, pricing on volume orders, 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 against the U.S. Dollar, particularly the recent volatility of the Euro and to a lesser extent, the Japanese Yen and South Korean Won. Our gross profit in future quarters will continue to be favorably impacted by lower amortization and depreciation as a result of the impairments of long-lived assets in our ILS segment in the second quarter of fiscal 2020. We have embarked on a number of internal strategic initiatives and are expecting that the impact of those will include an improvement of our gross margins by the end of calendar 2021

OEM Laser Sources

Our OLS gross profit percentage decreased by 1.3% to 46.0% in fiscal 2020 from 47.3% in fiscal 2019 primarily due to unfavorable product margins (1.6%) as a result of the impact of both lower shipments of higher margin flat panel display systems and lower revenues from consumable service parts and the unfavorable impact of a $7.0 million non-recurring fee recognized in the first quarter of fiscal 2019 related to the cancellation of orders from one customer for our ELA tools partially offset by unfavorable absorption of manufacturing costs on lower volumes. The unfavorable product margins were partially offset by lower other costs (0.2%) due to lower inventory provisions for excess and obsolete inventory in certain business units as well as lower intangibles amortization (0.1%) as a percentage of sales.

Industrial Lasers & Systems

Our ILS gross profit percentage increased by 1.2% to 14.5% in fiscal 2020 from 13.3% in fiscal 2019. The increase included a 3.1% favorable impact of lower restructuring costs, primarily related to the write-off of inventories and severance costs in the third quarter of fiscal 2019 due to our exit from a portion of our HPFL business and 3.0% lower amortization of intangibles due to the impairment of ILS intangibles in the second quarter of fiscal 2020. Excluding the 6.1% favorable impact of lower restructuring costs and intangibles amortization, gross profit percentage decreased 4.9% primarily due to higher other costs (3.9%) due to higher inventory provisions for excess and obsolete inventory in several business units as a percentage of sales and unfavorable product costs (2.5%) including unfavorable absorption of manufacturing costs on lower volumes over multiple products. The decreases were partially offset by 1.5% lower warranty and installation costs as a percentage of sales due to fewer warranty events, particularly for our HPFL products sold in China, partially offset by higher warranty events for fiber components and diode components products.

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 2020		Fiscal 2019	
	Amount	**Percentage of total net sales**	**Amount**	**Percentage of total net sales**
	(Dollars in thousands)			
Research and development	$ 115,578	9.4 %	$ 117,353	8.2 %
Selling, general and administrative	270,464	22.0 %	272,257	19.0 %
Impairment and other charges	451,025	36.7 %	—	— %
Amortization of intangible assets	3,987	0.3 %	13,760	1.0 %
Total operating expenses	$ 841,054	68.4 %	$ 403,370	28.2 %

Research and development

Fiscal 2020 research and development ("R&D") expenses decreased $1.8 million, or 2%, from fiscal 2019, but increased to 9.4% of sales, compared to 8.2% in fiscal 2019. The decrease in R&D expenses was primarily due to $3.7 million lower headcount spending and $0.2 million lower spending on materials, including lower customer reimbursements and the favorable impact of foreign exchange rates (primarily the weaker Euro). Headcount spending decreased $3.7 million due to lower restructuring costs for severance, lower spending due to the impact of headcount reductions and the favorable impact of foreign exchange rates partially offset by the impact of an extra week in the second quarter of fiscal 2020. Partially offsetting the decrease, R&D expenses increased $1.5 million due to higher stock-based compensation expense due to increased grants to employees and $0.6 million as a result of higher charges for increases in deferred compensation plan liabilities.

On a segment basis as compared to fiscal 2019, OLS R&D spending increased $2.4 million in fiscal 2020 primarily due to higher net spending on headcount and materials partially offset by the favorable impact of foreign exchange rates. ILS R&D spending decreased $4.5 million primarily due to lower headcount spending, lower net spending on materials and the favorable impact of foreign exchange rates. Corporate and other R&D spending increased $0.3 million primarily due to higher stock-based compensation expense and higher charges for increases in deferred compensation plan liabilities partially offset by lower headcount spending, including severance, in our former Advanced Research business unit.

Selling, general and administrative

Fiscal 2020 selling, general and administrative ("SG&A") expenses decreased $1.8 million, or 1%, from fiscal 2019. The decrease was primarily due to $14.5 million lower variable spending partially offset by $6.4 million higher stock-based compensation expense, $3.2 million higher charges for increases in deferred compensation plan liabilities and $3.1 million higher spending on headcount. The $14.5 million lower variable spending included lower spending on travel and other variable discretionary spending due to COVID-19, lower depreciation expense due to the impairment of ILS long-lived assets in the second quarter of fiscal 2020, lower provisions for bad debts, a gain on the sale-leaseback of our Hamburg facility, lower sales rep commissions and the favorable impact of foreign exchange rates, partially offset by higher consulting and audit spending on special projects and higher accelerated depreciation due to the consolidation of buildings at our headquarters. The $6.4 million higher stock-based compensation expense is primarily due to the acceleration of the accounting charges for equity grants for our former CEO and other executives who are retiring and increased grants to employees. The $3.1 million higher spending on headcount was primarily due to the impact of one extra week in the second quarter of fiscal 2020, lower vacation usage due to COVID-19 and higher costs related to the retirement of our former CEO partially offset by the impact of lower headcount and the favorable impact of foreign exchange rates.

On a segment basis as compared to fiscal 2019, OLS SG&A expenses decreased $2.0 million primarily due to lower variable spending including travel, sales rep commissions and other discretionary spending and as well as the favorable impact of foreign exchange rates partially offset by higher headcount spending and higher accelerated depreciation due to the consolidation of buildings at our headquarters. ILS SG&A spending decreased $16.6 million primarily due to lower variable spending (including lower spending on travel and other variable discretionary spending due to COVID-19, lower sales rep commissions, lower provisions for bad debts and lower depreciation expense), lower spending on headcount (lower severance and the impact of lower headcount net of the impact of one extra week in the second quarter of fiscal 2020) and the favorable impact of foreign exchange rates. Corporate and other SG&A spending increased $16.8 million primarily due to higher stock-based compensation expense, higher consulting and audit spending for special projects and higher charges for the deferred compensation plan as well as higher headcount spending including higher costs related to the retirement of our former CEO.

Goodwill and other impairment charges

In the second quarter of fiscal 2020, we recorded non-cash pre-tax goodwill impairment charges of $327.2 million related to our ILS segment to operating expense in our results of operations. In addition, we recorded non-cash pre-tax charges related to the impairment of intangible assets, property, plant and equipment and ROU assets of the ILS reporting unit of $33.9 million, $85.6 million and $1.8 million, respectively. See Note 8, "Goodwill and Intangible Assets" in the Notes to Consolidated Financial Statements and Note 11, "Leases" in the Notes to Consolidated Financial Statements under Item 8 of this annual report.

In the first quarter of fiscal 2019, we invested 3.0 million Euros ($3.4 million) in 3D-Micromac AG, a private company in Germany. The investment is included in other assets and is being carried on a cost basis. During the second quarter of fiscal 2020, we determined that our investment became impaired and wrote it down to its fair value. As a result, we recorded a non-cash impairment charge of $2.5 million to operating expense in our results of operations in the second quarter of fiscal 2020.

Amortization of intangible assets

Amortization of intangible assets decreased $9.8 million, or 71%, from fiscal 2019 to fiscal 2020 primarily due to the impairment of ILS intangibles in the second quarter of fiscal 2020, the completion of the amortization of certain intangibles from acquisitions and the favorable impact of foreign exchange rates.

Other income (expense), net

Other income (expense), net, decreased by $10.5 million to other expense of $12.5 million in fiscal 2020 from other expense of $23.0 million in fiscal 2019. The lower expenses were primarily due to $5.0 million higher gains, net of expenses, on our deferred compensation plan assets, $2.3 million lower foreign exchange losses, $2.1 million lower interest expense and $1.5 million lower benefit from non-service pension income. Interest expense decreased primarily due to lower amortization of debt issuance costs related to our Euro Term Loan and lower interest expense on our Revolving Credit Facility partially offset by higher interest on the Euro Term Loan.

Income taxes

Our effective tax rate on loss from continuing operations before income taxes for fiscal 2020 of 6.5% was lower than the U.S. federal tax rate of 21%. Our effective tax rate benefit for fiscal 2020 was unfavorably impacted primarily due to the impairment of goodwill that is not deductible for tax purposes and the establishment of valuation allowances for certain deferred tax assets. These unfavorable impacts were partially offset primarily from the release of unrecognized tax benefits net of settlements and competent authority offsets and losses in foreign jurisdictions subject to tax rates that are higher than the U.S. tax rates.

Our effective tax rate on income from continuing operations before income taxes for fiscal 2019 of 10.4% was lower than the U.S. federal tax rate of 21.0% primarily due to the tax benefit from losses of our German subsidiaries, which are subject to higher tax rates than U.S. tax rates, adjustments related to the Tax Act's transition tax, the net excess tax benefits from restricted stock unit vesting, the benefit of federal research and development tax credits and our Singapore and South Korea tax exemptions. These amounts were partially offset by an accrual for foreign withholding taxes on certain current year 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).

On March 27, 2020, the CARES Act was enacted and signed into law. U.S. GAAP rules require recognition of the tax effects of new legislation during the reporting period that includes the enactment date. The CARES Act, among other things, includes tax provision changes that benefit business entities and it makes certain technical corrections to the Tax Act. The tax relief measures for businesses include a five-year net operating loss ("NOL") carryback for any NOL generated in a taxable year beginning after December 31, 2017 and before January 1, 2021, suspension of the 80% limitation of NOL utilization for taxable years beginning before 2021, changes in the deductibility of interest, acceleration of alternative minimum tax credit refunds, payroll tax relief, and technical corrections allowing accelerated deductions for qualified improvement property. The CARES Act also provided other non-tax benefits, including employee retention credits, to assist businesses impacted by the pandemic. There is no material impact of the tax benefits under the CARES Act on our consolidated financial statements.

Coherent Singapore made an additional capital contribution to Coherent Korea in fiscal 2019 to take advantage of the High-Tech tax exemption provided by the Korean authorities. The High-Tech tax exemption is effective retroactively to the beginning of fiscal 2019 and the amount was used entirely in that year. There was no additional benefit available for fiscal 2020. For fiscal 2019, the tax exemption decreased Coherent Korea income taxes by approximately $2.4 million and the benefit of the tax holiday on net income per diluted share was $0.10.

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 Coherent Singapore income taxes by approximately $2.6 million and $3.9 million in fiscal 2020 and 2019, respectively. The benefits of the tax holiday on net income per diluted share were $0.11 and $0.16, respectively.

FINANCIAL CONDITION

Liquidity and capital resources

At October 3, 2020, we had assets classified as cash and cash equivalents and short-term investments, in an aggregate amount of $475.6 million, compared to $306.0 million at September 28, 2019. In addition, at October 3, 2020, we had $5.3 million of restricted cash. At October 3, 2020, approximately $349.7 million of our cash and securities was held in certain of our foreign subsidiaries and branches, $334.3 million of which was denominated in currencies other than the U.S. Dollar. 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. As a result of the enactment of the Tax Act and certain income tax treaty updates, we no longer consider 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. To date, we have had sufficient liquidity to manage the financial impact of COVID-19. However, we can provide no assurance that this will continue to be the case if the impact of COVID-19 is prolonged or if there is an extended impact on us or the economy in general. Further, COVID-19 has caused significant uncertainty and volatility in the credit markets. If our liquidity or access to capital becomes significantly constrained, or if costs of capital increase significantly due to the impact of COVID-19 as result of a volatility in the capital markets, a reduction in our creditworthiness or other factors, then our financial condition, results of operations and cash flows could be materially adversely affected.

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 few 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 Revolving Credit Facility. Our historical uses of cash have primarily been for acquisitions of businesses and technologies, capital expenditures, the repurchase of our common stock 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):

	Fiscal	
	2020	**2019**
Net cash provided by operating activities	**$ 206,907**	$ 181,401
Purchases of property and equipment	**(64,919)**	(83,283)
Acquisition of businesses, net of cash acquired	—	(18,881)
Investment in 3D-Micromac AG	—	(3,423)
Borrowings (repayments), net	**(9,699)**	263
Issuance of shares under employee stock plans	**13,362**	11,811
Repurchases of common stock	—	(77,410)
Net settlement of restricted common stock	**(13,549)**	(15,179)

Net cash provided by operating activities increased by $25.5 million in fiscal 2020 compared to fiscal 2019. The increase in cash provided by operating activities in fiscal 2020 was primarily due to higher cash flows from deferred taxes, taxes payable, accounts payable and inventories partially offset by lower net income (net of non-cash adjustments) and lower cash flows from accounts receivable. In order to support our liquidity during the pandemic, we are proactively taking measures to increase available cash on hand, including, but not limited to, reducing discretionary spending for operating and capital expenses. To further support our liquidity, we have elected to defer the payment of our employer portion of social security taxes beginning in April 2020 and through the end of the calendar year, which we expect to pay in equal installments in the first quarters of fiscal 2022 and 2023, as provided for under the CARES Act. We are also taking advantage of the retention credit of the CARES Act for employees who are idled as a result of COVID-19. 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, including consideration of the impact of COVID-19. 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 existing cash balances and cash flows from operations (as in our acquisitions of Ondax and certain Quantum assets) and additional borrowings (as in our acquisition of Rofin). 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 July 31, 2020, we reached an agreement to purchase Electro-optics Technology, Inc., a highly specialized U.S.-based components company, which will enable us to vertically integrate and improve the performance of our directed energy amplifier technology. We expect the acquisition to close in the second quarter of fiscal 2021, after we clear all regulatory requirements. We do not believe this acquisition will have a material impact on our liquidity or capital resources.

In fiscal 2019, we made debt principal payments of $7.5 million, recorded interest expense on the Euro Term Loan of $11.7 million and recorded $4.6 million amortization of debt issuance costs. On November 20, 2018, we borrowed an additional $40.0 million under our Revolving Credit Facility, subsequently repaid $30.0 million of these borrowings on July 29, 2019 and recorded interest expense related to it of $1.9 million in fiscal 2019.

In fiscal 2020, we made debt principal payments of $7.5 million, recorded interest expense on the Euro Term Loan of $12.3 million and recorded $3.3 million amortization of debt issuance costs. In fiscal 2020, we recorded interest expense related to our Revolving Credit Facility of $0.6 million.

On October 5, 2018, we acquired privately held Ondax for approximately $12.0 million, excluding transaction costs. On October 5, 2018, we acquired certain assets of Quantum for approximately $7.0 million, excluding transaction costs.

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. During fiscal 2019, we repurchased and retired 603,828 shares of outstanding common stock under this program at an average price of $128.20 per share for a total of $77.4 million. We made no repurchases under the program during fiscal 2020 and the program expired on December 31, 2019. See Note 14, "Stock Repurchases" in the Notes to Consolidated Financial Statements under Item 8 of this annual report.

On February 5, 2020, our board of directors authorized a stock repurchase program authorizing the Company to repurchase up to $100.0 million of our common stock through January 31, 2021. We have made no repurchases under the program during fiscal 2020. See Note 14, "Stock Repurchases" in the Notes to Consolidated Financial Statements under Item 8 of this annual report.

Additional sources of cash available to us, in addition to the amounts available under the Revolving Credit Facility, were international currency lines of credit and bank credit facilities totaling $16.9 million as of October 3, 2020, of which $16.1 million was unused and available. These unsecured international credit facilities were used in Europe and Japan during fiscal 2020. As of October 3, 2020, we had utilized $0.8 million of the international credit facilities as guarantees in Europe.

Our ratio of current assets to current liabilities decreased to 4.5:1 at October 3, 2020 compared to 4.6:1 at September 28, 2019. The decrease in our ratio was primarily due to lease liabilities recorded as a result of the adoption of ASC 842, higher accounts payable and lower accounts receivable partially offset by increases in our ratio due to higher cash and cash-equivalents. Our cash and cash equivalents, short-term investments and working capital are as follows (in thousands):

	Fiscal	
	2020	**2019**
Cash and cash equivalents	**$ 440,258**	$ 305,833
Short-term investments	**35,346**	120
Working capital	**943,606**	854,507

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 significant contractual obligations at October 3, 2020 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 obligations, including imputed interest	$ 112,170	$ 18,781	$ 33,536	$ 22,951	$ 36,902
Finance lease obligations, including imputed interest	579	404	175	—	—
Asset retirement obligations	6,805	300	2,325	1,826	2,354
Debt principal, interest and fees	466,152	22,995	44,131	399,026	—
Pension obligations	60,607	2,597	5,500	5,805	46,705
Purchase commitments for inventory	33,675	33,587	63	25	—
Purchase obligations-other	50,836	48,429	2,104	303	—
Total	$ 730,824	$ 127,093	$ 87,834	$ 429,936	$ 85,961

Our purchase commitments for inventory represent an estimate of significant commitments to purchase inventory from our suppliers in the ordinary course of business. Our purchase obligations-other represent an estimate of significant purchase commitments associated with the construction of a new manufacturing facility and other services in the ordinary course of business and include commitments of $29.8 million to purchase property and equipment in one of our manufacturing sites in Germany, primarily related to the construction of a new manufacturing facility. 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 $44.6 million at October 3, 2020. As of October 3, 2020, we had gross unrecognized tax benefits of $42.4 million which includes penalties and interest of $2.9 million. Approximately $15.4 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 2020 was $206.9 million, which included non-cash goodwill and other impairment charges of $451.0 million, depreciation and amortization of $76.8 million, cash provided by operating assets and liabilities of $51.8 million (primarily lower accounts receivable, lower inventories and higher accounts payable net of lower income taxes payable and payments made for lease liabilities), stock-based compensation expense of $44.8 million, amortization of operating ROU assets of $16.0 million, amortization of debt issue costs of $3.3 million and non-cash restructuring charges of $2.2 million, partially offset by net loss of $414.1 million and net increases in deferred tax assets of $24.5 million. Cash provided by operating activities in fiscal 2019 was $181.4 million, which included depreciation and amortization of $116.4 million, net income of $53.8 million, stock-based compensation expense of $36.5 million, non-cash restructuring charges of $12.6 million and amortization of debt issue costs of $4.6 million, partially offset by cash used by operating assets and liabilities of $19.1 million (primarily lower income taxes payable, accounts payable, customer deposits and deferred income net of lower accounts receivable and lower inventories) and net decreases in deferred tax assets of $14.9 million.

Cash used in investing activities in fiscal 2020 was $78.2 million, which included $43.0 million, net of proceeds from dispositions including $21.5 million received from the sale-leaseback of our Hamburg facility, used to acquire property and equipment and to purchase and upgrade buildings and $35.2 million net purchases of available-for-sale securities. Cash used in investing activities in fiscal 2019 was $100.3 million, which included $78.0 million, net of proceeds from dispositions, used to acquire property and equipment and to purchase and upgrade buildings, $18.9 million net of cash acquired to purchase Ondax and Quantum and $3.4 million invested in 3D-Micromac AG, a private company in Germany.

Cash used in financing activities in fiscal 2020 was $9.9 million, which included $13.5 million in outflows due to net settlement of restricted stock units and $9.7 million net debt payments partially offset by $13.4 million generated from our employee stock option and purchase plans. Cash used in financing activities in fiscal 2019 was $80.5 million, which included $77.4 million used to repurchase shares of our common stock and $15.2 million outflows due to net settlement of restricted stock units, partially offset by $11.8 million generated from our employee stock purchase plans and $0.3 million net debt borrowings.

Changes in exchange rates in fiscal 2020 resulted in an increase in cash balances of $8.0 million. Changes in exchange rates in fiscal 2019 resulted in a decrease in cash balances of $6.0 million.

RECENT ACCOUNTING PRONOUNCEMENTS

See Note 2, "Significant Accounting Policies" in the Notes to Consolidated Financial Statements under Item 8 of this annual report 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 consolidated 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 consolidated 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

Revenue is recognized when transfer of control to the customer occurs in an amount reflecting the consideration that we expect to be entitled. We determine revenue recognition by applying the following five-step approach: (1) identification of the contract, or contracts, with a customer; (2) identification of the performance obligations in the contract; (3) determination of the transaction price; (4) allocation of the transaction price to the performance obligations in the contract; and (5) recognition of revenue when, or as, we satisfy each performance obligation.

