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

FORM 10-K

(Mark One)

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

For the fiscal year ended December 31, 2021

OR

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

Commission file number 0-16244

VEECO INSTRUMENTS INC.
(Exact Name of Registrant as Specified in Its Charter)

Delaware	**11-2989601**
(State or Other Jurisdiction of Incorporation or Organization)	(I.R.S. Employer Identification No.)
Terminal Drive **Plainview, New York**	**11803**
(Address of Principal Executive Offices)	(Zip Code)

Registrant's telephone number, including area code:
(516) 677-0200

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, par value $0.01 per share	**VECO**	**The NASDAQ Global Select Market**

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

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

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

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

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

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

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

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

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

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 (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

The aggregate market value of the common stock held by non-affiliates of the registrant at July 2, 2021 (the last business day of the registrant's most recently completed second quarter) was $1,150,234,164 based on the closing price of $23.28 on the NASDAQ Global Select Market on that date.

As of February 11, 2022, there were 50,653,403 shares of the registrant's common stock, par value $0.01 per share, outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Certain portions of the definitive Proxy Statement to be used in connection with the Registrant's 2022 Annual Meeting of Stockholders are incorporated by reference into Part III of this Form 10-K.

VEECO INSTRUMENTS INC.

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This Annual Report on Form 10-K (“Form 10-K”) contains certain forward-looking statements within the meaning of the safe harbor provisions of the U.S. Private Securities Litigation Reform Act of 1995, as amended, relating to Veeco Instruments Inc. (together with its consolidated subsidiaries, “Veeco,” the “Company,” “Registrant,” “we,” “our,” or “us,” unless the context indicates otherwise) that are based on management’s expectations, estimates, projections, and assumptions. When used in this Form 10-K, words such as “expects,” “anticipates,” “plans,” “believes,” “scheduled,” “estimates,” and variations of these words and similar expressions are intended to identify forward-looking statements. Discussions containing such forward-looking statements may be found in Part I, Items 1 and 3, Part II, Items 7 and 7A hereof, as well as within this Form 10-K generally. Forward-looking statements in this discussion include, but are not limited to, those regarding anticipated growth and trends in our businesses and markets, industry outlooks and demand drivers, our investment and growth strategies, our development of new products and technologies, our business outlook for the current and future periods, the impact of the COVID-19 pandemic, our ongoing transformation initiative and the effects thereof on our operations and financial results, and other statements that are not historical facts. These statements and their underlying assumptions are subject to risks and uncertainties and are not guarantees of future performance. Factors that could cause actual results to differ materially from those expressed or implied by such statements include, without limitation:

- the level of demand for our products;
- industry and global economic conditions, including without limitation ongoing inflationary pressures and supply chain challenges;
- the effects of regional or global health epidemics, including the effects of the COVID-19 pandemic on the Company’s operations and on those of our customers and suppliers;
- global trade issues, including the ongoing trade disputes between the U.S. and China, and changes in trade and export license policies;
- our dependency on third-party suppliers and outsourcing partners;
- the timing of customer orders;
- our ability to develop, deliver and support new products and technologies;
- data security incidents, cyberattacks, and other disruptions in our information technology systems and/or those of our third party vendors and other partners;
- our ability to expand our current markets, increase market share and develop new markets;
- the concentrated nature of our customer base;
- our ability to obtain and protect intellectual property rights in key technologies;
- our ability to achieve the objectives of operational and strategic initiatives and attract, motivate and retain key employees;
- the variability of results among products and end-markets, and our ability to accurately forecast future results, market conditions, and customer requirements;
- the impact of our indebtedness, including our convertible senior notes and our capped call transactions; and
- other risks and uncertainties described in our SEC filings on Forms 10-K, 10-Q, and 8-K, including those included in Item 1A, "Risk Factors" of this Form 10-K, and from time-to-time in our other SEC reports.

All forward-looking statements speak only to management's expectations, estimates, projections and assumptions as of the date of this filing or, in the case of any document referenced herein or incorporated by reference, the date of that document. The Company does not undertake any obligation to update or publicly revise any forward-looking statements to reflect events, circumstances or changes in expectations after the date of this filing.

PART I

Item 1. Business

Business Description and Overview

Headquartered in Plainview, New York, we were organized as a Delaware corporation in 1989. We are a manufacturer of advanced semiconductor process equipment that solves an array of challenging materials engineering problems for our customers. Our comprehensive collection of ion beam, laser annealing, metal organic chemical vapor deposition ("MOCVD"), advanced packaging lithography, single wafer wet processing, molecular beam epitaxy ("MBE"), and atomic layer deposition ("ALD") technologies play an integral role in the fabrication of key devices that are enabling the 4th industrial revolution of all things connected. Such devices include leading advanced node application processors for mobile devices, thin film magnetic heads for hard disk drives in data storage, photonics devices for 3D sensing, advanced displays and high-speed data communications, and radio frequency ("RF") filters and power amplifiers for fifth generation ("5G") networks and mobile electronics. In close partnership with our customers, we combine decades of applications and materials know-how with leading-edge systems engineering to deliver high-volume manufacturing solutions with competitive cost of ownership. Serving a global and highly interconnected customer base, we have comprehensive sales and service operations across the Asia-Pacific, Europe, and North America regions to ensure real-time close collaboration and responsiveness.

Our 2022 priorities are:

- Protect: Safety is one of Veeco's core values. We have taken many steps to protect our employees, customers, suppliers, and stakeholders, and operate safely and successfully throughout the COVID-19 pandemic, resulting in the overall resiliency of our business. We have been able to serve our customers without pause and expect to continue to do so while executing on our strategic growth plans. We understand that the culture of the Company can have a direct impact on our performance. We made significant improvements to our culture as measured by a culture survey in 2021 compared to a baseline measured in 2019, and we remain committed to working with employees to continue to strengthen our culture. With safety top of mind and an emphasis on improving our culture, we enter 2022 with a healthy backlog and an improved balance sheet;

- Execute: We believe that our success depends on our ability to successfully execute in challenging environments, recognizing that our customers have high expectations. We are focused on the execution of multiple initiatives, including on-time deliveries, quality, and our on-going customer evaluation programs. We achieved significant revenue growth in 2021 despite a difficult supply chain environment. The Veeco United team worked through material shortages, lead time increases, and labor shortages in our factories as well as those of our suppliers. We are focused on continued execution throughout our entire supply chain in order to meet customer demand. Additionally, we continue to focus on improving the quality of our products and services, in line with our core value of our commitment to never stop improving. Finally, throughout 2021, we increased our emphasis on placing strategic evaluation systems with customers in the semiconductor and compound semiconductor markets, consistent with our growth plans. These systems are provided to customers after significant time spent demonstrating their capabilities in our factory, and represent one of the final stages in our customers' selection process. We invested in inventory, R&D, and service capability to support these evaluation systems. We are focused on successful outcomes for these evaluations and in continuing the elevated level of evaluation system activity with existing and potential customers;

- Innovate and Invest: We are focused on completing the transition of our San Jose operations to our newly leased facility. This facility is designed for the manufacture of our semiconductor market products, and will double our manufacturing capacity compared to the existing facility.

We are also focused on continuing to invest in our service capabilities. As we grow our business, and as our customers add capacity to their manufacturing operations, additional investments in service engineers and inventory are required. Finally, we will continue our efforts in product innovation. We have exciting new solutions in our semiconductor and compound semiconductor product development pipeline, which we believe will solve our customers' difficult materials challenges and enable sustainable growth in the long term; and

- Growth and Profitability: We view the semiconductor and compound semiconductor markets as significant growth opportunities in the near-term and long-term. We expect these markets to be the primary drivers of growth in 2022, driven by strong traction in laser annealing, advanced packaging lithography, EUV mask blank and MOCVD systems. We are focused on executing our backlog and winning additional orders to drive meaningful growth. While we expect expenses to increase as we continue to invest for growth, we are also focused on improving profitability through responsible management of our cost structure, with an emphasis on increasing gross margins.

Markets

Our products are purchased by customers in the following four end-markets: 1) Semiconductor; 2) Compound Semiconductor; 3) Data Storage; and 4) Scientific & Other.

Our array of process equipment systems are used in the production of a broad range of microelectronic components, including logic, dynamic random-access memory ("DRAM"), photonics devices (including laser diodes and micro-LEDs), power electronics, RF filters and amplifiers, magnetic heads for hard disk drives, and other semiconductor devices. Many of our systems are used to deposit advanced materials critical to the operation of the device and some of our systems are used in cleaning and surface preparation as well as the precise removal of critical materials. We are also a leader in systems used in the advanced packaging process flow of microelectronic components such as flip chip, fan-out wafer level packaging ("FOWLP"), and other wafer level packaging approaches, such as heterogeneous integration, used in the modern integration of diverse semiconductor products, especially in consumer electronics. In general, our customers purchase our systems to both produce current-generation devices in volume and to develop next-generation products which deliver more efficient, cost-effective, and advanced technological solutions. We operate in several highly cyclical business environments, and our customers' buying patterns are dependent upon industry trends and buying patterns for consumer electronics. As our products are sold into multiple markets, the following table describes these markets and the applicable Veeco technologies.

Markets	Description	Applicable Veeco Technologies
Semiconductor	The Semiconductor market refers to early process steps in logic and memory applications where silicon wafers are processed. There are many different process steps in forming patterned wafers, such as deposition, etching, masking, and doping, where the microchips are created but remain on the silicon wafer. As device architectures continue to shrink with advanced nodes, more precise process control is paramount to achieving high yields and competitive cost. One such process step is called Laser Annealing, which uses a very precise method to activate dopants, reduce contact resistance and modify material grain structure. The Veeco laser annealing technology enables our customers to have a lower thermal budget by annealing at higher temperatures over a shorter period of time. This market also includes mask blank production for extreme ultraviolet ("EUV") lithography with Veeco's Ion Beam Deposition technology. Finally, this market also includes Advanced Packaging which refers to a portfolio of wafer-level	• Laser Annealing • Ion Beam Deposition ("IBD") • Ion Beam Etch ("IBE") • Wet Processing • Advanced Packaging Lithography

	assembly technologies that enable improved performance of electronic products, such as	

	smartphones, high-end servers, and graphical processors. Demand for higher performance, smaller form factors, and lower power consumption in applications such as artificial intelligence, mobile devices, consumer electronics, and high-performance computing is driving the adoption of advanced packaging technologies. Veeco serves the advanced packaging market with lithography as well as wet processing equipment.	
Compound Semiconductor	The Compound Semiconductor market includes Photonics, Power Electronics, RF Filters and Amplifiers, and Solar applications. Photonics refers to light source technologies and laser-based solutions for 3D sensing, datacom and telecom applications. This includes micro-LED, laser diodes, edge emitting lasers and vertical cavity surface emitting lasers (“VCSELs”). Micro-LEDs may be used for next generation advanced displays. A micro-LED display is a new approach which uses an array of red, blue, and green micro-LEDs to directly display an image without motion blur or image retention, and with improved brightness, darker blacks, and wider viewing angles. Power Electronics refers to semiconductor devices such as rectifiers, inverters and converters for the control and conversion of electric power in growing applications such as fast or wireless charging of consumer electronics and automotive applications. RF power amplifiers and filters (including surface acoustic wave (“SAW”) and bulk acoustic wave (“BAW”) filters) are used in 5G communications infrastructure, smartphones, tablets, and mobile devices. They make use of radio waves for wireless broadcasting and/or communications. Solar refers to power obtained by harnessing the energy of the sun through the use of compound semiconductor devices such as photovoltaics.	• Gallium Nitride (“GaN”) MOCVD • Arsenides/ Phosphides (“As/P”) MOCVD • Wet Processing • MBE • ALD • IBE
Data Storage	Data Storage refers to the HDD market which provides significant value for mass storage and is an important part of large capacity storage applications. Our systems enable customers to manufacture the magnetic heads for hard disk drives.	• IBD • IBE • Physical Vapor Deposition • Mechanical (Lapping and Dicing) • Diamond Like Carbon Deposition • Wet Processing

Scientific & Other	Scientific & Other refers to advanced materials research and a range of manufacturing applications including optical coatings (laser mirrors, optical filters, and anti-reflective coatings).	• Ion Beam Sputtering for optical coatings • MBE for specialized laser and sensor devices • Wet Processing for sensors • ALD for a variety of applications

System Products

Laser Annealing Systems

Our laser annealing systems meet the industry demand for ultra-short time-scale annealing, heating the wafer up to temperatures just below the silicon melting point over a range of timeframes (hundreds of microseconds), enabling thermal annealing solutions at the most advanced semiconductor process nodes. This unique annealing technology provides a solution to the difficult challenge of fabricating ultra-shallow junctions and highly activated source/drain contacts at advanced logic nodes. In addition, our proprietary hardware design enables outstanding temperature uniformity across the wafer and die, by minimizing the pattern-density effect, thus reducing absorption variations.

We are also continuing to develop next generation melt anneal technology targeted for memory devices and annealing advanced logic devices at advanced nodes. As devices scale, achieving performance targets has become a challenge. To continue the roadmap, the industry is looking at new materials and the use of thermal processes that require nanosecond time-scale thermal annealing with temperatures exceeding the melting point. It is believed that nanosecond annealing will be required to meet the device targets at future nodes.

Ion Beam Deposition and Etch Systems

Our NEXUS® Ion Beam systems are used to deposit and etch thin film layers for multiple end applications in the Semiconductor, Data Storage, RF and other various emerging markets. These systems utilize Veeco’s proven gridded ion source technology which delivers a charged ion beam directed at a substrate for the etch application and at a sputter target for the deposition application. Our NEXUS® IBD system has a leading position in multiple markets including EUV mask blank manufacturing in which it enables our customers to deposit multilayers with high precision and ultra-low defects which is essential for EUV lithography. Our ion sources and grid technology are incorporated into etch systems used to pattern magnetic materials for the 300mm Semiconductor STT-MRAM market. The IBD systems are also critical in the manufacture of hard disk drive magnetic heads where they are used to deposit various magnetic and oxide layers and deliver best-in-class film properties. Our NEXUS® IBE systems are used to precisely etch complex features on materials which are challenging to pattern by traditional reactive ion etching techniques. These systems are widely used in the data storage industry for patterning of magnetic and oxide materials and are essential for forming the precise shape of the magnetic head. The NEXUS® systems may be included on our cluster system platform to allow either parallel or sequential deposition/etch processes.

Our Lancer™ IBE system is used for etching of SAW and BAW devices in the RF filter market and various waveguide patterning steps for AR/VR markets where their best-in-class film uniformity is a key advantage.

Our SPECTOR® Ion Beam Sputtering system was developed for high precision optical coatings and offers manufacturers state of the art optical thickness monitoring, improved productivity, and target material utilization, for cutting-edge optical interference coating applications. We also provide a broad array of ion beam sources.

Advanced Packaging Lithography

We have a leading position in the Advanced Packaging lithography equipment market for applications such as FOWLP, Flip Chip (including Copper Pillar), Fan In Wafer Lever Packaging, 3D stacking, interposers and embedded die. The Advanced Packaging market is driven by the need for improved performance, reduced power consumption, and the ability to image smaller geometries for mobile and automotive applications. These applications continue to demand increasingly complex packaging techniques and heterogeneous device integration from integrated device manufacturers (“IDMs,”), Foundries, and outsourced semiconductor assembly and test (“OSAT”) companies. Our Advanced Packaging tools are designed to optimize productivity for leading-edge 200mm and 300mm Advanced Packaging applications by delivering proven reliability and low cost of ownership in high-volume manufacturing environments. Our products are known for best-in-class yield coupled with outstanding resolution and depth of focus.

Single Wafer Wet Processing

We offer single wafer wet processing, and surface preparation systems which target growth opportunities in RF filters and amplifiers in the Compound Semiconductor market, as well as advanced packaging applications in the Semiconductor market. The WaferStorm® platform is based on our unique ImmJET™ technology, which provides improved performance at a lower cost of ownership than conventional wet bench-only or spray-only approaches. This highly flexible platform targets solvent-based cleaning applications that require a significant level of process control and flexibility. The WaferEtch® platform provides highly uniform, selective etching with onboard end-point detection for improved process control and yield in bumping applications. In addition, we have developed a state-of-the-art solution with the WaferEtch® platform to address the requirements of wafer thinning.

Metal Organic Chemical Vapor Deposition Systems

MOCVD production systems are used to make GaN and As/P-based devices for applications including power electronics, RF devices, specialty LED, display, and many other photonics applications. Our proven TurboDisc® technology is at the heart of our MOCVD systems and is the key to enabling best-in-class deposition uniformity, yield performance and cost per wafer savings for our customers with a combined advantage of high operating uptime and low maintenance costs. Our Lumina® platform is used for As/P deposition, and features long campaigns and low defectivity for exceptional yield and flexibility. Our Propel® series enables the development of highly-efficient GaN-based power electronics, RF devices and advanced GaN-on-silicon micro-LEDs. The Propel® system offers 200mm and fully-automated 300mm technology and incorporates single-wafer reactor technology for outstanding film uniformity, yield, and device performance.

Molecular Beam Epitaxy Systems

MBE is the process of precisely depositing epitaxially-aligned atomically-thin crystalline layers, or epilayers, of elemental materials onto a substrate in an ultra-high vacuum environment. We are a leading supplier of MBE systems worldwide.

Our MBE systems, sources, and components are used to develop and manufacture compound semiconductor devices in a wide variety of applications such as high-power fiber lasers, infrared detectors, mobile phones, radar systems, high efficiency solar cells, and basic materials science research. The GENxplor® MBE system creates high quality epitaxial layers and is ideal for cutting-edge research on a wide variety of materials including GaAs, antimonides, nitrides, and oxides on 3” diameter substrates.

Atomic Layer Deposition Systems

ALD is a thin-film deposition method in which a film is deposited on a substrate uniformly with precise control down to the atomic scale. Veeco offers a full suite of ALD systems for non-semiconductor front-end production applications across a wide range of markets and applications such as energy, optical, electronics, micro-electro mechanical systems ("MEMS"), nanostructures, and biomedical. We have recently developed the Firebird® ALD system, a fully automated tool capable of managing fragile wafers in a continuous operational sequence.

Other Systems

We have other deposition systems including Physical Vapor Deposition, Diamond-Like Carbon Deposition, and Chemical Vapor Deposition Systems primarily sold to the data storage market. In addition, we have mechanical systems such as saws and lappers for the data storage industry as well as the power semiconductor market. Finally, we have Gas-mixing systems primarily sold to the semiconductor market.

Sales and Service

We sell our products and services worldwide through various strategically located facilities in the United States, Europe, and the Asia-Pacific region. We believe that our customer service organization is a significant factor in our success. We provide service and support on a warranty, service contract, and an individual service-call basis. We believe that offering timely support creates stronger relationships with customers. Revenue from the sales of parts, upgrades, service, and support represented approximately 28%, 30%, and 26% of our net sales for the years ended December 31, 2021, 2020, and 2019, respectively. Parts and upgrade sales represented approximately 21%, 23%, and 19% of our net sales for those years, respectively, and service and support sales were 7%, 7%, and 7% respectively.

Customers

We sell our products to many of the world's semiconductor IDMs and Foundries, OSAT, HDD, and photonics manufacturers, as well as research centers and universities. We rely on certain principal customers for a significant portion of our sales. Sales to Western Digital and TDK Headway each separately accounted for more than 10% of our total net sales in 2021; and sales to Seagate Technology accounted for more than 10% of our total net sales in 2020 and 2019. If any principal customer discontinues its relationship with us or suffers economic difficulties, our business prospects, financial condition, and operating results could be materially and adversely affected.

Research and Development

Our research and development functions are focused on the timely creation of new products and enhancements to existing products, both of which are necessary to maintain our competitive position. We collaborate with our customers to align our technology and product roadmaps to customer requirements. Our research and development activities take place at our facilities in San Jose, California; Plainview, New York; Horsham, Pennsylvania; Somerset, New Jersey; St. Paul, Minnesota; and Waltham, Massachusetts.

Suppliers

We outsource certain functions to third parties, including the manufacture of several of our systems. While we rely on our outsourcing partners to perform their contracted functions, we maintain some level of internal manufacturing capability for these systems. Refer to Item 1A, "Risk Factors," for a description of risks associated with our reliance on suppliers and outsourcing partners.

Backlog

Our backlog consists of orders for which we received a firm purchase order, a customer-confirmed shipment date generally within twelve months, and a deposit, when required. Our backlog increased to $440.2 million at December 31, 2021 from $366.0 million at December 31, 2020.

Competition

In each of the markets that we serve, we face competition from established competitors, some of which have greater financial, engineering, and marketing resources than we do, as well as from smaller competitors. In addition, many of our products face competition from alternative technologies, some of which are more established than those used in our products. Significant factors for customer selection of our tools include system performance, accuracy, repeatability, ease of use, reliability, cost of ownership, and technical service and support. None of our competitors compete with us across all of our product lines.

Our principal competitors include: Aixtron; Applied Materials; Canon; Grand Plastics Technology Corporation; Mattson; Screen Semiconductor Solutions; and Shanghai Micro Electronics Equipment.

Intellectual Property

Our success depends, in part, on our proprietary technology, and we have over 400 patents in the United States and other countries.

We have patents and exclusive and non-exclusive licenses to patents owned by others covering certain of our products, which we believe provide us with a competitive advantage. We have a policy of seeking patents on inventions concerning new products and improvements as part of our ongoing research, development, and manufacturing activities. We believe that there is no single patent or exclusive or non-exclusive license to patents owned by others that is critical to our operations, as the success of our business depends primarily on the technical expertise, innovation, customer satisfaction, and experience of our employees. Refer to Item 1A, “Risk Factors,” for a description of risks associated with intellectual property.

The Veeco United Team

Veeco’s global workforce spans twelve countries around the world. At the end of 2021, we had 1,091 employees with 240 located in the Asia-Pacific region, 40 in the EMEA region, and 811 in the United States. Approximately 24% of our employees are involved in research and development; 55% are involved in operations, manufacturing, service, and quality assurance; and 21% are involved in sales, order administration, marketing, finance, information technology, general management, and other administrative functions. Our success depends on our ability to attract, retain, and motivate employees. We compete for talent with other companies and organizations. We consider our relations with the Veeco United Team to be favorable. We are subject to various federal, state, and local regulations, and regularly monitor all key employment activities, such as hiring, termination, pay and working practices to ensure compliance with such regulations. In addition, we supplement the Veeco United Team with contractors and other temporary workers.

Our Core Values

All Veeco employees are expected to honor our core values, which define the way we conduct our business in everyday actions and choices and form the foundation of our culture:

- We will always put our CUSTOMERS first
- We will never compromise on SAFETY
- We will always demonstrate RESPECT
- We will never stop IMPROVING
- We will always be ACCOUNTABLE
- We will never forget that DIVERSITY and INCLUSION makes us stronger

Employment, Recruitment and Development

Our recruitment programs are regionally focused, and hiring is done at a local level to ensure compliance with applicable 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 filling vacancies. In fiscal 2021, we hired 223 employees, 181 of whom were within the United States, 41 of whom were in the Asia-Pacific region, and 4 of whom were in the EMEA region.

We track and report key talent metrics including workforce demographics, talent pipeline and diversity. We invest in professional development programs to provide opportunities for individuals to advance their careers in either technical/individual contributor or leadership tracks. Many of our training and development programs are offered on-line for the benefit of employees located around the world. Additional focus is placed on the development of 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. Since turnover is an important indicator of employee satisfaction, we closely monitor turnover statistics. Our 12-month rolling average for voluntary turnover at December 31, 2021 was approximately 9.2%. Our employee average tenure is more than 8 years.

Employee Engagement

The engagement and satisfaction of the Veeco United Team is critical to our culture and our success. In 2019, we conducted a formal employee survey designed to assess global employee engagement, leadership, work environment and culture. 91% of our employees participated in the survey, itself an indicator of a high level of employee engagement. Participants provided over 2,000 responses to open-ended questions. The findings from this survey established an agenda for various initiatives designed to strengthen our Company. In 2021, we conducted a second formal employee survey, using the same survey instrument. Approximately 90% of employees participated in the survey and nearly 2,000 responses were provided to open-ended questions. We saw significant improvements across all survey areas, and we remain committed to working with employees to strengthen the Company's culture. In addition, our executives conduct regular meetings with our global workforce enabling all employees to engage with senior leaders and ask questions in open Q&A sessions. Finally, we maintain and regularly remind our employees about our confidential third-party hotline service that can be utilized to share their concerns.

Compensation Philosophy

Our compensation philosophy is targeted to support our employees' financial, physical, and mental health and well-being. We utilize third-party benchmarking surveys to ensure that our total compensation packages are competitive. We help employees share in the success of the Company through various programs including an Employee Stock Purchase Plan ("ESPP"), equity compensation, profit sharing and bonus plans. In addition to providing our employees with competitive compensation packages, we offer benefits designed to meet the needs of employees and their families, including paid time off, medical, dental and vision coverage, disability income protection, life insurance, retirement savings contributions, and more. Veeco pays the majority or all of the costs for many of these benefits.

Diversity and Inclusion

We are committed to building and sustaining a culture of diversity and inclusion where our people can be their authentic selves and are encouraged to reach their full potential. Our Veeco team, like the technologies we enable, is a rich combination of diverse individuals coming together as Veeco United to make a material difference for our people, our customers, and the world. As a global technology company, we recognize that a diverse employee population makes Veeco stronger, more innovative, and a more engaging place to work. We are always striving to attract talented individuals from a global candidate pool.

In the second quarter of 2021, Veeco established a Diversity and Inclusion Council. The Council, composed of diverse Veeco colleagues from many different parts of the Company, represents Veeco's ongoing commitment to inclusion of all genders, sexual orientations, races, ethnic origins, religions, and diversity of thought. The team has recently established Veeco's Diversity and Inclusion Mission Statement and Charter. The charter affirms our commitment to building awareness, enhancing community partnerships, addressing diversity in our recruiting and hiring practices, empowering employees to promote D&I initiatives, and identifying opportunities to have meaningful engagements with peers and the leadership team. We are excited to continue developing initiatives to promote and celebrate diversity at Veeco.

Employee Health and Safety, Pandemic Response

We are committed to providing a safe and healthy workplace for all employees. We accomplish this through strict compliance with applicable laws and regulations regarding workplace safety, including recognition and control of workplace hazards, tracking injury and illness rates, utilizing a global travel health program, and maintaining detailed emergency and disaster recovery plans.

Our highest priorities throughout the pandemic were, and continue to be, the health and well-being of our employees, customers, suppliers, and stakeholders. From the beginning of the pandemic, through the recent challenges posed by the acceleration of coronavirus variants, we have taken precautions to protect employees, visitors, and customers while minimizing disruption to our business. Our facilities remained operational as an “essential business” throughout the pandemic. However, we implemented rigorous health and safety protocols at our manufacturing facilities, including extensively and frequently disinfecting our facilities, limiting access to our facilities, checking temperatures of individuals entering our facilities, staggering shifts to minimize employee overlap in gowning areas, and providing protective equipment in order to minimize the risks to our employees. In addition, we required many of our employees to work from home wherever possible. We protected employees, customers, and stakeholders by providing remote meetings, demos, and service, whenever possible. Our Veeco United team was committed to remaining flexible and responsive throughout the pandemic. Our team monitored and responded quickly to local, state, and federal guidance related to the pandemic. We developed a COVID-19 Pledge to describe all the measures we implemented in our facilities to keep employees working on-site safe throughout the pandemic.

Available Information

Our corporate website address is www.veeco.com. All filings we make with the Securities and Exchange Commission (“SEC”), including our Annual Report on Form 10-K, our Quarterly Reports on Form 10-Q, our Current Reports on Form 8-K, our proxy statements and any amendments thereto filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, are available for free in the Investor Relations section of our website as soon as reasonably practicable after they are filed with or furnished to the SEC. The reference to our website address does not constitute inclusion or incorporation by reference of the information contained on our website in this Form 10-K or other filings with the SEC, and the information contained on our website is not part of this document.

Item 1A. Risk Factors

Key Risk Factors That May Impact Future Results

Stockholders should carefully consider the risk factors described below, many of which have been, and could be further, exacerbated by the COVID-19 pandemic and any further impact to the global business and economic environment which may result. Any of these factors, many of which are beyond our control, could materially and adversely affect our business, financial condition, operating results, cash flow, and stock price.

Risks Related to Our Business, Finance and Operations

The effects of the COVID-19 pandemic have strained and have negatively impacted our businesses and operations, and the duration and extent to which COVID-19 may impact our future results of operations and overall financial performance remains uncertain.

The outbreak and continuing spread of COVID-19 and its variants have resulted in a substantial curtailment of business activities worldwide and has caused and is likely to continue to cause weakened economic conditions, both domestically and abroad, including in markets in Asia and Europe from which we derive the majority of our revenue. Government restrictions (such as stay-at-home orders), quarantines and worker absenteeism as a result of COVID-19 have led to a significant number of business closures and other slowdowns. These slowdowns have adversely impacted and will likely continue to adversely impact Veeco directly, as well as our customers, suppliers and other partners.

While all of our global sites are currently operational, any local pandemic outbreaks could require us to temporarily curtail production levels or temporarily cease operations based on government mandates. Furthermore, the COVID-19 conditions have adversely impacted, and may continue to adversely impact, our ability to timely source critical parts and materials and to provide on-site services to our customers. Supply chain shortages, which have been and may continue to be exacerbated by shipping delays caused by transportation interruptions (associated with matters such as reduced availability of air transport, port closures, and increased border controls), could require us to purchase excess inventory with longer lead times, which could increase inventory obsolescence risk while negatively impacting our working capital. Shortages of critical parts have strained and may continue to strain our manufacturing capacity, threatening to adversely impact our ability to meet customer needs, which may negatively impact our revenues, results of operations and financial condition. While we have been able to successfully mitigate these risks thus far, without material negative impact to our financial performance, our continued ability to do so remains uncertain.

In addition, the conditions caused by COVID-19 could adversely affect our customers' ability or willingness to purchase our products or services or otherwise delay prospective customers' purchasing decisions. These conditions may delay the provisioning of our offerings, or lengthen payment terms, all of which could adversely affect our future sales, operating results and overall financial performance. In addition, adverse impacts on the creditworthiness of our customers and other counterparties may negatively affect their ability to pay amounts owed to us, which could materially and adversely affect our results of operations and financial condition.

The COVID-19 pandemic has resulted in significant disruption of global financial markets and could negatively impact our stock price, our access to capital, and our business and results of operations in the near and long-term.

Unfavorable market conditions have adversely affected, and may continue to adversely affect, our operating results.

Conditions of the markets in which we operate are volatile and may experience significant deterioration. Changing market conditions require that we continuously monitor and reassess our strategic resource allocation decisions. If we fail to properly adapt to changing business environments, we may lack the infrastructure and resources necessary to scale up our businesses to successfully compete during periods of growth, or we may incur excess fixed costs during periods of decreasing demand. Adverse market conditions relative to our products may result in:

- reduced demand for our products, or the rescheduling or cancellation of orders for our products which may result in negative backlog adjustments;

- asset impairments, including the impairment of goodwill and other intangible assets;
- unfavorable changes in customer mix and product mix;
- increased price competition for our products, or increased competition from sellers of used equipment or lower-priced alternatives to our products, which could lead to lower profit margins for our products;
- increased inventory obsolescence;
- disruptions in our supply chain;
- higher operating costs, caused by matters including but not limited to macroeconomic inflationary pressures, which the Company is currently beginning to experience; and
- an increase in uncollectable amounts due from our customers resulting in increased reserves for doubtful accounts and write-offs of accounts receivable.

If the markets in which we participate experience deteriorations or downturns, this could negatively impact our sales and revenue generation, margins, operating expenses, and profitability.

The timing of our orders, shipments, and revenue recognition may cause our quarterly operating results to fluctuate significantly.

We derive a substantial portion of our net sales in any fiscal period from the sale of a relatively small number of high-priced systems. As a result, the timing for the recognition of revenue for a single transaction could have a material effect on our sales and operating results for a particular fiscal period. As is typical in our industry, orders and shipments often occur during the last few weeks of a quarter. As a result, a delay of only a week or two can impact which period revenue is reported and can cause volatility in our revenue for a given reporting period. Our quarterly results have fluctuated significantly in the past and we expect this trend to continue.

Our sales cycle is long and unpredictable.

Historically, we have experienced long and unpredictable sales cycles (the period between our initial contact with a potential customer and the time that we recognize revenue from resulting sales to that customer). It is not uncommon for our sales cycle to exceed twelve months. The timing of an order often depends on our customer’s capital expenditure budget, over which we have no control. In addition, the time it takes us to procure and build a product to customer specifications typically ranges from three to twelve months. When coupled with the fluctuating amount of time required for shipment, installation, and final acceptance, our sales cycles often vary widely, and these variations can cause fluctuations in our operating results. As a result of our lengthy sales cycles, we may incur significant research and development, selling, general, and administrative expenses before we generate revenue for these products. We may never generate the anticipated revenue if a customer cancels or otherwise changes its purchase plans, or if our evaluation systems do not satisfy customer requirements (which could result in working capital constraints, excess inventory or inventory obsolescence, and other harm to the Company). These risks are particularly prevalent in the semiconductor market, which is often characterized by long customer qualification times, typically twelve to eighteen months. Once qualified, the ramp to volume production can take an additional extended period of time, often twelve to twenty-four months. During these periods, little to no revenue will be recognized by us, while we will continue to incur research and development costs. Despite our efforts, our products may never be qualified and may never achieve design-tool-of-record (“DTOR”) or production-tool-of-record (“PTOR”) status, and our business, financial condition, and results of operations may be materially and adversely affected.

Our backlog is subject to customer cancellation or modification which could result in decreased sales, increased inventory obsolescence, and liabilities to our suppliers for products no longer needed.

Customer purchase orders may be cancelled or rescheduled by the customer, sometimes with limited or no penalties, which may result in increased or unrecoverable costs for the Company. We adjust our backlog for such cancellations and contract modifications, among other items. A downturn in one or more of our businesses could result in an increase in order cancellations and postponements.

We write-off excess and obsolete inventory based on historical trends, future usage forecasts, and other factors including the amount of backlog we have on hand. If our backlog is canceled or modified, our estimates of future product demand may prove to be inaccurate, in which case we may have understated the write-off required for excess and obsolete inventory. In the future, if we determine that our inventory is overvalued, we will be required to recognize associated costs in our financial statements at the time of such determination. In addition, we place orders with our suppliers based on our customers' orders. If our customers cancel their orders with us, we may not be able to cancel our orders with our suppliers. Resulting charges could have a material adverse effect on our results of operations and financial condition.

We may be required to take impairment charges on assets.

We are required to assess goodwill and indefinite-lived intangible assets annually for impairment, or on an interim basis whenever certain events occur or circumstances change, such as an adverse change in business climate or a decline in the overall industry, that would more likely than not reduce the fair value below its carrying amount.

As part of our long term strategy, we may pursue future acquisitions of, or investments in, other companies or assets which could potentially increase our assets. We are required to test certain of our assets, including acquired intangible assets, property, plant, and equipment, and equity investments without readily observable market prices, for recoverability and impairment whenever there are indicators of impairment such as an adverse change in business climate. Adverse changes in business conditions or worse-than-expected performance by these acquired companies could negatively impact our estimates of future operations and result in impairment charges to these assets. For example, in the fourth quarters of 2019 and 2021 we recorded non-cash impairment charges of $25.0 million and $1.0 million, respectively, primarily related to our equity investments without readily observable market prices. If our assets are further impaired, our financial condition and results of operations could be materially and adversely affected.

We are exposed to risks associated with business combinations, acquisitions, strategic investments and divestitures.

We have completed several significant acquisitions and investments in the past and we will consider new opportunities in the future. Acquisitions and investments involve numerous risks, many of which are unpredictable and beyond our control, including the following:

- the failure to realize expected synergies and difficulties and costs, including the diversion of management's attention, in integrating the personnel, operations, technologies, and products of acquired companies;
- the inability to complete proposed transactions as anticipated, resulting in obligations to pay professional and other expenses, including any applicable termination fees;
- unknown, underestimated, and undisclosed commitments or liabilities;
- increased amortization expenses relating to intangible assets; and
- other adverse effects on our business, including the potential impairment and write-down of amounts capitalized as intangible assets and goodwill as part of the acquisition, as a result of such matters as technological advancements or worse-than-expected performance by the acquired company.

If we issue equity securities to pay for an acquisition or investment, the ownership percentage of our then-current shareholders would be reduced and the value of the shares held by these shareholders could be diluted, which could adversely affect the price of our stock. If we use cash to pay for an acquisition or investment, the payment could significantly reduce the cash that would be available to fund our operations, pay our indebtedness, or be used for other purposes, which could have a negative effect on our business.

In addition, we continually assess the strategic fit of our businesses and may from time to time seek to divest portions of our Company that no longer fit our strategic plan. Divestitures involve significant risks and uncertainties, including the ability to sell such businesses at satisfactory prices, on acceptable terms, and in a timely manner. Divestitures may also disrupt other parts of our businesses, distract the attention of our management, result in a loss of key employees or customers, and require that we allocate internal resources that would otherwise be devoted to operating our existing businesses. Divestitures may expose us to unanticipated liabilities (including those arising from representations and warranties made to a buyer regarding the businesses) and to ongoing obligations to support the businesses following such divestitures, any and all of which could adversely affect our business, financial condition, and results of operations.

We have adopted certain measures that may have anti-takeover effects which may make an acquisition of our Company by another company more difficult.

We have adopted, and may in the future adopt, certain measures that may have the effect of delaying, deferring, or preventing a takeover or other change in control of our Company, which a holder of our common stock might not consider to be in the holder's best interest. For example, our board of directors has the authority to issue up to 500,000 shares of preferred stock and to fix the rights (including voting rights), preferences and privileges of these shares ("blank check" preferred stock). Such preferred stock may have rights, including economic rights, senior to our common stock. As a result, the issuance of the preferred stock could have a material adverse effect on the price of our common stock and could make it more difficult for a third party to acquire a majority of our outstanding common stock.

In addition, our board of directors is divided into three classes with each class serving a staggered three-year term. The existence of a classified board makes it more difficult for our shareholders to change the composition of our board of directors, and therefore the Company's policies, in a relatively short period of time.

Furthermore, we have adopted certain certificate of incorporation and bylaws provisions which have anti-takeover effects. These include: (a) requiring certain actions to be taken at a meeting of shareholders rather than by written consent, (b) requiring a super-majority of shareholders to approve certain amendments to our bylaws, (c) limiting the maximum number of directors, and (d) providing that directors may be removed only for cause. These measures and those described above may have the effect of delaying, deferring, or preventing a takeover or other change in control of our Company that a holder of our common stock may not consider to be in the holder's best interest.

In addition, we are subject to the provisions of Section 203 of the General Corporation Law of the State of Delaware, which prohibits a Delaware corporation from engaging in any business combination, including mergers and asset sales, with an interested stockholder (generally, a 15% or greater stockholder) for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is approved in a prescribed manner. The operation of Section 203 may have anti-takeover effects, which could delay, defer, or prevent a takeover attempt that a holder of our common stock may not consider to be in the holder's best interest.

Despite the above measures, an activist shareholder could undertake action to implement governance, strategic, or other changes to the Company which a holder of our common stock may not consider to be in the holder's best interest. Such activities could interfere with our ability to execute our strategic plans, be costly and time consuming, disrupt our operations, and divert the attention of management and our employees.

Our current debt facilities, including our 2.70% Convertible Senior Notes due 2023 (the "2023 Notes"), our 3.50% Convertible Senior Notes due 2025 (the "2025 Notes"), or our 3.75% Convertible Senior Notes due 2027 (the "2027 Notes") (the 2023 Notes, 2025 Notes, and 2027 Notes, together, the "Notes"), and our revolving credit facility (the "Credit Facility"), may contain certain restrictions, covenants and repurchase provisions that may limit our ability to raise the funds necessary to meet our working capital needs, which may include the cash conversion of the Notes or repurchase of the Notes for cash upon a fundamental change.

As of December 31, 2021, we had $20.2 million in principal amounts outstanding in 2023 Notes, $132.5 million in principal amounts outstanding in 2025 Notes, and $125.0 million in principal amounts outstanding in 2027 Notes. In addition, as of December 31, 2021, we had an undrawn senior secured revolving credit facility in an aggregate principal amount of $150.0 million, including a $15.0 million letter of credit sublimit.

These debt facilities contain certain covenant and other restrictions that may limit our ability to, among other things, incur additional debt or create liens, sell certain assets, and merge or consolidate with third parties, which may, in turn, preclude us from responding to changes in business and economic conditions, engaging in transactions that might otherwise be beneficial to us, or obtaining additional financing. Our ability to comply with some of these covenants is dependent on our future performance, which will be subject to many factors, some of which are beyond our control such as prevailing economic conditions. In addition, our failure to comply with these covenants could result in a default under the Notes or Credit Facility, which could accelerate the debt. If any of our debt is accelerated, we may not have sufficient funds available to repay such debt, which could materially and negatively affect our financial condition and results of operation.

In addition, our ability to repurchase or to pay cash upon conversion of the Notes, or maturity of the Credit Facility, may be limited by law, by regulatory authority or by agreements governing our indebtedness that exist at the time of repurchase, conversion, or maturity. Our failure to settle the debt as required would constitute a default under the applicable debt facility and could also lead to a default under the other debt facilities. If the payment of the related indebtedness were to be accelerated after any applicable notice or grace periods, we may not have sufficient funds to repay the indebtedness.

Finally, holders of the Notes will have the right to require us to repurchase all or any portion of their Notes upon the occurrence of a fundamental change before the maturity date at a fundamental change repurchase price equal to 100% of the principal amount of the Notes to be repurchased, plus accrued and unpaid interest, if any, to, but excluding, the fundamental change repurchase date, as described in the applicable Notes and indenture. Additionally, upon conversion of the Notes, unless we elect to deliver solely shares of our common stock to settle such conversion (other than paying cash in lieu of delivering any fractional share), we will be required to make cash payments in respect of the Notes being converted. However, we may not have enough available cash or be able to obtain financing at the time we are required to make repurchases of the Notes surrendered therefor or pay cash with respect to the Notes being converted.

The conditional conversion features of the 2023 Notes, 2025 Notes, and 2027 Notes, if triggered, may materially and adversely affect our financial condition and operating results.

In the event the conditional conversion features of the 2023 Notes, 2025 Notes, and 2027 Notes are triggered, holders of Notes will be entitled to convert the Notes at any time during specified periods at their option. If one or more holders elect to convert the Notes, unless we elect to satisfy our conversion obligation by delivering solely shares of our common stock (other than paying cash in lieu of delivering any fractional share), we would be required to settle a portion or all of our conversion obligation through the payment of cash, which could adversely affect our liquidity. In addition, even if holders do not elect to convert the Notes, we could be required under applicable accounting rules to reclassify all or a portion of the outstanding principal of the Notes as a current rather than long-term liability, which could result in a material reduction of our net working capital.

The accounting method for convertible debt securities that may be settled in cash, such as the Notes, could have a material effect on our reported financial results.

In August 2020, the FASB issued ASU 2020-06: *Debt – Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging – Contracts in Entity's Own Equity (Subtopic 815-40): Accounting for Convertible Instruments and Contracts in an Entity's Own Equity*. Under the standard, which will be effective for our fiscal year 2022, an entity is no longer required to separately account for the liability and equity components of certain convertible debt instruments that may be settled entirely or partially in cash upon conversion, such as the Notes. As a result, entities will account for a convertible debt instrument wholly as debt, unless certain other conditions are met. The elimination of these separation models will reduce our non-cash interest expense, and thereby increasing net income (or reducing net loss). Additionally, ASU 2020-06 requires the application of the if-converted method for calculating diluted earnings per share, and precludes the use of the treasury stock method for certain debt instruments, which will adversely affect our diluted shares outstanding. We cannot be sure whether other changes may be made to the current accounting standards related to the Notes, or otherwise, that could have an adverse impact on our financial statements.

Issuance of our common stock, if any, upon conversion of the Notes, as well as the capped call transactions and the hedging activities of the option counterparties, may impair or reduce our ability to utilize our net operating loss carryforwards or our research and development credits carryforwards in the future.

Pursuant to U.S. federal and state tax rules, a corporation is generally permitted to deduct from taxable income in any year net operating losses ("NOLs") carried forward from prior years and to reduce from tax liabilities in any year R&D

credits carried forward from prior years.

As of December 31, 2021, we had U.S. federal NOL carryforwards of approximately $165.8 million, of which $6.9 million have an indefinite carryforward period, with the remaining expiring in 2036, if not utilized. We also had U.S. federal R&D credits carryforwards of approximately $32.1 million expiring in varying amounts between 2022 and 2041. If we were to experience a "change in ownership" under Section 382 of the Internal Revenue Code ("Section 382"), the NOL carry forward limitations under Section 382 would impose an annual limit on the amount of the future taxable income that may be offset by our NOLs generated prior to the change in ownership. The R&D credits carry forward limitation under Section 383 of the Internal Revenue Code would impose an annual limit on the amount of tax liabilities that may be offset by R&D credits generated prior to the change in ownership. If an ownership change were to occur, we may be unable to use a significant portion of our NOLs to offset future taxable income and/or a significant portion of R&D credits to offset future tax liabilities.

The shares of common stock, if any, issued upon conversion of the Notes will, upon such issuance, be taken into account when determining the cumulative change in our ownership for Section 382 purposes. As a result, any conversion of the Notes that we elect to settle in shares may materially increase the risk that we could experience an ownership change for these purposes in the future.

The capped call transactions may affect the value of the 2027 Notes and our common stock.

With respect to the 2027 Notes, we have entered into capped call transactions with certain option counterparties. The capped call transactions were expected generally to reduce the potential dilution upon conversion of the 2027 Notes and/or offset any cash payments we are required to make in excess of the principal amount of converted 2027 Notes, as the case may be, with such reduction and/or offset subject to a cap.

The option counterparties or their affiliates may enter into or modify hedge positions by entering into or unwinding various derivatives with respect to our common stock and/or purchasing or selling our common stock or other securities of ours in secondary market transactions prior to the maturity of the 2027 Notes (and are likely to do so during any observation period related to a conversion of the 2027 Notes). This activity could also cause or avoid an increase or a decrease in the market price of our common stock and the 2027 Notes, which could affect the ability of the noteholders to convert the 2027 Notes and, to the extent the activity occurs during any observation period related to a conversion of the 2027 Notes, it could affect the number of shares and value of the consideration that noteholders will receive upon conversion of the 2027 Notes.

Risks Associated with Operating a Global Business

We are exposed to risks of operating businesses outside the United States.

A majority of our sales are to customers located outside of the United States, which we expect to continue in the future. Our non-U.S. sales and operations are subject to risks inherent in conducting business outside the United States, many of which are beyond our control including:

- political and social attitudes, laws, rules, regulations, and policies within countries that favor local companies over U.S. companies, including government-supported efforts to promote local competitors;
- global trade issues and uncertainties with respect to trade policies, including tariffs, trade sanctions, and international trade disputes, and the ability to obtain required import and export licenses;
- differing legal systems and standards of trade which may not honor our intellectual property rights and which may place us at a competitive disadvantage;
- pressures from foreign customers and foreign governments for us to increase our operations and sourcing in the foreign country, which may necessitate the sharing of sensitive information and intellectual property rights;
- multiple conflicting and changing governmental laws and regulations, including varying labor laws and tax regulations;

- reliance on various information systems and information technology to conduct our business, making us vulnerable to cyberattacks by third parties or breaches due to employee error, misuse, or other causes, that could result in business disruptions, loss of or damage to our intellectual property and confidential information (and that of our customers and other business partners), reputational harm, transaction errors, processing inefficiencies, or other adverse consequences;
- regional economic downturns, varying foreign government support, unstable political environments, and other changes in foreign economic conditions;
- the impact of public health epidemics, such as the COVID-19 pandemic, on employees, suppliers, customers and the global economy;
- difficulties in managing a global enterprise, including staffing, managing distributors and representatives, and repatriating cash;
- longer sales cycles and difficulties in collecting accounts receivable; and
- different customs and ways of doing business.

These challenges, many of which are associated with sales into the Asia-Pacific region, have had and may continue to have a material adverse effect on our business.

Changes in U.S. trade policy and export controls and ongoing trade disputes between the U.S. and China have adversely affected, and may continue to adversely affect, our business, results of operations, and financial condition.

The U.S. government has enacted several changes in trade policy which have adversely affected the Company's ability to sell and service its products to and for customers located in China and in certain other countries. These changes have included, without limitation, the elimination of license exception CIV, the implementation of new regulations governing the sale of equipment to defined "Military End Users" and for defined "Military End Uses", and the addition of several companies to the U.S. Commerce Department's Entity List (including Semiconductor Manufacturing International Corporation and its related entities). The effect of these changes, among others, is that U.S. companies are now required to obtain export licenses before providing commodities, software, and technology (which are subject to the regulations) to customers for whom licensing requirements did not previously apply. These heightened export restrictions may also inhibit technical discussions with existing or prospective customers, negatively impacting our ability to pursue sales opportunities. The administrative processing, attendant delays and risk of ultimately not obtaining required export approvals pose a particular disadvantage to the Company relative to our non-U.S. competitors who are not required to comply with U.S. export controls. This difficulty and uncertainty has adversely affected our ability to compete for and win business from customers in China. Foreign customers affected by these and future U.S. government sanctions or threats of sanctions may respond by developing their own solutions to replace our products or by utilizing our foreign competitors' products. This "trade war" with China, together with the prospect of additional governmental action related to international sanctions and tariffs, has adversely affected, and is likely to continue to adversely affect, demand for our products and the results of our operations and financial condition.

The changes in U.S. trade policy and export controls, as well as sanctions imposed by the U.S. against certain Chinese companies, have triggered retaliatory action by China and could trigger further retaliation. In addition, China has provided, and is expected to continue to provide, significant assistance, financial and otherwise, to its domestic industries, including some of our competitors. We face increasing competition as a result of significant investment in the semiconductor industry by the Chinese government and various state-owned or affiliated entities that is intended to advance China's stated national policy objectives. In addition, the Chinese government may restrict us from participating in the China market or may prevent us from competing effectively with Chinese companies.

Further, we hold inventory of products that may be affected by the recent U.S. government actions, including potential order cancellations. While we continue to take steps to mitigate our exposure to this developing situation, if the sale of these products is delayed or we are unable to return or dispose of our inventory on favorable economic terms, we may incur additional carrying costs for the inventory or otherwise record charges associated with this inventory.

We may be unable to obtain required export licenses for the sale of our products.

Whether with respect to sales to customers located in China or otherwise, products which (i) are manufactured in the United States, (ii) incorporate controlled U.S. origin parts, technology, or software, or (iii) are based on U.S. technology, are subject to the U.S. Export Administration Regulations ("EAR") when exported to and re-exported from international jurisdictions, in addition to the local jurisdiction's export regulations applicable to individual shipments. Currently, our laser annealing, MOCVD, MBE and certain other systems and products are controlled for export under the EAR. Licenses or proper license exceptions may be required for the shipment of our products to certain customers or countries. Obtaining an export license or determining whether an export license exception exists often requires considerable effort by us and cooperation from the customer, which can add time to the order fulfillment process. We may be unable to obtain required export licenses or qualify for export license exceptions and, as a result, we may be unable to export products to our customers and/or meet their servicing needs. Non-compliance with the EAR or other applicable export regulations could result in a wide range of penalties including the denial of export privileges, fines, criminal penalties, and the seizure of commodities. In the event that an export regulatory body determines that any of our shipments violate applicable export regulations, we could be fined significant sums and our export capabilities could be restricted, which could have a material adverse impact on our business.

We are exposed to various risks associated with global regulatory requirements.

As a public company with global operations, we are subject to the laws of the United States and multiple foreign jurisdictions, and the rules and regulations of various governing bodies, which may differ among jurisdictions. We are required to comply with legal and regulatory requirements pertaining to such matters as data privacy (including, for example, the European Union General Data Protection Regulation and similar laws), labor laws, immigration, customs, trade, taxes, corporate governance, conflict minerals and other social responsibility legislation, and antitrust regulations, among others. These laws and regulations, which are ever-evolving and at times complex and inconsistent, impose costs on our business and divert management time and attention from revenue-generating activities. Changes to or ambiguities in these laws and regulations may create uncertainty regarding our compliance requirements. While we intend to comply with these regulatory requirements, if we are found by a court or regulatory agency to have failed in these efforts, our business, financial condition, and results of operations could be adversely affected.

We may be exposed to liabilities under the Foreign Corrupt Practices Act and other similar laws.