The transaction price is determined based on the consideration to which we will be entitled in exchange for transferring goods or services to the customer adjusted for estimated variable consideration, if any, as more fully described in Note 2, "Significant Accounting Policies - Revenue Recognition," in the Notes to Consolidated Financial Statements under Item 8 of this annual report. The majority of products and services offered by us have readily observable selling prices. As a part of our stand-alone selling price policy, we review product pricing on a periodic basis to identify any significant changes and revise our expected selling price assumptions as appropriate. Revenue is generally recognized when control of the product is transferred to the customer (i.e., when our performance obligation is satisfied), which typically occurs at shipment but which can occur over time for certain of our maintenance, extended warranty or custom product contracts. When goods or services have been delivered to the customer, but all conditions for revenue recognition have not been met, deferred revenue and deferred costs are recorded on our consolidated balance sheet. Recognizing revenue over time also includes an estimation of the progress towards completion based on the projected costs for the contract.

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 8, "Goodwill and Intangible Assets" in the Notes to Consolidated Financial Statements under Item 8 of this annual report). 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 the quarter ended April 4, 2020, the worldwide spread of COVID-19 created significant volatility, uncertainty and disruption to the global economy, representing an indicator to test our goodwill for impairment. Based on our internal projections and the preparation of our financial statements for the quarter ended April 4, 2020, and considering the forecasted decrease in demand due to the COVID-19 pandemic and other factors, we believed that the fair value of our ILS reporting unit might no longer have exceeded its carrying value and performed an interim goodwill impairment test on the ILS reporting unit. We also performed an interim goodwill impairment test on the OLS reporting unit.

Our goodwill impairment tests for the ILS and OLS reporting units were performed by comparing the fair value of the reporting units with their carrying values and recognizing an impairment charge for the amount by which the carrying value exceeded the fair value. Based on the estimated fair value of the ILS reporting unit, in the quarter ended April 4, 2020, we recorded a non-cash pre-tax charge related to the ILS reporting unit of $327.2 million, reducing the goodwill balance of the reporting unit to zero. The impairment charge was primarily the result of a decline in projected cash flows of the ILS reporting unit driven by lower forecasted sales volumes and profitability in several business units. The impairment charge was also the result of changes in certain market-related inputs to the analysis to reflect macro-economic changes caused by the impact of COVID-19, including lower pricing multiples for comparable public companies. No impairment charge was recognized for the OLS reporting unit as the fair value significantly exceeded the carrying value of the reporting unit.

In assessing goodwill for impairment, we were required to make significant judgments related to the fair value of our reporting units. We used a combination of the Income (discounted cash flow) approach and the Market (market comparable) approach to estimate the fair value of our reporting units. 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. Our assumptions used in the forecasts are based on historical data, supplemented by current and anticipated market conditions, estimated growth rates and management’s plans. The rate of return on cost of capital is weighted based on the capitalization of comparable companies. We utilized a discount rate for each of our reporting units that represents the risks that our businesses face, considering their sizes, their current economic environment and other industry data as we believe is appropriate. The Market approach determines fair value by comparing the reporting units to comparable companies in similar lines of business that are publicly traded. The selection of comparable companies is based on the markets in which the reporting units operate giving consideration to risk profiles, size, geography and diversity of products and services. 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. We utilized multiples for each of our reporting units that represent the risks that our businesses face, considering their sizes, their current economic environment and other industry data as we believe is appropriate. The interim goodwill impairment testing results were also reconciled with our market capitalization as of April 4, 2020, as the final step in the impairment testing.

Before performing the goodwill impairment test for the ILS reporting unit, we performed impairment tests on the long-lived assets allocated to the asset group of the ILS reporting unit, including intangible assets, property, plant and equipment and ROU assets as of April 4, 2020, due primarily to the same indicators that led to the interim goodwill impairment testing. Based on the impairment tests performed, we concluded that some of the long-lived assets allocated to the asset group of the ILS reporting unit were impaired as of April 4, 2020. Accordingly, we recorded non-cash pre-tax charges in the quarter ended April 4, 2020 related to the intangible assets, property, plant and equipment and right-of-use ("ROU") assets of the ILS reporting unit of $33.9 million, $85.6 million and $1.8 million, respectively. We did not identify any indicators that would lead us to believe that the carrying value of the long-lived assets allocated to the asset group of the OLS reporting unit may not be recoverable as of April 4, 2020.

In assessing our long-lived assets for impairment, we were required to make significant judgments related to the fair value of our long-lived assets, which are comprised of personal property, real property, and intangible assets. We used a combination of the Income, the Market approach, and the Cost (cost to create) approach to estimate the fair value of our long-lived assets. Our personal property assets consist of laser manufacturing and assembly equipment, semiconductor tools, laboratory and test equipment, furniture and fixtures and computer hardware and software. We used the Cost Approach (with support from the Market Approach) to estimate the fair value of our personal property, taking into consideration the physical deterioration, functional obsolescence and economic obsolescence of our personal property assets. Our real property assets consist of land and buildings, land rights (ground leased) and ROU assets. In determining the fair value of our real property assets, we used a combination of the Income, Market (sales comparison) and Cost approaches. We considered historical transaction information, current market conditions, operating performance, forecast growth and market-derived rates of return in our real property determination of fair value. The fair value of our ROU assets was determined using the Income approach by considering off-market components of the associated ROU leases. Our intangible assets consist of technology and customer relationship assets, and we used the Income approach to estimate the fair value of our intangible assets. We identified cash flows associated with each intangible asset, which were discounted at an after-tax rate of return appropriate for the risk profile of each intangible asset.

For our annual impairment test in fiscal 2020, for our OLS reporting unit we conducted a qualitative assessment of the goodwill during the fourth quarter 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 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 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 second quarter of fiscal 2020 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 2020. As such, it was not necessary to perform the goodwill impairment test in the fourth quarter of fiscal 2020. There is no goodwill in the ILS reporting unit due to the impairment of all goodwill of the ILS reporting unit in the second quarter of fiscal 2020.

At October 3, 2020, we had $101.3 million of goodwill, $21.8 million of purchased intangible assets and $245.7 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 to 18 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

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 2020, we increased our valuation allowance on deferred tax assets by $16.2 million to $57.7 million, primarily due to the net operating losses generated from certain foreign entities and California research and development tax credits, which are not expected to be recognized. As of October 3, 2020, we 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. 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. As a result of the enactment of the Tax Act and certain foreign tax law changes, we no longer consider foreign earnings to be indefinitely reinvested in our foreign subsidiaries. As a result of this change in assertion, we recorded a $16.1 million tax expense against our foreign earnings that are not indefinitely reinvested as of fiscal 2020. This is mainly related to foreign withholding taxes and state income taxes. We have not recognized any deferred taxes for outside basis differences in 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 2020 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 each of fiscal 2020 and 2019 year-ends, the fair value of our available-for-sale debt securities was $35.3 million and $0.1 million, respectively, all of which was classified as short-term investments. Gross unrealized gains and losses on available-for-sale debt securities were $36,000 and $(1,000), respectively, at fiscal 2020 year-end. There were no gross unrealized gains and losses on available-for-sale debt securities at fiscal 2019 year-end.

We are exposed to market risks related to fluctuations in floating interest rates related to our Euro Term Loan. As of October 3, 2020, we owed $419.8 million on this loan, which had an interest rate of 3.0% as of October 3, 2020. We performed a sensitivity analysis on the outstanding portion of our debt obligation as of October 3, 2020. 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 October 3, 2020.

Foreign currency exchange risk

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, the Singapore Dollar 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, Malaysian Ringgit, Swiss Franc, Taiwan Dollar, Swedish Krona, Canadian Dollar and Vietnamese Dong. 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 and resulting expenses and costs, 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 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.

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.

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. For example, a 10% change in the Euro as of October 3, 2020 would amount to less than a 0.2% change on our consolidated balance sheet.

At October 3, 2020, approximately $349.7 million of our cash, cash equivalents and short-term investments were held outside the U.S. in certain of our foreign operations, $334.3 million of which was denominated in currencies other than the U.S. Dollar.

See Note 7, "Derivative Instruments and Hedging Activities" in our Notes to Consolidated Financial Statements under Item 8 of this annual report for further discussion of our derivatives and hedging activities.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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:

Report of Independent Registered Public Accounting Firm	69
Consolidated Balance Sheets—October 3, 2020 and September 28, 2019	71
Consolidated Statements of Operations—Years ended October 3, 2020, September 28, 2019, and September 29, 2018	72
Consolidated Statements of Comprehensive Income (Loss)—Years ended October 3, 2020, September 28, 2019, and September 29, 2018	73
Consolidated Statements of Stockholders' Equity—Years ended October 3, 2020, September 28, 2019, and September 29, 2018	74
Consolidated Statements of Cash Flows—Years ended October 3, 2020, September 28, 2019, and September 29, 2018	75
Notes to Consolidated Financial Statements	77
Quarterly Financial Information (Unaudited)	120

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

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

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Coherent, Inc. and subsidiaries (the "Company") as of October 3, 2020 and September 28, 2019, the related consolidated statements of operations, comprehensive income (loss), stockholders' equity, and cash flows for each of the three years in the period ended October 3, 2020, 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 October 3, 2020 and September 28, 2019, and the results of its operations and its cash flows for each of the three years in the period ended October 3, 2020, 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 October 3, 2020, based on criteria established in *Internal Control — Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated December 1, 2020, expressed an unqualified opinion on the Company's internal control over financial reporting.

Change in Accounting Principle

As discussed in Note 2 to the financial statements, the Company changed its method of accounting for leases in fiscal year 2020 due to adoption of Financial Accounting Standards Board ("FASB") Topic 842, *Leases*.

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.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current-period audit of the financial statements that was communicated or required to be communicated to the audit committee and that (1) relates to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Equipment, Furniture, and Fixtures - Industrial Lasers & Systems Asset Group - Refer to Notes 2 and 8 to the financial statements

Critical Audit Matter Description

The Company evaluates long-lived assets for impairment when events or changes in circumstances exist that may indicate that the carrying amount of the asset group are no longer recoverable. Events that result in an impairment review include plans to discontinue a product line or a significant decrease in the operating results. When such an indicator occurs, the Company evaluates the asset group for impairment by comparing the undiscounted future cash flows expected to be generated by the asset group to the asset group’s carrying amount. If the carrying amount of an asset group exceeds the estimated undiscounted future cash flows, an analysis is performed to estimate the fair value of the individual assets within the asset group. An impairment is recorded if the fair value of an individual asset is less than the carrying amount. During the year ended October 3, 2020, an impairment loss of $47 million was recognized on machinery and equipment assets within the ILS asset group. We identified the valuation of machinery and equipment assets within the ILS asset group as a critical audit matter because there are significant judgments made by management when determining the fair value of the machinery and equipment assets. This required a high degree of auditor judgment and an increased extent of effort, including the need to involve our fair value specialists, when performing audit procedures to evaluate the reasonableness of the Company’s estimates and assumptions related to asset category selection, fair market value trend factors, assumed physical deterioration, and orderly liquidation value percentages.

How the Critical Audit Matter Was Addressed in the Audit

Our audit procedures included performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included the following, among others:

- We tested the effectiveness of internal controls over management’s asset group impairment assessment, including those over the asset category selection, fair market value trend factors, assumed physical deterioration, and orderly liquidation value percentages.

- With the assistance of our fair value specialists, we evaluated the appropriateness of management’s valuation methodologies and the reasonableness of the key assumptions by:

    - testing the source information underlying the determination of the asset category selection, fair market value trend factors, and assumed physical deterioration; and

    - developing a range of independent estimates and comparing the orderly liquidation values selected by management

/s/ DELOITTE & TOUCHE LLP

San Jose, California

December 1, 2020

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

COHERENT, INC. AND SUBSIDIARIES

CONSOLIDATED BALANCE SHEETS

(In thousands, except par value)

	October 3, 2020	September 28, 2019
ASSETS		
Current assets:		
Cash and cash equivalents	**$ 440,258**	$ 305,833
Restricted cash	**765**	792
Short-term investments	**35,346**	120
Accounts receivable—net of allowances of $7,630 and $8,690, respectively	**220,289**	267,553
Inventories	**426,756**	442,530
Prepaid expenses and other assets	**88,250**	77,993
Total current assets	**1,211,664**	1,094,821
Property and equipment, net	**245,678**	323,434
Goodwill	**101,317**	427,101
Intangible assets, net	**21,765**	84,813
Non-current restricted cash	**4,497**	12,036
Other assets	**242,575**	140,964
Total assets	**$ 1,827,496**	$ 2,083,169
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Short-term borrowings and current-portion of long-term obligations	**$ 16,817**	$ 14,863
Accounts payable	**60,225**	51,531
Income taxes payable	**6,861**	6,185
Other current liabilities	**184,155**	167,735
Total current liabilities	**268,058**	240,314
Long-term obligations	**411,140**	392,238
Other long-term liabilities	**221,074**	165,881
Commitments and contingencies (Note 13)		
Stockholders' equity:		
Common stock, Authorized—500,000 shares, par value $.01 per share:		
Outstanding—24,257 shares and 23,982 shares, respectively	**241**	238
Additional paid-in capital	**80,275**	34,320
Accumulated other comprehensive loss	**(25,667)**	(36,336)
Retained earnings	**872,375**	1,286,514
Total stockholders' equity	**927,224**	1,284,736
Total liabilities and stockholders' equity	**$ 1,827,496**	$ 2,083,169

See accompanying Notes to Consolidated Financial Statements.

COHERENT, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF OPERATIONS

(In thousands, except per share data)

	Year Ended		
	October 3, 2020	**September 28, 2019**	**September 29, 2018**
Net sales	**$ 1,228,999**	$ 1,430,640	$ 1,902,573
Cost of sales	**818,125**	944,175	1,071,882
Gross profit	**410,874**	486,465	830,691
Operating expenses:			
Research and development	**115,578**	117,353	132,586
Selling, general and administrative	**270,464**	272,257	293,632
Goodwill and other impairment charges	**451,025**	—	766
Amortization of intangible assets	**3,987**	13,760	10,690
Total operating expenses	**841,054**	403,370	437,674
Income (loss) from operations	**(430,180)**	83,095	393,017
Other income (expense):			
Interest income	**1,053**	1,119	1,571
Interest expense	**(17,037)**	(19,122)	(25,847)
Other—net	**3,441**	(5,044)	(7,186)
Total other expense, net	**(12,543)**	(23,047)	(31,462)
Income (loss) from continuing operations before income taxes	**(442,723)**	60,048	361,555
Provision for (benefit from) income taxes	**(28,584)**	6,223	114,195
Net income (loss) from continuing operations	**(414,139)**	53,825	247,360
Loss from discontinued operations, net of income taxes	—	—	(2)
Net income (loss)	**$ (414,139)**	$ 53,825	$ 247,358
Basic net income (loss) per share:			
Income (loss) per share from continuing operations	**$ (17.18)**	$ 2.23	$ 10.07
Loss per share from discontinued operations, net of income taxes	**$ —**	$ —	$ —
Basic net income (loss) per share	**$ (17.18)**	$ 2.23	$ 10.07
Diluted net income (loss) per share:			
Income (loss) per share from continuing operations	**$ (17.18)**	$ 2.22	$ 9.95
Loss per share from discontinued operations, net of income taxes	**$ —**	$ —	$ —
Diluted net income (loss) per share	**$ (17.18)**	$ 2.22	$ 9.95
Shares used in computation:			
Basic	**24,105**	24,118	24,572
Diluted	**24,105**	24,279	24,851

See accompanying Notes to Consolidated Financial Statements.

COHERENT, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME (LOSS)

(In thousands)

	Year Ended		
	October 3, 2020	**September 28, 2019**	**September 29, 2018**
Net income (loss)	**$ (414,139)**	$ 53,825	$ 247,358
Other comprehensive income (loss): [(1)]			
Translation adjustment, net of taxes [(2)]	**9,248**	(32,609)	(18,065)
Changes in unrealized gains (losses) on available-for-sale securities, net of taxes [(3)]	**1**	—	(4)
Defined benefit pension plans, net of taxes [(4)]	**1,420**	(6,560)	996
Other comprehensive income (loss), net of tax	**10,669**	(39,169)	(17,073)
Comprehensive income (loss)	**$ (403,470)**	$ 14,656	$ 230,285

(1) Reclassification adjustments were not significant during fiscal 2020, 2019, and 2018.

(2) Tax expenses (benefits) of $2,731, $(5,161), and $0 were provided on translation adjustments during fiscal 2020, 2019, and 2018, respectively.

(3) Tax benefits of $0, $0, and $(2) were provided on changes in unrealized losses on available-for-sale securities during fiscal 2020, 2019, and 2018, respectively.

(4) Tax expenses (benefits) of $713, $(2,371), and $202 were provided on changes in defined benefit pension plans during fiscal 2020, 2019, and 2018, respectively.

COHERENT, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

Three Years in the Period Ended October 3, 2020

(In thousands)

	Common Stock Shares	Common Stock Par Value	Add. Paid-in Capital	Accum. Other Comp. Income (Loss)	Retained Earnings	Total
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)
Repurchase of common stock	(575)	(6)	(99,994)	—	—	(100,000)
Cumulative effect of change in accounting principle	—	—	—	—	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**
Common stock issued under stock plans, net of shares withheld for employee taxes	287	2	(3,370)	—	—	(3,368)
Repurchases of common stock	(604)	(6)	(77,404)	—	—	(77,410)
Stock-based compensation	—	—	36,394	—	—	36,394
Net income	—	—	—	—	53,825	53,825
Other comprehensive loss, net of tax	—	—	—	(39,169)	—	(39,169)
Balances, September 28, 2019	**23,982**	**238**	**34,320**	**(36,336)**	**1,286,514**	**1,284,736**
Common stock issued under stock plans, net of shares withheld for employee taxes	275	3	(190)	—	—	(187)
Stock-based compensation	—	—	46,145	—	—	46,145
Net loss	—	—	—	—	(414,139)	(414,139)
Other comprehensive income, net of tax	—	—	—	10,669	—	10,669
Balances, October 3, 2020	**24,257**	**$ 241**	**$ 80,275**	**$ (25,667)**	**$ 872,375**	**$ 927,224**

See accompanying Notes to Consolidated Financial Statements

COHERENT, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CASH FLOWS

(In thousands)

	Year Ended		
	October 3, 2020	September 28, 2019	September 29, 2018
Cash flows from operating activities:			
Net income (loss)	**$ (414,139)**	$ 53,825	$ 247,358
Adjustments to reconcile net income (loss) to net cash provided by operating activities:			
Depreciation and amortization	**46,705**	54,925	53,342
Amortization of intangible assets	**30,128**	61,460	60,039
Impairment of goodwill	**327,203**	—	—
Impairment of long-lived assets	**121,350**	—	766
Impairment of investment	**2,472**	—	—
Deferred income taxes	**(24,471)**	(14,930)	16,607
Amortization of debt issuance cost	**3,321**	4,647	9,565
Stock-based compensation	**44,787**	36,466	32,738
Non-cash restructuring charges	**2,194**	12,609	1,246
Amortization of right of use assets	**16,033**	—	—
Non-cash pension impact	**2,134**	(8,931)	980
Other non-cash expense (gain)	**(2,571)**	421	559
Changes in assets and liabilities, net of effect of acquisitions:			
Accounts receivable	**53,104**	82,078	(47,020)
Inventories	**28,464**	17,805	(78,123)
Prepaid expenses and other assets	**(2,631)**	14,074	(6,695)
Other long-term assets	**(2,733)**	(549)	(7,692)
Accounts payable	**8,187**	(15,160)	(9,736)
Income taxes payable/receivable	**(25,024)**	(119,929)	474
Operating lease liabilities	**(15,964)**	—	—
Other current liabilities	**(985)**	(13,155)	(42,820)
Other long-term liabilities	**9,343**	15,745	4,523
Net cash provided by operating activities	**206,907**	181,401	236,111
Cash flows from investing activities:			
Purchases of property and equipment	**(64,919)**	(83,283)	(90,757)
Proceeds from dispositions of property and equipment	**21,926**	5,294	4,405
Purchases of available-for-sale securities	**(77,359)**	(11,552)	(54,442)
Proceeds from sales and maturities of available-for-sale securities	**42,168**	11,552	86,786
Acquisition of businesses, net of cash acquired	—	(18,881)	(45,448)
Investment at cost	—	(3,423)	—
Proceeds from sale of discontinued operation	—	—	25,000
Proceeds from sale of other entities	—	—	6,250
Other	—	—	470
Net cash used in investing activities	**(78,184)**	(100,293)	(67,736)

(continued)

COHERENT, INC. AND SUBSIDIARIES

CONSOLIDATED STATEMENTS OF CASH FLOWS (Continued)

(In thousands)

	Year Ended		
	October 3, 2020	**September 28, 2019**	**September 29, 2018**
Cash flows from financing activities:			
Short-term borrowings	**$ 12,695**	$ 119,594	$ 89,092
Repayments of short-term borrowings	**(14,474)**	(111,794)	(90,751)
Repayments of long-term borrowings	**(7,920)**	(7,537)	(171,593)
Issuance of common stock under employee stock option and purchase plans	**13,362**	11,811	10,574
Repurchase of common stock	**—**	(77,410)	(100,000)
Net settlement of restricted common stock	**(13,549)**	(15,179)	(36,320)
Net cash used in financing activities	**(9,886)**	(80,515)	(298,998)
Effect of exchange rate changes on cash, cash equivalents and restricted cash	**8,022**	(5,977)	(2,419)
Net increase (decrease) in cash, cash equivalents and restricted cash	**126,859**	(5,384)	(133,042)
Cash, cash equivalents and restricted cash, beginning of year	**318,661**	324,045	457,087
Cash, cash equivalents and restricted cash, end of year	**$ 445,520**	$ 318,661	$ 324,045
Supplemental disclosure of cash flow information:			
Cash paid during the year for:			
Interest	**$ 13,716**	$ 14,475	$ 16,282
Income taxes	**$ 33,617**	$ 156,650	$ 101,924
Cash received during the year for:			
Income taxes	**$ 10,933**	$ 23,416	$ 5,203
Noncash investing and financing activities:			
Unpaid property and equipment purchases	**$ 2,896**	$ 4,406	$ 6,176

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.