We are subject to the Foreign Corrupt Practices Act of 1977 ("FCPA") and other laws that prohibit improper payments or offers of payments to foreign government officials, as defined by the statute, for the purpose of obtaining or retaining business. Violations of the FCPA or similar laws or similar customer policies may result in severe criminal or civil sanctions or the loss of supplier privileges to a customer and we may be subject to other liabilities, which could negatively affect our business, financial condition, and results of operations.

Our operating results may be adversely affected by tightening credit markets.

As a global company with worldwide operations, we are subject to volatility and adverse consequences associated with economic downturns in different parts of the world. In the event of a downturn, many of our customers may delay or reduce their purchases of our products and services. If negative conditions in the credit markets prevent our customers from obtaining credit or necessary financing, product orders in these channels may decrease, which could result in lower revenue. In addition, we may experience cancellations of orders in backlog, rescheduling of customer deliveries, and attendant pricing pressures. If our suppliers face challenges in obtaining credit, in selling their products, or otherwise in operating their businesses, their ability to continue to supply materials to us may be negatively affected.

In addition, we finance some of our sales through trade credit. In addition to ongoing credit evaluations of our customers' financial condition, we seek to mitigate our credit risk by obtaining deposits and letters of credit on certain of our sales arrangements. We could suffer significant losses if a customer whose accounts receivable we have not secured fails or is otherwise unable to pay us, or if financial institutions providing letters of credit become insolvent. A loss in collections on our accounts receivable would have a negative impact on our financial condition and results of operations.

We are subject to foreign currency exchange risks.

We are exposed to foreign currency exchange rate risks that are inherent in our anticipated sales, purchase commitments, and assets and liabilities that are denominated in currencies other than the U.S. dollar. Although we attempt to mitigate our exposure to fluctuations in currency exchange rates, hedging activities may not always be available or adequate to mitigate the impact of our exchange rate exposure. Failure to sufficiently hedge or otherwise manage foreign currency risks properly could materially and adversely affect our financial condition, results of operations, and liquidity.

Risks Related to Intellectual Property and Cybersecurity

Disruptions in our information technology systems or data security incidents could result in significant financial, legal, regulatory, business, and reputational harm to us.

We are increasingly dependent on information technology systems and infrastructure, including mobile technologies, to operate our business. In the ordinary course of our business, we collect, store, process and transmit significant amounts of sensitive information, including intellectual property, proprietary business information, personally-identifiable information of individuals, and other confidential information, including that of our customers and other business partners. It is critical that we do so in a secure manner to maintain the confidentiality, integrity, and availability of this sensitive information. We have also outsourced elements of our operations (including elements of our information technology infrastructure) to third parties, and as a result, we manage a number of third-party vendors who have access to our computer networks and our confidential information.

All information systems are subject to disruption, breach, or failure. Potential vulnerabilities can be exploited from inadvertent or intentional actions of our employees, third-party vendors, business partners, or by malicious third parties. Attacks of this nature are increasing in their frequency, levels of persistence, sophistication, and intensity, and are being conducted by sophisticated and organized groups and individuals with a wide range of expertise and motives (including industrial espionage), including organized criminal groups, nation states, and others. In addition to the extraction of sensitive information, attacks could include the deployment of harmful malware, ransomware, or other means which could affect service reliability and threaten the confidentiality, integrity, and availability of information. Significant disruptions in our information technology systems (or those of our key suppliers, contract manufacturers, distributors, sales agents and other partners) or other data security incidents could adversely affect our business operations and result in the loss or misappropriation of, and unauthorized access to, sensitive information, which could result in financial, legal, regulatory, business, and reputational harm to us.

On November 1, 2018, we announced the discovery of an attack on our computer system by a highly-sophisticated actor. We notified law enforcement of the attack and retained forensic experts to assist with the investigation. We were not able to definitively determine the extent of the breach or the potential impact on our operations. We also were not able to definitively identify who was responsible for the attack. While we have engaged in remediation and implemented, and are continuing to implement, security measures intended to protect our information technology systems and infrastructure, there can be no assurance that such remediation and security measures will successfully prevent further security incidents. Additional information technology system disruptions, whether from attacks on our technology environment or from computer viruses, natural disasters, terrorism, war or other causes, could result in a material disruption in our business operations, force us to incur significant costs and engage in litigation, harm our reputation, and subject us to liability under laws, regulations, and contractual obligations.

We may be unable to effectively enforce and protect our intellectual property rights.

Our success as a company depends in part upon the protection of our intellectual property rights. We rely primarily on patent, copyright, trademark, and trade secret laws, as well as nondisclosure and confidentiality agreements and other methods, to protect our proprietary information, technologies, processes, and brand identity. We own various U.S. and international patents and have additional pending patent applications relating to certain of our products and technologies. The process of seeking patent protection is lengthy and expensive, and we cannot be certain that pending or future applications will result in issued patents or in patents which provide meaningful protection or commercial advantage. In addition, our intellectual property rights may be circumvented, invalidated, or rendered obsolete by the rapid pace of

technological change, or through efforts by others to reverse engineer our products or design around patents that we own. Policing unauthorized use of our products and technologies is difficult and time consuming and the laws of other countries may not protect our proprietary rights as fully or as readily as U.S. laws. Given these limitations, our success will depend in part upon our ability to innovate ahead of our competitors.

In addition, our outsourcing efforts require that we share certain portions of our technology with our outsourcing partners, which poses additional risks of infringement and trade secret misappropriation. Infringement of our rights by a third party, possibly for purposes of developing and selling competing products, could result in uncompensated lost market and revenue opportunities. Similar exposure could result in the event that former employees seek to compete with us through their unauthorized use of our intellectual property and proprietary information. We cannot be certain that the protective steps and measures we have taken will prevent the misappropriation or unauthorized use of our proprietary information and technologies, nor can we be certain that applicable intellectual property laws, regulations, and policies will not be changed in a manner detrimental to the sale or use of our products.

Litigation has been required in the past, is currently ongoing, and may be required in the future, to enforce our intellectual property rights, protect our trade secrets, and to determine the validity and scope of proprietary rights of others. As a result of any such litigation, we could lose our ability to enforce one or more patents, incur substantial costs, and jeopardize relationships with current or prospective customers or suppliers. Any action we take to enforce or defend our intellectual property rights could absorb significant management time and attention, and could otherwise negatively impact our operating results.

We may be subject to claims of intellectual property infringement by others.

We receive communications from time to time from other parties asserting the existence of patent or other rights which they believe cover certain of our products. We also periodically receive notices from customers who believe that we are required to indemnify them for damages they may incur related to infringement claims made against these customers by third parties. Our customary practice is to evaluate such assertions and to consider the available alternatives, including whether to seek a license, if appropriate. However, we cannot ensure that licenses can be obtained or, if obtained, will be on acceptable terms or that costly litigation or other administrative proceedings will not occur. If we are not able to resolve a claim, negotiate a settlement of the matter, obtain necessary licenses on commercially reasonable terms, or successfully prosecute and defend our position, our business, financial condition, and results of operations could be materially and adversely affected.

Risks Associated with Our Industry

We face significant competition.

We face significant competition throughout the world, which may increase as certain markets in which we operate continue to evolve. Some of our competitors have greater financial, engineering, manufacturing, and marketing resources than us. Other competitors are located in regions with lower labor costs and other reduced costs of operation. In addition, our ability to compete in foreign countries against local manufacturers may be hampered by nationalism, social attitudes, laws, regulations, and policies within such countries that favor local companies over U.S. companies or that are otherwise designed to promote the development and growth of local competitors. Furthermore, we face competition from smaller emerging equipment companies whose strategy is to provide a portion of the products and services we offer, with a focused approach on innovative technology for specialized markets. New product introductions or enhancements by us or our competitors could cause a decline in sales or loss of market acceptance of our existing or prior generation products. Increased competitive pressure could also lead to intensified price competition resulting in lower profit margins.

We operate in industries characterized by rapid technological change.

Each of the industries in which we operate is subject to rapid technological change. Our ability to remain competitive depends on our ability to enhance existing products and develop and manufacture new products in a timely and cost effective manner and to accurately predict technology transitions. Our performance may be adversely affected if we are

unable to accurately predict evolving market trends and related customer needs and to effectively allocate our resources among new and existing products and technologies.

The semiconductor industry, characterized by a high frequency and complexity of technology transitions and inflections (commonly referred to as “Moore’s Law”), poses unique risks and challenges. Our ability to successfully compete in this market will depend on our ability to address and manage a number of industry-specific risks, including and without limitation to the following:

- the heightened cost of research and development, associated with matters such as shrinking geometries, complex device structures, multiple applications and process steps, and the use of new materials;
- customer demands for shorter cycle times between order placements and product shipments, which will necessitate accurate forecasting of customer investment;
- customer demands for continuous reductions in the total cost of manufacturing system ownership, together with challenging equipment service demands and the resulting need for us to properly allocate our service resources;
- the number of types and varieties of semiconductors and number of applications across multiple substrate sizes;
- the need to reduce product development time, despite increasingly difficult technical challenges; and
- the importance of establishing market positions in segments with growing demand.

If we fail to properly allocate appropriate resources, successfully develop and commercialize products to meet customer demand, and effectively anticipate industry trends, our business and results of operations may be adversely impacted.

In addition, the semiconductor industry has experienced, and may continue to experience, significant consolidation, among both semiconductor manufacturers and manufacturing equipment suppliers. Larger competitors resulting from consolidations may have certain advantages over us, including but not limited to more efficient cost structures, substantially greater financial and other resources, greater presence in key markets, and greater name recognition. Consolidation among our competitors and integration among our customers could erode our market share, negatively impact our ability to compete, and have a material adverse effect on our business.

Whether in connection with the semiconductor industry or otherwise, we are also exposed to potential risks associated with unexpected product performance issues. Our product designs and manufacturing processes are complex and could contain unexpected product defects, especially when products are first introduced. Unexpected product performance issues could result in significant costs and damages, including increased service and warranty expenses, the need to provide product replacements or modifications, reimbursement for damages caused by our products, product recalls, related litigation, product write-offs, and disposal costs. Product defects could also result in personal injury or property damage, claims for which may exceed our existing insurance coverages. These and other costs could be substantial and our reputation could be harmed, resulting in a reduced demand for our products and a negative effect on our business, financial condition, and results of operations.

Certain of our sales are dependent on the demand for consumer electronic products and automobiles, which can experience significant volatility.

The demand for semiconductors, HDDs and other devices is highly dependent on sales of consumer electronic products, such as tablets, smartphones, laptops and wearable devices. In addition, as a result of the growing automotive semiconductor market, semiconductor demand is also heavily influenced by the demand for automobiles. Factors that could affect the levels of spending on consumer electronic products and automobiles include consumer confidence, access to credit, volatility in fuel and other energy costs, conditions in the residential real estate and mortgage markets, labor and healthcare costs, and other macroeconomic factors affecting consumer spending behavior. The emergence of new or competing technologies may also affect demand for consumer electronic products. These and other factors have had and could continue to have an adverse effect on the demand for our customers’ products and, in turn, on our customers’ demand for our products and services. Furthermore, in the past, some of our customers have overestimated their potential for market share growth. If this growth is overestimated, we may experience cancellations of orders in backlog, rescheduling of customer deliveries, obsolete inventory, and liabilities to our suppliers for products no longer needed. Alternatively, changes that result in sudden increases in demand for consumer electronic products and automobiles (for example, as a result of the reopening of the economy with the easing of COVID-19 related restrictions) may result in a shortage of parts and materials needed to manufacture our products, and attendant shipping delays (both to us and to our customers) and/or the cancellation of orders placed by our customers.

We have a concentrated customer base, located primarily in a limited number of regions, which operates in highly concentrated industries.

Our customer base continues to be highly concentrated. Orders from a relatively limited number of customers have accounted for, and likely will continue to account for, a substantial portion of our net sales, which may allow customers to demand pricing and other terms less favorable to us (including extended warranties, indemnification commitments, and the obligation to continue production of older products). Customer consolidation activity involving some of our largest customers could result in an even greater concentration of our sales in the future. Management changes at key customer accounts could result in a loss of future sales due to vendor preferences or other reasons and may introduce new challenges in managing customer relationships.

If a principal customer discontinues its relationship with us or suffers economic setbacks, our business, financial condition, and operating results could be materially and adversely affected. Our ability to increase sales in the future will depend in part upon our ability to obtain orders from new customers and we cannot be certain that we will be successful in these efforts. In addition, because a relatively small number of large manufacturers, many of whom are our customers, dominate the industries in which they operate, it may be especially difficult for us to replace these customers if we lose their business. A significant portion of orders in our backlog are orders from our principal customers.

In addition, a substantial investment is required by customers to install and integrate capital equipment into a production line. As a result, once a manufacturer has selected a particular vendor to supply capital equipment, the manufacturer will often attempt to consolidate its other capital equipment requirements with the same vendor. Accordingly, if a customer selects a competitor’s product over ours, we could experience difficulty selling to that customer for a significant period of time. Furthermore, we typically do not have long-term contracts with our customers. As a result, our agreements with our customers do not provide assurance of future sales, and we are exposed to competitive price pressures on new orders we attempt to obtain.

Our customer base is also highly concentrated in terms of geography, and the majority of our sales are to customers located in a limited number of countries. Dependence upon sales emanating from a limited number of regions increases our risk of exposure to local difficulties and challenges, such as those associated with regional economic downturns, political instability, trade wars and other trade disruptions, fluctuating currency exchange rates, natural disasters, social unrest, pandemics, terrorism, and acts of war. Our reliance upon customer demand arising primarily from a limited number of countries could materially and adversely impact our future results of operations.

The cyclicality of the industries we serve directly affects our business.

Our business depends in large part upon the capital expenditures of manufacturers in our four end-markets: Semiconductor; Compound Semiconductor; Data Storage; and Scientific & Other. We are subject to the business cycles of these industries, the timing, length, and volatility of which are difficult to predict. These industries have historically been highly cyclical and have experienced significant economic downturns in the last decade. As a capital equipment provider, our revenue depends in large part on the spending patterns of these customers, who often delay expenditures or cancel or reschedule orders in reaction to variations in their businesses or general economic conditions. In downturns, we must be able to quickly and effectively align our costs with prevailing market conditions, as well as motivate and retain key employees. However, because a portion of our costs are fixed, our ability to reduce expenses quickly in response to revenue shortfalls may be limited. Downturns in one or more of these industries have had, and will likely have, a material adverse effect on our business, financial condition, and operating results. Alternatively, during periods of rapid growth, we must be able to acquire and develop sufficient manufacturing capacity to meet customer demand and attract, hire, assimilate, and retain a sufficient number of qualified people. Our net sales and operating results may be negatively affected if we fail to predict and effectively respond.

Our failure to estimate customer demand accurately could result in inventory obsolescence, liabilities to our suppliers for products no longer needed, and manufacturing interruptions or delays which could affect our ability to meet customer demand.

The success of our business depends in part on our ability to accurately forecast and supply equipment and services that meet the rapidly changing technical and volume requirements of our customers. To meet these demands, we depend on the timely delivery of parts, components, and subassemblies from our suppliers. Uncertain worldwide economic conditions and market instabilities make it difficult for us (and our customers) to accurately forecast future product demand. If actual demand for our products is different than expected, we may purchase more or fewer parts than necessary or incur costs for canceling, postponing, or expediting delivery of parts. If we overestimate the demand for our products, excess inventory could result which could be subject to heavy price discounting, which could become obsolete, and which could subject us to liabilities to our suppliers for products no longer needed. Similarly, we may be harmed in the event that our competitors overestimate the demand for their products and engage in heavy price discounting practices as a result. In addition, the volatility of demand for capital equipment poses risks for companies in our supply chain, including challenges associated with inventory management and fluctuating working capital requirements.

Furthermore, certain key parts may be subject to long lead-times or may be obtainable only from a single supplier or limited group of suppliers, and some sourcing and assembly is provided by suppliers located in countries other than the United States. We may experience significant interruptions in our manufacturing operations, delays in our ability to timely deliver products or services, increased costs, or customer order cancellations as a result of:

- the failure or inability of our suppliers to timely deliver quality parts;
- volatility in the availability and cost of materials;
- difficulties or delays in obtaining required import or export approvals;
- information technology or infrastructure failures;
- natural disasters such as earthquakes, tsunamis, fires, floods, or storms; or
- other causes such as regional economic downturns, international trade disruptions, pandemics, political instability, terrorism, or acts of war, which could result in delayed deliveries, manufacturing inefficiencies, increased costs, or order cancellations.

In addition, in the event of an unanticipated increase in demand for our products, our need to rapidly increase our business and manufacturing capacity may be limited by our working capital constraints and those of our suppliers, which may cause or exacerbate interruptions in our manufacturing and supply chain operations. Any or all of these factors could materially and adversely affect our business, financial condition, and results of operations.

We rely on a limited number of suppliers, some of whom are our sole source for particular components.

Certain of the parts, components, and sub-assemblies included in our products are obtained from a single source or a limited group of suppliers. Our inability to develop alternative sources, as necessary, could result in a prolonged interruption in our ability to supply related products, a failure on our part to meet the demands our customers, and a significant increase in the price of related products, which could adversely affect our business, financial condition, and results of operations.

Our failure to successfully manage our outsourcing activities or failure of our outsourcing partners to perform as anticipated could adversely affect our results of operations.

To better align our costs with market conditions, increase the percentage of variable costs relative to total costs, and to increase productivity and operational efficiency, we have outsourced certain functions to third parties, including the manufacture of several of our systems. While we maintain some level of internal manufacturing capability for these systems, we rely on our outsourcing partners to perform their contracted functions to allow us flexibility to adapt to changing market conditions, including periods of significantly diminished order volumes. If our outsourcing partners do not perform as required, or if our outsourcing efforts do not allow us to realize the intended cost savings and flexibility,

our results of operations (and those of our third-party providers) may be adversely affected. Disputes and possibly litigation involving third party providers could result and we could suffer damage to our reputation. Dependence on contract manufacturing and outsourcing may also adversely affect our ability to bring new products to market. Although we attempt to select reputable providers, one or more of these providers could fail to perform as we expect. If we do not effectively manage our outsourcing efforts or if third party providers do not perform as anticipated, we may not realize the benefits of productivity improvements and we may experience operational difficulties, increased costs, manufacturing and installation interruptions or delays, inefficiencies in the structure and operation of our supply chain, loss of intellectual property rights, quality issues, increased product time-to-market, and an inefficient allocation of our human resources, any or all of which could materially and adversely affect our business, financial condition, and results of operations.

General Risk Factors

The price of our common shares is volatile and could decrease.

The stock market in general and the market for technology stocks in particular has experienced significant volatility. The trading price of our common shares has fluctuated significantly and could decline independent of the overall market, and shareholders could lose all or a substantial part of their investment. The market price of our common shares could continue to fluctuate in response to several factors, including among others:

- difficult macroeconomic conditions, international trade disputes, unfavorable geopolitical events, and general stock market uncertainties, such as those occasioned by a global liquidity crisis and a failure of large financial institutions;
- actual or anticipated variations in our results of operations;
- issues associated with the performance of our products, or the performance of our internal systems such as our customer relationship management (“CRM”) system or our enterprise resource planning (“ERP”) system;
- announcements of financial developments or technological innovations;
- our failure to meet the performance estimates of investment research analysts;
- changes in recommendations and financial estimates by investment research analysts, and decisions by investment research analysts to cease coverage of our Company;
- margin trading, short sales, hedging and derivative transactions involving our common stock;
- our failure to successfully implement cost reduction initiatives and restructuring activities, if and when required;
- delays or difficulties in satisfying internal control evaluations and attestation requirements of Section 404 of the Sarbanes Oxley Act of 2002;
- the commencement of, and rulings on, litigation and legal proceedings; and
- the occurrence of major catastrophic events.

Securities class action litigation is often brought against a company following periods of volatility in the market price of its securities. We have defended security class actions lawsuits in the past, and are currently defending such a lawsuit now. These lawsuits, if and when brought, can result in substantial costs and a diversion of management’s attention and resources, which can adversely affect our financial condition, results of operations, and liquidity.

We are subject to risks of non-compliance with environmental, health, and safety regulations and sustainability requirements.

We are subject to environmental, health, and safety regulations in connection with our business operations, including but not limited to regulations related to the development, manufacture and use of our products, recycling and disposal of related materials, and the operation and use of our facilities and real property. Failure or inability to comply with existing or future environmental, health and safety regulations, including those relating to climate change, could result in

significant remediation liabilities, the imposition of fines, the suspension or termination of research, development, or use of certain of our products, and other harm to the Company, which could have a material adverse effect on our business, financial condition, and results of operations.

In addition to regulatory compliance, customer and investor sustainability requirements, as well as the Company’s own sustainability targets, could cause us from time to time to alter our manufacturing and other operations, potentially at significant cost to the Company as we strive to meet these requirements and targets. Any failure to meet these sustainability standards could negatively affect the demand for our products and our stock price, and may subject the Company to significant costs and liabilities and reputational harm.

We are committed to ensuring safe working conditions, treating our employees with dignity and respect, and sourcing, manufacturing, and distributing our products in a responsible and environmentally friendly manner, and any failure on our part to do so may cause reputational and other harm for the Company. Furthermore, some of our operations involve the storage, handling, and use of hazardous materials that may pose a risk of fire, explosion, or environmental release. Such events could result from acts of terrorism, natural disasters, or operational failures and may result in injury or loss of life to our employees and others, local environmental contamination, and property damage. These events may cause a temporary shutdown of an affected facility, or portion thereof, and we could be subject to penalties or claims as a result. Each of these events could have a material adverse effect on our business, financial condition, and results of operations.

Our inability to attract, retain, and motivate employees could have a material adverse effect on our business.

Our success depends largely on our ability to attract, retain, and motivate employees, including those in executive, managerial, engineering and marketing positions, as well as highly skilled and qualified technical personnel. Competition for qualified design and technical personnel is intense, particularly in the semiconductor industry and especially when business cycles are improving. Competitors may try to recruit, and may succeed in recruiting, our most valuable technical employees. To attract and retain key employees, we must provide competitive compensation packages, including cash and stock-based compensation, among other benefits. If the value of our stock-based incentive awards decreases, or if our total compensation packages are not viewed as competitive, our ability to attract and retain key employees could suffer. We do not have key person life insurance on any of our executives, and we may not be able to readily replace key departed employees. Our inability to attract, retain, and motivate key personnel could have a significant negative effect on our business, financial condition, and results of operations.

Changes in accounting pronouncements or taxation rules, practices, or rates may adversely affect our financial results.

Changes in, or newly enacted, accounting pronouncements or taxation rules, practices or rates can materially affect our revenue recognition practices, effective tax rates, results of operations, and our financial condition. In addition, varying interpretations of accounting pronouncements or taxation practices, and the questioning of our current or past practices, may adversely affect our reported financial results.

Furthermore, we are subject to income tax on a jurisdictional or legal entity basis and significant judgment is required in certain instances to allocate our taxable income to a jurisdiction and to determine the related income tax expense and benefits. Losses in one jurisdiction generally may not be used to offset profits in other jurisdictions. As a result, changes in the mix of our earnings (or losses) between jurisdictions, among other factors, could alter our overall effective income tax rate, possibly resulting in significant tax rate increases. In addition, our effective tax rate could increase if we determine that it is no longer more likely than not that we are able to realize our remaining net deferred tax assets, if we are unable to generate sufficient future taxable income in certain jurisdictions, or if we are otherwise required to increase our valuation allowances against our deferred tax assets. Furthermore, we are regularly audited by various tax authorities, and these audits may result in increased tax provisions which could negatively affect our operating results in the period or periods in which such determinations are made or changes occur.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Our corporate headquarters and principal research and development, manufacturing, and sales and service facilities as of December 31, 2021 are as follows:

Owned Facilities Location	Approximate Size (sq. ft.)	Use
Plainview, NY	80,000	Corporate Headquarters; R&D; Sales & Service; Administration
Somerset, NJ	80,000	R&D; Manufacturing; Sales & Service; Administration
St. Paul, MN	43,000	R&D; Manufacturing; Sales & Service; Administration
Somerset, NJ	38,000	R&D; Sales & Service; Administration

Leased Facilities Location	Approximate Size (sq. ft.)	Use	Lease Expiration
San Jose, CA	100,000	R&D; Manufacturing; Sales & Service; Administration	2023
San Jose, CA	100,000	R&D; Manufacturing; Sales & Service; Administration	2037
Somerset, NJ	57,000	Warehouse	2027
Horsham, PA	49,000	R&D; Manufacturing; Sales & Service; Administration	2024
Waltham, MA	17,000	R&D; Sales & Service; Administration	2023

In addition to the above, our foreign sales and service subsidiaries lease office space in China, Germany, Japan, Malaysia, Philippines, Singapore, South Korea, Thailand, Taiwan and the United Kingdom. Additionally, we are in a period of transition from our existing San Jose facility to a newly leased facility in San Jose, both of which are reflected in the table above. The new facility has approximately the same square footage as our existing San Jose, California facility, but expanded manufacturing capabilities for our laser annealing and lithography technologies. We will continue to transition to the new facility over the next few quarters. We believe our facilities are adequate to meet our current needs.

Item 3. Legal Proceedings

The discussion under the heading *Legal Proceedings* within Note 9, "Commitments and Contingencies" to the Consolidated Financial Statements is incorporated herein by reference.

Item 4. Mine Safety Disclosures

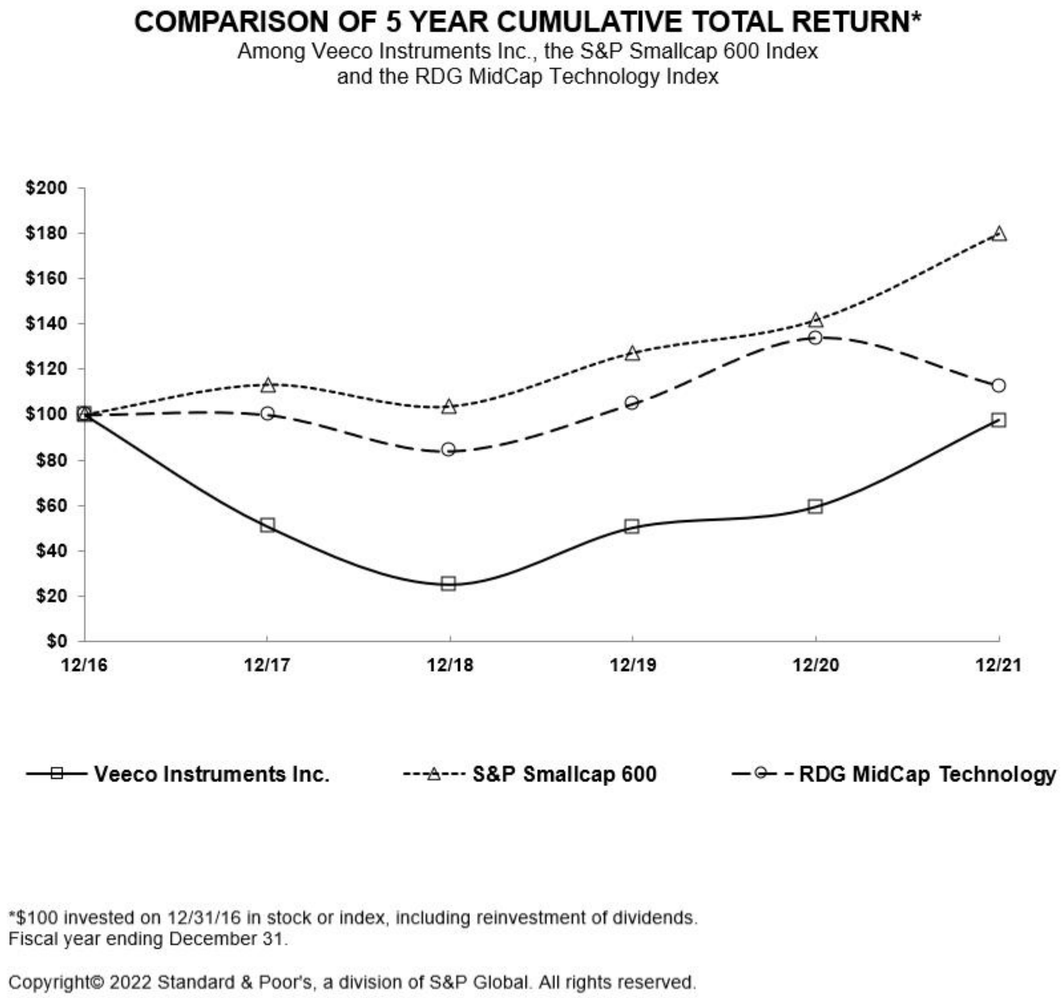
Not Applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Our common stock is quoted on The NASDAQ Global Select Market under the symbol "VECO." As of February 11, 2022, there were approximately 129 stockholders of record of our common stock. Because many of our shares of common stock are held by brokers and other institutions on behalf of stockholders, we are unable to estimate the total number of stockholders represented by these record holders. We have not paid dividends on our common stock. The Board of Directors will determine future dividend policy based on our consolidated results of operations, financial condition, capital requirements, and other circumstances.

Stock Performance Graph



ASSUMES $100 INVESTED ON DEC. 31, 2016
ASSUMES DIVIDENDS REINVESTED
FISCAL YEAR ENDING DEC. 31

	2016	2017	2018	2019	2020	2021
Veeco Instruments Inc.	100.00	50.94	25.42	50.38	59.55	97.67
S&P Smallcap 600	100.00	113.23	103.63	127.24	141.60	179.58
RDG MidCap Technology	100.00	99.98	84.06	104.84	133.78	112.72

Item 6. [Reserved]

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

Executive Summary

We are an innovative manufacturer of semiconductor process equipment. Our proven ion beam, laser annealing, lithography, MOCVD and single wafer wet processing technologies play an integral role in the fabrication and packaging of advanced semiconductor devices. With equipment designed to optimize performance, yield and cost of ownership, Veeco holds leading technology positions in the markets we serve. To learn more about Veeco's systems and service offerings, visit www.veeco.com.

The Veeco United team executed well in a challenging environment during 2021, accomplishing a number of milestones, including:

- Significant progress on our San Jose capacity expansion project, including shipping the first systems out of this new facility;
- Greatly increased our emphasis on placing evaluation systems with customers. We believe these evaluation systems are a final step in our customer's selection process;
- Overall 28% revenue growth, led by the Semiconductor and Data Storage markets;
- Achieved $68 million in cash flow from operations;
- Grew backlog by $74 million to $440 million;
- Improved our capital structure by repurchasing $112 million of our 2023 Senior Convertible Notes;
- Improved financial flexibility by entering into revolving credit facility of $150 million; and
- Improved our ESG efforts and disclosures, as reflected in our 2nd Corporate Sustainability Report released in November 2021.

These accomplishments enabled us to exit 2021 well positioned to execute on our growth plans for 2022.

COVID-19 Update

As a result of the COVID-19 pandemic, governmental authorities have implemented and are continuing to implement numerous and constantly evolving measures to try to contain the virus, such as travel bans and restrictions, limits on gatherings, quarantines, shelter-in-place orders, vaccine mandates, and business shutdowns. We have important internal and third-party manufacturing operations in the U.S. and Singapore, and sales and support operations in China, Germany, Japan, Malaysia, Philippines, Singapore, South Korea, Thailand, Taiwan and the United Kingdom, all of which have been affected by the COVID-19 pandemic.

Measures providing for business shutdowns generally exclude certain essential services, and those essential services include critical infrastructure and the businesses that support that critical infrastructure. Our operations are considered part of the critical and essential infrastructure defined by applicable government authorities and, although governmental measures to contain the pandemic may be modified or extended, our manufacturing facilities remain open. We believe our diverse product offerings and the critical nature of certain of our products for infrastructure insulate us, to some extent, from the adverse effects of the pandemic; however, a prolonged economic downturn will adversely affect our customers, which could have a material adverse effect on our revenues, particularly if customers from whom we derive a significant amount of revenue reduce or delay purchases to mitigate the impacts of the pandemic or fail to make payments to us on time or at all.

We serve a global and highly interconnected customer base across the Asia-Pacific region, Europe, and North America. Our net sales to customers located outside of the United States represented approximately 62% of our total net sales for the year ended December 31, 2021, and 68% and 70% for the years ended December 31, 2020 and 2019, respectively, and we expect that net sales to customers outside the United States will continue to represent a significant percentage of our total net sales. As a result, our business will be adversely impacted by further deterioration in global economic conditions, particularly in markets in Asia and Europe.

We are starting to see the effects of the macroeconomic inflationary cost environment and supply chain disruptions due to strained transportation capacity, labor shortages and absenteeism associated with COVID-19, and high global demand as markets reopen and economic stimulus drives growth. These effects include longer lead times and increased costs. We are taking proactive steps in an effort to manage the impact to our business, including buying in advance and re-sourcing components on a more frequent basis. We continue to monitor our global supply chain and may experience additional disruptions in future periods, which could cause a disruption in our ability to obtain raw materials or components required to manufacture our products.

Like many in our industry, we are managing through the effects of the COVID-19 pandemic. Although the full extent of the COVID-19 pandemic's impact on our business, results of operations, supply chain, and growth can not be predicted or quantified, we proactively endeavor to identify potential challenges to our business and have been executing business continuity activities to manage disruptions in our business and continue to provide critical infrastructure to our customers. In response to the pandemic, we have taken, or intend to take, the following steps, among others, to keep our employees safe and minimize the spread of the virus, while continuing to serve our customers:

- implemented rigorous health and safety protocols at our manufacturing facilities, including extensively and frequently disinfecting our facilities, limiting access to our facilities, checking temperatures of individuals entering our facilities, staggering shifts to minimize employee overlap in gowning areas, and providing protective equipment;
- mandated remote working arrangements for employees who do not need to be physically present on the manufacturing floor or at customer facilities;
- implemented virtual meetings, customer demos, and factory acceptances to enable customers to review data and performance of their system in our factory remotely via live video;
- performing service and support activities remotely, when possible, to resolve customer issues and enable our customers to maintain their operations;
- proactively identified gaps in our supply chain and re-sourced a number of components in order to maintain our customer shipment commitments and mitigate single points of failure;
- monitoring our IT systems and implementing contingency and disaster recovery plans to support our IT infrastructure to ensure that our systems remain continuously operative; and
- continuing to monitor and, if necessary, reduce our operating expenses and capital expenditures to maintain financial flexibility and profit margins.

While these steps have been effective so far, there could be additional challenges ahead that may impact either our operations or those of our customers, which could have a negative effect on our financial performance, including productivity and capacity impacts as a result of the ongoing pandemic. We expect to continue to implement these measures until we determine that the COVID-19 pandemic is adequately contained for purposes of our business, and we may take further actions as government authorities require or recommend or as we determine to be in the best interests of our employees, customers and suppliers. As a result, we may incur additional expenses in future periods in response to the pandemic, which could adversely affect our financial position, results of operations, or cash flows. In addition, we may revise our approach to these initiatives or take additional actions to meet the needs of our employees and customers, and mitigate the impact of the pandemic on our business.

Business Update

We categorize our revenue by the end-markets into which we sell. Our four end-markets are: Semiconductor; Compound Semiconductor; Data Storage; and Scientific & Other.

Sales in the Semiconductor market grew 49% in 2021 and were driven by our laser annealing systems for logic devices and lithography systems for Advanced Packaging. We continue to build momentum for our laser annealing solutions with advanced node logic customers. We have been winning additional application steps with leading manufacturers. We have evaluation systems at a DRAM manufacturer and are working with new and existing logic customers on their next manufacturing nodes. We also continue to deliver our laser annealing systems to trailing node logic manufacturers. Our lithography systems for Advanced Packaging are aligned with longer-term growth of FOWLP and other Advanced Packaging applications such as heterogeneous integration. Additionally, the ongoing adoption of EUV Lithography for advanced node, semiconductor manufacturing continues to drive demand for our mask blank systems. Overall, our technology and market strategy is well aligned with trends such as artificial intelligence, mobile connectivity and high performance computing that drive the Semiconductor market. We expect continued growth in this market. Finally, we have begun shipping systems from our new San Jose facility, and expect to fully transition to this new location in 2022.

We address the Compound Semiconductor market with a broad portfolio of technologies including primarily Wet Processing and MOCVD, along with MBE and Ion Beam, all of which have been developed to support emerging applications such as 5G driven RF device/filter manufacturing, Gallium Nitride power electronics, and photonics applications including edge-emitting lasers and micro-LEDs. Sales in the Compound Semiconductor market were flat in 2021. However, we did experience strong growth in equipment shipments for RF Devices and we expect future growth to come from MOCVD and other system shipments in the Photonics market.

Sales in the Data Storage market have been growing for several years, primarily driven by shipments of Ion Beam systems. Demand for our Ion Beam products was driven by cloud-based storage growth. In order to be successful, hard disk drive manufacturers are required to improve areal density of magnetic heads for hard disk drives and are manufacturing drives with an increasing number of heads. After multiple years of customers accelerating their capacity additions, contributing to growth in 2021 of 37%, we expect a period of slowing capacity adds by our data storage customers, resulting in an expected revenue decline in our data storage business in 2022 from recent levels. With data proliferation forecasted to continue to grow, however, we feel confident about the long-term prospects of our data storage business.

Sales in the Scientific & Other market are largely driven by sales to governments, universities, and research institutions. Revenue was slightly higher in 2021 compared to 2020, and we expect sales in this market to grow modestly in the long run, in line with GDP.

Overall, we enter 2022 with strong backlog in our semiconductor and compound semiconductor markets which, along with our customer engagements and order activity, lead us to expect revenue growth in the coming year as we make progress toward our long-term financial target model.

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Results of Operations

Years Ended December 31, 2021 and 2020

The following table presents revenue and expense line items reported in our Consolidated Statements of Operations for 2021 and 2020 and the period-over-period dollar and percentage changes for those line items. Our results of operations are reported as one business segment, represented by our single operating segment.

	For the year ended December 31,				Change Period to Period	
	2021		2020			
	(dollars in thousands)					
Net sales	$583,277	100 %	$454,163	100 %	$129,114	28 %
Cost of sales	341,003	58 %	259,863	57 %	81,140	31 %
Gross profit	242,274	42 %	194,300	43 %	47,974	25 %
Operating expenses, net:						
Research and development	88,680	15 %	78,994	17 %	9,686	12 %
Selling, general, and administrative	84,536	14 %	76,251	17 %	8,285	11 %
Amortization of intangible assets	12,280	2 %	15,333	3 %	(3,053)	(20)%
Restructuring	—	— %	1,097	— %	(1,097)	*
Asset impairment	—	— %	281	— %	(281)	*
Other operating expense (income), net	68	— %	(221)	— %	289	(131)%
Total operating expenses, net	185,564	32 %	171,735	38 %	13,829	8 %
Operating income (loss)	56,710	10 %	22,565	5 %	34,145	151 %
Interest income (expense), net	(26,020)	(4)%	(23,188)	(5)%	(2,832)	12 %
Other income (expense), net	(5,010)	(1)%	(7,841)	(2)%	2,831	(36)%
Income (loss) before income taxes	25,680	4 %	(8,464)	(2)%	34,144	*
Income tax expense (benefit)	(358)	— %	(73)	— %	(285)	*
Net income (loss)	$ 26,038	4 %	$ (8,391)	(2)%	$ 34,429	*

* Not meaningful

Net Sales

The following is an analysis of sales by end-market and by region:

	Year ended December 31,				Change Period to Period	
	2021		2020			
	(dollars in thousands)					
Sales by end-market						
Semiconductor	$247,051	43 %	$165,909	37 %	$ 81,142	49 %
Compound Semiconductor	106,972	18 %	107,922	24 %	(950)	(1)%
Data Storage	168,760	29 %	123,288	26 %	45,472	37 %
Scientific & Other	60,494	10 %	57,044	13 %	3,450	6 %
Total	$583,277	100 %	$454,163	100 %	$129,114	28 %
Sales by geographic region						
United States	$217,209	38 %	$145,353	32 %	$ 71,856	49 %
EMEA	55,129	9 %	73,124	16 %	(17,995)	(25)%
China	105,998	18 %	57,589	13 %	48,409	84 %

Rest of APAC	204,633	35 %	177,569	39 %	27,064	15 %
Rest of World	308	— %	528	— %	(220)	(42)%
Total	$583,277	100 %	$454,163	100 %	$129,114	28 %

Total sales increased for the year ended December 31, 2021 against the comparable prior year period primarily in the Semiconductor and Data Storage markets. By geography, sales increased in the United States, China, and Rest of APAC regions, partially offset by decreases in the EMEA region. The increase in sales in the United States was primarily driven by shipments to Data Storage and Compound Semiconductor customers, while the increase in sales in the Rest of APAC region was primarily driven by shipments to Semiconductor and Data Storage customers. The increase in sales in the China region was primarily driven by shipments to Semiconductor customers. The decrease in sales in the EMEA region was primarily driven by a decrease in shipments to Data Storage customers. Included within the Rest of APAC region for the year ended December 31, 2021 were sales in Taiwan and South Korea of $65.2 million and $50.4 million, respectively, while sales within Rest of APAC region for the year ended December 31, 2020 included sales in Singapore and Taiwan of $49.4 million and $40.0 million, respectively. We expect there will continue to be year-to-year variations in our future sales distribution across markets and geographies. In light of the global nature of our business, we are impacted by conditions in the various countries in which we and our customers operate.

Gross Profit

In 2021, gross profit increased compared to 2020 primarily due to an increase in sales volume, partially offset by decreased gross margins. Gross margins decreased principally due to an increase in spending as we invested in service infrastructure and capacity expansion to meet the growing demands for our semiconductor product lines and supporting our evaluation systems at customers, as well as product and region mix of sales in the period. We expect our gross margins to fluctuate each period due to product mix and other factors, while we remain committed to increasing our overall gross margins.

Research and Development

The markets we serve are characterized by continuous technological development and product innovation, and we invest in various research and development initiatives to maintain our competitive advantage and achieve our growth objectives. Research and development expenses increased in 2021 compared to 2020 primarily from personnel-related expenses as we invest in new research and development and additional applications for our technology in order to be well positioned to capitalize on emerging global megatrends and support longer term growth in Semiconductor and Compound Semiconductor markets. However, expenses as a percentage of revenue have decreased when compared to the prior period.

Selling, General, and Administrative

Selling, general, and administrative expenses increased in 2021 compared to 2020 primarily due to higher variable expenses associated with the increase in revenue, profitability, and order in-take. However, expenses as a percentage of revenue have decreased when compared to the prior year period. Given the uncertainty regarding the impacts on our business resulting from the COVID-19 pandemic, we are focused on the proactive management of expenses. In future periods, we may incur additional selling, general and administrative expenses to support our responses to the COVID-19 pandemic. In addition, we are currently experiencing some duplicate operating expenses for the transition from our existing facility in San Jose, California to our new leased facility, and we expect to continue to do so until this transition is completed over the next several quarters.

Amortization Expense

Amortization expense decreased in 2021 compared to 2020 primarily due to changes in amortization expense to reflect expected cash flows of certain intangible assets, as well as certain other intangible assets becoming fully amortized in 2021.

Interest Income (Expense)

For the year ended December 31, 2021, we recorded net interest expense of $26.0 million, compared to $23.2 million for the comparable prior period. The increase in interest expense was primarily related to the issuance of the 2027 Notes in May 2020 and the 2025 Notes in November 2020, partially offset by the partial repurchases and exchange of the 2023 Notes in 2020 and 2021, as well as an increase in interest income of approximately $0.8 million as compared to the prior period. Included in interest expense for both of the years ended December 31, 2021 and 2020 were non-cash charges of

$13.8 million related to the amortization of debt discount and transaction costs of the 2023 Notes, 2025 Notes, and 2027 Notes.

Other Income (Expense)

On November 5, 2021, we entered into a privately negotiated note purchase agreement with a holder of our outstanding 2023 Notes, under which we agreed to repurchase and retire approximately $111.5 million in aggregate original principal amount of the 2023 Notes, with a carrying amount of $105.5 million, for cash consideration of approximately $115.6 million, and approximately $1.0 million of accrued and unpaid interest. We accounted for the partial settlement of the 2023 Notes as an extinguishment, and as such, recorded a loss on extinguishment of approximately $4.0 million for the year ended December 31, 2021. In addition, we recorded a non-cash impairment charge of approximately $1.0 million related to an equity investment without a readily observable market price.

On May 18, 2020, in connection with the completion of a private offering of $125 million aggregate principal amount of 3.75% convertible senior notes, we repurchased and retired approximately $88.3 million in aggregate principal amount of our outstanding 2023 Notes, with a carrying amount of $78.1 million, for approximately $81.2 million of cash. Additionally, on November 11, 2020, we entered into a privately negotiated exchange agreement with a holder of our outstanding 2023 Notes, under which we agreed to retire $125.0 million in aggregate original principal amount of the 2023 Notes, with a carrying amount of $113.1 million, in exchange for the issuance of $132.5 million in aggregate principal amount of new 3.50% convertible senior notes. We accounted for both transactions as an extinguishment of the 2023 Notes, and as such, recorded a loss on extinguishment of approximately $7.8 million for the year ended December 31, 2020.

Income Taxes

The 2021 income tax benefit of $0.4 million is comprised of a $0.7 million income tax benefit related to the reduction of uncertain tax positions based upon settlements with tax authorities, partially offset by a $0.3 million income tax expense attributable to the foreign income taxes and foreign withholding taxes.

The 2020 income tax benefit of $0.1 million is comprised of: (i) a $0.8 million income tax benefit related to the amortization and subsequent sale of certain intangible assets during the year, which was partially offset by (ii) a $0.5 million income tax expense attributed to the profitable non-U.S. operations, as well as withholding tax to repatriate certain foreign earnings as a result of changes in tax laws under the 2017 Tax Act, and (iii) a $0.2 million income tax expense related primarily to U.S. tax amortization of our indefinite-lived intangible assets that is not available to offset existing deferred tax assets, as well as state and local income taxes.

Years Ended December 31, 2020 and 2019

See Part II, Item 7 of our Annual Report on Form 10-K for the fiscal year ended December 31, 2020, filed with the SEC on February 22, 2021, for Management’s Discussions and Analysis of Financial Condition and Results of Operations for the fiscal year ended December 31, 2019.

Liquidity and Capital Resources

Our cash and cash equivalents, restricted cash, and short-term investments are as follows:

	December 31, 2021	December 31, 2020
	(in thousands)	
Cash and cash equivalents	$ 119,747	$ 129,625
Restricted cash	725	658
Short-term investments	104,181	189,771
Total	$ 224,653	$ 320,054

A portion of our cash and cash equivalents is held by our subsidiaries throughout the world, frequently in each subsidiary's respective functional currency, which is typically the U.S. dollar. At December 31, 2021 and 2020, cash and cash equivalents of $38.3 million and $40.2 million, respectively, were held outside the United States. As of December 31, 2021, we had $12.8 million of accumulated undistributed earnings generated by our non-U.S. subsidiaries for which the U.S. repatriation tax has been provided. Approximately $5.3 million of undistributed earnings would be subject to foreign withholding taxes if distributed back to the United States. We believe that our projected cash flow from operations, combined with our cash and short-term investments, will be sufficient to meet our projected working capital requirements, contractual obligations, and other cash flow needs for the next twelve months, including scheduled interest payments on our convertible senior notes.

A summary of the cash flow activity for the year ended December 31, 2021 and 2020 is as follows:

Cash Flows from Operating Activities

	For the year ended December 31,	
	2021	**2020**
	(in thousands)	
Net income (loss)	$ 26,038	$ (8,391)
Non-cash items:		
Depreciation and amortization	26,058	30,697
Non-cash interest expense	13,819	13,792
Deferred income taxes	(651)	(299)
Share-based compensation expense	15,249	12,703
Loss on extinguishment of debt	4,029	7,841
Asset impairment	—	281
Impairment of equity investment	980	—
Provision for bad debts	—	140
Changes in operating assets and liabilities	(17,780)	(13,743)
Net cash provided by (used in) operating activities	$ 67,742	$ 43,021

Net cash provided by operating activities was $67.7 million for the year ended December 31, 2021 and was due to net income of $26.0 million and adjustments for non-cash items of $59.5 million, partially offset by a decline in cash flow from operating activities due to changes in operating assets and liabilities of $17.8 million. The changes in operating assets and liabilities was largely attributable to increases in accounts receivable and inventories and decreases in deferred revenue, partially offset by increases in accounts payable and cash received for landlord reimbursements for leasehold improvements.

Net cash provided by operating activities was $43.0 million for the year ended December 31, 2020 and was due to the net loss of $8.4 million plus a decline in cash flow from operating activities due to changes in operating assets and liabilities of $13.7 million, being more than offset by adjustments for non-cash items of $65.2 million. The changes in operating assets and liabilities was largely attributable to increases in accounts receivable and inventories and decreases in deferred revenue, partially offset by increases in accounts payable and customer deposits.

Cash Flows from Investing Activities

	For the year ended December 31,	
	2021	**2020**
	(in thousands)	
Capital expenditures	$ (40,643)	$ (6,802)
Changes in investments, net	83,446	(74,493)
Proceeds from held for sale assets, net of costs to sell	1,725	9,503
Net cash provided by (used in) investing activities	$ 44,528	$ (71,792)

The net cash provided by investing activities during the year ended December 31, 2021 was attributable to the net change in investments, partially offset by capital expenditures. We experienced increased capital expenditures associated

with the build-out of our newly leased facility in San Jose, California during 2021, and expect to complete this build-out over the next several quarters. In addition, we expect a period of some duplicate operating expenses until the transition from our pre-existing facility to our new facility is completed. The net cash used in investing activities during the year ended December 31, 2020 was attributable to net change in investments as well as capital expenditures, partially offset by the proceeds from the sale of a non-core product line.

Cash Flows from Financing Activities

	For the year ended December 31,	
	2021	2020
	(in thousands)	
Proceeds from issuance of 2027 Notes, net of issuance costs	$ —	$ 120,095
Purchase of capped calls	—	(10,313)
Repurchase of 2023 Notes	(115,604)	(81,240)
Debt issuance costs	(835)	—
Settlement of equity awards, net of withholding taxes	(5,590)	556
Net cash provided by (used in) financing activities	$ (122,029)	$ 29,098

The net cash used in financing activities for the year ended December 31, 2021 was primarily related to the cash used to repurchase $111.5 million principal amount of our 2023 Notes as well as the settlement of equity awards. The net cash provided by financing activities for the year ended December 31, 2020 was primarily related to the net cash proceeds received from the issuance of the 2027 Notes, net of issuance costs, partially offset by the cash used to repurchase the 2023 Notes as well as the purchase of capped calls.

Convertible Senior Notes and Revolving Credit Facility

We have $20.2 million outstanding principal balance of 2.70% convertible senior notes that bear interest at a rate of 2.70% per year, payable semiannually in arrears on January 15 and July 15 of each year, and mature on January 15, 2023, unless earlier purchased by the Company, redeemed, or converted. In addition, we have $132.5 million outstanding principal balance of 3.50% convertible senior notes that bear interest at a rate of 3.50% per year, payable semiannually in arrears on January 15 and July 15 of each year, and mature on January 15, 2025, unless earlier purchased by the Company, redeemed, or converted. Finally, we have $125.0 million outstanding principal balance of 3.75% convertible senior notes that bear interest at a rate of 3.75% per year, payable semiannually in arrears on June 1 and December 1 of each year, and mature on June 1, 2027, unless earlier purchased by the Company, redeemed, or converted. The 2027 Notes are currently convertible by shareholders until March 31, 2022.

We believe that we have sufficient capital resources and cash flows from operations to support scheduled interest payments on these debts. In addition, we have access to a $150.0 million revolving credit facility (including an ability to request an additional $75.0 million, for a total commitment of no more than $225.0 million) to provide for our working capital needs and reimburse drawings under letters of credit and for other general corporate purposes. The Company has no immediate plans to draw down on the facility, which expires in December of 2026. Interest under the Facility is variable based on the Company’s secured net leverage ratio and is expected to bear interest based on SOFR plus a range of 150 to 225 basis points, if drawn. There is a yearly commitment fee of 25 to 35 basis points, based on the Company’s secured net leverage ratio, charged on the unused portion of the Facility.

Contractual Obligations and Commitments

We have commitments under certain contractual arrangements to make future payments for goods and services. These contractual arrangements secure the rights to various assets and services to be used in the future in the normal course of business. We expect to fund these contractual arrangements with cash generated from operations in the normal course of business, as well as existing cash and cash equivalents and short-term investments. In addition, we have bank guarantees and letters of credit issued by a financial institution on our behalf as needed. At December 31, 2021, outstanding bank guarantees and letters of credit totaled $2.7 million and unused bank guarantees and letters of credit of $15.2 million were available to be drawn upon.

The following table summarizes our contractual arrangements at December 31, 2021 and the timing and effect that those commitments are expected to have on our liquidity and cash flow in future periods.