	October 3, 2020	**September 28, 2019**	**September 29, 2018**
Cash and cash equivalents	**$ 440,258**	$ 305,833	$ 310,495
Restricted cash, current	**765**	792	858
Restricted cash, non-current	**4,497**	12,036	12,692
Total cash, cash equivalents, and restricted cash shown in the consolidated statement of cash flows	**$ 445,520**	$ 318,661	$ 324,045

(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 scientific, commercial, and industrial 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 2020, 2019, and 2018 ended on October 3, 2020, September 28, 2019, and September 29, 2018, respectively, and are referred to in these financial statements as fiscal 2020, fiscal 2019, and fiscal 2018 for convenience. Fiscal 2020 included 53 weeks and fiscal 2019 and 2018 each included 52 weeks. The fiscal years of several 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 March 8, 2018, we acquired privately held O.R. Lasertechnologie GmbH and certain assets of its U.S.-based affiliate (collectively "OR Laser"). On October 5, 2018, we acquired privately held Ondax, Inc. ("Ondax"). The significant accounting policies of OR Laser and Ondax have been aligned to conform to those of Coherent, and the consolidated financial statements include the results of OR Laser and Ondax 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.

2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

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 2020 year-end, cash and cash equivalents included cash, money market funds, and time deposits.

Concentration of Credit Risk

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 2020 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 October 3, 2020, we held cash and cash equivalents and short-term investments outside the U.S. in certain of our foreign operations totaling approximately $349.7 million, $334.3 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 23.9% and 28.6% of accounts receivable at fiscal 2020 and fiscal 2019 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, Canadian Dollar, Swedish Krona, Taiwan Dollar, and Vietnamese Dong. 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. If we have any that meet this criteria, 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.

2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

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

	Fiscal		
	2020	**2019**	**2018**
Beginning balance	**$ 8,690**	$ 4,568	$ 6,890
Additions charged to expenses	**2,630**	5,210	1,980
Accruals related to acquisitions	**—**	—	37
Deductions from reserves	**(3,690)**	(1,088)	(4,339)
Ending balance	**$ 7,630**	$ 8,690	$ 4,568

Inventories

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	
	2020	**2019**
Purchased parts and assemblies	**$ 116,957**	$ 134,298
Work-in-process	**173,871**	174,550
Finished goods	**135,928**	133,682
Total inventories	**$ 426,756**	$ 442,530

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		
	2020	**2019**	**Useful Life**
Land	**$ 19,576**	$ 19,490	
Buildings and improvements	**169,748**	173,333	5-40 years
Equipment, furniture and fixtures	**364,376**	389,225	3-10 years
Leasehold improvements	**72,474**	94,878	shorter of asset life or lease term
	626,174	676,926	
Accumulated depreciation and amortization	**(380,496)**	(353,492)	
Property and equipment, net	**$ 245,678**	$ 323,434	

In fiscal 2020, we completed a sale-leaseback transaction for our Hamburg, Germany facility. See Note 11, "Leases" for further discussion.

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 2020 year-end, gross expected future cash flows of $6.8 million would be required to fulfill these obligations.

2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

The following table reconciles changes in our asset retirement liability for fiscal 2020 and 2019 (in thousands):

Asset retirement liability as of September 29, 2018	$ 5,802
Reduction to asset retirement obligations	(1,155)
Adjustments and additions to asset retirement obligations recognized	390
Accretion recognized	127
Changes due to foreign currency exchange	(90)
Asset retirement liability as of September 28, 2019	5,074
Reduction to asset retirement obligations	(32)
Adjustments and additions to asset retirement obligations recognized	813
Accretion recognized	161
Changes due to foreign currency exchange	163
Asset retirement liability as of October 3, 2020	$ 6,179

At October 3, 2020, $0.3 million and $5.9 million of the asset retirement liability were included in Other current liabilities and Other long-term liabilities, respectively, on our consolidated balance sheets. At September 28, 2019, $0.1 million and $4.9 million of the asset retirement liability were included in Other current liabilities and Other long-term liabilities, respectively, 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 2020, we recorded non-cash pre-tax charges in the quarter ended April 4, 2020 related to the intangible assets, property, plant and equipment, and right-of-use ("ROU") assets of the ILS reporting unit of $33.9 million, $85.6 million, and $1.8 million, respectively (See Note 8, "Goodwill and Intangible Assets").

Goodwill

Goodwill is tested for impairment on an annual basis and between annual tests in certain circumstances, and written down when impaired (See Note 8, "Goodwill and Intangible Assets"). Based on the estimated fair value of the ILS reporting unit, in the quarter ended April 4, 2020, we recorded a non-cash pre-tax charge related to the ILS reporting unit of $327.2 million, reducing the goodwill balance of the reporting unit to zero. 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 our fiscal 2020 annual testing, for our OLS reporting unit we conducted a qualitative assessment of the goodwill during the fourth quarter 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 amounts. Based on our assessment, goodwill in the OLS reporting unit was not impaired as of the first day of the fourth quarter of fiscal 2020. As such, it was not necessary to perform the goodwill impairment test in the fourth quarter of fiscal 2020. There is no goodwill in the ILS reporting unit due to the impairment of all goodwill of the ILS reporting unit in the second quarter of fiscal 2020.

Intangible Assets

Intangible assets, including acquired existing technology, customer relationships and production know-how are amortized on a straight-line basis over their estimated useful lives, currently 4 year to 15 years (See Note 8, "Goodwill and Intangible Assets").

2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

Warranty Reserves

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 to 18 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 2020, 2019, and 2018 were as follows (in thousands):

	Fiscal		
	2020	**2019**	**2018**
Beginning balance	**$ 36,460**	$ 40,220	$ 36,149
Additions related to current period sales	**37,788**	52,271	58,865
Warranty costs incurred in the current period	**(40,724)**	(54,538)	(51,935)
Accruals resulting from acquisitions	**—**	21	179
Adjustments to accruals related to foreign exchange and other	**1,508**	(1,514)	(3,038)
Ending balance	**$ 35,032**	$ 36,460	$ 40,220

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

Effective September 30, 2018, we adopted ASU 2014-09, Revenue from Contracts with Customers ("ASC 606"), using the modified retrospective transition method applied to contracts that were not completed as of September 29, 2018. Revenue for the reporting periods after September 30, 2018 are presented under ASC 606, while prior period amounts are reported in accordance with our historical accounting under ASC 605, Revenue Recognition ("ASC 605"). There was no impact on the opening accumulated retained earnings, revenues, costs, deferred income, customer deposits or other balances as of September 30, 2018 due to the adoption of ASC 606.

Under ASC 606, we determine revenue recognition by applying the following five-step approach:

Step 1 Identification of the contract, or contracts, with a customer;
Step 2 Identification of the performance obligations in the contract;
Step 3 Determination of the transaction price;
Step 4 Allocation of the transaction price to the performance obligations in the contract; and
Step 5 Recognition of revenue when, or as, we satisfy each performance obligation.

Contracts and customer purchase orders, which in some cases are governed by master sales agreements, are generally used to determine the existence of an arrangement. In addition, shipping documents and customer acceptance, if applicable, are used to verify delivery and transfer of control. Performance obligations are identified based on the products or services that will be transferred to the customer that are considered distinct. Being distinct is defined as products or services that the customer can benefit from either on its own or together with other resources that are readily available from third parties or from us, and by the product or service being separately identifiable from other promises in the contract. We assess our ability to collect from our customers based primarily on the creditworthiness and past payment history of each customer. Revenue from all sales are

2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

recognized at the transaction price. The transaction price is determined based on the consideration to which we will be entitled in exchange for transferring goods or services to the customer adjusted for estimated variable consideration, if any. The consideration associated with customer contracts is generally fixed. Variable consideration includes discounts, rebates, credits and incentives, or other similar items. The amount of consideration that can vary is not a substantial portion of the total consideration. Variable consideration estimates are re-assessed at each reporting period until a final outcome is determined. Changes to the original transaction price due to a change in estimated variable consideration are calculated on a retrospective basis, with the adjustment recorded in the period in which the change occurs.

Sales to customers are generally not subject to any price protection or return rights. Accordingly, upon application of steps one through five above, product revenue is recognized upon shipment and transfer of control. The majority of products and services offered by us have readily observable selling prices. As a part of our stand-alone selling price policy, we review product pricing on a periodic basis to identify any significant changes and revise our expected selling price assumptions as appropriate.

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

Revenue recognition at a point in time

Revenues recognized at a point in time consist primarily of product, installation and training. The majority of our sales are made to original equipment manufacturers ("OEMs"), distributors, representatives and end-users. Sales made to customers generally do not require installation of the products by us and are not subject to other post-delivery obligations. Sales to end-users in the scientific market typically require installation by us and, thus, involve post-delivery obligations; however, our post-delivery installation obligations are not essential to the functionality of our products and represent a separate performance obligation. We recognize revenue for these sales following the transfer of control of such products to the customer, which typically occurs upon shipment or delivery depending on the terms of the underlying contracts. In those instances that we have agreed to perform installation or provide training, we defer revenue related to installation or training until these services have been rendered.

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 more advanced performance than our published specifications, the revenue is recognized when the control transfers or the revenue is deferred until customer acceptance occurs.

Revenue recognition over time

We periodically enter into contracts in which a customer may purchase a combination of goods and/or services, such as products with maintenance contracts or extended warranty. These contracts are evaluated to determine if the multiple promises are separate performance obligations. Once we determine the performance obligations, we then determine the transaction price, which includes estimating the amount of variable consideration, if any. We then allocate the transaction price to each performance obligation in the contract based on a relative stand-alone selling price charged separately to customers. Extended warranties are sold separately from products and represent a distinct performance obligation. Revenue related to the performance obligation for extended warranties is recognized over time as the customer simultaneously receives and consumes the benefits provided by us.

Customized products, for which we have an enforceable right to payment for performance completed to date, are recorded over time. We use the output method to recognize revenue over time for such contracts as it best depicts the satisfaction of our performance obligations.

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. Customs duties billed to customers are recorded in cost of sales.

2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

Warranty

We provide warranties on the majority of our product sales and reserves for estimated warranty costs are recorded during the period of sale. These standard warranties are assurance type warranties and do not offer any services beyond the assurance that the product will continue working as specified. Therefore, these warranties are not considered separate performance obligations in the arrangement. Instead, the expected cost of the warranty is accrued as an expense. 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 to 18 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.

Costs of obtaining a contract

We recognize the incremental direct costs of obtaining a contract from a customer as an expense, which primarily includes sales commissions. Sales commissions are recorded at a point of time when control of the product transfers or over a period of time when sales commission provided is expected to be recovered through future services. The costs are recorded within selling, general and administrative expense. Costs incurred prior to the transfer of control of the product to the customer and costs to be amortized over a future period are classified as a prepaid asset and are included in prepaid expenses and other assets. Upon adoption of ASC 606, we determined there was an immaterial impact on sales commissions and therefore, we did not record a transition adjustment on adoption. For the fiscal 2020 and 2019, costs of obtaining a contract to be amortized over a future period of $0.3 million and $0.1 million were classified as a prepaid asset and are included in prepaid expenses and other assets, respectively.

Payment terms

Our standard payment terms are 30 days but vary by the industry and location of the customer and the products or services offered. The time between invoicing and when payment is due is not significant. As our standard payment terms are less than one year, we have elected the practical expedient under ASC 606-10-32-18 and therefore are not required to assess whether each contract has a significant financing component.

Customer deposits and deferred revenue

When we receive consideration from a customer prior to transferring goods or services under the terms of a sales contract, we record customer deposits or deferred revenue, depending on whether or not the product has shipped to the customer, which are included in other current liabilities or other long-term liabilities when the payment is made or due, whichever is earlier. We recognize deferred revenue as net sales after control of the goods or services has been transferred to the customer and all revenue recognition criteria are met.

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 $3.4 million, $3.8 million, and $3.2 million were offset against research and development costs in fiscal 2020, 2019, and 2018, 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.

COHERENT, INC. AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

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 (loss) (net of tax) at fiscal 2020 year-end was substantially comprised of accumulated translation adjustments of $25.1 million and deferred actuarial losses on pension plans of $0.5 million. Accumulated other comprehensive loss (net of tax) at fiscal 2019 year-end was substantially comprised of accumulated translation adjustments of $34.4 million and deferred actuarial losses on pension plans of $2.0 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.

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

	Fiscal		
	2020	2019	2018
Weighted average shares outstanding—basic	**24,105**	24,118	24,572
Dilutive effect of employee stock awards	—	161	279
Weighted average shares outstanding—diluted	**24,105**	24,279	24,851
Net income (loss) from continuing operations	**$ (414,139)**	$ 53,825	$ 247,360
Loss from discontinued operations, net of income taxes	—	—	(2)
Net income (loss)	**$ (414,139)**	$ 53,825	$ 247,358

For fiscal 2020, all potentially dilutive securities have been excluded from the dilutive share calculation as we reported a net loss. There were 98,103 and 103,547 potentially dilutive securities excluded from the dilutive share calculation for fiscal 2019 and 2018, respectively, as their effect was anti-dilutive.

Stock-Based Compensation

We recognize compensation expense for all share-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 whose number of units vesting is based on our total shareholder return over the performance period compared to the Russell Index. We value certain performance restricted stock units with vesting based on goals related to free cash flow target amounts units using the intrinsic value method, which is based on the fair market value price on the grant date. 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.

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

2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

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 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. As a result of enactment of the Tax Cuts and Jobs Act (the “Tax Act”) and certain foreign tax law changes, we no longer consider foreign earnings to be indefinitely reinvested in our foreign subsidiaries. As a result of this change in assertion, we recorded a $16.1 million tax expense against our foreign earnings that are not indefinitely reinvested as of fiscal 2020. This is mainly related to foreign withholding taxes and state income taxes. We have not recognized any deferred taxes for outside basis differences in foreign subsidiaries.

Adoption of New Accounting Pronouncements

In December 2019, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") 2019-12, Simplifying the Accounting for Income Taxes. The ASU updates specific areas of ASC 740, Income Taxes, to reduce complexity while maintaining or improving the usefulness of the information provided to users of financial statements. We elected to early adopt ASU 2019-12 in the second quarter of fiscal 2020 with no material impact to our consolidated financial statements.

In February 2018, the FASB issued ASU 2018-02, Income Statement-Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income. The guidance allows companies to reclassify stranded tax effects resulting from the Tax Act from accumulated other comprehensive income to retained earnings. The guidance also requires certain new disclosures regardless of the election. The amendments in ASU 2018-02 are effective for all entities for fiscal years beginning after December 15, 2018, and interim periods within those fiscal years. We adopted ASU 2018-02 in the first quarter of fiscal 2020 with no material impact to our consolidated financial statements.

In February 2016, the FASB issued accounting guidance (ASC 842) 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. We adopted ASC 842 in the first quarter of fiscal 2020 utilizing the optional transition method by applying the new standard to leases existing at the date of initial application and not restating comparative periods. We determine if an arrangement contains a lease at inception for arrangements with an initial term of more than 12 months, and classify it as either finance or operating. We have elected the package of practical expedients which allows us to not reassess 1) whether any expired or existing contracts are or contain leases; 2) the lease classification for any expired or existing leases; and 3) initial direct costs for any existing leases. In addition, we also elected to use the practical expedient allowed in the standard to not separate lease and non-lease components and apply the short-term lease measurement and recognition exemption to all leases shorter than 12 months when calculating the lease liability under ASC 842. The adoption of the standard resulted in the recognition of operating lease assets of $90.4 million, with corresponding operating lease liabilities of $93.5 million on our consolidated balance sheet, primarily related to real estate leases. The difference between the operating lease right-of-use assets and operating lease liabilities primarily represents our deferred rent as of adoption. As of the date of adoption, we recognized finance lease assets of $1.0 million, with corresponding finance lease liabilities of $0.9 million on our consolidated balance sheet, primarily related to equipment leases.

See Note 11, "Leases" for more information.

2. SIGNIFICANT ACCOUNTING POLICIES (Continued)

Recently Issued Accounting Pronouncements

In June 2016, the FASB issued ASU 2016-13, Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments and a subsequent amendment, ASU 2018-19 (collectively, Topic 326). Topic 326 requires measurement and recognition of expected credit losses for financial assets held. The new standard will become effective for our fiscal year 2021, which begins on October 4, 2020. We do not expect the standard will have a material impact on our consolidated statements of operations.

Other recent accounting pronouncements issued by the FASB (including its Emerging Issues Task Force), the AICPA, and the SEC did not or are not believed by management to have a material impact on our present or future consolidated financial statements.

3. REVENUE RECOGNITION

Disaggregation of Revenue

Based on the information that our chief operating decision maker ("CODM") uses to manage the business, we disaggregate revenue by type and market application within each segment. No other level of disaggregation is required considering the type of products, customers, markets, contracts, duration of contracts, timing of transfer of control and sales channels.

The following tables summarize revenue from contracts with customers (in thousands):

Sales by revenue type and segment

	Fiscal					
	2020		2019		2018	
	OEM Laser Sources	Industrial Lasers & Systems	OEM Laser Sources	Industrial Lasers & Systems	OEM Laser Sources	Industrial Lasers & Systems
Net sales:						
Products(1)	**$ 441,476**	**$ 369,342**	$ 532,863	$ 430,878	$ 890,591	$ 512,818
Other product and service revenues(2)	**317,453**	**100,728**	353,813	113,086	368,886	130,278
Total net sales	**$ 758,929**	**$ 470,070**	$ 886,676	$ 543,964	$ 1,259,477	$ 643,096

(1) Net sales primarily recognized at a point in time.
(2) Includes sales of spare parts, related accessories, and other consumable parts as well as revenues from service agreements, of which $62.4 million for fiscal 2020 was recognized over time.

Sales by market application and segment

	Fiscal					
	2020		2019		2018	
	OEM Laser Sources	Industrial Lasers & Systems	OEM Laser Sources	Industrial Lasers & Systems	OEM Laser Sources	Industrial Lasers & Systems
Net sales:						
Microelectronics	**$ 466,780**	**$ 71,755**	$ 568,387	$ 63,789	$ 951,166	$ 85,188
Materials processing	**36,129**	**299,621**	38,017	366,861	46,467	474,437
OEM components and instrumentation	**158,748**	**89,799**	163,095	103,693	140,616	80,207
Scientific and government programs	**97,272**	**8,895**	117,177	9,621	121,228	3,264
Total net sales	**$ 758,929**	**$ 470,070**	$ 886,676	$ 543,964	$ 1,259,477	$ 643,096

See Note 18, "Segment and Geographic Information" for revenue disaggregation by reportable segment and geographic region.

3. REVENUE RECOGNITION (Continued)

Contract Balances

We record accounts receivable when we have an unconditional right to the consideration. Contract liabilities are recorded when cash payments are received or due in advance of performance. Contract liabilities consist of customer deposits and deferred revenue, where we have unsatisfied or partly satisfied performance obligations. Contract liabilities classified as customer deposits are included in other current liabilities and contract liabilities classified as deferred revenue are included in other current liabilities or other long-term liabilities on our consolidated balance sheets. Payment terms vary by customer.