	Payments due by period				
	Total	Less than 1 year	1 – 3 years	3 – 5 years	More than 5 years
			(in thousands)		
Principal payments on long-term debt	$277,673	$ —	$20,173	$132,500	$125,000
Cash interest on debt	42,821	9,861	18,922	11,694	2,344
Operating leases	55,414	4,901	7,748	6,805	35,960
Purchase commitments(1)	192,975	192,975	—	—	—
Total	$568,883	$207,737	$46,843	$150,999	$163,304

(1) Purchase commitments are generally for inventory used in the manufacturing of our products. We generally do not enter into purchase commitments extending beyond one year. At December 31, 2021, we have $3.9 million of offsetting supplier deposits that will be applied against these purchase commitments.

Critical Accounting Policies and Estimates

Our discussion and analysis of our 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. The preparation of these financial statements requires a high degree of judgment, either in the application and interpretation of existing accounting literature or in the development of estimates that affect the reported amounts of assets, liabilities, revenues, and expenses. We continuously evaluate our estimates and judgments based on historical experience, as well as other factors that we believe to be reasonable under the circumstances. The results of our evaluation form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. These estimates may change in the future if underlying assumptions or factors change, and actual results may differ from these estimates.

We consider the following significant accounting policies to be critical because of their complexity and the high degree of judgment involved in maintaining them.

Revenue Recognition

We recognize revenue upon the transfer of control of the promised product or service to the customer in an amount that reflects the consideration we expect to receive in exchange for such product or service. We perform the following five steps to determine when to recognize revenue: (1) identification of the contract(s) with customers, (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, a performance obligation is satisfied. Judgment is used in the following areas in the determination of when to recognize revenue:

- *Identification of performance obligations and allocation of contract price:* Our contracts with customers frequently contain multiple deliverables, such as systems, upgrades, components, spare parts, installation, maintenance, and service plans. We allocate revenue to each performance obligation on a relative stand-alone selling price basis. The stand-alone selling prices are determined based on the prices at which we separately sell the systems, upgrades, components, spare parts, installation, maintenance, and service plans. For items that are not sold separately, we estimate stand-alone selling prices generally using an expected cost plus margin approach. Judgment is required to properly identify the performance obligations within a contract and to determine how the revenue should be allocated among the performance obligations.

- *Combination of contracts:* Judgment is required when evaluating whether multiple transactions with the same customer or related parties should be considered part of a single contract. This evaluation includes an assessment of whether the contracts or agreements are negotiated or executed within a short time frame of each other or if there are indicators that the contracts are negotiated in contemplation of one another.

- *Variable consideration:* Our contracts with customers generally do not contain variable consideration. In the rare instances where variable consideration is included, we estimate the amount of variable consideration and determine what portion of that, if any, has a high probability of significant subsequent revenue reversal, and if so, that amount is excluded from the transaction price.

- *Transfer of control:* Judgment may be required in the determination of when transfer of control occurs. This judgment may include the interpretation of commercial terms and consideration of the customer’s post-delivery acceptance provisions. Our system sales arrangements, including certain upgrades, generally include field acceptance provisions that may include functional or mechanical test procedures. When we objectively demonstrate that the criteria specified in the contractual acceptance provisions are achieved prior to delivery either through customer testing or our historical experience of our tools meeting specifications, transfer of control of the product to the customer is considered to have occurred and revenue is recognized upon system delivery since there is no substantive contingency remaining related to the acceptance provisions at that date. For new products, new applications of existing products, or for products with substantive customer acceptance provisions where we cannot objectively demonstrate that the criteria specified in the contractual acceptance provisions have been achieved prior to delivery, revenue and the associated costs are deferred. We recognize such revenue and costs upon obtaining objective evidence that the acceptance provisions can be achieved, assuming all other revenue recognition criteria have been met.

Any material changes in the identification of performance obligations, determination and allocation of the transaction price to performance obligations, and determination of when transfer of control occurs to the customer, could impact the timing and amount of revenue recognition, which could have a material effect on our financial condition and results of operations.

Inventory Valuation

Inventories are stated at the lower of cost or net realizable value, with cost determined on a first-in, first-out basis. Each quarter we assess the valuation and recoverability of all inventories: materials (raw materials, spare parts, and service inventory); work-in-process; and finished goods. Obsolete inventory or inventory in excess of our estimated usage requirements is written down to its estimated net realizable value if less than cost. We evaluate usage requirements by analyzing historical usage, anticipated demand, alternative uses of materials, and other qualitative factors. Unanticipated changes in demand for our products may require a write down of inventory that could materially affect our operating results.

Goodwill and Intangible Assets

Goodwill is tested for impairment at least annually in the beginning of the fourth quarter of our fiscal year, which may require significant judgment. We may first perform a qualitative assessment of whether it is more likely than not that the reporting unit’s fair value is less than its carrying amount, and, if so, we then quantitatively compare the fair value of our reporting unit to its carrying amount. If the fair value of the reporting unit exceeds its carrying amount, goodwill is not impaired. If the carrying amount of the reporting unit exceeds its fair value, we then record an impairment loss equal to the difference, up to the carrying value of goodwill.

We determine the fair value of our reporting unit based on a reconciliation of the aggregate fair value of our reporting unit to our adjusted market capitalization. The adjusted market capitalization is calculated by multiplying the average share price of our common stock for the last ten trading days prior to the measurement date by the number of outstanding common shares and adding a control premium. The determination of a reasonable control premium may require significant judgment and is estimated using historical transactions in similar industries.

The carrying values of long-lived assets, including identifiable intangible assets, are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. If circumstances require a long-lived asset or asset group be tested for possible impairment, a recoverability test is performed utilizing undiscounted cash flows expected to be generated by that asset or asset group compared to its carrying amount. If the carrying amount of the long-lived asset or asset group is not recoverable on an undiscounted cash

flow basis, impairment is recognized to the extent the carrying amount exceeds its fair value. Fair value is determined through various valuation techniques including discounted cash flow models or, when available, quoted market values and third-party appraisals. It is not possible for us to predict the likelihood of any possible future impairments or, if such an impairment were to occur, the magnitude of any impairment.

Intangible assets with finite useful lives, including purchased technology, customer-related intangible assets, patents, trademarks, backlog, and software licenses, are subject to amortization over the expected period of economic benefit to us. We evaluate whether events or circumstances have occurred that warrant a revision to the remaining useful lives of intangible assets. In cases where a revision is deemed appropriate, the remaining carrying amounts of the intangible assets are amortized over the revised remaining useful life.

Intangible assets related to in-process research and development ("IPR&D") projects are considered to be indefinite-lived until the completion or abandonment of the associated R&D efforts. If and when development is complete, the associated assets would be deemed long-lived and would then be amortized based on their respective estimated useful lives at that point in time. Indefinite-lived intangible assets are tested for impairment at least annually in the beginning of the fourth quarter of our fiscal year. In testing indefinite-lived intangible assets for impairment, we may first perform a qualitative assessment of whether it is more likely than not that the fair value of the indefinite-lived intangible asset is less than its carrying amount, and, if so, we then quantitatively compare the fair value of the indefinite-lived intangible asset to its carrying amount. We determine the fair value of our indefinite-lived intangible assets using a discounted cash flow method.

Income Taxes

We estimate our income taxes in each of the jurisdictions in which we operate. Deferred income taxes reflect the net tax effect of temporary differences between the asset and liability balances recognized for financial reporting purposes and the balances used for income tax purposes, as well as the tax effect of carry forwards. We record a valuation allowance to reduce our deferred tax assets to the amount that is more likely than not to be realized. Realization of our net deferred tax assets is dependent on future taxable income.

We recognize the effect of income tax positions for only those positions which are estimated to more likely than not be sustained if challenged. We reflect changes in recognition or measurement in the period in which our change in judgment occurs. We record interest and penalties related to uncertain tax positions in income tax expense. Income taxes related to the global intangible low-taxed income ("GILTI") rules are expensed as incurred.

Recent Accounting Pronouncements

We adopted ASU 2019-12 in the second quarter of 2020. Additionally, we will adopt ASU 2020-06 effective January 1, 2022. Refer to Note 1, "Significant Accounting Policies," for additional information.

We are also evaluating other pronouncements recently issued but not yet adopted. The adoption of these pronouncements is not expected to have a material impact on our consolidated financial statements.

Item 7A. Quantitative and Qualitative Disclosures about Market Risk

Interest Rate Risk

Our exposure to market rate risk for changes in interest rates primarily relates to our investment portfolio. We centrally manage our investment portfolios considering investment opportunities and risks, tax consequences, and overall financing strategies. Our investment portfolio includes fixed-income securities with a fair value of approximately $104.2 million at December 31, 2021. These securities are subject to interest rate risk and, based on our investment portfolio at December 31, 2021, a 100 basis point increase in interest rates would result in a decrease in the fair value of the portfolio of $1.0 million. While an increase in interest rates may reduce the fair value of the investment portfolio, we will not realize the losses in the Consolidated Statements of Operations unless the individual fixed-income securities are sold prior to recovery or the loss is determined to be other-than-temporary.

Currency Exchange Risk

We conduct business on a worldwide basis and, as such, a portion of our revenues, earnings, and net investments in foreign affiliates is exposed to changes in currency exchange rates. The economic impact of currency exchange rate movements is complex because such changes are often linked to variability in real growth, inflation, interest rates, governmental actions, and other factors. These changes, if material, could cause us to adjust our financing and operating strategies. Consequently, isolating the effect of changes in currency does not incorporate these other important economic factors.

Changes in currency exchange rates could affect our foreign currency denominated monetary assets and liabilities and forecasted cash flows. We may enter into monthly forward derivative contracts with the intent of mitigating a portion of this risk. We only use derivative financial instruments in the context of hedging and not for speculative purposes and have not designated our foreign exchange derivatives as hedges. Accordingly, changes in fair value from these contracts are included in “Other operating expense (income), net” in our Consolidated Statements of Operations. We execute derivative transactions with highly rated financial institutions to mitigate counterparty risk.

Our net sales to customers located outside of the United States represented approximately 62%, 68%, and 70% of our total net sales in 2021, 2020, and 2019, respectively. We expect that net sales to customers outside the United States will continue to represent a large percentage of our total net sales. Our net sales denominated in currencies other than the U.S. dollar represented approximately 3%, 5%, and 4% of total net sales in 2021, 2020, and 2019, respectively.

A 10% change in foreign exchange rates would have an immaterial impact on the consolidated results of operations since most of our sales outside the United States are denominated in U.S. dollars.

Item 8. Financial Statements and Supplementary Data

Our Consolidated Financial Statements are listed in the Index to Consolidated Financial Statements and Financial Statement Schedule filed as part of this Form 10-K.

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

None.

Item 9A. Controls and Procedures

Management’s Report on Internal Control over Financial Reporting

Our principal executive and financial officers have evaluated and concluded that our disclosure controls and procedures are effective as of December 31, 2021. The disclosure controls and procedures are designed to ensure that the information required to be disclosed in this report filed under the Securities Exchange Act of 1934 is recorded, processed, summarized, and reported within the time periods specified in the Securities and Exchange Commission’s rules and forms and is accumulated and communicated to our principal executive and financial officers as appropriate to allow timely decisions regarding required disclosure.

Our principal executive and financial officers are responsible for establishing and maintaining adequate internal control over financial reporting, which is a process designed and put into effect 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. Using the criteria established in the Internal Control — Integrated Framework (2013) published by the Committee of Sponsoring Organizations of the Treadway Commission (“COSO”), Management has evaluated, assessed, and concluded that internal control over financial reporting is effective as of December 31, 2021.

KPMG LLP, an independent registered public accounting firm, has audited the consolidated financial statements included in this Annual Report on Form 10-K and, as part of their audit, has issued their report, included herein, on the effectiveness of our internal control over financial reporting.

Changes in Internal Control over Financial Reporting

During the quarter ended December 31, 2021, there were no changes in internal control that have materially affected or are reasonably likely to materially affect internal control over financial reporting.

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
Veeco Instruments Inc.:

Opinion on Internal Control Over Financial Reporting

We have audited Veeco Instruments Inc. and subsidiaries' (the Company) internal control over financial reporting as of December 31, 2021, based on criteria established in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2021, based on criteria established in Internal Control – Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2021 and 2020, the related consolidated statements of operations, comprehensive income (loss), stockholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2021, and the related notes and financial statement schedule II – valuation and qualifying accounts (collectively, the consolidated financial statements), and our report dated February 18, 2022 expressed an unqualified opinion on those consolidated financial statements.

Basis for Opinion

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

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

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

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

/s/ KPMG LLP

Melville, New York
February 18, 2022

Item 9B. Other Information

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

Information required by this Item that will appear under the headings “Governance,” “Executive Officers,” and “Delinquent Section 16(a) Reports” in the definitive proxy statement to be filed with the SEC relating to our 2022 Annual Meeting of Stockholders is incorporated herein by reference.

We have adopted a Code of Ethics for Senior Officers (the “Code”) which applies to our principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions. A copy of the Code can be found on our website (www.veeco.com). We intend to disclose on our website the nature of any future amendments to and waivers of the Code that apply to the chief executive officer, principal financial officer, principal accounting officer, or persons performing similar functions. We have also adopted a Code of Conduct which applies to all of our employees, including those listed above, as well as to our directors. A copy of the Code of Conduct can be found on our website (www.veeco.com). The website address above is intended to be an inactive, textual reference only. None of the material on this website is part of this report.

Item 11. Executive Compensation

Information required by this Item that will appear under the heading “Compensation” in the definitive proxy statement to be filed with the SEC relating to our 2022 Annual Meeting of Stockholders is incorporated herein by reference.

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

Information required by this Item that will appear under the headings “Security Ownership of Certain Beneficial Owners and Management” and “Equity Compensation Plan Information” in the definitive proxy statement to be filed with the SEC relating to our 2022 Annual Meeting of Stockholders is incorporated herein by reference.

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

Information required by this Item that will appear under the headings “Certain Relationships and Related Transactions” and “Independence of Board” in the definitive proxy statement to be filed with the SEC relating to our 2022 Annual Meeting of Stockholders is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services

Information required by this Item that will appear under the heading “Independent Auditor Fees and Other Matters” in the definitive proxy statement to be filed with the SEC relating to our 2022 Annual Meeting of Stockholders is incorporated herein by reference.

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PART IV

Item 15. Exhibits, Financial Statement Schedules

(a) (1) The Registrant's financial statements together with a separate table of contents are annexed hereto
(2) Financial Statement Schedules are listed in the separate table of contents annexed hereto.
(3) Exhibits

Unless otherwise indicated, each of the following exhibits has been previously filed with the Securities and Exchange Commission by the Company under File No. 0-16244.

Exhibit Number	Exhibit Description	Incorporated by Reference			Filed or Furnished Herewith
		Form	Exhibit	Filing Date	
1.1	Conflict Minerals Report of Veeco Instruments Inc.	SD	1.01	5/28/2021	
3.1	Amended and Restated Certificate of Incorporation of Veeco dated December 1, 1994, as amended June 2, 1997 and July 25, 1997.	10-Q	3.1	8/14/1997	
3.2	Amendment to Certificate of Incorporation of Veeco dated May 29, 1998.	10-K	3.2	3/14/2001	
3.3	Amendment to Certificate of Incorporation of Veeco dated May 5, 2000.	10-Q	3.1	8/14/2000	
3.4	Amendment to Certificate of Incorporation of Veeco dated May 16, 2002.	10-Q	3.1	10/26/2009	
3.5	Amendment to Certificate of Incorporation of Veeco dated May 18, 2010.	10-K	3.8	2/24/2011	
3.6	Sixth Amended and Restated Bylaws of Veeco effective January 22, 2021.	8-K	3.1	1/22/2021	
3.7	Certificate of Designation, Preferences, and Rights of Series A Junior Participating Preferred Stock of Veeco dated March 14, 2001.	10-Q	3.1	5/9/2001	
4.1	Indenture, dated as of January 18, 2017, by and between Veeco Instruments Inc. and U.S. Bank National Association, as Trustee (relating to the 2.70% Convertible Notes due 2023).	8-K	4.1	1/18/2017	
4.2	First Supplemental Indenture, dated as of January 18, 2017, by and between Veeco Instruments Inc. and U.S. Bank National Association, as Trustee (relating to the 2.70% Convertible Notes due 2023).	8-K	4.2	1/18/2017	
4.3	Indenture, dated as of May 18, 2020, between Veeco Instruments Inc. and U.S. Bank National Association, as trustee.	8-K	4.1	5/18/2020	
4.4	Form of 3.75% Convertible Senior Notes due 2027.	8-K	4.1	5/18/2020	
4.5	Indenture, dated as of November 17, 2020, between Veeco Instruments Inc. and U.S. Bank National Association, as trustee.	8-K	4.1	11/17/2020	
4.6	Form of 3.50% Convertible Senior Notes due 2025.	8-K	4.1	11/17/2020	
4.7	Description of the Registrant's Securities Registered Pursuant to Section 12 of the Securities Exchange Act of 1934.	10-K	4.3	2/21/2020	
10.1	Lease dated February 18, 2021 between Veeco Instruments Inc. and Trimble-Junction Ventures LLC.	8-K	10.1	2/24/2021	

Exhibit Number	Exhibit Description	Incorporated by Reference Form	Exhibit	Filing Date	Filed or Furnished Herewith
10.2*	Veeco Severance Benefits Policy, effective May 1, 2009.	10-K	10.1	2/22/2021	
10.3*	Veeco Amended and Restated 2010 Stock Incentive Plan, effective May 5, 2016.	S-8	10.1	6/2/2016	
10.4*	Veeco Amended and Restated 2010 Stock Incentive Plan, effective March 3, 2017.	10-Q	10.1	11/3/2017	
10.5*	Veeco Instruments Inc. 2019 Stock Incentive Plan.	S-8	10.1	5/7/2019	
10.6*	Ultratech, Inc. 1993 Stock Option/Stock Issuance Plan (as Amended and Restated as of May 31, 2011).	S-8	10.1	5/26/2017	
10.7	Form of Capped Call Confirmation.	8-K	10.1	5/18/2020	
10.8	Exchange Agreement.	8-K	10.1	11/17/2020	
10.9	Note Purchase Agreement, dated as of November 5, 2021, by and between Veeco Instruments Inc. and Lynrock Lake LLP.	8-K	10.1	11/8/2021	
10.10	Loan and Security Agreement, dated as of December 16, 2021, by and among Veeco Instruments Inc., as borrower, the guarantors party thereto, the lenders from time to time party thereto, HSBC Bank USA, National Association, as administrative agent, collateral agent, joint lead arranger, and joint bookrunner, Barclays bank PLC, as joint lead arranger and joint bookrunner, and Santander Bank, N.A.	8-K	10.1	12/20/2021	
10.11	Guaranty, dated as of December 16, 2021, by the guarantors, identified therin in favor of HSBC Bank USA, National Association, as agent.	8-K	10.2	12/20/2021	
10.12*	Form of Notice of Performance Share Award and related terms and conditions pursuant to the Veeco 2010 Stock Incentive Plan, effective June 2016.	10-Q	10.1	11/1/2016	
10.13*	Form of Notice of Critical Priorities Performance Share Award and related terms and conditions pursuant to the Veeco 2010 Stock Incentive Plan, effective June 2016.	10-Q	10.2	11/1/2016	
10.14*	Form of Notice of Performance Share Award and related terms and conditions pursuant to the Veeco 2010 Stock Incentive Plan, effective March 2018.	10-Q	10.1	5/7/2018	
10.15*	Form of Notice of Restricted Stock Award and related terms and conditions pursuant to the Veeco 2010 Stock Incentive Plan, effective March 2018.	10-Q	10.2	5/7/2018	
10.16*	Form of Notice of Performance Restricted Stock Unit Award and related terms and conditions pursuant to the Veeco 2010 Stock Incentive Plan, effective March 2019.	10-Q	10.1	5/7/2019	
10.17*	Form of Notice of Restricted Stock Award and related terms and conditions pursuant to the Veeco 2010 Stock Incentive Plan, effective March 2019 (time-based version A).	10-Q	10.2	5/7/2019	

Exhibit Number	Exhibit Description	Incorporated by Reference			Filed or Furnished Herewith
		Form	Exhibit	Filing Date	
10.18*	Form of Notice of Restricted Stock Award and related terms and conditions pursuant to the Veeco 2010 Stock Incentive Plan, effective March 2019 (time-based version B).	10-Q	10.3	5/7/2019	
10.19*	Form of Notice of Performance Restricted Stock Unit Award and related terms and conditions pursuant to the Veeco 2019 Stock Incentive Plan, effective March 2020.	10-K	10.16	2/22/2021	
10.20*	Form of Notice of Restricted Stock Award and related terms and conditions pursuant to the Veeco 2019 Stock Incentive Plan, effective March 2020.	10-K	10.17	2/22/2021	
10.21*	Form of Notice of Performance Restricted Stock Unit Award and related terms and conditions pursuant to the Veeco 2019 Stock Incentive Plan, effective March 2021.	10-Q	10.1	5/4/2021	
10.22*	Form of Notice of Restricted Stock Award and related terms and conditions pursuant to the Veeco 2019 Stock Incentive Plan, effective March 2021.	10-Q	10.2	5/4/2021	
10.23*	Veeco 2013 Inducement Stock Incentive Plan, effective September 26, 2013.	10-Q	10.1	11/4/2013	
10.24*	Veeco Instruments Inc. 2016 Employee Stock Purchase Plan.	S-8	10.9	6/2/2016	
10.25*	First Amendment to Veeco Instruments Inc. 2016 Employee Stock Purchase Plan.	S-8	10.11	5/7/2019	
10.26*	Second Amendment to Veeco Instruments Inc. 2016 Employee Stock Purchase Plan.	S-8	10.1	5/11/2021	
10.27*	Form of Amended and Restated Indemnification Agreement entered into between Veeco and each of its directors and executive officers (August 2017).	10-Q	10.2	8/3/2017	
10.28*	Veeco Amended and Restated Senior Executive Change in Control Policy, effective as of January 1, 2014.	10-K	10.22	2/28/2014	
10.29*	Letter Agreement dated January 30, 2012 between Veeco and Dr. William J. Miller.	10-K	10.30	2/22/2012	
10.30*	Letter Agreement dated August 29, 2018 between Veeco and Dr. William J. Miller.	8-K	10.2	9/4/2018	
10.31*	Amendment dated March 22, 2019 to the Letter Agreement between Veeco and William J. Miller, Ph.D.	10-Q	10.4	5/7/2019	
10.32*	Letter Agreement dated January 21, 2004 between Veeco and John P. Kiernan.	10-K	10.38	3/12/2004	
10.33*	Amendment effective June 9, 2006 to Letter Agreement between Veeco and John P. Kiernan.	10-Q	10.3	8/4/2006	
10.34*	Amendment effective December 31, 2008 to Letter Agreement between Veeco and John P. Kiernan.	10-K	10.40	3/2/2009	
10.35*	Letter dated January 1, 2020 from Veeco to John P. Kiernan.	8-K	99.2	1/2/2020	
10.36*	Letter Agreement dated March 20, 2019 between Veeco and Adrian Devasahayam.	10-K	10.30	2/22/2021	
10.37*	Letter Agreement dated August 4, 2017 between Veeco and Peter Porshnev.	10-K	10.31	2/22/2021	

Exhibit Number	Exhibit Description	Incorporated by Reference			Filed or Furnished Herewith
		Form	Exhibit	Filing Date	
10.38*	Letter Agreement dated March 9, 2020 between Veeco and Susan Wilkerson.	10-K	10.32	2/22/2021	
21.1	Subsidiaries of the Registrant.				X
23.1	Consent of KPMG LLP.				X
31.1	Certification of Chief Executive Officer pursuant to Rule 13a—14(a) or Rule 15d—14(a) of the Securities and Exchange Act of 1934.				X
31.2	Certification of Chief Financial Officer pursuant to Rule 13a—14(a) or Rule 15d—14(a) of the Securities and Exchange Act of 1934.				X
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.				X
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.				X
101.INS	XBRL Instance Document – the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline. XBRL document.				**
101.XSD	XBRL Schema.				**
101.PRE	XBRL Presentation.				**
101.CAL	XBRL Calculation.				**
101.DEF	XBRL Definition.				**
101.LAB	XBRL Label.				**
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101).				**

* Indicates a management contract or compensatory plan or arrangement, as required by Item 15(a) (3) of Form 10-K.

** Filed herewith electronically

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, as amended, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized, on February 18, 2022.

Veeco Instruments Inc.

By: /s/ WILLIAM J. MILLER, Ph.D.
William J. Miller, Ph.D.
Chief Executive Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, as amended, this report has been signed below by the following persons on behalf of the Registrant and in the capacities indicated, on February 18, 2022.

Signature	Title
/s/ WILLIAM J. MILLER, Ph.D. William J. Miller, Ph.D.	Chief Executive Officer and Director (principal executive officer)
/s/ JOHN P. KIERNAN John P. Kiernan	Senior Vice President and Chief Financial Officer (principal financial & accounting officer)
/s/ RICHARD A. D’AMORE Richard A. D’Amore	Chairman
/s/ KATHLEEN A. BAYLESS Kathleen A. Bayless	Director
/s/ SUJEET CHAND Sujeet Chand	Director
/s/ GORDON HUNTER Gordon Hunter	Director
/s/ KEITH D. JACKSON Keith D. Jackson	Director
/s/ MARY JANE RAYMOND Mary Jane Raymond	Director
/s/ PETER J. SIMONE Peter J. Simone	Director
/s/ THOMAS ST. DENNIS Thomas St. Dennis	Director

Veeco Instruments Inc. and Subsidiaries

Index to Consolidated Financial Statements and Financial Statement Schedule

Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors
Veeco Instruments Inc.:

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of Veeco Instruments Inc. and subsidiaries (the Company) as of December 31, 2021 and 2020, the related consolidated statements of operations, comprehensive income (loss), stockholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2021, and the related notes and financial statement schedule II – valuation and qualifying accounts (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2021 and 2020, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2021, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2021, 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 February 18, 2022 expressed an unqualified opinion on the effectiveness of the Company's internal control over financial reporting.

Basis for Opinion

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

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

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated 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 consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of a critical audit matter does not alter in any way our opinion on the consolidated 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.

Assessment of the value of excess and obsolete inventory

As discussed in Note 1 of the consolidated financial statements, the Company assesses the valuation of its inventories, including materials, work-in-process, and finished goods, each reporting period. Obsolete inventory or inventory in excess of the Company's estimated usage requirement is written down to its estimated net realizable value if less than

cost. Estimates of usage include the Company's analysis of anticipated demand, possible alternative uses of its inventory, as well as other qualitative factors. As of December 31, 2021, the Company's inventories totaled $170.9 million.