A rollforward of our customer deposits and deferred revenue are as follows (in thousands):

	Fiscal	
	2020	**2019**
Beginning balance	**$ 42,550**	$ 55,637
Amount of customer deposits and deferred revenue recognized in income	**(171,521)**	(189,318)
Additions to customer deposits and deferred revenue	**183,604**	177,753
Translation adjustments	**1,706**	(1,522)
Ending balance	**$ 56,339**	$ 42,550

Remaining performance obligations represent the transaction price allocated to performance obligations that are unsatisfied or partially unsatisfied as of the end of the reporting period. The following table includes estimated revenue expected to be recognized in the future related to performance obligations for sales of maintenance agreements, extended warranties, installation, and contracts with customer acceptance provisions included in customer deposits and deferred revenue as follows (in thousands):

	1 year	Thereafter	Total
Performance obligations as of September 28, 2019	$ 34,538	$ 8,012	$ 42,550
Performance obligations as of October 3, 2020	**42,715**	**13,624**	**56,339**

4. BUSINESS COMBINATIONS

Fiscal 2019 Acquisitions

Ondax

On October 5, 2018, we acquired privately held Ondax for approximately $12.0 million, excluding transaction costs. Ondax developed and produced 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. Ondax's operating results have been included in our Industrial Lasers & Systems segment. See Note 18, "Segment and Geographic Information."

4. BUSINESS COMBINATIONS (Continued)

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

Tangible assets:		
Cash	$	103
Accounts receivable		534
Inventories		1,793
Prepaid expenses and other assets		17
Deferred tax assets		681
Property and equipment		122
Liabilities assumed		(499)
Intangible assets:		
Existing technology		5,600
Customer relationships		300
Goodwill		3,333
Total	$	11,984

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 useful lives of 1 to 8 years. The fair values of the acquired intangibles were 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 the development of new technologies; and (2) the potential to leverage our sales force to attract new customers.

In the quarter ended April 4, 2020, we performed an interim impairment test and the entire goodwill balance and a portion of the existing technology intangible assets were impaired. See Note 8, "Goodwill and Intangible Assets".

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

Quantum

On October 5, 2018, we acquired certain assets of Quantum Coating, Inc. ("Quantum") for approximately $7.0 million, excluding transaction costs, and accounted for the transaction as an asset purchase.

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

Tangible assets:		
Property and equipment	$	2,770
Intangible assets:		
Existing technology		1,600
Customer relationships		230
Production know-how		2,300
Backlog		100
Total	$	7,000

4. BUSINESS COMBINATIONS (Continued)

The identifiable intangible assets are being amortized over their respective useful lives of 1 to 5 years. The fair values of the acquired intangibles were 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.

Fiscal 2018 Acquisitions

On March 8, 2018, we acquired OR Laser for approximately $47.4 million, excluding transaction costs. OR Laser produced 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 18, "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 were being amortized over their respective useful lives of 1 to 8 years until they were fully impaired in the quarter ended April 4, 2020. 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 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.

4. BUSINESS COMBINATIONS (Continued)

In the quarter ended April 4, 2020, we performed an interim impairment test and the entire goodwill balance and remaining net book value of the existing technology and customer relationships intangible assets were fully impaired. See Note 8, "Goodwill and Intangible Assets".

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.

5. 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 October 3, 2020 and September 28, 2019, we had one investment carried on a cost basis. See Note 9, "Balance Sheet Details." If we were to fair value this investment, it would be based upon Level 3 inputs. This investment is not considered material to our consolidated financial statements.

We measure the fair value of outstanding debt obligations for disclosure purposes on a recurring basis. As of October 3, 2020, the current and long-term portion of long-term obligations of $6.8 million and $411.1 million, respectively, are reported at amortized cost. As of September 28, 2019, the current and long-term portion of long-term obligations of $4.9 million and $392.2 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.

5. FAIR VALUES (Continued)

Financial assets and liabilities measured at fair value as of October 3, 2020 and September 28, 2019 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 2020			Fiscal year-end 2019		
		(Level 1)	(Level 2)		(Level 1)	(Level 2)
Assets:						
Cash equivalents:						
Money market fund deposits	**$ 36,646**	**$ 36,646**	**$ —**	$ 21,422	$ 21,422	$ —
Certificates of deposit	**56,191**	**56,191**	**—**	—	—	—
Short-term investments:						
U.S. Treasury and agency obligations [1]	**35,346**	**—**	**35,346**	120	—	120
Prepaid and other assets:						
Foreign currency contracts [2]	**812**	**—**	**812**	370	—	370
Money market fund deposits — Deferred comp and supplemental plan [3]	**203**	**203**	**—**	433	433	—
Mutual funds — Deferred comp and supplemental plan [3]	**22,778**	**22,778**	**—**	22,419	22,419	—
Total	**$ 151,976**	**$ 115,818**	**$ 36,158**	$ 44,764	$ 44,274	$ 490
Liabilities:						
Other current liabilities:						
Foreign currency contracts [2]	**(2,811)**	**—**	**(2,811)**	(960)	—	(960)
Total	**$ 149,165**	**$ 115,818**	**$ 33,347**	$ 43,804	$ 44,274	$ (470)

(1) 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.

(2) 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 7, "Derivative Instruments and Hedging Activities."

(3) 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.

6. 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 2020 year-end			
	Cost Basis	Unrealized Gains	Unrealized Losses	Fair Value
Cash and cash equivalents	**$ 440,258**	**$ —**	**$ —**	**$ 440,258**
Short-term investments:				
Available-for-sale securities:				
U.S. Treasury and agency obligations	**$ 35,311**	**$ 36**	**$ (1)**	**$ 35,346**
Total short-term investments	**$ 35,311**	**$ 36**	**$ (1)**	**$ 35,346**

	Fiscal 2019 year-end			
	Cost Basis	Unrealized Gains	Unrealized Losses	Fair Value
Cash and cash equivalents	$ 305,833	$ —	$ —	$ 305,833
Short-term investments:				
Available-for-sale securities:				
U.S. Treasury and agency obligations	$ 120	$ —	$ —	$ 120
Total short-term investments	$ 120	$ —	$ —	$ 120

There were less than $0.1 million of unrealized gains and losses at October 3, 2020. None of the $1,000 in unrealized losses at October 3, 2020 were considered to be other-than-temporary impairments. There were no unrealized gains or losses at September 28, 2019.

The amortized cost and estimated fair value of available-for-sale investments in debt securities as of October 3, 2020 and September 28, 2019 classified as short-term investments on our consolidated balance sheets, were as follows (in thousands):

	Fiscal year-end			
	2020		2019	
	Amortized Cost	Estimated Fair Value	Amortized Cost	Estimated Fair Value
Investments in available-for-sale debt securities due in less than one year	**$ 35,311**	**$ 35,346**	$ 120	$ 120

During fiscal 2020, we received $5,000 in proceeds from the sale of available-for-sale securities and realized no gross gains or losses. During fiscal 2019, we received no proceeds from the sale of available-for-sale securities and realized no gross gains or losses.

7. 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, Singapore Dollar, and Chinese Renminbi. 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

7. DERIVATIVE INSTRUMENTS AND HEDGING ACTIVITIES (Continued)

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 our 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.

Non-Designated Derivatives

The total 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):

	U.S. Notional Contract Value		U.S. Fair Value	
	Fiscal 2020 year-end	**Fiscal 2019 year-end**	**Fiscal 2020 year-end**	**Fiscal 2019 year-end**
Foreign currency hedge contracts				
Purchase	**$ 169,206**	$ 53,920	**$ (1,802)**	$ (117)
Sell	**$ (166,813)**	$ (86,984)	**$ (197)**	$ (473)

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 5, "Fair Values."

During fiscal 2020, 2019, and 2018, we recognized a gain of $1.1 million, a loss of $5.8 million, and a loss of $5.5 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 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.

8. 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.

In the quarter ended April 4, 2020, the worldwide spread of coronavirus ("COVID-19") created significant volatility, uncertainty and disruption to the global economy, representing an indicator to test our goodwill for impairment. Based on our internal projections and the preparation of our financial statements for the quarter ended April 4, 2020, and considering the forecasted decrease in demand due to the COVID-19 pandemic and other factors, we believed that the fair value of our ILS reporting unit might no longer have exceeded its carrying value and performed an interim goodwill impairment test on the ILS reporting unit. We also performed an interim goodwill impairment test on the OLS reporting unit.

Our goodwill impairment tests for the ILS and OLS reporting units were performed by comparing the fair value of the reporting units with their carrying values and recognizing an impairment charge for the amount by which the carrying value exceeded the fair value. Based on the estimated fair value of the ILS reporting unit, in the quarter ended April 4, 2020, we recorded a non-cash pre-tax charge related to the ILS reporting unit of $327.2 million, reducing the goodwill balance of the reporting unit to zero. The impairment charge was primarily the result of a decline in projected cash flows of the ILS reporting unit driven by lower forecasted sales volumes and profitability in several business units. The impairment charge was also the result of changes in certain market-related inputs to the analysis to reflect macro-economic changes caused by the impact of

8. GOODWILL AND INTANGIBLE ASSETS (Continued)

COVID-19, including lower pricing multiples for comparable public companies. No impairment charge was recognized for the OLS reporting unit as the fair value significantly exceeded the carrying value of the reporting unit.

In assessing goodwill for impairment, we were required to make significant judgments related to the fair value of our reporting units. We used a combination of the Income (discounted cash flow) approach and the Market (market comparable) approach to estimate the fair value of our reporting units. 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. Our assumptions used in the forecasts are based on historical data, supplemented by current and anticipated market conditions, estimated growth rates, and management's plans. The rate of return on cost of capital is weighted based on the capitalization of comparable companies. We utilized a discount rate for each of our reporting units that represents the risks that our businesses face, considering their sizes, their current economic environment and other industry data as we believe is appropriate. The Market approach determines fair value by comparing the reporting units to comparable companies in similar lines of business that are publicly traded. The selection of comparable companies is based on the markets in which the reporting units operate giving consideration to risk profiles, size, geography and diversity of products and services. 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. We utilized multiples for each of our reporting units that represent the risks that our businesses face, considering their sizes, their current economic environment and other industry data as we believe is appropriate. The interim goodwill impairment testing results were also reconciled with our market capitalization as of April 4, 2020, as the final step in the impairment testing.

Before performing the goodwill impairment test for the ILS reporting unit, we performed impairment tests on the long-lived assets allocated to the asset group of the ILS reporting unit, including intangible assets, property, plant and equipment, and ROU assets as of April 4, 2020, due primarily to the same indicators that led to the interim goodwill impairment testing. Based on the impairment tests performed, we concluded that some of the long-lived assets allocated to the asset group of the ILS reporting unit were impaired as of April 4, 2020. Accordingly, we recorded non-cash pre-tax charges in the quarter ended April 4, 2020 related to the intangible assets, property, plant and equipment, and right-of-use ("ROU") assets of the ILS reporting unit of $33.9 million, $85.6 million, and $1.8 million, respectively. We did not identify any indicators that would lead us to believe that the carrying value of the long-lived assets allocated to the asset group of the OLS reporting unit may not be recoverable as of April 4, 2020. In fiscal 2019, we did not have any impairment of intangible assets as a result of the impairment analysis.

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. In assessing our long-lived assets for impairment, we were required to make significant judgments related to the fair value of our long-lived assets, which are comprised of personal property, real property, and intangible assets. We used a combination of the Income, the Market approach, and the Cost (cost to create) approach to estimate the fair value of our long-lived assets. Our personal property assets consist of laser manufacturing and assembly equipment, semiconductor tools, laboratory and test equipment, furniture and fixtures, and computer hardware and software. We used the Cost Approach (with support from the Market Approach) to estimate the fair value of our personal property, taking into consideration the physical deterioration, functional obsolescence, and economic obsolescence of our personal property assets. Our real property assets consist of land and buildings, land rights (ground leased), and ROU assets. In determining the fair value of our real property assets, we used a combination of the Income, Market (sales comparison), and Cost approaches. We considered historical transaction information, current market conditions, operating performance, forecast growth, and market-derived rates of return in our real property determination of fair value. The fair value of our ROU assets was determined using the Income approach by considering off-market components of the associated ROU leases. Our intangible assets consist of technology and customer relationship assets, and we used the Income approach to estimate the fair value of our intangible assets. We identified cash flows associated with each intangible asset, which were discounted at an after-tax rate of return appropriate for the risk profile of each intangible asset.

We performed our annual impairment test using the opening balance sheet as of the first day of the fourth quarter of fiscal 2020 and noted no indications of impairment or triggering events, not already considered in the quarter ended April 4, 2020. In our fiscal 2020 annual testing, for our OLS reporting unit we conducted a qualitative assessment of the goodwill during the fourth quarter 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 amounts. Based on our assessment, goodwill in the OLS reporting unit was not impaired as of the first day of the fourth quarter of fiscal 2020. As such, it was not necessary to perform

8. GOODWILL AND INTANGIBLE ASSETS (Continued)

the goodwill impairment test in the fourth quarter of fiscal 2020. There is no goodwill in the ILS reporting unit due to the impairment of all goodwill of the ILS reporting unit in the second quarter of fiscal 2020. Between the completion of our assessment and the end of the fourth quarter of fiscal 2020, we noted no indications of impairment or triggering events to cause us to review goodwill for potential impairment.

The changes in the carrying amount of goodwill by segment for fiscal 2020 and 2019 are as follows (in thousands):

	Industrial Lasers & Systems (1)	OEM Laser Sources (2)	Total
Balance as of September 29, 2018	$ 342,208	$ 100,732	$ 442,940
Additions (see Note 4)	3,333	—	3,333
Translation adjustments	(15,260)	(3,912)	(19,172)
Balance as of September 28, 2019	330,281	96,820	427,101
Impairment charges	(327,203)	—	(327,203)
Translation adjustments	(3,078)	4,497	1,419
Balance as of October 3, 2020	$ —	$ 101,317	$ 101,317

(1) Gross amount of goodwill for our ILS segment was $340.2 million at October 3, 2020 and $343.3 million at September 28, 2019, respectively. At October 3, 2020 and September 28, 2019, the accumulated impairment loss for the ILS reporting unit was $340.2 million and $13.0 million, respectively, reflecting impairment charges in fiscal 2020 and fiscal 2009.

(2) Gross amount of goodwill for our OLS segment was $110.0 million and $105.5 million at October 3, 2020 and September 28, 2019, respectively. At both October 3, 2020 and September 28, 2019, the accumulated impairment loss for the OLS reporting unit was $8.7 million reflecting impairment charges in fiscal 2003 and fiscal 2009.

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

	Fiscal year-end 2020			Fiscal year-end 2019		
	Gross Carrying Amount	Accumulated Amortization	Net	Gross Carrying Amount	Accumulated Amortization	Net
Existing technology	**$ 46,547**	**$ (37,630)**	**$ 8,917**	$ 193,704	$ (131,429)	$ 62,275
Customer relationships	**24,388**	**(12,923)**	**11,465**	42,083	(21,512)	20,571
Trade name	—	—	—	5,261	(5,138)	123
Production know-how	**2,300**	**(917)**	**1,383**	2,300	(456)	1,844
Total	**$ 73,235**	**$ (51,470)**	**$ 21,765**	$ 243,348	$ (158,535)	$ 84,813

For accounting purposes, when an intangible asset is fully amortized, it is removed from the disclosure schedule. The net carrying amounts as of fiscal 2020, have been reduced by impairment charges of $27.7 million and $6.2 million for existing technology and customer relationships, respectively.

During the third quarter of fiscal 2019, in conjunction with our decision to exit a portion of our High Power Fiber Laser ("HPFL") business and consolidate all HPFL manufacturing and engineering functions in our Tampere, Finland facility by transferring certain HPFL activities from our Hamburg, Germany facility, we abandoned the in-process research and development project totaling $4.7 million and fully amortized the intangible asset. See Note 19, "Restructuring Charges."

The weighted average remaining amortization periods for existing technology, customer relationships, and production know-how are approximately 1.5 years, 6.1 years, and 3.0 years, respectively. Amortization expense for intangible assets during fiscal 2020, 2019, and 2018 was $30.1 million, $61.5 million, and $60.0 million, respectively. The change in accumulated amortization also includes $2.9 million (increase) and $7.8 million (decrease) of foreign exchange impact for fiscal 2020 and fiscal 2019, respectively.

8. GOODWILL AND INTANGIBLE ASSETS (Continued)

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

	Estimated Amortization Expense
2021	$ 9,722
2022	3,272
2023	2,703
2024	1,920
2025	1,919
Thereafter	2,229
Total	$ 21,765

9. BALANCE SHEET DETAILS

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

	Fiscal year-end	
	2020	**2019**
Prepaid and refundable income taxes	**$ 50,548**	$ 44,096
Other taxes receivable	**13,006**	11,208
Prepaid expenses and other assets	**24,696**	22,689
Total prepaid expenses and other assets	**$ 88,250**	$ 77,993

Other assets consist of the following (in thousands):

	Fiscal year-end	
	2020	**2019**
Assets related to deferred compensation arrangements (see Note 12)	**$ 39,720**	$ 35,842
Deferred tax assets (see Note 16)	**102,028**	87,011
Right of use assets, net - operating leases (See Note 11)	**85,905**	—
Right of use assets, net - finance leases (See Note 11)	**656**	—
Other assets [(1)]	**14,266**	18,111
Total other assets	**$ 242,575**	$ 140,964

(1) In the first quarter of fiscal 2019, we invested 3.0 million Euro ($3.4 million) in 3D-Micromac AG, a private company in Germany. The investment is included in other assets and is being carried on a cost basis and is adjusted for impairment if we determine that indicators of impairment exist at any point in time. During the second quarter of fiscal 2020, we determined that our investment became impaired and wrote it down to its fair value. As a result, we recorded a non-cash impairment charge of $2.5 million to operating expense in our results of operations in the second quarter of fiscal 2020.

9. BALANCE SHEET DETAILS (Continued)

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

	Fiscal year-end	
	2020	2019
Accrued payroll and benefits	$ 54,211	$ 55,698
Operating lease liability, current (see Note 11)	15,366	—
Finance lease liability, current (see Note 11)	399	—
Accrued expenses and other	36,432	41,039
Warranty reserve (see Note 2)	35,032	36,460
Customer deposits	9,717	10,843
Deferred revenue	32,998	23,695
Total other current liabilities	$ 184,155	$ 167,735

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

	Fiscal year-end	
	2020	2019
Long-term taxes payable	$ 15,374	$ 37,385
Operating lease liability, long-term (see Note 11)	75,264	—
Finance lease liability, long-term (see Note 11)	178	—
Deferred compensation (see Note 12)	42,854	39,715
Deferred tax liabilities (see Note 16)	15,721	27,785
Deferred revenue	13,624	8,012
Asset retirement obligations liability (see Note 2)	5,892	4,934
Defined benefit plan liabilities (see Note 17)	45,810	45,862
Other long-term liabilities	6,357	2,188
Total other long-term liabilities	$ 221,074	$ 165,881

10. BORROWINGS

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 "Initial Credit Agreement" and, as amended by the Amendments (defined below), the "Credit Agreement"). The Initial 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 (the "Revolving Credit Facility") with a $30.0 million letter of credit sublimit and a $10.0 million swing line sublimit, in each case, which may be increased from time to time pursuant to an incremental feature set forth in the Credit Agreement. The Initial Credit Agreement was amended on May 8, 2017 (the "First Amendment") to reduce the interest rate margins applicable to the Euro Term Loan and was amended again on July 5, 2017 (the "Second Amendment" and, together with the First Amendment, the "Amendments") to make certain technical changes in connection with the conversion of the Borrower from a German company with limited liability to a German limited partnership.

The Credit Agreement contains customary mandatory prepayment provisions. 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 (in the first quarter of fiscal 2024), at which time all outstanding principal and accrued and unpaid interest on the Euro Term Loan must be repaid.

10. BORROWINGS (continued)

As of October 3, 2020, the outstanding principal amount of the Euro Term Loan was 358.2 million Euros. As of October 3, 2020, the outstanding amount of the Revolving Credit Facility was $10.0 million plus a 10.0 million Euro letter of credit.

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 that is subject to adjustment pursuant to a pricing grid based on consolidated total gross leverage ratio. At October 3, 2020, the applicable margin for Euro Term Loans borrowed as Eurocurrency Rate loans was 2.25% per annum and as Base Rate loans was 1.25%. The applicable margin for revolving loans borrowed as Eurocurrency Rate loans was 4.25% per annum and as Base Rate loans was 3.25% per annum. 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).

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.

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 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. We were in compliance with all covenants at October 3, 2020.

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 First 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 repayments. 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 in the consolidated balance sheets and will be amortized to interest expense using the straight-line method over the contractual term of 5 years of the Revolving Credit Facility.

Additional sources of cash available to us were international currency lines of credit and bank credit facilities totaling $16.9 million as of October 3, 2020, of which $16.1 million was unused and available. These unsecured international credit facilities were used in Europe and Japan in fiscal 2020. As of October 3, 2020, we had utilized $0.8 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):

10. BORROWINGS (continued)

	Fiscal year-end	
	2020	**2019**
Current portion of Euro Term Loan [(1)]	**$ 4,970**	$ 2,748
1.3% Term loan due 2024	**1,465**	1,367
1.0% State of Connecticut term loan due 2023	**382**	378
Capital lease obligations	**—**	370
Line of credit borrowings	**10,000**	10,000
Total short-term borrowings and current portion of long-term obligations	**$ 16,817**	$ 14,863

(1) Net of debt issuance costs of $2.9 million and $4.6 million at October 3, 2020 and September 28, 2019, respectively.

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

	Fiscal year-end	
	2020	**2019**
Euro Term Loan due 2024 [(1)]	**$ 406,099**	$ 385,208
1.3% Term loan due 2024	**4,395**	5,466
1.0% State of Connecticut term loan due 2023	**646**	1,028
Capital lease obligations	**—**	536
Total long-term obligations	**$ 411,140**	$ 392,238

(1) Net of debt issuance costs of $5.9 million and $6.4 million at October 3, 2020 and September 28, 2019, respectively.

Contractual maturities of our debt obligations, excluding line of credit borrowings, as of October 3, 2020 are as follows (in thousands):

	Amount
2021	$ 9,700
2022	9,698
2023	9,584
2024	397,752
Total	$ 426,734

11. LEASES

We determine if an arrangement contains a lease at inception for arrangements with an initial term of more than 12 months, and classify it as either a finance or operating lease. We lease certain real and personal property from unrelated third parties under non-cancellable operating leases that expire at various dates through fiscal 2032. These operating leases are mainly for administrative offices, research-and-development, and manufacturing facilities, as well as sales offices in various countries around the world. Certain leases require us to pay property taxes, insurance, and routine maintenance, and include escalation clauses. Many leases include one or more options to renew. We assume renewals in our determination of the lease term when the renewals are deemed to be reasonably assured at lease commencement. We have also entered into various finance leases to obtain servers and certain other equipment for our operations. These arrangements are typically for three to six years. Our assets, liabilities, and lease costs related to finance leases are immaterial.

As the rates implicit in our leases are not readily determinable, we use incremental borrowing rates based on the information available at the commencement date in determining the present value of future lease payments. We consider both the credit rating and the length of the lease when calculating the incremental borrowing rate. We combine lease and non-lease components into a single lease component for both our operating and finance leases.

For the purpose of lease liability measurement, we consider only payments that are fixed and determinable at the time of commencement. Any variable payments that depend on an index or rate are expensed as incurred.

11. LEASES (continued)

We generally recognize sublease income on a straight-line basis over the sublease term.

As a result of interim impairment testing performed on long-lived assets in the quarter ended April 4, 2020, we recorded non-cash pre-tax charges related to the ROU assets of the ILS reporting unit of $1.8 million in the quarter ended April 4, 2020. See Note 8, "Goodwill and Intangible Assets" for discussion of the interim impairment testing.

In fiscal 2020, we completed a sale-leaseback transaction for our Hamburg, Germany facility in which we sold the buildings for a purchase price, net of expenses, of $19.6 million and leased back a portion of the facilities with lease terms from 6 to 15 years with early termination provisions after 3 and 5 years, respectively. The sale qualified for sale-leaseback operating lease accounting classification and we recorded a gain, net of selling costs, on the transaction of $2.2 million, which is recorded in selling, general and administrative expense in the consolidated statements of operations. We also recorded operating lease right of use assets of $5.1 million and corresponding operating lease liabilities of $5.1 million. The non-cash portion of the gain of $4.0 million is included in Other non-cash expense (gain) within cash flows from operations in our consolidated statements of cash flows.

The components of operating lease costs (in thousands), lease term (in years) and discount rate are as follows:

	Fiscal 2020
Operating lease cost	$ 19,629
Variable lease cost	1,421
Short-term lease cost	459
Sublease income	(126)
Total lease cost	$ 21,383

	Fiscal year-end 2020
Weighted average remaining lease term	7.8
Weighted average discount rate	4.9 %

Supplemental cash flow information related to leases are as follows (in thousands):

	Fiscal year-end 2020
Operating cash outflows from operating leases	$ 19,391
ROU assets obtained in exchange for new operating lease liabilities	10,884

See Note 9, "Balance Sheet Details" for supplemental balance sheet information related to leases.

11. LEASES (continued)

Maturities of our operating lease liabilities, which do not include short-term leases and variable lease payments at October 3, 2020 are as follows (in thousands):

	Operating Leases
2021	$ 18,781
2022	17,909
2023	15,627
2024	12,107
2025	10,844
2026 and thereafter	36,902
Total minimum lease payments	112,170
Amounts representing interest	(21,540)
Present value of total operating lease liabilities	$ 90,630

As of September 28, 2019, future minimum lease payments as defined under the previous lease accounting guidance ASC 840 under our non-cancellable operating leases are as follows (in thousands):

	Amount
2020	$ 19,578
2021	14,579
2022	10,405
2023	6,817
2024	4,156
2025 and thereafter	10,755
Total minimum lease payments	$ 66,290

Rent expense was $22.9 million and $22.1 million in fiscal 2019, and 2018, respectively.

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 plans, 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	
	2020	2019
Cash surrender value of life insurance contracts	$ 18,520	$ 16,223
Fair value of mutual and money market funds	22,981	22,852
Total assets	$ 41,501	$ 39,075
Total assets, included in:		
Prepaid expenses and other assets	$ 1,781	$ 3,233
Other assets	39,720	35,842
Total assets	$ 41,501	$ 39,075

	Fiscal year-end	
	2020	2019
Total deferred compensation liability, included in:		
Other current liabilities	$ 1,781	$ 3,233
Other long-term liabilities	42,854	39,715
Total deferred compensation liability	$ 44,635	$ 42,948

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 net gains of $6.1 million in fiscal 2020, $1.1 million in fiscal 2019, and $4.8 million in fiscal 2018, and fluctuate on a quarterly basis. Changes in the obligation to plan participants are recorded as a component of operating expenses and cost of sales; such amounts were net losses of $5.3 million in fiscal 2020, $1.5 million in fiscal 2019, and $5.2 million in fiscal 2018, and fluctuate on a quarterly basis. 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

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 2020, 2019, and 2018 were $6.1 million, $5.7 million, and $5.6 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 2020, 2019, and 2018, a total of 107,284 shares, 108,034 shares, and 66,099 shares, respectively, were purchased by and distributed to employees at an average price of $114.54, $109.32, and $159.97 per share, respectively. At fiscal 2020 year-end, we had 143,465 shares of our common stock reserved for future issuance under the plan.

12. EMPLOYEE STOCK AWARD AND BENEFIT PLANS (continued)

Stock Award Plans

We maintain stock plans in which employees, service providers, and non-employee directors are eligible participants. The plans, the 2011 Equity Incentive Plan (the "2011 Plan") and the Equity Incentive Plan (the "2020 Plan"), provide 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 was able to grant options and awards (time-based restricted stock units and performance restricted stock units), of which grants with respect to 530,115 shares of common stock remained outstanding at fiscal 2020 year-end (calculated at 100% of target amount for performance awards). Under the 2020 Plan, Coherent may grant options and awards (time-based restricted stock units and performance restricted stock units) to purchase up to 3,080,000 shares of common stock plus any forfeited or cancelled shares subject to outstanding awards under the 2011 Plan, of which 3,034,036 shares remained available for grant at fiscal 2020 year-end. At fiscal 2020 year-end, all outstanding stock options and restricted stock units have been issued under plans approved by our shareholders. Following approval of the 2020 Plan by our shareholders on April 27, 2020, there will be no further grants of awards under the 2011 Equity Incentive Plan. However, the 2011 Equity Incentive Plan will continue to govern awards previously granted under it.

Since adoption of the 2011 Plan and the 2020 Plan, no stock options have been granted to employees. No options are outstanding as of fiscal 2020 year-end.

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, market-based or performance-based conditions for vesting. Until restricted stock vests, shares (including those issuable upon vesting of the applicable restricted stock unit) are generally 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. For example, the initial grants made to new members of the Board of Directors vest over two years and members of the Board of Directors have annual grants tied to their reelection to the Board, which vest on the following February 15.
- The market-based performance restricted stock unit award grants are generally 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 award) over the performance period compared with the performance of the applicable Russell Index or companies therein (or as otherwise determined by the Compensation and HR Committee).
- The performance restricted stock unit award grants based on goals related to free cash flow target amounts for the fiscal year vested as of fiscal 2020 year-end.

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

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.

12. EMPLOYEE STOCK AWARD AND BENEFIT PLANS (continued)

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 2020, 2019, and 2018 were estimated using the following weighted-average assumptions:

	Employee Stock Purchase Plans		
	Fiscal		
	2020	2019	2018
Expected life in years	**0.5**	0.5	0.5
Expected volatility	**58.0 %**	47.9 %	50.1 %
Risk-free interest rate	**1.0 %**	2.4 %	1.6 %
Weighted average fair value per share	**$ 43.54**	$ 40.77	$ 64.39

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 or companies therein and could range from no units to a maximum of twice the initial award units.

The weighted average fair value for the performance units was determined using a Monte Carlo simulation model incorporating the following weighted average assumptions:

	Fiscal		
	2020	2019	2018
Risk-free interest rate	**0.8 %**	2.9 %	1.7 %
Volatility	**50.5 %**	43.7 %	37.0 %
Weighted average fair value	**$ 161.46**	$ 117.43	$ 315.05

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.

In addition, during fiscal 2020, we issued performance restricted stock unit award grants to certain employees with vesting based on goals related to free cash flow target amounts, with the initial fair value determined based on our closing stock price on the date of grant. Such awards were granted to serve as a performance incentive with a pay-for-performance forward-looking free cash flow target for the fiscal year in recognition of the impact of the COVID-19 pandemic. The number of shares issuable under these performance units upon satisfaction of the free cash flow performance criteria is capped at 100% of target. The total stock-based compensation of these awards will be adjusted based on the level of achievement of free cash flow for fiscal 2020. We believe that these awards will vest at 100% of target.

12. EMPLOYEE STOCK AWARD AND BENEFIT PLANS (continued)

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 2020, 2019, and 2018 (in thousands):

	Fiscal		
	2020	**2019**	**2018**
Cost of sales	**$ 5,314**	$ 4,880	$ 4,403
Research and development	**4,478**	2,990	3,247
Selling, general and administrative	**34,995**	28,596	25,088
Income tax benefit	**(5,640)**	(4,946)	(5,073)
	$ 39,147	$ 31,520	$ 27,665

During fiscal 2020, $6.7 million of stock-based compensation cost was capitalized as part of inventory for all stock plans, $5.3 million was amortized into cost of sales, and $2.8 million remained in inventory at October 3, 2020. During fiscal 2019, $4.8 million of stock-based compensation cost was capitalized as part of inventory for all stock plans, $4.8 million was amortized into cost of sales, and $1.5 million remained in inventory at September 28, 2019.

At fiscal 2020 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 $37.7 million. We do not estimate forfeitures and account for them as they occur. This cost will be amortized on a straight-line basis over a weighted-average period of approximately 1.5 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. We adopted the new accounting standard on share-based compensation in the first quarter of fiscal 2018. As a result, we recognized net excess tax benefits from stock award exercises and restricted stock unit vesting as a discrete tax benefit, which reduced the provision for income taxes by $0.9 million, $2.5 million, and $12.8 million for fiscal 2020, 2019, and 2018, respectively.

Stock Awards Activity

At each of fiscal 2019 and 2018 year-end, we had 24,000 shares subject to vested stock options outstanding. The vested stock options were exercised in fiscal 2020 and none are outstanding at fiscal 2020 year-end.

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 2020, 2019, and 2018 (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 September 30, 2017	399	$ 118.83	176	$ 105.34
Granted	99	254.20	78	315.05
Vested [(1)]	(213)	88.45	(95)	70.57
Forfeited	(6)	119.66	—	—
Nonvested stock at September 29, 2018	279	$ 155.24	159	$ 155.76
Granted	195	128.25	105	117.43
Vested[(1)]	(169)	127.90	(131)	74.48
Forfeited	(10)	170.97	—	—
Nonvested stock at September 28, 2019	295	$ 152.47	133	$ 184.26
Granted	284	141.05	84	152.96
Vested[(1)]	(150)	150.91	(81)	163.17
Forfeited	(10)	169.92	—	—
Nonvested stock at October 3, 2020	419	$ 144.87	136	$ 177.54

(1) Service-based restricted stock units vested during each fiscal year. Performance-based restricted stock units included at 100% of target goal. Under the terms of the market-based awards, the recipient may earn between 0% and 200% of the award. Under the terms of the performance-based awards based on free cash flow targets, the recipient may earn between 0% and 100% 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 88,000 in fiscal 2020, 120,000 in fiscal 2019, and 131,000 in fiscal 2018; tax payments made were $13.5 million, $15.2 million, and $36.3 million, respectively.

13. 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 October 3, 2020, we did not have any material indemnification claims that were probable or reasonably possible.

Commitments

We maintain commitments to purchase inventory from our suppliers as well as fixed assets, services and other assets in the ordinary course of business. As of October 3, 2020, we had total estimated significant purchase commitments for inventory of approximately $33.7 million and significant purchase obligations for fixed assets and services of $50.8 million.

Legal Proceedings

We are subject to legal claims and litigation arising in the ordinary course of business, such as contract-related, product sales and servicing, real estate, product liability, regulatory matters, employment or intellectual property claims.

13. COMMITMENTS AND CONTINGENCIES (continued)

Although we do not expect that such 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, or in future periods.

The United States and many foreign governments impose tariffs and duties on the import and export of certain products we sell and purchase. From time to time our customs compliance, product classifications, duty calculations, and payments are reviewed or audited by government agencies. Any adverse result in such a review or audit could negatively affect our results in the period in which they occur, or in future periods.

German authorities are currently investigating an export compliance matter involving one of our German subsidiaries involving four former employees (whose employment was terminated following our discovery of this matter). While under German law the subsidiary can be held liable for certain infringements by its employees of German export control laws we believe that this matter involves less than approximately 1.5 million Euros in transactions in the period currently under investigation and do not believe that the final resolution of this matter will be material to our consolidated financial position, results of operations or cash flows. However, the German government investigation is ongoing and it is possible that substantial payments, fines, penalties or damages could result. Even though we do not currently expect this matter to be material to our consolidated financial position, results of operations or cash flows, circumstances could change as the investigation progresses.

14. 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, thereby repurchasing the full amount authorized under this program.

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. During fiscal 2019, we repurchased and retired 603,828 shares of outstanding common stock under this program at an average price of $128.20 per share for a total of $77.4 million. We made no repurchases under the program during fiscal 2020 and the program expired on December 31, 2019.

On February 5, 2020, our board of directors authorized a stock repurchase program authorizing the Company to repurchase up to $100.0 million of our common stock through January 31, 2021.We made no repurchases under the program during fiscal 2020.

15. OTHER INCOME (EXPENSE), NET

Other income (expense) includes other-net which is comprised of the following (in thousands):

	Fiscal		
	2020	**2019**	**2018**
Foreign exchange loss	**$ (3,486)**	$ (5,774)	$ (11,286)
Gain on deferred compensation investments, net (Note 12)	**6,099**	1,140	4,835
Other	**828**	(410)	(735)
Other—net	**$ 3,441**	$ (5,044)	$ (7,186)

16. 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		
	2020	**2019**	**2018**
Currently payable:			
Federal	**$ (1,660)**	$ 1,995	$ 1,163
State	**471**	557	114
Foreign	**1,176**	13,448	107,487
	(13)	16,000	108,764
Deferred and other:			
Federal	**(2,343)**	(407)	26,334
State	**(1,605)**	516	(489)
Foreign	**(24,623)**	(9,886)	(20,414)
	(28,571)	(9,777)	5,431
Provision for (benefit from) income taxes	**$ (28,584)**	$ 6,223	$ 114,195

The components of income from continuing operations before income taxes consist of (in thousands):

	Fiscal		
	2020	**2019**	**2018**
United States	**$ (98,900)**	$ 54,480	$ 65,272
Foreign	**(343,823)**	5,568	296,283
Income (loss) from continuing operations before income taxes	**$ (442,723)**	$ 60,048	$ 361,555

The reconciliation of the income tax expense (benefit) at the U.S. Federal statutory rate (21.0% in fiscal 2020, 21.0% in fiscal 2019, and 24.5% in fiscal 2018) to actual income tax expense is as follows (in thousands):

16. INCOME TAXES (continued)

	Fiscal		
	2020	**2019**	**2018**
Federal statutory tax expense (benefit)	**$ (92,972)**	$ 12,610	$ 88,684
Valuation allowance	**15,231**	7,925	4,263
Taxes on foreign earnings at rates greater (less) than U.S. rates, net	**(27,041)**	(8,210)	8,417
Stock-based compensation	**3,640**	556	(8,536)
State income taxes, net of federal income tax benefit	**(1,249)**	1,131	(373)
Research and development credit	**(4,350)**	(3,665)	(6,972)
Deferred compensation	**(564)**	(206)	(560)
Release of unrecognized tax benefits	**(20,027)**	(6,688)	(352)
Release of interest accrued for unrecognized tax benefits	**(4,232)**	(205)	(156)
Reversal of competent authority	**8,552**	—	—
U.S. tax reform impact	**—**	—	26,653
Deferred taxes on foreign earnings	**1,303**	1,215	—
Write-off of withholding tax credits	**—**	1,134	—
Goodwill impairment	**89,962**	—	—
Other, net	**3,163**	626	3,127
Provision for (benefit from) income taxes	**$ (28,584)**	$ 6,223	$ 114,195
Effective tax rate	**6.5 %**	10.4 %	31.6 %

Our effective tax rate on loss from continuing operations before income taxes for fiscal 2020 of 6.5% was lower than the U.S. federal tax rate of 21.0%. Our effective tax rate benefit for fiscal 2020 was unfavorably impacted primarily due to the impairment of goodwill that is not deductible for tax purposes and the establishment of valuation allowances for certain deferred tax assets. These unfavorable impacts were partially offset primarily from the release of unrecognized tax benefits net of settlements and competent authority offsets and losses in foreign jurisdictions subject to tax rates that are higher than the U.S. tax rates.

The effective tax rate on income from continuing operations before income taxes for fiscal 2019 of 10.4% was lower than the U.S. federal tax rate of 21.0% primarily due to the tax benefit from losses of our German subsidiaries, which are subject to higher tax rates than U.S. tax rates, adjustments related to the Tax Act's transition tax, the net excess tax benefits from restricted stock unit vesting, the benefit of federal research and development tax credits and our Singapore and South Korea tax exemptions. These amounts are partially offset by an accrual for foreign withholding taxes on certain current year 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 Section 162(m).

On March 27, 2020, the Coronavirus Aid, Relief, and Economic Security Act (the "CARES Act") was enacted and signed into law. U.S. GAAP rules require recognition of the tax effects of new legislation during the reporting period that includes the enactment date. The tax relief measures for businesses include a five-year net operating loss ("NOL") carryback for any NOL generated in a taxable year beginning after December 31, 2017 and before January 1, 2021, suspension of the 80% limitation of NOL utilization for taxable years beginning before 2021, changes in the deductibility of interest, acceleration of alternative minimum tax credit refunds, payroll tax relief, and technical corrections allowing accelerated deductions for qualified improvement property. The CARES Act also provided other non-tax benefits, including employee retention credits, to assist businesses impacted by the pandemic. There is no material impact of the tax benefits under the CARES Act on our consolidated financial statements.

Coherent Singapore made an additional capital contribution to Coherent Korea in 2019 to take advantage of the High-Tech tax exemption provided by the Korean authorities. The High-Tech tax exemption is effective retroactively to the beginning of fiscal 2019 and the amount was used entirely in that year. There was no additional benefit available for fiscal 2020. For fiscal 2019, the tax exemption decreased Coherent Korea income taxes by approximately $2.4 million and the benefit of the tax holiday on net income (loss) per diluted share was $0.10.