We identified the assessment of the value of excess and obsolete inventory as a critical audit matter. Subjective auditor judgment was required to evaluate the Company's estimates of anticipated demand, which can be affected by market and economic conditions outside the Company's control.

The primary procedures we performed to address this critical audit matter included the following. We evaluated the design and tested the operating effectiveness of certain internal controls related to the Company's inventory valuation process. This included controls related to the development of estimates of anticipated demand of inventory. We evaluated current year estimates of anticipated demand used to assess the value of excess and obsolete inventory by comparing them to historical sales volumes and inspecting documentation when they differed significantly. For certain inventory items, we compared the prior year estimate of anticipated demand to actual results to assess the Company's ability to accurately forecast.

/s/ KPMG LLP

We have served as the Company's auditor since 2015.

Melville, New York
February 18, 2022

Veeco Instruments Inc. and Subsidiaries
Consolidated Balance Sheets
(in thousands, except share amounts)

	December 31, 2021	December 31, 2020
Assets		
Current assets:		
Cash and cash equivalents	$ 119,747	$ 129,625
Restricted cash	725	658
Short-term investments	104,181	189,771
Accounts receivable, net	109,609	79,991
Contract assets	18,293	21,246
Inventories	170,858	145,906
Deferred cost of sales	346	433
Prepaid expenses and other current assets	25,628	19,301
Total current assets	549,387	586,931
Property, plant, and equipment, net	99,743	65,271
Operating lease right-of-use assets	28,813	10,275
Intangible assets, net	33,905	46,185
Goodwill	181,943	181,943
Deferred income taxes	1,639	1,440
Other assets	3,546	6,019
Total assets	$ 898,976	$ 898,064
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 44,456	$ 33,656
Accrued expenses and other current liabilities	79,752	44,876
Customer deposits and deferred revenue	63,136	67,235
Income taxes payable	1,860	914
Total current liabilities	189,204	146,681
Deferred income taxes	4,792	5,240
Long-term debt	229,438	321,115
Long-term operating lease liabilities	32,834	6,305
Other liabilities	5,080	10,349
Total liabilities	461,348	489,690
Stockholders' equity:		
Preferred stock, $0.01 par value; 500,000 shares authorized; no shares issued and outstanding.	—	—
Common stock, $0.01 par value; 120,000,000 shares authorized; 50,652,864 shares issued and outstanding at December 31, 2021 and 49,723,751 shares issued and outstanding at December 31, 2020	507	497
Additional paid-in capital	1,116,921	1,113,352
Accumulated deficit	(681,283)	(707,321)
Accumulated other comprehensive income	1,483	1,846
Total stockholders' equity	437,628	408,374
Total liabilities and stockholders' equity	$ 898,976	$ 898,064

See accompanying Notes to the Consolidated Financial Statements.

Veeco Instruments Inc. and Subsidiaries
Consolidated Statements of Operations
(in thousands, except per share amounts)

	For the year ended December 31,		
	2021	2020	2019
Net sales	$ 583,277	$ 454,163	$ 419,349
Cost of sales	341,003	259,863	261,155
Gross profit	242,274	194,300	158,194
Operating expenses, net:			
Research and development	88,680	78,994	90,557
Selling, general, and administrative	84,536	76,251	79,749
Amortization of intangible assets	12,280	15,333	17,085
Restructuring	—	1,097	6,403
Asset impairment	—	281	4,020
Other operating expense (income), net	68	(221)	(42)
Total operating expenses, net	185,564	171,735	197,772
Operating income (loss)	56,710	22,565	(39,578)
Interest income	2,340	1,551	4,680
Interest expense	(28,360)	(24,739)	(22,085)
Other income (expense), net	(5,010)	(7,841)	(20,973)
Income (loss) before income taxes	25,680	(8,464)	(77,956)
Income tax expense (benefit)	(358)	(73)	777
Net income (loss)	$ 26,038	$ (8,391)	$ (78,733)
Income (loss) per common share:			
Basic	$ 0.53	$ (0.17)	$ (1.66)
Diluted	$ 0.49	$ (0.17)	$ (1.66)
Weighted average number of shares:			
Basic	49,073	48,362	47,482
Diluted	53,643	48,362	47,482

See accompanying Notes to the Consolidated Financial Statements.

Veeco Instruments Inc. and Subsidiaries
Consolidated Statements of Comprehensive Income (Loss)
(in thousands)

	For the year ended December 31,		
	2021	2020	2019
Net income (loss)	$26,038	$(8,391)	$(78,733)
Other comprehensive income (loss), net of tax:			
Available-for-sale securities:			
Change in net unrealized gains or losses	(311)	(53)	49
Unrealized gain (loss) on available-for-sale securities	(311)	(53)	49
Currency translation adjustments:			
Change in currency translation adjustments	(52)	5	(19)
Reclassification adjustments for net (gains) losses included in net income	—	—	44
Net changes related to currency translation adjustments	(52)	5	25
Total other comprehensive income (loss), net of tax	(363)	(48)	74
Total comprehensive income (loss)	$25,675	$(8,439)	$(78,659)

See accompanying Notes to the Consolidated Financial Statements.

Veeco Instruments Inc. and Subsidiaries
Consolidated Statements of Stockholders' Equity
(in thousands)

	Common Stock		Treasury Stock		Additional Paid-in Capital	Accumulated Deficit	Accumulated Other Comprehensive Income	Total
	Shares	Amount	Shares	Amount				
Balance at December 31, 2018	48,547	$ 485	523	$(5,872)	$1,061,325	$ (619,983)	$ 1,820	$437,775
Net income (loss)	—	—	—	—	—	(78,733)	—	(78,733)
Other comprehensive income (loss), net of tax	—	—	—	—	—	—	74	74
Share-based compensation expense	—	—	—	—	15,270	—	—	15,270
Net issuance under employee stock plans	447	5	(523)	5,872	(5,537)	(214)	—	126
Balance at December 31, 2019	48,994	490	—	—	1,071,058	(698,930)	1,894	374,512
Net income (loss)	—	—	—	—	—	(8,391)	—	(8,391)
Other comprehensive income (loss), net of tax	—	—	—	—	—	—	(48)	(48)
Share-based compensation expense	—	—	—	—	12,703	—	—	12,703
Net issuance under employee stock plans	730	7	—	—	549	—	—	556
Extinguishment of equity component of repurchased/exchanged 2023 Notes	—	—	—	—	(14,714)	—	—	(14,714)
Equity component of 2025 Notes	—	—	—	—	20,706	—	—	20,706
Equity component of 2027 Notes	—	—	—	—	33,363	—	—	33,363
Purchase of capped calls	—	—	—	—	(10,313)	—	—	(10,313)
Balance at December 31, 2020	49,724	497	—	—	1,113,352	(707,321)	1,846	408,374
Net income (loss)	—	—	—	—	—	26,038	—	26,038
Other comprehensive income (loss), net of tax	—	—	—	—	—	—	(363)	(363)
Share-based compensation expense	—	—	—	—	15,249	—	—	15,249
Net issuance under employee stock plans	929	10	—	—	(5,600)	—	—	(5,590)
Extinguishment of equity component of repurchased 2023 Notes	—	—	—	—	(6,080)	—	—	(6,080)
Balance at December 31, 2021	50,653	$ 507	—	$ —	$1,116,921	$ (681,283)	$ 1,483	$437,628

See accompanying Notes to the Consolidated Financial Statements.

Veeco Instruments Inc. and Subsidiaries
Consolidated Statements of Cash Flows
(in thousands)

	For the year ended December 31,		
	2021	**2020**	**2019**
Cash Flows from Operating Activities			
Net income (loss)	$ 26,038	$ (8,391)	$ (78,733)
Adjustments to reconcile net income (loss) to net cash provided by (used in) operating activities:			
Depreciation and amortization	26,058	30,697	34,399
Non-cash interest expense	13,819	13,792	12,676
Deferred income taxes	(651)	(299)	360
Share-based compensation expense	15,249	12,703	15,270
Loss on extinguishment of debt	4,029	7,841	—
Asset impairment	—	281	4,020
Impairment of equity investments	980	—	20,973
Provision for bad debts	—	140	392
Changes in operating assets and liabilities:			
Accounts receivable and contract assets	(26,664)	(30,361)	5,796
Inventories and deferred cost of sales	(24,803)	(11,528)	14,969
Prepaid expenses and other current assets	7,621	(2,610)	7,520
Accounts payable and accrued expenses	20,225	15,959	(26,945)
Customer deposits and deferred revenue	(4,099)	12,424	(17,866)
Income taxes receivable and payable, net	947	86	(655)
Other, net	8,993	2,287	408
Net cash provided by (used in) operating activities	67,742	43,021	(7,416)
Cash Flows from Investing Activities			
Capital expenditures	(40,643)	(6,802)	(10,873)
Proceeds from the sale of investments	330,702	173,530	127,349
Payments for purchases of investments	(247,256)	(248,023)	(192,988)
Proceeds from held for sale assets, net of costs to sell	1,725	9,503	645
Net cash provided by (used in) investing activities	44,528	(71,792)	(75,867)
Cash Flows from Financing Activities			
Proceeds from issuance of 2027 Notes, net of issuance costs	—	120,095	—
Purchase of capped calls	—	(10,313)	—
Repurchase of 2023 Notes	(115,604)	(81,240)	—
Debt issuance costs	(835)	—	—
Proceeds (net of tax withholdings) from option exercises and employee stock purchase plan	3,402	2,878	3,106
Restricted stock tax withholdings	(8,992)	(2,322)	(2,980)
Net cash provided by (used in) financing activities	(122,029)	29,098	126
Effect of exchange rate changes on cash and cash equivalents	(52)	5	26
Net increase (decrease) in cash, cash equivalents, and restricted cash	(9,811)	332	(83,131)
Cash, cash equivalents, and restricted cash - beginning of period	130,283	129,951	213,082
Cash, cash equivalents, and restricted cash - end of period	$ 120,472	$ 130,283	$ 129,951
Supplemental Disclosure of Cash Flow Information			
Interest paid	$ 12,551	$ 12,700	$ 9,408
Net income taxes paid (refunds received)	(139)	329	2,931
Non-cash activities			
Capital expenditures included in accounts payable and accrued expenses	9,096	687	249
Net transfer of property, plant and equipment to inventory	63	1,624	(4,916)
Right-of-use assets obtained in exchange for lease obligations	23,777	1,741	5,576

See accompanying Notes to the Consolidated Financial Statements.

Veeco Instruments Inc. and Subsidiaries
Notes to Consolidated Financial Statements

Note 1 — Significant Accounting Policies

(a) Description of Business

Veeco Instruments Inc. (together with its consolidated subsidiaries, “Veeco,” or the “Company”) operates in a single segment: the development, manufacture, sales, and support of semiconductor and thin film process equipment primarily sold to make electronic devices.

(b) Basis of Presentation

The accompanying audited Consolidated Financial Statements of the Company have been prepared in accordance with United States generally accepted accounting principles (“GAAP”). The Company reports interim quarters on a 13-week basis ending on the last Sunday of each period, which is determined at the start of each year. The Company’s fourth quarter always ends on the last day of the calendar year, December 31. During 2021 the interim quarters ended on April 4, July 4, and October 3, and during 2020 the interim quarters ended on March 29, June 28, and September 27. The Company reports these interim quarters as March 31, June 30, and September 30 in its interim consolidated financial statements.

(c) Use of Estimates

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. Although these estimates are based on management’s knowledge of current events and actions it may undertake in the future, these estimates may ultimately differ from actual results. Significant items subject to such estimates and assumptions include: (i) stand-alone selling prices for the Company’s products and services; (ii) allowances for doubtful accounts; (iii) inventory obsolescence; (iv) the useful lives and expected future cash flows of property, plant, and equipment and identifiable intangible assets; (v) the fair value of the Company’s reporting unit and related goodwill; (vi) investment valuations and the valuation of derivatives, deferred tax assets, and assets acquired in business combinations; (vii) the recoverability of long-lived assets; (viii) liabilities for product warranty and legal contingencies; (ix) share-based compensation; (x) lease term and incremental borrowing rates used in determining operating lease assets and liabilities; and (xi) income tax uncertainties.

(d) Principles of Consolidation

The Consolidated Financial Statements include the accounts of the Company and its subsidiaries. Intercompany balances and transactions have been eliminated in consolidation. Companies acquired during each reporting period are reflected in the results of the Company effective from their respective dates of acquisition through the end of the reporting period.

(e) Foreign Currencies

Assets and liabilities of the Company’s foreign subsidiaries that operate using functional currencies other than the U.S. dollar are translated using the exchange rates in effect at the balance sheet date. Results of operations are translated using monthly average exchange rates. Adjustments arising from the translation of the foreign currency financial statements of the Company’s subsidiaries into U.S. dollars, including intercompany transactions of a long-term nature, are reported as currency translation adjustments in “Accumulated other comprehensive income” in the Consolidated Balance Sheets. Foreign currency transaction gains or losses are included in “Other operating expense (income), net” in the Consolidated Statements of Operations.

(f) Revenue Recognition

Revenue is recognized upon the transfer of control of the promised product or service to the customer in an amount that reflects the consideration the Company expects to receive in exchange for such product or service. The Company’s contracts with customers generally do not contain variable consideration. In the rare instances where variable

Veeco Instruments Inc. and Subsidiaries
Notes to Consolidated Financial Statements (Continued)

consideration is included, the Company estimates the amount of variable consideration and determines what portion of that, if any, has a high probability of significant subsequent revenue reversal, and if so, that amount is excluded from the transaction price. The Company's contracts with customers frequently contain multiple deliverables, such as systems, upgrades, components, spare parts, installation, maintenance, and service plans. Judgment is required to properly identify the performance obligations within a contract and to determine how the revenue should be allocated among the performance obligations. The Company also evaluates whether multiple transactions with the same customer or related parties should be considered part of a single contract based on an assessment of whether the contracts or agreements are negotiated or executed within a short time frame of each other or if there are indicators that the contracts are negotiated in contemplation of one another.

When there are separate units of accounting, the Company allocates revenue to each performance obligation on a relative stand-alone selling price basis. The stand-alone selling prices are determined based on the prices at which the Company separately sells the systems, upgrades, components, spare parts, installation, maintenance, and service plans. For items that are not sold separately, the Company estimates stand-alone selling prices generally using an expected cost plus margin approach.

Most of the Company's revenue is recognized at a point in time when the performance obligation is satisfied. The Company considers many facts when evaluating each of its sales arrangements to determine the timing of revenue recognition, including its contractual obligations and the nature of the customer's post-delivery acceptance provisions. The Company's system sales arrangements, including certain upgrades, generally include field acceptance provisions that may include functional or mechanical test procedures. For many of these arrangements, a customer source inspection of the system is performed in the Company's facility, test data is sent to the customer documenting that the system is functioning to the agreed upon specifications prior to delivery, or other quality assurance testing is performed internally to ensure system functionality prior to shipment. Historically, such source inspection or test data replicates the field acceptance provisions that are performed at the customer's site prior to final acceptance of the system. When the Company objectively demonstrates that the criteria specified in the contractual acceptance provisions are achieved prior to delivery either through customer testing or the Company's historical experience of its tools meeting specifications, transfer of control of the product to the customer is considered to have occurred and revenue is recognized upon system delivery since there is no substantive contingency remaining related to the acceptance provisions at that date. For new products, new applications of existing products, or for products with substantive customer acceptance provisions where the Company cannot objectively demonstrate that the criteria specified in the contractual acceptance provisions have been achieved prior to delivery, revenue and the associated costs are deferred. The Company recognizes such revenue and costs upon obtaining objective evidence that the acceptance provisions can be achieved, assuming all other revenue recognition criteria have been met.

In certain cases, the Company's contracts with customers contain a billing retention, which is billed by the Company and payable by the customer when field acceptance provisions are completed. Revenue recognized in advance of the amount that has been billed is recorded as a contract asset on the Consolidated Balance Sheets.

The Company recognizes revenue related to maintenance and service contracts over time based upon the respective contract term. Installation revenue is recognized over time as the installation services are performed. The Company recognizes revenue from the sales of components, spare parts, and specified service engagements at a point in time, which is typically consistent with the time of delivery in accordance with the terms of the applicable sales arrangement.

The Company may receive customer deposits on system transactions. The timing of the transfer of goods or services related to the deposits is either at the discretion of the customer or expected to be within one year from the deposit receipt. As such, the Company does not adjust transaction prices for the time value of money. Incremental direct costs incurred related to the acquisition of a customer contract, such as sales commissions, are expensed as incurred since the expected performance period is one year or less.

Veeco Instruments Inc. and Subsidiaries
Notes to Consolidated Financial Statements (Continued)

The Company has elected to treat shipping and handling costs, including those costs incurred to move, package, and prepare the Company's products for shipment and to move the products to a customer's designated location, as a fulfillment activity, and the Company includes such costs in "Cost of sales" in the Consolidated Statements of Operations as incurred. These costs are generally comprised of payments to third-party shippers. Taxes assessed by governmental authorities that are collected by the Company from a customer are excluded from revenue.

(g) Warranty Costs

The Company typically provides standard warranty coverage on its systems for one year from the date of final acceptance by providing labor and parts necessary to repair the systems during the warranty period. The Company records the estimated warranty cost when revenue is recognized on the related system. Warranty cost is included in "Cost of sales" in the Consolidated Statements of Operations. The estimated warranty cost is based on the Company's historical experience with its systems and regional labor costs. The Company calculates the average service hours by region and parts expense per system utilizing actual service records to determine the estimated warranty charge. The Company updates its warranty estimates on a quarterly basis when the actual product performance or field expense differs from original estimates.

(h) Research and Development Costs

Research and development costs are expensed as incurred and include charges for the development of new technology and the transition of existing technology into new products or services.

(i) Advertising Expense

The cost of advertising is expensed as incurred and totaled $0.3 million, $0.4 million, and $0.5 million for the years ended December 31, 2021, 2020, and 2019, respectively.

(j) Accounting for Share-based Compensation

Share-based awards exchanged for employee services are accounted for under the fair value method. Accordingly, share-based compensation cost is measured at the grant date based on the estimated fair value of the award. The expense for awards is recognized over the employee's requisite service period (generally the vesting period of the award). The Company has elected to treat awards with only service conditions and with graded vesting as one award. Consequently, the total compensation expense is recognized straight-line over the entire vesting period, so long as the compensation cost recognized at any date at least equals the portion of the grant date fair value of the award that is vested at that date.

In addition to stock options, restricted share awards ("RSAs") and restricted stock units ("RSUs") with time-based vesting, the Company grants performance share units and awards ("PSUs" and "PSAs") that have either performance or market conditions. Compensation cost for PSUs and PSAs with performance conditions is recognized over the requisite service period based on the timing and expected level of achievement of the performance targets. A change in the assessment of performance attainment prior to the conclusion of the performance period is recognized in the period of the change in estimate. Compensation cost for PSUs and PSAs with market conditions is recognized over the requisite service period regardless of the expected level of achievement. For all PSUs and PSAs, the number of shares issued to the employee at the conclusion of the service period may vary from the original target based upon the level of attainment of the performance or market conditions.

The Company uses the Black-Scholes option-pricing model to compute the estimated fair value of option awards and purchase rights under the Employee Stock Purchase Plan. The Company uses a Monte Carlo simulation to compute the estimated fair value of awards with market conditions. The Black-Scholes model and Monte Carlo simulation include assumptions regarding dividend yields, expected volatility, expected option term, and risk-free interest rates. See Note 13, "Stock Plans," for additional information.

Veeco Instruments Inc. and Subsidiaries
Notes to Consolidated Financial Statements (Continued)

(k) Income Taxes

Income taxes are accounted for under the asset and liability method. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases and operating loss and tax credit carryforwards. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities from a change in tax rate is recognized in income in the period that includes the enactment date.

(l) Concentration of Credit Risk

Financial instruments that potentially subject the Company to concentrations of credit risk consist primarily of cash and cash equivalents, investments, derivative financial instruments used in hedging activities, and accounts receivable. The Company invests in a variety of financial instruments and, by policy, limits the amount of credit exposure with any one financial institution or commercial issuer. Historically, the Company has not experienced any material credit losses on its investments.

The Company maintains an allowance reserve for potentially uncollectible accounts for estimated losses resulting from the inability of its customers to make required payments. The Company evaluates its allowance for doubtful accounts based on a combination of factors. In circumstances where specific invoices are deemed to be uncollectible, the Company provides a specific allowance for bad debt against the amount due to reduce the net recognized receivable to the amount reasonably expected to be collected. The Company also provides allowances based on its write-off history. Finally, the Company also considers its current expectations of future economic conditions, including the impact of COVID-19, when estimating its allowance for doubtful accounts. The allowance for doubtful accounts totaled $0.7 million at both December 31, 2021 and 2020.

To further mitigate the Company’s exposure to uncollectable accounts, the Company may request certain customers provide a negotiable irrevocable letter of credit drawn on a reputable financial institution. These irrevocable letters of credit are typically issued to mature between zero and 90 days from the date the documentation requirements are met, typically when a system ships or upon receipt of final acceptance from the customer. The Company, at its discretion, may monetize these letters of credit on a non-recourse basis after they become negotiable but before maturity. The fees associated with the monetization are included in “Selling, general, and administrative” in the Consolidated Statements of Operations and were immaterial for the years ended December 31, 2021, 2020, and 2019.

(m) Fair Value of Financial Instruments

The carrying amounts of financial instruments, including cash equivalents, accounts receivable, accounts payable, and accrued expenses reflected in the consolidated financial statements approximate fair value due to their short-term maturities. The fair value of debt for footnote disclosure purposes, including current maturities, if any, is estimated using recently quoted market prices of the instrument, or if not available, a discounted cash flow analysis based on the estimated current incremental borrowing rates for similar types of instruments.

(n) Cash, Cash Equivalents, and Short-term Investments

All financial instruments purchased with an original maturity of three months or less at the time of purchase are considered cash equivalents. Such items may include liquid money market funds, certificate of deposit and time deposit accounts, U.S. treasuries, government agency securities, and corporate debt. Investments that are classified as cash equivalents are carried at cost, which approximates fair value. The Company’s cash and cash equivalents includes $41.7 million and $86.2 million of cash equivalents at December 31, 2021 and 2020, respectively.

Veeco Instruments Inc. and Subsidiaries
Notes to Consolidated Financial Statements (Continued)

A portion of the Company's cash and cash equivalents is held by its subsidiaries throughout the world, frequently in each subsidiary's respective functional currency, which is typically the U.S. dollar. Approximately 32% and 31% of cash and cash equivalents were maintained outside the United States at December 31, 2021 and 2020, respectively.

Short-term investments consist of marketable debt securities, and are generally classified as available-for-sale for use in current operations, if required, and are reported at fair value, with unrealized gains and losses, net of tax, presented as a separate component of stockholders' equity under the caption "Accumulated other comprehensive income" on the Consolidated Balance Sheets. These securities can include U.S. treasuries, government agency securities, corporate debt, and commercial paper, all with maturities of greater than three months when purchased. All realized gains and losses and unrealized losses resulting from declines in fair value that are other than temporary are included in "Other operating expense (income), net" in the Consolidated Statements of Operations. The specific identification method is used to determine the realized gains and losses on investments.

Non-marketable equity securities are equity securities without readily observable market prices and are included in "Other assets" in the Consolidated Balance Sheets. Non-marketable securities are measured at cost, adjusted for changes in observable prices minus impairment. Changes in fair value and impairment charges are included in "Other income (expense), net" in the Consolidated Statements of Operations.

(o) Inventories

Inventories are stated at the lower of cost or net realizable value, with cost determined on a first-in, first-out basis. Each quarter the Company assesses the valuation and recoverability of all inventories: materials (raw materials, spare parts, and service inventory); work-in-process; and finished goods. Obsolete inventory or inventory in excess of management's estimated usage requirement is written down to its estimated net realizable value if less than cost. The Company evaluates usage requirements by analyzing historical usage, anticipated demand, alternative uses of materials, and other qualitative factors. Unanticipated changes in demand for the Company's products may require a write down of inventory, which would be reflected in cost of sales in the period the revision is made. Inventory acquired as part of a business combination is recorded at fair value on the date of acquisition.

(p) Business Combinations

The Company allocates the fair value of the purchase consideration of the Company's acquisitions to the tangible assets, intangible assets, including in-process research and development ("IPR&D"), if any, and liabilities assumed, based on estimated fair values. The excess of the fair value of purchase consideration over the fair values of these identifiable assets and liabilities is recorded as goodwill. Acquisition-related expenses are recognized separately from the business combination and are expensed as incurred.

(q) Goodwill and Indefinite-Lived Intangible Assets

Goodwill is an asset representing the future economic benefits arising from assets acquired in a business combination that are not individually identified and separately recognized. Goodwill is measured as the excess of the consideration transferred over the net fair value of identifiable assets acquired and liabilities assumed. Intangible assets with indefinite useful lives are measured at their respective fair values on the acquisition date. Intangible assets related to IPR&D projects are considered to be indefinite-lived until the completion or abandonment of the associated research and development ("R&D") efforts. If and when development is complete, the associated assets would be deemed long-lived and would then be amortized based on their respective estimated useful lives at that point in time. Goodwill and indefinite-lived intangibles are not amortized into results of operations but instead are evaluated for impairment. The Company performs the evaluation in the beginning of the fourth quarter of each year or more frequently if impairment indicators arise.

Veeco Instruments Inc. and Subsidiaries
Notes to Consolidated Financial Statements (Continued)

In testing goodwill for impairment, the Company may first perform a qualitative assessment of whether it is more likely than not that the reporting unit's fair value is less than its carrying amount, and, if so, the Company then quantitatively compares the fair value of the reporting unit to its carrying amount. If the fair value exceeds the carrying amount, goodwill is not impaired. If the carrying amount exceeds fair value, the Company then records an impairment loss equal to the difference, up to the carrying value of goodwill.

The Company determines the fair value of its reporting unit based on a reconciliation of the fair value of the reporting unit to the Company's adjusted market capitalization. The adjusted market capitalization is calculated by multiplying the average share price of the Company's common stock for the last ten trading days prior to the measurement date by the number of outstanding common shares and adding a control premium. The control premium is estimated using historical transactions in similar industries.

In testing indefinite-lived intangible assets for impairment, the Company may first perform a qualitative assessment of whether it is more likely than not that the fair value of the indefinite-lived intangible asset is less than its carrying amount, and, if so, the Company then quantitatively compares the fair value of the indefinite-lived intangible asset to its carrying amount. The Company determines the fair value of its indefinite-lived intangible assets using a discounted cash flow method.