16. INCOME TAXES (continued)

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 Coherent Singapore income taxes by approximately $2.6 million, $3.9 million, and $2.5 million in fiscal 2020, fiscal 2019, and fiscal 2018, respectively. The benefits of the tax holiday on net income (loss) per diluted share were $0.11, $0.16, and $0.10, respectively.

The significant components of deferred tax assets and liabilities were (in thousands):

	Fiscal year-end	
	2020	**2019**
Deferred tax assets:		
Reserves and accruals not currently deductible	**$ 28,520**	$ 24,069
Operating loss carryforwards and tax credits	**83,447**	71,890
Deferred revenue	**4,412**	986
Depreciation and amortization	**14,362**	—
Stock-based compensation	**4,906**	5,649
Competent authority offset to transfer pricing tax reserves	**4,283**	10,585
Accumulated translation adjustment	**2,508**	5,459
Retirement and pension	**17,982**	16,618
Lease liabilities	**21,737**	—
Other	**165**	4,423
Total gross deferred tax assets	**182,322**	139,679
Valuation allowance	**(57,707)**	(41,491)
Total net deferred tax assets	**124,615**	98,188
Deferred tax liabilities:		
Depreciation and amortization	—	23,625
Deferred tax liabilities on foreign earnings	**16,055**	14,603
Inventory capitalization	**1,394**	734
Right of use assets	**20,859**	—
Total gross deferred tax liabilities	**38,308**	38,962
Net deferred tax assets	**$ 86,307**	$ 59,226

In determining our fiscal 2020 and 2019 tax provisions under ASC 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 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 2020 and 2019 year-ends.

During fiscal 2020, we increased our valuation allowance on deferred tax assets by $16.2 million to $57.7 million, primarily due to the net operating losses generated from certain foreign entities and California research and development tax credits, which are not expected to be recognized. At October 3, 2020, we 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. 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):

16. INCOME TAXES (continued)

	Fiscal year-end	
	2020	**2019**
Non-current deferred income tax assets	**$ 102,028**	$ 87,011
Non-current deferred income tax liabilities	**(15,721)**	(27,785)
Net deferred tax assets	**$ 86,307**	$ 59,226

We have various tax attribute carryforwards which include the following:

- Foreign gross net operating loss carryforwards are $114.2 million, of which $87.1 million have no expiration date and $27.2 million have various expiration dates beginning in fiscal 2021. Among the total of $114.2 million foreign net operating loss carryforwards, a valuation allowance of $104.3 million has been provided for certain jurisdictions since the recovery of the carryforwards is uncertain. U.S. federal and certain state gross net operating loss carryforwards are $11.8 million and $30.7 million, respectively, which were acquired from our acquisitions. A full valuation allowance against certain state net operating losses of $30.7 million has been recorded.

- U.S. federal R&D credit carryforwards of $38.7 million are scheduled to expire beginning in fiscal 2025. California R&D credit carryforwards of $34.0 million have no expiration date. A total of $28.8 million valuation allowance, before U.S. federal benefit, has been recorded against California R&D credit carryforwards of $34.0 million since the recovery of the carryforwards is uncertain. Other states R&D credit carryforwards of $3.6 million are scheduled to expire beginning in fiscal 2021. A valuation allowance totaling $1.9 million, before U.S. federal benefit, has been recorded against certain state R&D credit carryforwards of $3.6 million since the recovery of the carryforwards is uncertain.

- U.S. federal foreign tax credit carryforwards of $53.4 million are scheduled to expire beginning in fiscal 2022.

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 2017 and 2011, respectively, are closed to examination. In our other major foreign jurisdictions and our major state jurisdictions, the years prior to fiscal 2014 and 2016, 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 November 2018, Coherent Korea Ltd. received a tax audit notice for fiscal 2016. The audit began in December 2018. The South Korean tax authorities also performed an audit focused on intercompany transfer pricing arrangements for fiscal 2014, 2015, and 2017. In May 2019, the South Korean tax authorities issued transfer pricing assessments for taxes, royalties, and sales commissions. We are in the process of appealing and contesting these assessments through the Competent Authority process between South Korea, Germany, and the United States. Accordingly, there is no change to our tax reserves at the time of filing of this annual report. We are continuing to monitor and evaluate this situation. In October 2020, the South Korean tax authorities advised us that they are performing an internal review of our initial and second High-Tech tax exemptions approved in fiscal 2013 and 2016, respectively. The tax authorities requested information to further substantiate the timing of the benefits of our exemptions and this review is currently ongoing.

In Germany, various Coherent and legacy Rofin entities are under audit for the years 2011 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.

16. INCOME TAXES (continued)

A reconciliation of the change in gross unrecognized tax benefits, excluding interest and penalties, is as follows (in thousands):

	Fiscal year-end		
	2020	**2019**	**2018**
Balance as of the beginning of the year	**$ 58,111**	$ 65,882	$ 47,566
Tax positions related to current year:			
Additions	**1,410**	605	19,033
Tax positions related to prior year:			
Additions	**86**	448	117
Reductions	**(17)**	(6,071)	—
Lapses in statutes of limitations	**(1,211)**	(639)	(700)
Decrease in unrecognized tax benefits based on settlement	**(19,463)**	—	—
Foreign currency revaluation adjustment	**591**	(2,114)	(134)
Balance as of end of year	**$ 39,507**	$ 58,111	$ 65,882

As of October 3, 2020, the total amount of gross unrecognized tax benefits including gross interest and penalties was $42.4 million, of which $31.2 million, if recognized, would affect our effective tax rate. In March 2020, German tax authorities completed their transfer pricing audits for certain legacy-Rofin German entities for fiscal 2013 through 2016. As a result, we released tax reserves of $17.3 million and reversed deferred tax assets of $8.7 million related to the competent authority offsets associated with the transfer pricing adjustments. In addition, legacy-Rofin U.S. audits for fiscal 2014 through 2016 were completed in fiscal 2020 and we recorded a benefit of $1.6 million. Our total gross unrecognized tax benefit, net of certain deferred tax assets is classified as a long-term taxes payable in the consolidated balance sheets. We include interest and penalties related to unrecognized tax benefits within the provision for income taxes. As of October 3, 2020, the total amount of gross interest and penalties accrued was $2.9 million and it is classified as Other long-term liabilities in the consolidated balance sheets. As of September 28, 2019, we had accrued $5.8 million for the gross interest and penalties and it is classified as Other long-term liabilities in the consolidated balance sheets.

A summary of the fiscal tax years that remain subject to examination, as of October 3, 2020, for our major tax jurisdictions is:

United States—Federal	2017—forward
United States—Various States	2016—forward
Netherlands	2014—forward
Germany	2011—forward
Japan	2014—forward
South Korea	2015—forward
United Kingdom	2018—forward

17. DEFINED BENEFIT PLANS

As a result of the Rofin acquisition in fiscal 2017, we 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 and 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-

17. DEFINED BENEFIT PLANS (continued)

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. During fiscal 2020, we opened a lump sum payment election window for the RS Inc. defined benefit plan to allow certain participants the option to receive the entire value of their benefit as a single lump sum payment, resulting in payments of $1.0 million.

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.

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 2020, 2019, and 2018 (in thousands):

	Fiscal		
	2020	**2019**	**2018**
Service cost	**$ 2,153**	$ 1,955	$ 2,262
Interest cost	**857**	1,308	1,230
Expected return on plan assets	**(682)**	(817)	(787)
Recognized net actuarial (gain) loss	**(690)**	470	240
Foreign exchange impacts	**66**	(79)	(56)
Recognition of curtailment gain due to plan freeze	**—**	—	(1,236)
Net periodic pension cost	**$ 1,704**	$ 2,837	$ 1,653

The service cost component of net periodic costs is included in selling, general and administrative ("SG&A") expenses, and the interest costs, net actuarial (gain) loss and other components are included in Other-net within other income (expense) in the consolidated statements of operations.

17. DEFINED BENEFIT PLANS (continued)

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):

	Fiscal 2020	Fiscal 2019
Change in benefit obligation:		
Projected benefit obligation at beginning of year	**$ 60,437**	$ 51,499
Service cost	**2,153**	1,955
Interest cost	**857**	1,308
Assumption change	**(1,783)**	9,505
Experience (gain) loss	**22**	(308)
Foreign exchange rate impacts	**2,433**	(1,889)
Benefits paid – total	**(3,010)**	(1,633)
Settlement gain	**(502)**	—
Projected benefit obligation at end of year	**$ 60,607**	$ 60,437
Projected benefit obligation at end of year:		
U.S. plans	**$ 18,775**	$ 18,892
Foreign plans	**41,832**	41,545
Projected benefit obligation at end of year	**$ 60,607**	$ 60,437
Change in plan assets:		
Fair value of plan assets at beginning of year	**$ 12,997**	$ 12,486
Actual return on plan assets	**1,218**	539
Employer contributions	**208**	455
Benefits paid – funded plan	**(1,522)**	(483)
Fair value of plan assets at end of year	**$ 12,901**	$ 12,997
Fair value of plan assets at end of year:		
U.S. plans	**$ 12,645**	$ 12,766
Foreign plans	**256**	231
Fair value of plan assets at end of year	**12,901**	12,997
Unfunded status at end of year	**$ (47,706)**	$ (47,440)
Amounts recognized in the consolidated balance sheet:		
Accrued benefit liability – current	**$ (1,896)**	**$ (1,578)**
Accrued benefit liability – non current	**(45,810)**	**(45,862)**
Accumulated other comprehensive (gain) loss (pre-tax)	**456**	**2,590**

17. DEFINED BENEFIT PLANS (continued)

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

	Fiscal year-end	
	2020	**2019**
Projected benefit obligation	**$ 60,607**	$ 60,437
Accumulated benefit obligation	**56,847**	55,941
Fair value of plan assets	**12,901**	12,997

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

	Fiscal 2020	**Fiscal 2019**
Discount rate:		
U.S.	**2.3 %**	3.0 %
Foreign	**1.2 %**	0.8 %
Expected return on plan assets:		
U.S.	**5.0 %**	5.8 %
Rate of compensation increase		
U.S.	**— %**	— %
Foreign	**2.2 %**	2.1 %

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. The decrease in discount rates for U.S. and foreign plans was the primary reason for the assumption change and the increase in the projected benefit obligation.

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

	Amount
2021	$ 2,597
2022	3,009
2023	2,492
2024	2,863
2025	2,942
2026-2030	16,329
Total	$ 30,232

Our pension plan asset allocations at October 3, 2020 and September 28, 2019 by asset category are as follows:

	Allocation		
	Target	Fiscal 2020	Fiscal 2019
Equity securities	30 %	32 %	33 %
Debt securities	70 %	68 %	67 %
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

17. 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 October 3, 2020 are as follows:

Asset categories	Level 1	Level 2	Level 3	Total
Cash and cash equivalents:				
Money market	$ 469	$ —	$ —	$ 469
Equity securities:				
Small cap	—	50	—	50
Mid cap	—	143	—	143
Large cap	—	293	—	293
Total market stock	—	2,140	—	2,140
International	—	1,166	—	1,166
Emerging markets	—	197	—	197
Debt securities:				
Bonds and mortgages	—	3,323	—	3,323
Inflation protected	—	—	—	—
High yield	—	272	—	272
Liability driven investments	—	4,848	—	4,848
Total plan assets	$ 469	$ 12,432	$ —	$ 12,901

The fair values of our pension plan assets, by level within the fair value hierarchy, at September 28, 2019 are as follows:

Asset categories	Level 1	Level 2	Level 3	Total
Cash and cash equivalents:				
Money market	$ 503	$ —	$ —	$ 503
Equity securities:				
Small cap	—	135	—	135
Mid cap	—	250	—	250
Large cap	—	751	—	751
Total market stock	—	1,689	—	1,689
International	—	1,276	—	1,276
Emerging markets	—	204	—	204
Debt securities:				
Bonds and mortgages	—	3,110	—	3,110
Inflation protected	—	634	—	634
High yield	—	634	—	634
Liability driven investments	—	$ 3,811	—	3,811
Total plan assets	$ 503	$ 12,494	$ —	$ 12,997

18. SEGMENT AND GEOGRAPHIC INFORMATION

At October 3, 2020, we were organized into two reporting segments, OLS and ILS, based upon our organizational structure and how the 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 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 tools, consumer goods, and medical device manufacturing.

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 (loss) from continuing operations is the measure of profit and loss that our CODM uses to assess performance and make decisions. Assets by segment are not a measure used to assess the performance of the company by the CODM and thus are not reported in our disclosures. Income (loss) 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 certain operating expenses to our operating segments and we manage them 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 (loss) from continuing operations for our operating segments and a reconciliation of our total income (loss) from continuing operations to income (loss) from continuing operations before income taxes (in thousands):

	Fiscal		
	2020	2019	2018
Net sales:			
OEM Laser Sources	**$ 758,929**	$ 886,676	$ 1,259,477
Industrial Lasers & Systems	**470,070**	543,964	643,096
Total net sales	**$ 1,228,999**	$ 1,430,640	$ 1,902,573
Income (loss) from continuing operations:			
OEM Laser Sources	**$ 169,883**	$ 239,073	$ 469,835
Industrial Lasers & Systems (1)	**(518,186)**	(93,133)	(3,687)
Corporate and other	**(81,877)**	(62,845)	(73,131)
Total income (loss) from continuing operations	**(430,180)**	83,095	393,017
Total other expense, net	**(12,543)**	(23,047)	(31,462)
Income (loss) from continuing operations before income taxes	**$ (442,723)**	$ 60,048	$ 361,555

(1) The fiscal 2020 loss includes non-cash pre-tax goodwill impairment charges of $327.2 million as well as non-cash pre-tax charges related to the impairment of intangible assets, property, plant and equipment and ROU assets of $33.9 million, $85.6 million, and $1.8 million, respectively. See Note 8, "Goodwill and Intangible Assets" in the Notes to Consolidated Financial Statements and Note 11, "Leases" in the Notes to Consolidated Financial Statements under Item 8 of this annual report.

18. 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 2020, 2019, and 2018 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	2020	2019	2018
United States	**$ 296,102**	$ 339,585	$ 309,495
Foreign countries:			
South Korea	**247,461**	313,461	652,313
China	**196,824**	194,653	235,568
Japan	**94,068**	138,028	180,223
Asia-Pacific, other	**94,835**	93,389	124,733
Germany	**117,170**	145,285	166,926
Europe, other	**125,739**	148,680	171,936
Rest of World	**56,800**	57,559	61,379
Total foreign countries sales	**932,897**	1,091,055	1,593,078
Total sales	**$ 1,228,999**	$ 1,430,640	$ 1,902,573

Long-lived assets, which include all non-current assets other than goodwill, intangibles, non-current restricted cash, our investment in 3D-Micromac AG and deferred taxes, by geographic region, are as follows (in thousands):

	Fiscal year-end	
LONG-LIVED ASSETS	2020	2019
United States	**$ 170,412**	$ 151,640
Foreign countries:		
Germany	**123,019**	152,529
Europe, other	**35,810**	29,815
Asia-Pacific	**56,125**	39,977
Total foreign countries long-lived assets	**214,954**	222,321
Total long-lived assets	**$ 385,366**	$ 373,961

Major Customers

We had one major customer who accounted for 17.2%, 16.8%, and 25.8% of consolidated revenue during fiscal 2020, 2019, and 2018, respectively. The customer purchased primarily from our OLS segment.

19. RESTRUCTURING CHARGES

In the first quarter of fiscal 2017, we began the implementation of planned restructuring activities in connection with the acquisition of Rofin. The activities under this plan primarily related to the exiting of our legacy HPFL 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.

In June 2019, we announced our plans to exit a portion of our HPFL business and consolidate all HPFL manufacturing and engineering functions in our Tampere, Finland facility by transferring certain HPFL activities from our Hamburg, Germany

19. RESTRUCTURING CHARGES (continued)

facility. In conjunction with this announcement, we recorded charges in the third and fourth quarters of fiscal 2019 totaling $19.7 million primarily related to write-offs of excess inventory, which is recorded in cost of sales, and estimated severance. We recorded charges in fiscal 2020 of $1.1 million, primarily related to accelerated depreciation and project management consulting.

We also vacated our leased facility in Santa Clara at the end of the lease term on July 31, 2020 and combined operations into our owned Santa Clara headquarters. We did not incur material expenses in fiscal 2019 related to this project. We incurred costs in fiscal 2020 of $1.5 million, primarily related to accelerated depreciation. We also incurred costs in fiscal 2020 of $0.1 million for other projects.

In the fourth quarter of fiscal 2020, we began a restructuring program in our ILS segment which includes management reorganizations, the planned closure of certain manufacturing sites, and the right-sizing of global sales, service, order admin, marketing communication and certain administrative functions, among others. In the fourth quarter of fiscal 2020, we incurred costs of $2.6 million, primarily related to severance.

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 2020 and fiscal 2019 (in thousands):

	Severance Related	Asset Write-Offs	Other	Total
Balances, September 29, 2018	$ 836	$ —	$ 286	$ 1,122
Provision	9,172	12,609	940	22,721
Payments and other	(1,729)	(12,609)	(1,011)	(15,349)
Balances, September 28, 2019	8,279	—	215	8,494
Provision	2,468	2,194	629	5,291
Payments and other	(8,136)	(2,194)	(614)	(10,944)
Balances, October 3, 2020	$ 2,611	$ —	$ 230	$ 2,841

At October 3, 2020, $2.8 million of accrued severance related and other costs were included in other current liabilities. The asset write-offs for accelerated depreciation and other costs in fiscal 2020 primarily related to the exit of a portion of our HPFL business in Hamburg, Germany, and costs to vacate our leased facility in Santa Clara and combine operations into our owned Santa Clara headquarters. The severance related costs in fiscal 2020 primarily related to the restructuring program that began in the fourth quarter of fiscal 2020. The severance related, asset write-offs of inventory and other costs in fiscal 2019 primarily related to the exit of a portion of our HPFL business in Hamburg, Germany. The severance related, asset write-offs of inventory and other costs in fiscal 2019 other than those related to the exit of a portion of our HPFL business in Hamburg, Germany primarily related to the consolidation of certain manufacturing sites.

By segment, $3.9 million and $21.9 million of restructuring costs were incurred in the ILS segment and $1.4 million and $0.8 million were incurred in the OLS segment in fiscal 2020 and 2019, respectively. Restructuring charges are recorded in cost of sales, research and development and selling, general and administrative expenses in our consolidated statements of operations.

QUARTERLY FINANCIAL INFORMATION (UNAUDITED)

Summarized quarterly financial data for the years ended October 3, 2020 and September 28, 2019 are as follows (in thousands, except per share amounts):

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Fiscal 2020:				
Net sales	$ 320,771	$ 293,147	$ 298,330	$ 316,751
Gross profit	109,253	94,111	95,277	112,233
Net income (loss)	5,793	(418,913)	(8,708)	7,689
Net income (loss) per basic share	$ 0.24	$ (17.39)	$ (0.36)	$ 0.32
Net income (loss) per diluted share	$ 0.24	$ (17.39)	$ (0.36)	$ 0.32
Fiscal 2019:				
Net sales	$ 383,146	$ 372,860	$ 339,170	$ 335,464
Gross profit	149,350	130,717	98,003	108,395
Net income (loss)	35,550	20,750	(3,099)	624
Net income (loss) per basic share	$ 1.46	$ 0.86	$ (0.13)	$ 0.03
Net income (loss) per diluted share	$ 1.45	$ 0.85	$ (0.13)	$ 0.03

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 2020 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 October 3, 2020 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/ ANDREAS W. MATTES	/s/ KEVIN S. PALATNIK
Andreas W. Mattes *President and Chief Executive Officer*	Kevin S. Palatnik *Executive Vice President and Chief Financial Officer*

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 October 3, 2020, 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 October 3, 2020. The effectiveness of our internal control over financial reporting as of October 3, 2020 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

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

There have been no changes 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 October 3, 2020.

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 October 3, 2020, 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 October 3, 2020, 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 October 3, 2020, of the Company and our report dated December 1, 2020, expressed an unqualified opinion on those consolidated financial statements and included an explanatory paragraph related to the Company's change in method of accounting for leases in fiscal year 2020 due to adoption of Financial Accounting Standards Board ("FASB") Topic 842, *Leases*.

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
December 1, 2020

ITEM 9B. OTHER INFORMATION

Not applicable.

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, as amended, will be set forth under the caption "Delinquent Section 16(a) Reports," if applicable, (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 2021 (the "2021 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 2021 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* and may be found as follows:

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

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 2021 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 2021 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 2021 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 will be 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 2021 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.

PART IV

ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

1. 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.

2. Exhibits

EXHIBIT INDEX

		Incorporated by reference herein			
Exhibit Numbers		Form	Exhibit No.	Filing Date	File No.
3.1	Restated and Amended Certificate of Incorporation	10-K	3.1	December 28, 1990	000-05255
3.2	Certificate of Amendment of Restated and Amended Certificate of Incorporation of Coherent, Inc.	10-K	3.2	December 18, 2002	000-05255
3.3	Bylaws of Coherent, Inc. as amended and restated on January 28, 2018	8-K	3.1	January 31, 2018	001-33962
4.1	Description of Capital Stock	10-K	4.1	November 26, 2019	001-33962
10.1‡	Form of Indemnification Agreement	10-K	10.18	December 15, 2010	001-33962
10.2‡	Amended and Restated Employee Stock Purchase Plan	S-8	10.1	June 12, 2012	333-182074
10.3‡	Change of Control and Leadership Change Severance Plan, as amended and restated effective April 13, 2019	10-Q	10.1	May 8, 2019	001-33962
10.4‡	Variable Compensation Plan, as amended	10-K	10.7	November 30, 2011	001-33962
10.5‡	Supplementary Retirement Plan	10-Q	10.5	May 10, 2006	000-05255
10.6‡	2005 Deferred Compensation Plan	10-Q	10.1	February 8, 2012	001-33962
10.7‡	2011 Equity Incentive Plan	S-8	10.1	May 6, 2011	333-174019
10.8‡	2011 Equity Incentive Plan-Form of RSU Agreement for members of the Board of Directors	10-Q	10.1	August 10, 2011	001-33962
10.9‡	2011 Equity Incentive Plan-Form of Option Agreement for members of the Board of Directors	10-Q	10.2	August 10, 2011	001-33962
10.10‡	2011 Equity Incentive Plan-Form of Time-Based RSU Agreement	10-K	10.23	November 30, 2011	001-33962
10.11‡	2011 Equity Incentive Plan-Form of Performance RSU Agreement	10-K	10.11	November 26, 2019	001-33962
10.12‡	2011 Equity Incentive Plan-Form of Global RSU Agreement	10-K	10.12	November 27, 2018	001-33962
10.13‡	2011 Equity Incentive Plan-Form of Global Performance RSU Agreement	10-K	10.13	November 26, 2019	001-33962
10.14‡	Equity Incentive Plan	S-8	99.1	April 27, 2020	333-237855
10.15‡	Equity Incentive Plan – Form of Global Restricted Stock Unit Agreement	10-Q	10.2	August 12, 2020	001-33962
10.16‡	Equity Incentive Plan – Form of Performance Restricted Stock Unit Agreement	10-Q	10.3	August 12, 2020	001-33962
10.17‡	Employment Agreement dated March 31, 2020 between Andreas W. Mattes and the Company	8-K	10.1	April 6, 2020	001-33962
10.18‡	Offer letter with Thomas Merk	10-Q	10.3	February 9, 2017	001-33962
10.19‡	Managing director agreement with Thomas Merk	10-Q	10.4	February 9, 2017	001-33962
10.20‡	CEO Transition and Retirement Agreement, dated April 13, 2019, between the Company and John Ambroseo	10-Q	10.2	May 8, 2019	001-33962
10.21‡	Transition Agreement and Release, dated February 4, 2019, between the Company and Paul Sechrist	10-Q	10.2	February 6, 2019	001-33962
10.22‡	Offer letter with Kevin Palatnik	10-Q	10.3	February 10, 2016	001-33962
10.23**	Executive Transition Services Agreement, dated August 20, 2020, between the Company and Kevin Palatnik				
10.24	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	8-K	10.1	November 8, 2016	001-33962

Exhibit Numbers		Incorporated by reference herein Form	Exhibit No.	Filing Date	File No.
10.25	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	8-K	10.1	May 9, 2017	001-33962
10.26	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	10-Q	10.2	August 9, 2017	001-33962
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	Inline XBRL Instance				
101.SCH	Inline XBRL Taxonomy Extension Schema				
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase				
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase				
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase				
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase				
104	Cover Page Interactive Data File (formatted as inline XBRL and contained in Exhibit 101)				

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

SIGNATURES

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

	COHERENT, INC.
Date: December 1, 2020	/s/ ANDREAS W. MATTES
	By: Andreas W. Mattes
	President and Chief Executive Officer

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints Andreas W. Mattes and Kevin S. Palatnik, and each of them individually, as his attorney-in-fact, each with full power of substitution, for him in any and all capacities to sign any and all amendments to this annual report on Form 10-K, and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that said attorney-in-fact, or his or her substitute, may do or cause to be done by virtue hereof.

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

/s/ ANDREAS W. MATTES	
Andreas W. Mattes (Director and Principal Executive Officer)	December 1, 2020 Date
/s/ KEVIN S. PALATNIK	
Kevin S. Palatnik (Principal Financial and Accounting Officer)	December 1, 2020 Date
/s/ JAY T. FLATLEY	
Jay T. Flatley (Director)	December 1, 2020 Date
/s/ PAMELA FLETCHER	
Pamela Fletcher (Director)	December 1, 2020 Date
/s/ BEVERLY KAY MATTHEWS	
Beverly Kay Matthews (Director)	December 1, 2020 Date
/s/ MICHAEL R. MCMULLEN	
Michael R. McMullen (Director)	December 1, 2020 Date
/s/ GARRY W. ROGERSON	
Garry W. Rogerson (Director)	December 1, 2020 Date
/s/ STEVE SKAGGS	
Steve Skaggs (Director)	December 1, 2020 Date
/s/ SANDEEP VIJ	
Sandeep Vij (Director)	December 1, 2020 Date

Exhibit 10.23

EXECUTION COPY

EXECUTIVE TRANSITION SERVICES AGREEMENT

THIS EXECUTIVE TRANSITION SERVICES AGREEMENT ("Agreement") is entered into as of August 20, 2020 ("Execution Date") by Kevin Palatnik ("Executive") and Coherent, Inc. for and on behalf of itself and its predecessors, successors, assigns, parents, subsidiaries, branches, affiliated entities and related entities (collectively, "Company"). Executive and Company are collectively referred to in this Agreement as the "Parties."

WHEREAS, Executive has been employed by the Company as Executive Vice President and Chief Financial Officer and Executive and the Company would like to provide for an effective transition of the Chief Financial Officer role in connection with the termination of Executive's employment with the Company as of February 28, 2021 ("Separation Date");

WHEREAS, the Company's Chief Executive Officer, under the auspices of the Board of Directors ("Board") will commence a search process to identify a successor Chief Financial Officer;

WHEREAS, Executive shall transition to the role of Special Advisor from the role of Executive Vice President and Chief Financial Officer upon a transition date communicated by the Company's Chief Executive Officer or the Board in writing to the Executive in connection with any commencement of a successor to serve as Chief Financial Officer of the Company prior to February 28, 2021 ("Transition Date");

WHEREAS, the Company wishes to set forth the terms of Executive's role with the Company during the period from the Execution Date through the Separation Date in exchange for the agreements expressed herein;

WHEREAS, Executive is a participant in the Company's Change of Control and Leadership Change Severance Plan (the "Severance Plan");

WHEREAS, a Change in Leadership under the Severance Plan has occurred and, in consideration of the foregoing, the Company and Executive have mutually agreed hereunder that Executive's termination will be treated as a termination of Executive's employment without Change in Leadership Just Cause as defined under the Severance Plan ("Cause"), which entitles Executive to the severance provisions under the Severance Plan, including the requirement for Executive to execute and deliver an effective release to the Company as a condition to receiving such severance provisions;

WHEREAS, each of the undersigned Parties to this Agreement has had ample opportunity to review the facts and law relevant to this issue, has consulted fully and freely with competent counsel of its choice if desired, and has entered this Agreement knowingly and intelligently without duress or coercion from any source and Executive has had a reasonable time in which to consider whether to sign this Agreement.

NOW, THEREFORE, in consideration of the foregoing recitals and the mutual promises contained below, it is agreed as follows:

1. Title and Provision of Services. From the Execution Date through immediately before the earlier of the Transition Date or Separation Date, Executive shall continue to serve as Executive Vice President and Chief Financial Officer of the Company with the duties, responsibilities and authority consistent with those Executive had immediately prior to the Execution Date. From any Transition Date through the Separation Date, Executive shall serve as a Special Advisor, with such duties and obligations as may be mutually agreed upon between Executive and the Chief Executive Officer. From the Execution Date through the Separation Date, Executive shall perform such services reasonably requested by the Chief Executive Officer or the Board which are consistent with such services provided prior to the Execution Date. Executive agrees to fully cooperate with the orderly transfer of his responsibilities as the Company may direct, including, without limitation, after the Separation Date: (i) reasonably assisting in the transition of his duties to a new Chief Financial Officer; (ii) complying with any reasonable Company request for information after the Separation Date; (iii) making himself reasonably available in connection with any and all claims, disputes, negotiations, investigations, and lawsuits or administrative proceedings involving the Company or its affiliates; and (iv) providing thorough and accurate information or documents, providing truthful declarations or statements to the Company or its affiliates, meeting with attorneys or other representatives of the Company or its affiliates, preparing for and giving thorough and truthful testimony, and/or otherwise cooperating in the investigation, defense or prosecution of proceedings involving the Company.

2. Payments by the Company. In consideration for (i) Executive's execution, without revocation, and compliance with this Agreement, including the release of claims below, (ii) Executive's execution of the Release of Claims attached hereto as Exhibit A ("Release") no earlier than the day following the Separation Date, (iii) Executive not revoking the Release prior to the eighth day following such execution and (iv) Executive providing the services set forth in paragraph 1 and provided that the Company does not terminate Executive's employment for Cause, the following compensation will be provided to Executive: (i) base salary at a rate no less than Executive's base salary in effect on the Execution Date for the period from the Execution Date through the Separation Date; (ii) continued vesting in Executive's outstanding equity awards under the Company's 2011 Equity Incentive Plan according to their terms during the period from the Execution Date through the Separation Date; and (iii) continued participation until the Separation Date in the Company's Variable Compensation Plan and benefit programs to the extent provided and consistent with their terms (such base salary, continued vesting and

benefits, collectively, "Benefits"). Executive acknowledges and understands that amounts payable pursuant to this Agreement will be reduced by any and all applicable federal, state, or local payroll tax withholding or other authorized deductions permitted by applicable law. Executive also acknowledges and understands that this Agreement provides no other rights to compensation or benefits for the period from the Execution Date through the Separation Date other than as set forth in this paragraph and paragraph 3 of this Agreement. Executive acknowledges that the Benefits provided to Executive as set forth above and the Change in Leadership Severance Benefits (as defined in paragraph 3 below) are greater than the sum to which Executive is otherwise entitled to receive without executing this Agreement (including the Release), and Executive agrees that these Benefits and the Change in Leadership Severance Benefits are in excess of those to which Executive is otherwise entitled without a release of claims under the Company's policies and procedures, or under any law, agreement or plan, written, oral or implied.

3. Change in Leadership Severance Benefits. The Executive shall be entitled to the payments and benefits under the Severance Plan upon termination of employment upon the Separation Date without Cause in the payment amount set forth in Section 4.3(b) of the Severance Plan and certain equity compensation acceleration, benefit continuation payments and pro rata bonus as set forth in Section 4.5(b) of the Severance Plan (collectively, "Change in Leadership Severance Benefits"). If Executive should die after the Transition Date but before the Separation Date, Executive's estate shall be entitled to the payments and benefits set forth in the preceding sentence with Executive's date of death substituted for the Separation Date for purposes of calculating the Change in Leadership Severance Benefits subject to the execution by Executive's estate of the Release reflecting Executive's death and the effectiveness of such Release.

4. Resignation from All Positions. Effective immediately prior to the earlier of the Transition Date or Separation Date, Executive hereby resigns from any and all positions he holds with the Company including, without limitation, Executive Vice President and Chief Financial Officer except for the position of Special Advisor, and will not thereafter represent himself as being an executive officer of the Company for any purpose. After the Separation Date, Executive will not represent himself as being an executive officer, officer, attorney, agent or representative of the Company for any purpose.

5. Separation Date and Certain Requirements. Executive's employment relationship with the Company will be terminated as of the Separation Date, unless earlier terminated by the Company for Cause or by Executive's death. Executive understands and agrees that the terms contained in this Agreement are offered by the Company contingent upon Executive's fulfillment of his obligations under this Agreement including, without limitation, unless otherwise determined by the Board or specifically set forth in this Agreement, serving as Executive Vice

President and Chief Financial Officer until the earlier of the Transition Date or Separation Date and as a Special Advisor from any Transition Date through the Separation Date and cooperation in an orderly transition of Executive's duties and execution and nonrevocation of the release contained within this Agreement and the execution and nonrevocation of the Release.

6. Reaffirmation of Agreements. Executive expressly reaffirms and incorporates as part of this Agreement any and all confidentiality, intellectual property and non-solicitation provisions of any agreement with the Company, including, without limitation, the Employee Confidential Information and Arbitration Agreement dated as of February 8, 2016 ("Confidential Information Agreement").

7. Waiver and Release. To the extent permitted by applicable law, in exchange for the consideration provided in this Agreement, Executive, for himself and his heirs, executors, representatives, agents, insurers, administrators, successors and assigns (collectively, "Releasors") irrevocably and unconditionally fully and forever waives, releases and discharges the Company and each and all of its present and former officers, agents, directors, managers, employees, representatives, affiliates, shareholders, attorneys, members, and each of their successors and assigns, and all persons acting by, through, under or in concert with, and individually in their official capacities (collectively, "Releasees") from any and all claims, demands, actions, causes of action, obligations, judgments, rights, fees, damages, liabilities and expenses (inclusive of attorneys' fees) of any kind whatsoever, whether known or unknown (collectively, "Claim" or "Claims"), including, without limitation, any Claims under any federal, state, local or foreign law, that Releasors may have, have ever had or may in the future have arising out of, or in any way related to Executive's hire, benefits, employment, termination or separation from employment and any actual or alleged act, omission, transaction, practice, conduct, occurrence or other matter that existed or arose on or before the date of his execution of this Agreement, including, but not limited to any claims, under (as amended) the United States Constitution, Title VII of the Civil Rights Act, the Age Discrimination in Employment Act, the Americans with Disabilities Act, the Equal Pay Act, the Employee Retirement Income Security Act (with respect to unvested benefits), the Civil Rights Act of 1991, 42 U.S.C. section 1981, the Sarbanes-Oxley Act of 2002, the Worker Adjustment and Retraining Notification Act, the Family Medical Leave Act, the Rehabilitation Act, the Occupational Safety and Health Act, the Fair Labor Standards Act, the California Fair Employment and Housing Act, the California Family Rights Act, the California Business and Professions Codes, Civil Code, Labor Code, and Government Code, and/or any other federal, state or local law (statutory, regulatory or otherwise) that may be legally waived and released and any common law tort and/or contract claims, including, but not limited to, any claims of wrongful discharge, defamation, emotional distress, tortious interference with contract, invasion of privacy, nonphysical injury, personal injury or sickness or any other harm.

Nothing in this Agreement will be construed to (i) limit or affect Executive's right to challenge the validity of this release; (ii) in any way interfere with Executive's right and responsibility to give truthful testimony under oath; or (iii) prohibit Executive from participating in an investigation, filing a charge or otherwise communicating with any federal, state or local government office, official or agency, including, but not limited to, the Equal Employment Opportunity Commission, Department of Labor, National Labor Relations Board, or the Securities and Exchange Commission. However, Executive expressly promises never to seek or accept any compensatory damages, back pay, front pay, or reinstatement remedies with respect any Claim that Executive has released in this Agreement. Furthermore, this waiver and release of claims excludes, and Executive does not waive, release or discharge, any claims under state workers' compensation or unemployment laws Executive has against the Company and/or any claims by Executive that cannot be released by a private settlement agreement. In addition, nothing in this Agreement waives, releases or discharges (i) any claim regarding rights of indemnification and receipt of legal fees and expenses to which you are entitled under the Indemnification Agreement between the Company and Executive, the Company's or an affiliate of the Company's Certificate of Incorporation or By-laws (or similar instrument) or pursuant to applicable law or modifies, amends, or otherwise limits in any manner any rights Executive may have under the Indemnification Agreement or (ii) any of Executive's vested rights under the Coherent, Inc. 401(k) Retirement Plan, the Coherent, Inc. Deferred Compensation Plan or health benefit programs.

8. Unknown Claims. Executive agrees that his waiver and release of claims extends to all Claims of every nature and kind, known or unknown, suspected or unsuspected, past or present, arising from or attributable to Executive's employment or separation of employment with the Company. Executive therefore waives the protection of California Civil Code section 1542 or any analogous state law or federal law or regulation. Section 1542 reads as follows:

> **A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR OR RELEASING PARTY DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM OR HER, WOULD HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR OR RELEASED PARTY.**

9. Return of Property. Upon the Separation Date (or such other date as mutually agreed between Executive and a duly authorized representative of the Company), Executive will return to the Company all files, memoranda, records, credit cards, pagers, computers, computer files, passwords and pass keys, card keys, or related physical or electronic access devices, and any and all other property received from the Company or any of its current or former executives or generated by Executive in the course of employment; provided that Executive shall be allowed

to retain his mobile number. Upon the Separation Date, Executive will delete all electronic data and files pertaining to Executive's job or the Company's business operations, existing on Executive's personal computers, other personal electronic devices, and on any email account maintained or accessible by Executive other than his Company-issued account. Without limitation on the foregoing, Executive will upon the Separation Date return to the Company all of the Company's property, including records, vendor/client lists, other lists, data, notes, reports, proposals, correspondence, specifications, drawings, blueprints, sketches, laboratory notebooks, flow charts, materials, equipment, other documents or property or other non-public information, or copies or reproductions of any of the aforementioned items, electronic devices (including, but not limited to, any laptop computer, smart phone or similar device, or cellphone), or other documents or property which, in each case, Executive obtained, received or produced in connection with his employment with the Company or that was within Executive's possession and control.

10. No Admission. The Parties agree and acknowledge that this Agreement, and compliance with this Agreement, will not be construed as an admission by the Company of any liability whatsoever, or as an admission by the Company of any violation of the rights of Executive or any person, or violation of any order, law, statute, duty, or contract whatsoever against Executive or any person.

11. Assignment. This Agreement will be binding upon the Parties and upon their heirs, administrators, representatives, executors, successors, and assigns, and will inure to the benefit of said parties and each of them and to their heirs, administrators, representatives, executors, successors, and assigns. Executive expressly warrants that he has not transferred to any person or entity any rights, causes of action or claims released in this Agreement. Any purported assignment by Executive will be null and void.

12. Severability. Should any provision of this Agreement be held by a court of competent jurisdiction to be enforceable only if modified, or if any portion of this Agreement will be held as unenforceable and thus stricken, such holding will not affect the validity of the remainder of this Agreement, the balance of which will continue to be binding upon the Parties with any such modification to become a part of, and treated as though originally set forth in, this Agreement. The Parties further agree that any such court is expressly authorized to modify any such unenforceable provision of this Agreement in lieu of severing such unenforceable provision from this Agreement in its entirety, whether by rewriting the offending provision, deleting any or all of the offending provision, adding additional language to this Agreement or by making such other modifications as it deems warranted to carry out the intent and agreement of the Parties as embodied in this Agreement to the maximum extent permitted by law. However, if a court should hold that Executive's waiver and release of claims is void or voidable, in whole or in part,

the Company at its election may recover the excess Benefits paid or provided under this Agreement.

13. Entire Agreement. This Agreement, including the Release, sets forth the entire agreement between the Parties and fully supersedes any and all prior agreements or understandings, written or oral, between the Parties pertaining to the subject matter of this Agreement (except that Executive will continue to be bound by the confidentiality, intellectual property and non-solicitation provisions of any agreement with the Company and/or any similar agreement previously executed by Executive will remain fully enforceable and binding on the Parties). Executive acknowledges and confirms that he will be entitled to the benefits of the Severance Plan only as set forth in paragraph 3 and that he will not be entitled to benefits of the Severance Plan with respect to any Change of Control occurring on or after the Execution Date. Executive represents and acknowledges that in executing this Agreement Executive did not rely and has not relied upon any representation or statement made by the Company or by any of the Company’s agents, attorneys, or representatives with regard to the subject matter, basis or effect of this Agreement or otherwise, other than those specifically stated in this written Agreement. This Agreement may be modified only in a written document signed by the Parties and referring specifically to this Agreement.