(r) Long-lived Assets

Long-lived intangible assets consist of purchased technology, customer relationships, patents, trademarks and tradenames, and backlog and are initially recorded at fair value. Long-lived intangible assets are amortized over their estimated useful lives in a method reflecting the pattern in which the economic benefits are consumed or straight-lined if such pattern cannot be reliably determined.

Property, plant, and equipment are recorded at cost. Depreciation expense is calculated based on the estimated useful lives of the assets by using the straight-line method. Amortization of leasehold improvements is recognized using the straight-line method over the shorter of the remaining lease term or the estimated useful lives of the improvements.

Long-lived assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. If circumstances require a long-lived asset or asset group be tested for possible impairment, a recoverability test is performed utilizing undiscounted cash flows expected to be generated by that asset or asset group compared to its carrying amount. If the carrying amount of the long-lived asset or asset group is not recoverable on an undiscounted cash flow basis, impairment is recognized to the extent the carrying amount exceeds its fair value. Fair value is determined through various valuation techniques including discounted cash flow models or, when available, quoted market values and third-party appraisals.

(s) Leases

Upon the adoption of ASC Topic 842, *Leases* ("ASC 842") as of January 1, 2019, the Company determines at contract inception if an arrangement is a lease, or contains a lease, of an identified asset for which the Company has the right to obtain substantially all of the economic benefits from its use and the right to direct its use. Right-of-use ("ROU") assets represent the Company's right to use an underlying asset for the lease term, while lease liabilities represent the Company's obligation to make lease payments arising from the lease. Operating lease ROU assets and liabilities are recognized at lease commencement date based on the present value of lease payments over the lease term. The implicit discount rate in the Company's leases generally cannot readily be determined, and therefore the Company uses its incremental borrowing rate based on information available at lease commencement date in determining the present value of future payments. The Company has options to renew or terminate certain leases. These options are included in the determination of lease term when it is reasonably certain that the Company will exercise such options. The Company does not separate lease and non-lease components in determining ROU assets or lease liabilities for real estate leases.

Veeco Instruments Inc. and Subsidiaries
Notes to Consolidated Financial Statements (Continued)

Additionally, the Company does not recognize ROU assets or lease liabilities for leases with original terms or renewals of one year or less.

(t) Recently Adopted Accounting Standards

The Company adopted ASU 2019-12: *Income Taxes (Topic 740): Simplifying the Accounting for Income Taxes* in the second quarter of 2020, effective as of the beginning of fiscal year 2020. This ASU simplifies the accounting for income taxes by eliminating certain exceptions to the general principles and simplifying several aspects of ASC 740, *Income Taxes*, including, but not limited to, requirements related to the following: a) exception to the incremental approach for intraperiod tax allocation; b) the tax basis step-up in goodwill obtained in a transaction that is not a business combination; c) ownership changes in investments - changes from a subsidiary to an equity method investment; d) separate financial statements of entities not subject to tax; e) interim-period accounting for enacted changes in tax law; and f) the year-to-date loss limitation in interim-period tax accounting. The adoption did not have a material impact on the Company's consolidated financial statements as of the date of adoption.

(u) Recent Accounting Pronouncements Not Yet Adopted

In August 2020, the FASB issued ASU 2020-06: *Debt – Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging – Contracts in Entity's Own Equity (Subtopic 815-40): Accounting for Convertible Instruments and Contracts in an Entity's Own Equity*. This standard simplifies the accounting for convertible debt instruments by removing the separation models for convertible debt with a cash conversion feature, as well as convertible instruments with a beneficial conversion feature. As a result, entities will account for a convertible debt instrument wholly as debt, unless certain other conditions are met. The elimination of these models will reduce non-cash interest expense for entities that have issued a convertible instrument that was within the scope of those models before the adoption of ASU 2020-06. Additionally, ASU 2020-06 requires the application of the if-converted method for calculating diluted earnings per share, and precludes the use of the treasury stock method for certain debt instruments. The provisions of ASU 2020-06 are applicable for fiscal years beginning after December 15, 2021. The Company's 2023 Notes, 2025 Notes, and 2027 Notes all are currently accounted for using the separation models for convertible debt with a cash conversion feature, and therefore upon adoption of ASU 2020-06 in the first quarter of 2022, the Company expects a decrease in non-cash interest expense. Additionally, the Company will be required to use the if-converted method for its current convertible debt when calculating diluted earnings (loss) per share, which will result in an increase in income available to common shareholders, as well as an increase in diluted shares outstanding. The Company expects to use the modified retrospective method of adoption, which will result in an increase in the carrying value of long-term debt of approximately $44.3 million as of January 1, 2022, with a corresponding decrease in stockholders' equity.

The Company is evaluating other pronouncements recently issued but not yet adopted. The adoption of these pronouncements is not expected to have a material impact on our consolidated financial statements.

Note 2 — Income (Loss) Per Share

Basic income (loss) per share is calculated by dividing net income (loss) by the weighted average number of shares outstanding during the period. Diluted income per share is calculated by dividing net income by the weighted average number of shares used to calculate basic income per share plus the weighted average number of common share equivalents outstanding during the period. The dilutive effect of outstanding options to purchase common stock and non-participating share-based awards is considered in diluted income per share by application of the treasury stock method. The dilutive effect of performance share units is included in diluted income per common share in the periods the performance targets have been achieved, or would have been achieved if the reporting date was the end of the contingency period. The Company has determined that it has the ability and intent to settle the principal amount of its convertible senior notes in cash, and the excess of the principal portion in shares of its common stock. As such, the Company accounts for the conversion spread using the treasury stock method, and the shares issuable upon conversion of the Notes are not included in the calculation of diluted earnings per share except to the extent that the conversion

Veeco Instruments Inc. and Subsidiaries
Notes to Consolidated Financial Statements (Continued)

value of the Notes exceeds their principal amount and if the effect would be dilutive.

The computations of basic and diluted income (loss) per share for the years ended December 31, 2021, 2020, and 2019 are as follows:

	For the year ended December 31,		
	2021	2020	2019
	(in thousands, except per share amounts)		
Net income (loss)	$ 26,038	$ (8,391)	$ (78,733)
Net income (loss) per common share:			
Basic	$ 0.53	$ (0.17)	$ (1.66)
Diluted	$ 0.49	$ (0.17)	$ (1.66)
Basic weighted average shares outstanding	49,073	48,362	47,482
Effect of potentially dilutive share-based awards	1,090	—	—
Dilutive effect of convertible notes	3,480	—	—
Diluted weighted average shares outstanding	53,643	48,362	47,482
Common share equivalents excluded from the diluted weighted average shares outstanding since the Company incurred a net loss and their effect would be antidilutive	—	947	531
Potentially dilutive shares excluded from the diluted calculation as their effect would be antidilutive	456	923	1,689
Maximum potential shares to be issued for settlement of the 2023, 2025, and 2027 Notes excluded from the diluted calculation as their effect would be antidilutive due to a net loss or the fact that the conversion value of the Notes did not exceed their principal amount	8,421	17,753	8,618

Note 3 — Fair Value Measurements

Fair value is the price that would be received for an asset or the amount paid to transfer a liability in an orderly transaction between market participants. The Company is required to classify certain assets and liabilities based on the following fair value hierarchy:

- Level 1: Quoted prices in active markets that are unadjusted and accessible at the measurement date for identical, unrestricted assets or liabilities;

- Level 2: Quoted prices for identical assets and liabilities in markets that are not active, quoted prices for similar assets and liabilities in active markets or financial instruments for which significant inputs are observable, either directly or indirectly; and

- Level 3: Prices or valuations that require inputs that are both significant to the fair value measurement and unobservable.

A financial instrument's level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement. The Company has evaluated the estimated fair value of financial instruments using available market information and valuations as provided by third-party sources. The use of different market assumptions or estimation methodologies could have a significant effect on the estimated fair value amounts.

Veeco Instruments Inc. and Subsidiaries
Notes to Consolidated Financial Statements (Continued)

The following table presents the Company's assets that were measured at fair value on a recurring basis at December 31, 2021 and 2020:

	Level 1	Level 2	Level 3	Total
		(in thousands)		
December 31, 2021				
Cash equivalents				
Certificate of deposits and time deposits	$ 41,544	$ —	$ —	$ 41,544
Money market cash	121	—	—	121
Total	$ 41,665	$ —	$ —	$ 41,665
Short-term investments				
U.S. treasuries	$ 51,095	$ —	$ —	$ 51,095
Government agency securities	—	12,052	—	12,052
Corporate debt	—	40,035	—	40,035
Commercial paper	—	999	—	999
Total	$ 51,095	$53,086	$ —	$104,181
December 31, 2020				
Cash equivalents				
Certificate of deposits and time deposits	$ 59,168	$ —	$ —	$ 59,168
Commercial paper	—	2,000	—	2,000
U.S. treasuries	24,997	—	—	24,997
Total	$ 84,165	$ 2,000	$ —	$ 86,165
Short-term investments				
U.S. treasuries	$149,219	$ —	$ —	$149,219
Corporate debt	—	32,554	—	32,554
Commercial paper	—	7,998	—	7,998
Total	$149,219	$40,552	$ —	$189,771

The Company's investments classified as Level 1 are based on quoted prices that are available in active markets, as well as certificates of deposits and time deposits that are classified as Level 1 due to their short-term nature. The Company's investments classified as Level 2 are valued using observable inputs to quoted market prices, benchmark yields, reported trades, broker/dealer quotes, or alternative pricing sources with reasonable levels of price transparency.

Veeco Instruments Inc. and Subsidiaries
Notes to Consolidated Financial Statements (Continued)

Note 4 — Investments

At December 31, 2021 and 2020 the amortized cost and fair value of marketable securities, which are included in “Short-term investments” on the Consolidated Balance Sheets, were as follows:

	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Estimated Fair Value
	(in thousands)			
December 31, 2021				
U.S. treasuries	$ 51,269	$ —	$ (174)	$ 51,095
Government agency securities	12,075	—	(23)	12,052
Corporate debt	40,169	—	(134)	40,035
Commercial paper	999	—	—	999
Total	$104,512	$ —	$ (331)	$104,181
December 31, 2020				
U.S. treasuries	$149,206	$ 14	$ (1)	$149,219
Corporate debt	32,588	—	(34)	32,554
Commercial paper	7,997	1	—	7,998
Total	$189,791	$ 15	$ (35)	$189,771

Available-for-sale securities in a loss position at December 31, 2021 and 2020 were as follows:

	December 31, 2021		December 31, 2020	
	Estimated Fair Value	Gross Unrealized Losses	Estimated Fair Value	Gross Unrealized Losses
	(in thousands)			
U.S. treasuries	$ 51,095	$ (174)	$19,991	$ (1)
Government agency securities	12,052	(23)	—	—
Corporate debt	40,035	(134)	32,554	(34)
Total	$103,182	$ (331)	$52,545	$ (35)

At December 31, 2021 and 2020, there were no short-term investments that had been in a continuous loss position for more than 12 months.

The contractual maturities of securities classified as available-for-sale at December 31, 2021 were as follows:

	December 31, 2021	
	Amortized Cost	Estimated Fair Value
	(in thousands)	
Due in one year or less	$ 53,617	$ 53,550
Due after one year through two years	50,895	50,631
Total	$ 104,512	$ 104,181

Actual maturities may differ from contractual maturities because borrowers may have the right to call or prepay obligations with or without call or prepayment penalties. The realized gains or losses for the years ended December 31, 2021, 2020, and 2019 were immaterial.

Veeco Instruments Inc. and Subsidiaries
Notes to Consolidated Financial Statements (Continued)

Other Investments

Veeco has an ownership interest of less than 20% in a non-marketable investment, Kateeva, Inc. (“Kateeva”), over which Veeco does not exert significant influence. Additionally, the Company has a separate, non-marketable investment in another entity, with a carrying value of $2.0 million at December 31, 2021. The Company does not exert significant influence over this investment and its ownership interest is also less than 20%. Neither equity investment has a readily observable market price, and therefore the Company has elected to measure these investments at cost, adjusted for changes in observable market prices minus impairment. The investments are included in “Other assets” on the Consolidated Balance Sheets. These investments are subject to periodic impairment reviews which require judgment. The analyses include assessments of the companies’ financial condition, the business outlooks for their products and technologies, their projected results and cash flows, business valuation indications from recent rounds of financing, the likelihood of obtaining subsequent rounds of financing, and the impact of equity preferences held by Veeco relative to other investors. During the year ended December 31, 2019, the Company identified impairment indicators on the Company’s investment in Kateeva, and as a result of a valuation analysis, concluded that its investment in Kateeva is fully impaired, and recorded a non-cash impairment charge of $21.0 million. During the year ended December 31, 2021, the Company identified impairment indicators on the Company’s other investment, and recorded a non-cash impairment charge of $1.0 million. Both impairment charges were included in “Other income (expense), net” in the Consolidated Statement of Operations.

Note 5 — Inventories

Inventories are stated at the lower of cost or net realizable value, with cost determined on a first-in, first-out basis. Inventories consist of the following:

	December 31, 2021	December 31, 2020
	(in thousands)	
Materials	$ 96,027	$ 82,679
Work-in-process	54,128	53,979
Finished goods	20,703	9,248
Total	$ 170,858	$ 145,906

Note 6 — Property, Plant, and Equipment

Property, plant, and equipment, net, consist of the following:

	December 31, 2021	December 31, 2020	Average Useful Life
	(in thousands)		
Land	$ 5,061	$ 5,061	N/A
Building and improvements	63,946	62,865	10 – 40 years
Machinery and equipment (1)	145,656	140,493	3 – 10 years
Leasehold improvements	45,979	6,671	3 – 17 years
Gross property, plant, and equipment	260,642	215,090	
Less: accumulated depreciation and amortization	160,899	149,819	
Net property, plant, and equipment	$ 99,743	$ 65,271	

(1) Machinery and equipment also includes software, furniture, and fixtures

Depreciation expense was $13.8 million, $15.4 million, and $17.3 million for the years ended December 31, 2021, 2020, and 2019, respectively. During the year ended December 31, 2019, the Company classified vacant land in St. Paul,

Veeco Instruments Inc. and Subsidiaries
Notes to Consolidated Financial Statements (Continued)

Minnesota as held for sale, and subsequently sold the land for approximately $0.6 million, which approximated its carrying value.

Note 7 — Goodwill and Intangible Assets

Goodwill represents the future economic benefits arising from assets acquired in a business combination that are not individually identified and separately recognized. There were no changes in goodwill balances during the years ended December 31, 2021 or 2020, while the below table reflects the gross carrying amounts and accumulated impairments as of the respective periods:

	Gross carrying amount	Accumulated impairment	Net amount
		(in thousands)	
Balance at December 31, 2021 and 2020	$ 430,331	$ 248,388	$ 181,943

The Company performs its annual goodwill impairment test at the beginning of the fourth quarter each year. As the Company maintains a single goodwill reporting unit, it determines the fair value of its reporting unit based upon the Company's adjusted market capitalization. The annual test performed at the beginning of the fourth quarter of fiscal 2021, 2020, and 2019 did not result in any potential impairment as the fair value of the reporting unit was determined to exceed the carrying amount of the reporting unit.

The valuation of goodwill will continue to be subject to changes in the Company's market capitalization and observable market control premiums. This analysis is sensitive to changes in the Company's stock price and absent other qualitative factors, the Company may be required to record goodwill impairment charges in future periods if the stock price declines and remains depressed for an extended period of time.

The components of purchased intangible assets were as follows:

		December 31, 2021			December 31, 2020		
	Average Remaining Amortization Period	Gross Carrying Amount	Accumulated Amortization and Impairment	Net Amount	Gross Carrying Amount	Accumulated Amortization and Impairment	Net Amount
	(in years)			*(in thousands)*			
Technology	3.6	$327,908	$ 310,551	$17,357	$327,908	$ 302,358	$25,550
Customer relationships	7.3	146,465	132,970	13,495	146,465	130,131	16,334
Trademarks and tradenames	2.5	30,910	27,857	3,053	30,910	26,614	4,296
Other	-	3,686	3,686	—	3,686	3,681	5
Total	5.0	$508,969	$ 475,064	$33,905	$508,969	$ 462,784	$46,185

Other intangible assets primarily consist of patents, licenses, and backlog.

Veeco Instruments Inc. and Subsidiaries
Notes to Consolidated Financial Statements (Continued)

Based on the intangible assets recorded at December 31, 2021, and assuming no subsequent additions to or impairment of the underlying assets, the remaining estimated annual amortization expense, is expected to be as follows:

	Amortization *(in thousands)*
2022	$ 10,018
2023	8,347
2024	6,708
2025	3,136
2026	2,134
Thereafter	3,562
Total	$ 33,905

Note 8 — Accrued Expenses and Other Liabilities

The components of accrued expenses and other current liabilities were as follows:

	December 31, 2021	December 31, 2020
	(in thousands)	
Payroll and related benefits	$ 35,712	$ 26,630
Warranty	7,878	5,058
Operating lease liabilities	4,437	4,148
Interest	2,757	2,574
Professional fees	1,467	1,112
Legal settlement	15,000	—
Sales, use, and other taxes	4,889	2,658
Other	7,612	2,696
Total	$ 79,752	$ 44,876

Customer deposits and deferred revenue

Customer deposits totaled $46.9 million and $49.3 million at December 31, 2021 and 2020, respectively, which are included in "Customer deposits and deferred revenue" in the Consolidated Balance Sheets. Deferred revenue represents amounts billed, other than deposits, in excess of the revenue that can be recognized on a particular contract at the balance sheet date. Changes in deferred revenue were as follows:

	(in thousands)
Balance - December 31, 2020	$ 17,985
Deferral of revenue	6,782
Recognition of unearned revenue	(8,491)
Balance - December 31, 2021	$ 16,276

As of December 31, 2021, the Company has approximately $33.6 million of remaining performance obligations on contracts with an original estimated duration of one year or more, of which approximately 94% is expected to be recognized within one year, with the remaining amounts expected to be recognized between one to three years. The Company has elected to exclude disclosures regarding remaining performance obligations that have an original expected duration of one year or less.

Veeco Instruments Inc. and Subsidiaries
Notes to Consolidated Financial Statements (Continued)

Other liabilities

As part of a prior acquisition, the Company assumed an executive non-qualified deferred compensation plan that allowed qualifying executives to defer cash compensation. The plan was frozen at the time of acquisition and no further contributions have been made. The plan was terminated and fully liquidated during 2021. At December 31, 2020, plan assets approximated $2.4 million, representing the cash surrender value of life insurance policies and is included within “Other assets” in the Consolidated Balance Sheets, while plan liabilities approximated $2.5 million and is included within “Other liabilities” in the Consolidated Balance Sheets.

At December 31, 2021 and 2020, other liabilities also included (i) asset retirement obligations of $2.8 million and $2.7 million, respectively; (ii) income tax payables of $0.4 million and $1.4 million, respectively; and (iii) medical and dental benefits for former executives of $1.8 million and $1.9 million, respectively. Additionally, as a result of the Coronavirus, Aid, Relief, and Economic Security Act, the Company has accrued for and deferred the deposit and payment of its share of social security taxes, resulting in a liability of $3.6 million at December 31, 2020, of which $1.8 million is included within “Accrued expenses and other current liabilities”, and $1.8 million is included within “Other liabilities” in the Consolidated Balance Sheets. At December 31, 2021, a $1.7 million liability remains for these deferred payroll taxes, which is included within “Accrued expenses and other current liabilities.”

Note 9 — Commitments and Contingencies

Warranty

Changes in the Company’s product warranty reserves were as follows:

	December 31,		
	2021	2020	2019
		(in thousands)	
Balance - beginning of the year	$ 5,058	$ 7,067	$ 7,852
Warranties issued	7,102	4,626	5,865
Consumption of reserves	(5,784)	(6,691)	(6,242)
Changes in estimate	1,502	56	(408)
Balance - end of the year	$ 7,878	$ 5,058	$ 7,067

Minimum Lease Commitments

The Company’s operating leases primarily include real estate leases for properties used for manufacturing, R&D activities, sales and service, and administration, as well as certain equipment leases. Some leases may include options to renew for a period of up to 5 years, while others may include options to terminate the lease. The weighted average remaining lease term of the Company’s operating leases as of December 31, 2021 was 12 years, and the weighted average discount rate used in determining the present value of future lease payments was 5.7%.

Veeco Instruments Inc. and Subsidiaries
Notes to Consolidated Financial Statements (Continued)

The following table provides the maturities of lease liabilities at December 31, 2021:

	Operating Leases *(in thousands)*
Payments due by period:	
2022	$ 4,901
2023	3,979
2024	3,769
2025	3,309
2026	3,496
Thereafter	35,960
Total future minimum lease payments	55,414
Less: Imputed interest	(18,143)
Total	$ 37,271
Reported as of December 31, 2021	
Accrued expenses and other current liabilities	$ 4,437
Long-term operating lease liabilities	32,834
Total	$ 37,271

Operating lease cost for the years ended December 31, 2021, 2020, and 2019 was $6.6 million, $5.4 million, and $5.5 million, respectively. Variable lease cost for all years ended December 31, 2021, 2020, and 2019 was $1.7 million. Additionally, the Company has an immaterial amount of short-term leases. Lease expense, which includes operating lease costs and variable lease costs, was $8.4 million, $7.1 million, and $7.2 million for the years ended December 31, 2021, 2020, and 2019, respectively. In addition, the Company is obligated under such leases for certain other expenses, including real estate taxes and insurance. Operating cash outflows from operating leases for the year ended December 31, 2021, 2020, and 2019 were $6.6 million (excluding landlord reimbursements for leasehold improvements of $6.1 million included within “Other, net” in the Consolidated Statements of Cash Flows), $6.9 million, and $7.2 million, respectively.

Legal Proceedings

On June 8, 2018, an Ultratech shareholder who received Veeco stock as part of the consideration for the Ultratech acquisition filed a purported class action complaint in the Superior Court of the State of California, County of Santa Clara, captioned Wolther v. Maheshwari et al., Case No. 18CV329690, on behalf of himself and others who purchased or acquired shares of Veeco pursuant to the registration statement and prospectus which Veeco filed with the SEC in connection with the Ultratech acquisition (the “Wolther Action”). On August 2 and August 8, 2018, two purported class action complaints substantially similar to the Wolther Action were filed on behalf of different plaintiffs in the same court as the Wolther Action. These cases have been consolidated with the Wolther Action, and a consolidated complaint was filed on December 11, 2018. The consolidated complaint seeks to recover damages and fees under Sections 11, 12, and 15 of the Securities Act of 1933 for, among other things, alleged false/misleading statements in the registration statement and prospectus relating to the Ultratech acquisition, relating primarily to the alleged failure to disclose delays in the advanced packaging business, increased MOCVD competition in China, and an intellectual property dispute. In October 2021, Veeco and the court-appointed class representatives signed an agreement to settle the Wolther Action on a class-wide basis for $15.0 million, subject to court approval and class members’ opportunity to object and opt-out, which is included within “Accrued expenses and other current liabilities” in the Consolidated Balance Sheets as of December 31, 2021. The settlement amount will be funded by insurance carriers, the receivable for which is included in “Prepaid expenses and other current assets” in the Consolidated Balance Sheets as of December 31, 2021.

Veeco Instruments Inc. and Subsidiaries
Notes to Consolidated Financial Statements (Continued)

On December 21, 2018, a purported Veeco stockholder filed a derivative action in the Superior Court of the State of California, County of Santa Clara, captioned Vladimir Gusinsky Revocable Trust v. Peeler, et al., Case No. 18CV339925, on behalf of nominal defendant Veeco. The complaint seeks to assert claims for breach of fiduciary duty, waste of corporate assets, and unjust enrichment against current and former Veeco directors premised on purported misstatements and omissions in the registration statement relating to the Ultratech acquisition. Veeco is defending this matter vigorously. On January 25, 2021, the court granted the defendants' demurrer without leave to amend effecting the dismissal of the case. Plaintiff is appealing the dismissal of its case.

The Company is involved in various other legal proceedings arising in the normal course of business. The Company does not believe that the ultimate resolution of these matters will have a material adverse effect on its consolidated financial position, results of operations, or cash flows.

Concentrations of Credit Risk

The Company depends on purchases from its ten largest customers, which accounted for 65% and 62% of net accounts receivable at December 31, 2021 and 2020, respectively.

Customers who accounted for more than 10% of net accounts receivable or net sales are as follows:

	Accounts Receivable December 31,		Net Sales For the Year Ended December 31,		
Customer	**2021**	**2020**	**2021**	**2020**	**2019**
Customer A	14 %	*	15 %	*	*
Customer B	*	*	10 %	*	*
Customer C	12 %	*	*	*	*
Customer D	10 %	*	*	*	*
Customer E	*	*	*	13 %	11 %

* Less than 10% of aggregate accounts receivable or net sales

The Company manufactures and sells its products to companies in different geographic locations. Refer to Note 17, "Segment Reporting and Geographic Information," for additional information. In certain instances, the Company requires deposits from its customers for a portion of the sales price in advance of shipment and performs periodic credit evaluations on its customers. Where appropriate, the Company requires letters of credit on certain non-U.S. sales arrangements. Receivables generally are due within 30 to 90 days from the date of invoice. In some geographies, receivables may be payable up to 150 days from the date of the invoice.

Receivable Purchase Agreement

In December 2020, the Company entered into a receivable purchase agreement with a financial institution to sell certain of its trade receivables from customers without recourse, up to $15.0 million at any point in time. Pursuant to this agreement, the Company sold $11.6 million of receivables during the year ended December 31, 2020, of which $5.9 million was outstanding at December 31, 2020, and subsequently settled during 2021. There were no further sales of receivables under this agreement during 2021, and therefore the full $15.0 million is available under the agreement for additional sales of receivables as of December 31, 2021. The Company did not sell any receivables under this agreement during 2021. The net sale of accounts receivable under the agreement is reflected as a reduction of accounts receivable in the Company's Consolidated Balance Sheet at the time of sale and any fees for the sale of trade receivables were not material for the periods presented.

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Notes to Consolidated Financial Statements (Continued)

Suppliers

The Company outsources certain functions to third parties, including the manufacture of several of its systems. While the Company relies on its outsourcing partners to perform their contracted functions, the Company maintains some level of internal manufacturing capability for these systems. In addition, certain of the components and sub-assemblies included in the Company's products are obtained from a single source or a limited group of suppliers. The failure of the Company's present outsourcing partners and suppliers to meet their contractual obligations and the Company's inability to make alternative arrangements or resume the manufacture of these systems could have a material adverse effect on the Company's revenues, profitability, cash flows, and relationships with its customers.