14. Governing Law. This Agreement will be interpreted in accordance with the plain meaning of its terms and not strictly for or against any of the Parties. Except to the extent that federal law applies, this Agreement is entered into under California law and will be construed and governed under the laws of the State of California

15. Taxes. The Company and affiliates make no representations with regard to the effect on Executive’s federal, state, or local income tax liability with regard to the Benefits or Change in Leadership Severance Benefits and any other payments or benefits being provided to Executive. Executive hereby assumes full and sole responsibility for payment of taxes due, if any, on the consideration tendered herein and further agrees to defend, indemnify, and hold the Company and its affiliates harmless from and against any loss, liability, obligation, action, cause of action, claims, demands, or other expenses of any nature whatsoever, relating to, in connection with, or arising out of the payment of said taxes and interest, and/or penalties imposed, arising out of any such tax.

16. Section 409A. The Company and Executive intend that this Agreement and the payments provided hereunder be exempt from the requirements of Section 409A of the Internal Revenue Code of 1986, as amended (“Section 409A”) to the maximum extent possible, or to the extent Section 409A is applicable to this Agreement, the Company and Executive intend that this Agreement and any payments thereunder comply with the deferral, payout and other limitations and restrictions imposed under Section 409A. Notwithstanding anything herein to the contrary,

this Agreement is intended to be interpreted, operated and administered in a manner consistent with such intentions; provided, however that in no event shall the Company or any of its affiliates (or any of their successors) be liable for any additional tax, interest or penalty that may be imposed on the Executive pursuant to Section 409A or for any damages incurred by the Executive as a result of this Agreement (or the payments hereunder) failing to comply with, or be exempt from Section 409A. Without limiting the generality of the foregoing, and notwithstanding any other provision of this Agreement to the contrary if at the time the Executive's employment hereunder terminates, the Executive is a "specified employee" within the meaning of Section 409A, then to the extent necessary to avoid subjecting the Executive to the imposition of any additional tax or interest under Section 409A, amounts that would (but for this provision) be payable within six months following the date of the Executive's separation from service shall not be paid to the Executive during such period, but shall instead be paid in a lump sum on the first payroll date that occurs on or after the date six months and one day following the date of such Executive's separation from service or, if earlier, upon the Executive's death.

17. Knowing and Voluntary Acknowledgement. Executive agrees and acknowledges that: (a) Executive has read the terms of this Agreement and understands all of its terms; (b) Executive is hereby advised of Executive's right to consult with an attorney of his choice prior to executing this Agreement; (c) this Agreement represents an important legal and binding agreement, that he is executing this Agreement voluntarily, free from duress, undue pressure or influence, harassment or intimidation and that he enters into it with full knowledge of its intent and terms; and (d) he is not waiving or releasing rights or claims that may arise after his execution of this Agreement.

Executive understands and agrees that Executive has been offered an opportunity of at least 21 days (the "Consideration Period") within which to consider this Agreement and its ramifications and discuss the terms of this Agreement with the Company before executing it. Executive further acknowledges that any modification of this Agreement, whether material or immaterial, will not restart or change the Consideration Period.

Executive further understands and agrees that once Executive signs this Agreement, he will have an additional 7 days in which to revoke his acceptance of this Agreement. To do so, Executive must provide notice of revocation prior to the expiration of the 7-day revocation period to Mark Rakic, Senior Vice President of Human Resources in writing via hand delivery, fax at (408) 764-4820 or by e-mail to, if using email, with a copy to, or to their designated successors. Provided Executive has not revoked his acceptance of this Agreement during such 7-day revocation period, this Agreement shall become effective the eighth day after the Executive signs this Agreement ("Effective Date").

Executive acknowledges that, even if this Agreement is not executed or is canceled or revoked by Executive, the provisions of the Confidential Information Agreement, that otherwise by their terms survive termination of Executive's employment shall remain in full force and effect.

18. Counterparts. This Agreement may be signed in counterparts, each of which will be deemed an original, but all of which, taken together, will constitute the same instrument; provided, however, that this Agreement will be of no force or effect unless executed by both Parties. Counterparts may be delivered via facsimile, electronic mail (including pdf or any electronic signature complying with the U.S. federal ESIGN Act of 2000, e.g., www.docusign.com) or other transmission method and any counterpart so delivered shall be deemed to have been duly and validly delivered and be valid and effective for all purposes.

19. Captions. Captions and headings of the sections and paragraphs of this Agreement are intended solely for convenience and no provision of this Agreement is to be construed by reference to the caption or heading of any section or paragraph.

IN WITNESS WHEREOF, the Parties have executed this Agreement as of the dates indicated below.

COHERENT, INC.		**KEVIN PALATNIK**	
By:	/s/ BRET DIMARCO	/s/ KEVIN PALATNIK	
	Bret DiMarco	Kevin Palatnik	
Its:	*Executive Vice President, Chief Legal Officer and Secretary*	*Executive Vice President and Chief Financial Officer*	
Dated:	August 20, 2020	Dated:	August 20, 2020

EXHIBIT A

RELEASE OF CLAIMS

This Release of Claims ("Release Agreement") is entered into on the date set forth below by Kevin Palatnik ("Executive") and Coherent, Inc. for and on behalf of itself and its predecessors, successors, assigns, parents, subsidiaries, branches, affiliated entities and related entities (collectively, "Company"). In consideration for certain benefits, including without limitation the Change in Leadership Severance Benefits as set forth in the Executive Transition Services Agreement dated August 20, 2020 ("Agreement") and as a condition to Executive's right to receive those benefits including the Change in Leadership Severance Benefits, Executive hereby agrees as follows:

1. Termination Date. Executive's employment terminated on February 28, 2021.

2. Confidential Information. Executive shall continue to maintain the confidentiality of all confidential and proprietary information of the Company and shall continue to comply with the terms and conditions of the Executive Confidential Information and Arbitration Agreement [1] between Executive and the Company. Nothing in this Release Agreement nor any other agreement with the Company is intended to or will be used in any way to limit employees' rights to communicate with a government agency, as provided for, protected under or warranted by applicable law. Executive shall return all the Company property and confidential and proprietary information in his possession to the Company on the Effective Date (as defined below) of this Release Agreement.

3. Payment of Salary. Executive acknowledges and represents that the Company has paid all salary, wages, bonuses, accrued vacation, commissions and any and all other benefits due to Executive.

4. Release of Claims. Executive agrees that the payment to him of such Change in Leadership Severance Benefits represents consideration for settlement in full of all outstanding obligations owed to Executive by the Company. Executive, on behalf of himself or herself, and his respective heirs, family members, executors and assigns, hereby fully and forever releases the Company and its past, present and future officers, agents, directors, employees, investors, shareholders, administrators, affiliates, divisions, subsidiaries, parents, predecessor and successor corporations, and assigns, from, and agrees not to sue or otherwise institute or cause to be instituted any legal or administrative proceedings concerning any claim, duty, obligation or cause of action relating to any matters of any kind, whether presently known or unknown, suspected or unsuspected, that he may possess arising from any omissions, acts or facts that have occurred up until and including the Effective Date of this Release Agreement including, without limitation,

(a) any and all claims relating to or arising from Executive's employment relationship with the Company or its affiliates and the termination of that relationship;

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[*] and similar or other agreements dealing with confidential information

(b) any and all claims relating to, or arising from, Executive's right to purchase, or actual purchase of shares of stock of the Company, including, without limitation, any claims for fraud, misrepresentation, breach of fiduciary duty, breach of duty under applicable state corporate law, and securities fraud under any state or federal law;

(c) any and all claims for wrongful discharge of employment; termination in violation of public policy; discrimination; breach of contract, both express and implied; breach of a covenant of good faith and fair dealing, both express and implied; promissory estoppel; negligent or intentional infliction of emotional distress; negligent or intentional misrepresentation; negligent or intentional interference with contract or prospective economic advantage; unfair business practices; defamation; libel; slander; negligence; personal injury; assault; battery; invasion of privacy; false imprisonment; and conversion;

(d) any and all claims for violation of any federal, state or municipal statute, including, but not limited to, Title VII of the Civil Rights Act of 1964, the Civil Rights Act of 1991, the Age Discrimination in Employment Act of 1967, the Americans with Disabilities Act of 1990, the Fair Labor Standards Act, the Executive Retirement Income Security Act of 1974, The Worker Adjustment and Retraining Notification Act, the California Fair Employment and Housing Act, and Labor Code section 201, et seq. and section 970, et seq. and all amendments to each such Act as well as the regulations issued thereunder;

(e) any and all claims for violation of the federal, or any state, constitution;

(f) any and all claims arising out of any other laws and regulations relating to employment or employment discrimination; and

(g) any and all claims for attorneys' fees and costs.

Executive agrees that the release set forth in this section shall be and remain in effect in all respects as a complete general release as to the matters released. This release does not extend to (i) any obligations due Executive under the Change of Control and Leadership Change Severance Plan; (ii) Executive's right to file a charge with, or participate in a charge by, the Equal Employment Opportunity Commission or comparable state agency against the Company (with the understanding that any such filing or participation does not give Executive the right to recover any monetary damages against the Company; Executive's release of claims herein bars Executive from recovering such monetary relief from the Company); (iii) claims under Division 3, Article 2 of the California Labor Code (which includes California Labor Code section 2802 regarding indemnity for necessary expenditures or losses by Executive); (iv) claims prohibited from release as set forth in California Labor Code section 206.5 (specifically "any claim or right on account of wages due, or to become due, or made as an advance on wages to be earned, unless payment of such wages has been made"); and (v) Executive's rights to coverage under any fiduciary insurance policy purchased or obtained by or on behalf of the Company in which Executive is insured or in connection with the Company's Change in Control (as defined in the Plan) or to indemnification under any contract, by-law or other arrangement that would cover Executive but for this Release Agreement.

5. Acknowledgment of Waiver of Claims under ADEA. Executive acknowledges that he is waiving and releasing any rights he may have under the Age Discrimination in Employment Act of 1967 ("ADEA") and that this waiver and release is knowing and voluntary. Executive and the Company agree that this waiver and release does not apply to any rights or claims that may arise under the ADEA after the Effective Date of this Release Agreement. Executive acknowledges that the consideration given for this waiver and Release Agreement is in addition to anything of value to which Executive was already entitled. Executive further acknowledges that he has been advised by this writing that (a) he should consult with an attorney prior to executing this Release Agreement; (b) he has at least twenty-one (21) days within which to consider this Release Agreement; (c) he has seven (7) days following the execution of this Release Agreement by the parties to revoke the Release Agreement; (d) this Release Agreement shall not be effective until the revocation period has expired without revocation; and (e) nothing in this Release Agreement prevents or precludes Executive from challenging or seeking a determination in good faith of the validity of this waiver under the ADEA, nor does it impose any condition precedent, penalties or costs for doing so, unless specifically authorized by federal law. Any revocation should be in writing and delivered to the Senior Vice-President of Human Resources at the Company by close of business on the seventh day from the date that Executive signs this Release Agreement.

6. Civil Code Section 1542. Executive represents that he is not aware of any claims against the Company other than the claims that are released by this Release Agreement. Nevertheless, Executive intends this release to be a general release, and to all claims he may have, whether known or unknown. Executive acknowledges that he has been advised by legal counsel and is familiar with the provisions of California Civil Code 1542, below, which provides as follows:

> **A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR OR RELEASING PARTY DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, AND THAT IF KNOWN BY HIM OR HER, WOULD HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR OR RELEASING PARTY.**

Executive, being aware of said code section and in furtherance of his release of all claims, known and unknown, agrees to expressly waive any rights he may have thereunder, as well as under any statute or common law principles of similar effect.

7. No Pending or Future Lawsuits. Executive represents that he has no lawsuits, claims, or actions pending in his name, or on behalf of any other person or entity, against the Company or any other person or entity referred to herein. Executive also represents that he does not intend to bring any claims on his own behalf or on behalf of any other person or entity against the Company or any other person or entity referred to herein.

8. Application for Employment. Executive understands and agrees that, as a condition of this Release Agreement, he shall not be entitled to any employment with the

Company, its subsidiaries, or any successor, and he hereby waives any right, or alleged right, of employment or re-employment with the Company.

9. No Cooperation. Executive agrees that he will not counsel or assist any attorneys or their clients in the presentation or prosecution of any disputes, differences, grievances, claims, charges, or complaints by any third party against the Company or its affiliates and/or any officer, director, employee, agent, representative, shareholder or attorney of the Company or its affiliates, unless under a subpoena or other court order to do so or when required to do so in response to an investigation conducted by an administrative agency of competent jurisdiction.

10. Costs. The Parties shall each bear their own costs, expert fees, attorneys' fees and other fees incurred in connection with this Release Agreement.

11. Authority. Executive represents and warrants that he has the capacity to act on his own behalf and on behalf of all who might claim through him to bind them to the terms and conditions of this Release Agreement.

12. No Representations. Executive represents that he has had the opportunity to consult with an attorney, and has carefully read and understands the scope and effect of the provisions of this Release Agreement. Neither party has relied upon any representations or statements made by the other party hereto which are not specifically set forth in this Release Agreement.

13. Severability. In the event that any provision hereof becomes or is declared by a court of competent jurisdiction to be illegal, unenforceable or void, this Release Agreement shall continue in full force and effect without said provision.

14. Entire Agreement. This Release Agreement, along with the Plan and the Executive Confidential Information and Arbitration Agreement,[2] represents the entire agreement and understanding between the Company and Executive concerning Executive's separation from the Company.

15. No Oral Modification. This Release Agreement may only be amended in writing signed by Executive and the CEO of the Company.

16. Governing Law. This Release Agreement shall be governed by the internal substantive laws, but not the choice of law rules, of the State of California.

17. Effective Date. This Release Agreement is effective eight (8) days after it has been signed by both Parties, and provided that Executive shall have not revoked this Release Agreement under paragraph 5. Such eighth day shall be deemed the "Effective Date" of this Release Agreement.

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[*] and similar or other agreements dealing with confidential information

18. Counterparts. This Release Agreement may be executed in counterparts, and each counterpart shall have the same force and effect as an original and shall constitute an effective, binding agreement on the part of each of the undersigned.

19. Voluntary Execution of Release Agreement. This Release Agreement is executed voluntarily and without any duress or undue influence on the part or behalf of the Parties hereto, with the full intent of releasing all claims. The Parties acknowledge that:

(a) They have read this Release Agreement;

(b) They have been represented in the preparation, negotiation, and execution of this Release Agreement by legal counsel of their own choice or that they have voluntarily declined to seek such counsel;

(c) Understand the terms and consequences of this Release Agreement and of the releases it contains;

(d) They are fully aware of the legal and binding effect of this Release Agreement.

IN WITNESS WHEREOF, the Parties have executed this Release Agreement on the respective dates set forth below.

COHERENT, INC.		**KEVIN PALATNIK**	
By:	/s/ BRET DIMARCO	/s/ KEVIN PALATNIK	
	Bret DiMarco	Kevin Palatnik	
Its:	*Executive Vice President, Chief Legal Officer and Secretary*	*Executive Vice President and Chief Financial Officer*	
Dated:	August 20, 2020	Dated:	August 20, 2020

SUBSIDIARIES

The following table sets forth information as to Coherent's subsidiaries as of October 3, 2020, all of which are included in the consolidated financial statements. Coherent owns 100% of the outstanding voting securities of such corporations noted below, either directly or indirectly.

Name	Jurisdiction of Incorporation
Nufibre Pty Ltd.	Australia
Coherent Canada Inc.	Canada
Coherent (Beijing) Commercial Company Ltd.	China
Coherent Nanjing Laser Co. Ltd.	China
Nanjing Eastern Laser Co., Ltd.	China
Nanjing Eastern Technologies Co., Ltd.	China
Rofin-Baasel China Company, Ltd.	China
Corelase Oy	Finland
Coherent France SAS	France
CBL Verwaltungsgesellschaft mbH	Germany
Coherent (Deutschland) GmbH	Germany
Coherent Germany GmbH	Germany
Coherent GmbH	Germany
Coherent Holding BV & Co. KG	Germany
Coherent Kaiserslautern GmbH	Germany
Coherent LaserSystems GmbH & Co. KG	Germany
Coherent Munich GmbH & Co. KG	Germany
Coherent Real Estate 1 GmbH & Co. KG	Germany
Coherent Real Estate 2 GmbH & Co. KG	Germany
Coherent Real Estate GmbH	Germany
DILAS Diodenlaser GmbH	Germany
O.R. Lasertechnologie GmbH	Germany
PMB Elektronik GmbH	Germany
Rasant-Alcotec Beschichtungstechnik GmbH	Germany
Rofin-Sinar Laser GmbH	Germany
Coherent Israel Ltd.	Israel
Coherent Italia S.r.l.	Italy
Coherent Japan KK	Japan
Rofin-Baasel Korea Co., Ltd.	Korea
COHR Malaysia SDN. BHD.	Malaysia
Coherent Scotland Limited	Scotland
Coherent Singapore Pte. Ltd.	Singapore
Rofin-Baasel Singapore Pte Ltd.	Singapore
Coherent Korea Ltd.	South Korea
Rofin-Baasel Espana S.L.	Spain
Rofin-Sinar Technologies Europe, S.L.	Spain
Optoskand AB	Sweden
Coherent Switzerland AG	Switzerland
Rofin-Baasel Taiwan Ltd.	Taiwan
Coherent (Thailand) Co. Ltd.	Thailand
Coherent Dutch Merger Sub B.V.	The Netherlands
Coherent Europe B.V.	The Netherlands
Coherent Rofin B.V.	The Netherlands
Coherent Shared Services B.V.	The Netherlands

COHR International Investment C.V.	The Netherlands
Coherent (UK) Holdings Ltd.	United Kingdom
Coherent (UK) Limited	United Kingdom
E.S. Technology Limited	United Kingdom
MiDaz Lasers Limited	United Kingdom
Rofin-Baasel UK LIMITED	United Kingdom
Coherent Asia, Inc.	United States
Coherent International LLC	United States
Coherent NA, Inc.	United States
Coherent TIOS, Inc.	United States
Ondax, Inc.	United States
DILAS Diode Laser, Inc.	United States
Nufern	United States
Nufern International, Inc.	United States
Nufern US, Inc.	United States
Rofin-Baasel Inc.	United States
Rofin-Sinar Technologies LLC	United States
Coherent Services Vietnam Limited Liability Company	Vietnam

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We consent to the incorporation by reference in Registration Statement Nos. 333-237855, 333-182074, 333-174019, 333-163910, 333-159832, 333-115498, 333-104347, 333-85854, and 333-134062 on Form S-8 of our reports dated December 1, 2020, relating to the financial statements of Coherent, Inc. (the “Company”) and the effectiveness of the Company's internal control over financial reporting appearing in the Annual Report on Form 10-K of the Company for the year ended October 3, 2020.

/s/ DELOITTE & TOUCHE LLP

San Jose, California
December 1, 2020

Exhibit 31.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER PURSUANT TO EXCHANGE ACT RULE 13a-14(a)

I, Andreas W. Mattes, certify that:

1. I have reviewed this Annual Report on Form 10-K of Coherent, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report.
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
   a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
   a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
   b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: December 1, 2020

By: /s/ ANDREAS W. MATTES
Andreas W. Mattes
President and Chief Executive Officer

Exhibit 31.2

CERTIFICATION OF CHIEF FINANCIAL OFFICER PURSUANT TO EXCHANGE ACT RULE 13a-14(a)

I, Kevin Palatnik, certify that:

1. I have reviewed this Annual Report on Form 10-K of Coherent, Inc.;

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

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

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

    a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

    b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

    c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

    d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

    a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

    b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: December 1, 2020

By: /s/ KEVIN PALATNIK

Kevin Palatnik

Executive Vice President and Chief Financial Officer

Exhibit 32.1

Certification of Chief Executive Officer Pursuant to 18 U.S.C. Section 1350,
As Adopted Pursuant to Section 906 of the As Sarbanes-Oxley Act of 2002

I, Andreas W. Mattes certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that the Annual Report of Coherent, Inc. on Form 10-K for the fiscal year ended October 3, 2020 fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and that the information contained in such Annual Report on Form 10-K fairly presents in all material respects the financial condition and results of operations of Coherent, Inc.

Date: December 1, 2020

By: /s/ ANDREAS W. MATTES
Andreas W. Mattes
President and Chief Executive Officer

Exhibit 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

I, Kevin Palatnik certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that the Annual Report of Coherent, Inc. on Form 10-K for the fiscal year ended October 3, 2020 fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 and that the information contained in such Annual Report on Form 10-K fairly presents in all material respects the financial condition and results of operations of Coherent, Inc.

Date: December 1, 2020

By: /s/ Kevin Palatnik
Kevin Palatnik
Executive Vice President and Chief Financial Officer