The Company had deposits with its suppliers of $3.9 million and $7.2 million at December 31, 2021 and 2020, respectively, that were included in "Prepaid expenses and other current assets" on the Consolidated Balance Sheets.

Purchase Commitments

The Company had purchase commitments of $193.0 million at December 31, 2021, substantially all of which will come due within one year. Purchase commitments are primarily for inventory used in manufacturing products and are partially offset by existing deposits with suppliers.

Bank Guarantees

The Company has bank guarantees and letters of credit issued by a financial institution on its behalf as needed. At December 31, 2021, outstanding bank guarantees and letters of credit totaled $2.7 million and unused bank guarantees and letters of credit of $15.2 million were available to be drawn upon.

Note 10 — Debt

Convertible Senior Notes

2023 Notes

On January 10, 2017, the Company issued $345.0 million of 2.70% convertible senior unsecured notes due 2023 (the "2023 Notes"). The Company received net proceeds, after deducting underwriting discounts and fees and expenses payable by the Company, of approximately $335.8 million. The 2023 Notes bear interest at a rate of 2.70% per year, payable semiannually in arrears on January 15 and July 15 of each year, commencing on July 15, 2017. The 2023 Notes mature on January 15, 2023, unless earlier purchased by the Company, redeemed, or converted.

On May 18, 2020, in connection with the completion of a private offering of $125.0 million aggregate principal amount of 3.75% convertible senior notes due 2027 described below, the Company repurchased and retired approximately $88.3 million in aggregate principal amount of its outstanding 2023 Notes, with a carrying amount of $78.1 million, for approximately $81.2 million of cash. The Company accounted for the partial settlement of the 2023 Notes as an extinguishment, and as such, recorded a loss on extinguishment of approximately $3.0 million for the year ended December 31, 2020, which is included in "Other income (expense), net" in the Consolidated Statements of Operations, as well as a reduction of additional paid-in capital of $0.1 million for the repurchase of the conversion feature.

Additionally, on November 11, 2020, the Company entered into a privately negotiated exchange agreement with a holder of its outstanding 2023 Notes, under which the Company agreed to retire $125.0 million in aggregate original principal amount of the 2023 Notes, with a carrying amount of $113.1 million, in exchange for the issuance of $132.5 million in aggregate principal amount of new 3.50% convertible senior notes due 2025 described below, which had a fair value that approximated the principal amount of notes issued. The Company accounted for the partial settlement of the 2023 Notes as an extinguishment, and as such, recorded a loss on extinguishment of approximately $4.8 million for the year ended

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December 31, 2020, which is included in “Other income (expense), net” in the Consolidated Statements of Operations, as well as a reduction of additional paid-in capital of $14.6 million for the exchange of the conversion feature.

Finally, on November 5, 2021, the Company entered into a privately negotiated note purchase agreement with a holder of its outstanding 2023 Notes, under which the Company agreed to repurchase and retire approximately $111.5 million in aggregate original principal amount of the 2023 Notes, with a carrying amount of $105.5 million, for cash consideration of approximately $115.6 million, and approximately $1.0 million of accrued and unpaid interest. The Company accounted for the partial settlement of the 2023 Notes as an extinguishment, and as such, recorded a loss on extinguishment of approximately $4.0 million for the year ended December 31, 2021, which is included in “Other income (expense), net” in the Consolidated Statements of Operations, as well as a reduction of additional paid-in capital of $6.1 million for the repurchase of the conversion feature.

2025 Notes

On November 17, 2020, as part of the privately negotiated exchange agreement described above, the Company issued $132.5 million of 3.50% convertible senior notes due 2025 (the “2025 Notes”). The 2025 Notes bear interest at a rate of 3.50% per year, payable semiannually in arrears on January 15 and July 15 of each year, commencing on July 15, 2021. The 2025 Notes mature on January 15, 2025, unless earlier purchased by the Company, redeemed, or converted.

2027 Notes

On May 18, 2020, the Company completed a private offering of $125.0 million of 3.75% convertible senior notes due 2027 (the “2027 Notes”). The Company received net proceeds of approximately $121.9 million, after deducting underwriting discounts and fees and expenses payable by the Company. Additionally, the Company used approximately $10.3 million of cash to purchase capped calls, discussed below. The 2027 Notes bear interest at a rate of 3.75% per year, payable semiannually in arrears on June 1 and December 1 of each year, commencing on December 1, 2020. The 2027 Notes mature on June 1, 2027, unless earlier purchased by the Company, redeemed, or converted.

The 2023 Notes, 2025 Notes, and 2027 Notes (collectively, the “Notes”) are unsecured obligations of Veeco and rank senior in right of payment to any of Veeco’s subordinated indebtedness; equal in right of payment to all of Veeco’s unsecured indebtedness that is not subordinated; effectively subordinated in right of payment to any of Veeco’s secured indebtedness to the extent of the value of the assets securing such indebtedness; and structurally subordinated to all indebtedness and other liabilities (including trade payables) of Veeco’s subsidiaries.

The Notes are convertible into cash, shares of the Company’s common stock, or a combination thereof, at the Company’s election, upon the satisfaction of specified conditions and during certain periods as described below. The initial conversion rates are 24.9800, 41.6667, and 71.5372 shares of the Company’s common stock per $1,000 principal amount of the 2023 Notes, 2025 Notes, and 2027 Notes, respectively, representing initial effective conversion prices of $40.03, $24.00, and $13.98 per share of common stock, respectively. The conversion rates may be subject to adjustment upon the occurrence of certain specified events.

Holders may convert all or any portion of their notes, in multiples of one thousand dollar principal amount, at their option at any time prior to the close of business on the business day immediately preceding October 15, 2022 with respect to the 2023 Notes, October 15, 2024 with respect to the 2025 Notes, and October 1, 2027 with respect to the 2027 Notes, only under the following circumstances:

(i) During any calendar quarter (and only during such calendar quarter), if the last reported sale price of the common stock for at least 20 trading days (whether or not consecutive) during a period of 30 consecutive trading days ending on the last trading day of the immediately preceding calendar quarter is greater than or equal to 130% of the conversion price on each applicable trading day;

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(ii) During the five consecutive business day period after any five consecutive trading day period (the "measurement period") in which the trading price per one thousand dollar principal amount of Notes for each trading day of the measurement period was less than 98% of the product of the last reported sale price of Veeco's common stock and the conversion rate on each such trading day;

(iii) If the Company calls any or all of applicable series of the Notes for redemption at any time prior to the close of business on the scheduled trading day immediately preceding the redemption date; or

(iv) Upon the occurrence of specified corporate events.

For the calendar quarter ended December 31, 2021, the last reported sales price of common stock during the 30 consecutive trading days, based on the criteria outlined in (i) above, was greater than 130% of the conversion price of the 2027 Notes, and as such the 2027 Notes are convertible by the holders until March 31, 2022.

Holders may convert their notes at any time, regardless of the foregoing circumstances, on or after October 15, 2022 with respect to the 2023 Notes, October 15, 2024 with respect to the 2025 Notes, and October 1, 2026 with respect to the 2027 Notes, until the close of business on the business day immediately preceding the respective maturity date.

Upon conversion by the holders, the Company may elect to settle such conversion in shares of its common stock, cash, or a combination thereof. As a result of its cash conversion options, the Company segregated the liability component of the instruments from the equity components. The liability components were measured by estimating the fair value of a non-convertible debt instrument that is similar in its terms to the Notes. The calculation of the fair value of the debt components required the use of Level 3 inputs, including utilization of convertible investors' credit assumptions and high yield bond indices. Fair value was estimated through discounting future interest and principal payments, an income approach, due under the Notes at a discount rate equal to the estimated borrowing rate for similar non-convertible debt, or 7.0%, 8.0%, and 9.1% with respect to the 2023 Notes, 2025 Notes, and 2027 Notes, respectively. The excess of the aggregate face values of the Notes over the estimated fair values of the liability components of $72.5 million, $21.0 million, and $34.2 million with respect to the 2023 Notes, 2025 Notes, and 2027 Notes, respectively, were recognized as debt discounts and recorded as an increase to additional paid-in capital and will be amortized over the expected lives of the Notes using the effective interest rate method. Amortization of the debt discounts are recognized as non-cash interest expense.

The transaction costs of $9.2 million, $1.9 million, and $3.1 million incurred in connection with the issuance of the 2023 Notes, 2025 Notes, and 2027 Notes, respectively, were allocated to the liability and equity components based on their relative values. Transaction costs allocated to the liability component are being amortized using the effective interest rate method and recognized as non-cash interest expense over the expected terms of the Notes. Transaction costs allocated to the equity component of $1.9 million, $0.3 million, and $0.8 million with respect to the 2023 Notes, 2025 Notes, and 2027 Notes, respectively, reduced the value of the equity components recognized in stockholders' equity.

In connection with the offering of the 2027 Notes, on May 13, 2020, the Company entered into privately negotiated capped call transactions (the "Capped Call Transactions"), pursuant to capped call confirmations, covering the total principal amount of the 2027 Notes for an aggregate premium of $10.3 million. The Capped Call Transactions are expected generally to reduce the potential dilution to the Company's common stock upon any conversion of the 2027 Notes and/or offset any cash payments the Company is required to make in excess of the aggregate principal amount of converted 2027 Notes, as the case may be, with such reduction and/or offset subject to a cap based on the capped price of the Capped Call Transactions. The Capped Call Transactions exercise price is equal to the initial conversion price of the 2027 Notes, and the capped price of the Capped Call Transactions is approximately $18.46 per share and is subject to certain adjustments under the terms of the capped call confirmations.

The Capped Call Transactions are separate transactions entered into by the Company with the capped call counterparties, are not part of the terms of the 2027 Notes and do not change the holders' rights under the 2027 Notes. Holders of the

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2027 Notes do not have any rights with respect to the Capped Call Transactions. The cost of the Capped Call Transactions is not expected to be tax-deductible as the Company did not elect to integrate the Capped Call Transactions into the 2027 Notes for tax purposes. The Company used a portion of the net proceeds from the offering of the 2027 Notes to pay for the Capped Call Transactions, and the cost of the Capped Call Transactions was recorded as a reduction of the Company's additional paid-in capital in the accompanying consolidated financial statements.

The carrying values of the Notes are as follows:

	December 31, 2021			December 31, 2020		
	Principal Amount	Unamortized debt discount/ transaction costs	Net carrying value	Principal Amount	Unamortized debt discount/ transaction costs	Net carrying value
			(in thousands)			
2023 Notes	$ 20,173	$ (967)	$ 19,206	$ 131,695	$ (11,925)	$ 119,770
2025 Notes	132,500	(17,302)	115,198	132,500	(22,097)	110,403
2027 Notes	125,000	(29,966)	95,034	125,000	(34,058)	90,942
Net carrying value	$ 277,673	$ (48,235)	$ 229,438	$ 389,195	$ (68,080)	$ 321,115

Total interest expense related to the Notes is as follows:

	For the year ended December 31,		
	2021	2020	2019
		(in thousands)	
Cash Interest Expense			
Coupon interest expense - 2023 Notes	$ 3,138	$ 7,390	$ 9,315
Coupon interest expense - 2025 Notes	4,637	554	—
Coupon interest expense - 2027 Notes	4,688	2,904	—
Non-cash Interest Expense			
Amortization of debt discount/transaction costs-2023 Notes	4,932	10,887	12,676
Amortization of debt discount/transaction costs-2025 Notes	4,795	546	—
Amortization of debt discount/transaction costs-2027 Notes	4,092	2,359	—
Total Interest Expense	$ 26,282	$ 24,640	$ 21,991

The Company determined the Notes are Level 2 liabilities in the fair value hierarchy and estimated their fair values as $20.4 million, $175.0 million, and $258.9 million at December 31, 2021 for the 2023 Notes, 2025 Notes, and 2027 Notes, respectively.

Revolving Credit Facility

On December 16, 2021, the Company entered into a loan and security agreement providing for a senior secured revolving credit facility in an aggregate principal amount of $150 million (the "Credit Facility"), including a $15 million letter of credit sublimit. The Credit Facility is guaranteed by the Company's direct material U.S. subsidiaries, subject to customary exceptions. Borrowings under the Credit Facility are secured by a first-priority lien on substantially all of the assets of the Company, subject to customary exceptions. The Credit Facility has a term of five years, maturing on December 16, 2026, or earlier if certain liquidity measures are not met prior to the 2025 Notes maturing. Subject to certain conditions and the receipt of commitments from the lenders, the Loan and Security Agreement allows for revolving commitments under the Credit Facility to be increased by up to $75 million. The existing lenders under the Credit Facility are entitled, but not obligated, to provide such incremental commitments.

Borrowings will bear interest at a floating rate which can be, at the Company's option, either (a) an alternate base rate plus an applicable rate ranging from 0.50% to 1.25% or (b) a SOFR rate (with a floor of 0.00%) for the specified interest

period plus an applicable rate ranging from 1.50% to 2.25%, in each case, depending on the Company's Secured Net Leverage Ratio (as defined in the Loan and Security Agreement). The Company will pay an unused commitment fee ranging from 0.25% to 0.35% based on unused capacity under the Credit Facility and the Company's Secured Net Leverage Ratio. The Company may use the proceeds of borrowings under the Credit Facility to pay transaction fees and expenses, provide for its working capital needs and reimburse drawings under letters of credit and for other general corporate purposes.

The Loan and Security Agreement contains customary affirmative covenants for transactions of this type, including, among others, the provision of financial and other information to the administrative agent, notice to the administrative agent upon the occurrence of certain material events, preservation of existence, maintenance of properties and insurance, compliance with laws, including environmental laws, the provision of additional guarantees, and an affiliate transactions covenant, subject to certain exceptions. The Loan and Security Agreement contains customary negative covenants, including, among others, restrictions on the ability to merge and consolidate with other companies, incur indebtedness, refinance our existing convertible notes, grant liens or security interests on assets, make investments, acquisitions, loans, or advances, pay dividends, and sell or otherwise transfer assets.

The Loan and Security Agreement contains financial maintenance covenants that require the Borrower to maintain an Interest Coverage Ratio (as defined in the Loan and Security Agreement) of not less than 3.00 to 1.00, a Total Net Leverage Ratio (as defined in the Loan and Security Agreement) of not more than 4.50 to 1.00, and a Secured Net Leverage Ratio (as defined in the Loan and Security Agreement) of not more than 2.50 to 1.00, in each case, tested at the end of each fiscal quarter commencing with the fiscal quarter ending March 31, 2022. The Loan and Security Agreement also provides for a number of customary events of default, including, among others: payment defaults to the lenders; voluntary and involuntary bankruptcy proceedings; covenant defaults; material inaccuracies of representations and warranties; certain change of control events; material money judgments; and other customary events of default. The occurrence of an event of default could result in the acceleration of obligations and the termination of lending commitments under the Loan and Security Agreement.

No amounts were outstanding under the Credit Facility as of December 31, 2021.

Note 11 — Derivative Financial Instruments

The Company is exposed to financial market risks arising from changes in currency exchange rates. Changes in currency exchange rates could affect the Company's foreign currency denominated monetary assets and liabilities and forecasted cash flows. The Company sometimes enters into monthly forward derivative contracts with the intent of mitigating a portion of this risk. The Company only used derivative financial instruments in the context of hedging and not for speculative purposes and had not designated its foreign exchange derivatives as hedges. Accordingly, changes in fair value from these contracts were recorded as "Other operating expense (income), net" in the Company's Consolidated Statements of Operations. The Company executed derivative transactions with highly rated financial institutions to mitigate counterparty risk.

The Company did not have any outstanding derivative contracts at December 31, 2021 and 2020.

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Notes to Consolidated Financial Statements (Continued)

Note 12 — Stockholders' Equity

Accumulated Other Comprehensive Income ("AOCI")

The following table presents the changes in the balances of each component of AOCI, net of tax:

	Foreign Currency Translation	Unrealized Gains (Losses) on Available for Sale Securities	Total
		(in thousands)	
Balance - December 31, 2018	$ 1,836	$ (16)	$ 1,820
Other comprehensive income (loss)	25	49	74
Balance - December 31, 2019	1,861	33	1,894
Other comprehensive income (loss)	5	(53)	(48)
Balance - December 31, 2020	1,866	(20)	1,846
Other comprehensive income (loss)	(52)	(311)	(363)
Balance - December 31, 2021	$ 1,814	$ (331)	$ 1,483

The Company did not allocate additional tax expense (benefit) to other comprehensive income (loss) for all years presented as the Company is in a full valuation allowance position such that a deferred tax asset related to amounts recognized in other comprehensive income is not regarded as realizable on a more-likely-than-not basis.

Preferred Stock

The Board of Directors has authority under the Company's Certificate of Incorporation to issue shares of preferred stock, par value $0.01, with voting and economic rights to be determined by the Board of Directors. As of December 31, 2021, no preferred shares have been issued.

Treasury Stock

On December 11, 2017, the Company's Board of Directors authorized a program to repurchase up to $100 million of the Company's common stock to be completed through December 11, 2019. At the end of the program, $14.3 million of the $100 million had been utilized.

The Company records treasury stock purchases under the cost method using the first-in, first-out ("FIFO") method. Upon reissuance of treasury stock, amounts in excess of the acquisition cost are credited to additional paid-in capital. If the Company reissues treasury stock at an amount below its acquisition cost and if additional paid-in capital associated with prior treasury stock transactions is insufficient to cover the difference between the acquisition cost and the reissue price, this difference is charged to accumulated deficit.

Note 13 — Stock Plans

Share-based incentive awards are provided to employees under the terms of the Company's equity incentive compensation plans (the "Plans"), which are administered by the Compensation Committee of the Board of Directors. The 2019 Plan originated as the 2010 Stock Incentive Plan and was originally approved by the Company's shareholders in May 2010. This Plan was subsequently amended, as approved by shareholders, in 2013, 2016, and 2019 (at which time the Plan was renamed the 2019 Stock Incentive Plan (as amended to date, the "2019 Plan")). The Company's employees, non-employee directors, and consultants are eligible to receive awards under the 2019 Plan, which can include non-qualified stock options, incentive stock options, RSAs, RSUs, PSAs, PSUs, share appreciation rights, dividend equivalent rights, or any combination thereof. The Company settles awards under the Plans with newly issued shares or with shares held in treasury.

In 2013, the Board of Directors granted equity awards to certain employees under the Company's 2013 Inducement Stock Incentive Plan (the "Inducement Plan"). The Company issued 124,500 stock option shares and 87,000 RSUs under this plan. Stock options under this plan vest over a three year period and have a 10-year term, and RSUs under this plan vest over a two or four year period. At December 31, 2013, the Inducement Plan was merged into the 2019 Plan and is considered an inactive plan with no further shares available for grant. At December 31, 2021, there are 2,000 option shares and no RSUs outstanding under the Inducement Plan.

The Company is authorized to issue up to 13.3 million shares under the 2019 Plan. Option awards are granted with an exercise price equal to the closing price of the Company's common stock on the trading day prior to the date of grant; option awards generally vest over a three year period and have a seven or ten year term. RSAs and RSUs generally vest over one to five years. Certain option and share awards provide for accelerated vesting if there is a change in control, as defined in the 2019 Plan. At December 31, 2021, there are 0.4 million option shares and 0.7 million RSUs and PSUs outstanding under the 2019 Plan.

The Company is authorized to issue up to 2.25 million shares under the approved 2016 employee stock purchase plan ("ESPP"), including additional shares authorized under plan amendments approved by shareholders in 2019 and 2021. Under the ESPP, substantially all employees in the U.S. may purchase the Company's common stock through payroll deductions at a price equal to 85 percent of the lower of the fair market value of the Company's common stock at the beginning or end of each six-month offer period, as defined in the ESPP, and subject to certain limits. The ESPP was approved by the Company's shareholders.

Shares Reserved for Future Issuance

At December 31, 2021, the Company has 3.4 million shares reserved to cover exercises of outstanding stock options, vesting of RSUs, and additional grants under the 2019 Plan. At December 31, 2021, the Company has 0.8 million shares reserved to cover future issuances under the ESPP Plan.

Share-Based Compensation

The Company recognized share-based compensation in the following line items in the Consolidated Statements of Operations for the periods indicated:

	For the year ended December 31,		
	2021	**2020**	**2019**
		(in thousands)	
Cost of sales	$ 2,373	$ 1,870	$ 1,903
Research and development	3,850	2,900	3,340
Selling, general, and administrative	9,026	7,933	9,630
Restructuring	—	—	397
Total	$15,249	$12,703	$15,270

The Company did not realize any tax benefits associated with share-based compensation for the years ended December 31, 2021, 2020, and 2019 due to the full valuation allowance on its U.S. deferred tax assets. See Note 16, "Income Taxes" for additional information. The Company capitalized an immaterial amount of share-based compensation into inventory for the years ended December 31, 2021, 2020, and 2019.

Veeco Instruments Inc. and Subsidiaries
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Unrecognized share-based compensation costs at December 31, 2021 are summarized below:

	Unrecognized Share-Based Compensation Costs	Weighted Average Period Expected to be Recognized
	(in thousands)	(in years)
Restricted stock units	$ 2,064	1.9
Restricted stock awards	16,791	1.9
Performance share units	5,363	2.1
Total unrecognized share-based compensation cost	$ 24,218	1.9

Stock Option Awards

Stock options are awards issued to employees that entitle the holder to purchase shares of the Company's stock at a fixed price. The following table summarizes the equity activity related to stock options:

	Number of Shares	Weighted Average Exercise Price
	(in thousands)	
Balance - December 31, 2018	1,222	$ 34.80
Expired	(103)	33.97
Balance - December 31, 2019	1,119	34.88
Expired	(389)	34.15
Balance - December 31, 2020	730	35.26
Exercised	(2)	23.36
Expired	(285)	40.16
Balance - December 31, 2021	443	32.15

The following table summarizes stock option information at December 31, 2021:

	Options Outstanding and Exercisable			
Range of Exercise Prices	**Shares**	**Aggregate Intrinsic Value**	**Weighted Average Remaining Contractual Life**	**Weighted Average Exercise Price**
	(in thousands)	(in thousands)	(in years)	
$20.00 - $30.00	12	$ —	1.6	$ 29.26
$30.01 - $40.00	431	—	0.9	32.22
	443	$ —	1.0	32.15

There were no unvested options outstanding as of December 31, 2021.

The following table summarizes information on options exercised for the periods indicated:

	Year ended December 31,		
	2021	2020	2019
		(in thousands)	
Cash received from options exercised	$ 37	$ —	$ —
Intrinsic value of options exercised	$ 6	$ —	$ —

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Notes to Consolidated Financial Statements (Continued)

RSAs, RSUs, PSAs, PSUs

RSAs are stock awards issued to employees and directors that are subject to specified restrictions and a risk of forfeiture. RSUs are stock awards issued to employees that entitle the holder to receive shares of common stock as the awards vest. PSAs and PSUs are awards that result in an issuance of shares of common stock to employees if certain performance or market conditions are achieved. All of these awards typically vest over one to four years and vesting is subject to the employee's continued service with the Company and, in the case of performance awards, meeting certain performance or market conditions. The fair value of the awards is determined and fixed based on the closing price of the Company's common stock on the trading day prior to the date of grant, or, in the case of performance awards with market conditions, fair value is determined using a Monte Carlo simulation.

The following table summarizes the equity activity of non-vested restricted shares and performance shares:

	Number of Shares	Weighted Average Grant Date Fair Value
	(in thousands)	
Balance - December 31, 2018	2,218	$ 20.74
Granted	1,107	11.53
Performance award adjustments	(25)	28.91
Vested	(768)	21.77
Forfeited	(275)	18.48
Balance - December 31, 2019	2,257	16.20
Granted	1,054	9.53
Performance award adjustments	(51)	30.94
Vested	(798)	16.01
Forfeited	(422)	14.87
Balance - December 31, 2020	2,040	12.73
Granted	1,031	24.26
Performance award adjustments	159	18.38
Vested	(1,014)	15.50
Forfeited	(133)	15.08
Balance - December 31, 2021	2,083	17.33

The total fair value of shares that vested during the years ended December 31, 2021, 2020, and 2019 was $22.8 million, $9.0 million, and $8.8 million, respectively. For performance awards, the final number of shares earned will vary depending on the achievement of the actual results relative to the performance or market conditions. Each performance award is included in the table above at the grant date target share amount until the end of the performance period if not previously forfeited.

The fair value of performance awards with market conditions is estimated on the date of grant using a Monte Carlo simulation. Estimates of fair value are not intended to predict actual future events or the value ultimately realized by employees who receive these awards. The weighted average fair value and the assumptions used in calculating such values during fiscal years 2021, 2020, and 2019 for performance awards with market conditions were based on estimates at the date of grant as follows:

	Year ended December 31,		
	2021	2020	2019
Weighted average fair value	$27.81	$10.59	$ 16.45
Dividend yield	0 %	0 %	0 %
Expected volatility factor[1]	63 %	60 %	53 %

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Notes to Consolidated Financial Statements (Continued)

Risk-free interest rate(2)	0.34 %	0.54 %	2.37 %
Expected life (in years)(3)	3.0	3.0	2.8

(1) Expected volatility is measured using historical daily price changes of the Company's stock over the respective expected term.
(2) The risk-free rate for periods within the contractual term is based on the U.S. Treasury yield curve in effect at the time of grant.
(3) The expected life is the number of years the Company estimates that the awards will be outstanding prior to exercise.

Employee Stock Purchase Plan

For the years ended December 31, 2021, 2020, and 2019 the Company received cash proceeds of $3.4 million, $2.9 million, and $3.1 million, and issued shares of 196,024, 254,703, and 395,941, respectively, under the ESPP Plan. The weighted average estimated values of employee purchase rights as well as the weighted average assumptions that were used in calculating such values during fiscal years 2021, 2020, and 2019 were based on estimates at the date of grant as follows:

	Year ended December 31,		
	2021	2020	2019
Weighted average fair value	$5.90	$4.81	$2.96
Dividend yield	0 %	0 %	0 %
Expected volatility factor(1)	52 %	70 %	60 %
Risk-free interest rate(2)	0.07 %	0.95 %	2.41 %
Expected life (in years)(3)	0.5	0.5	0.5

(1) Expected volatility is measured using historical daily price changes of the Company's stock over the respective expected term.
(2) The risk-free rate for periods within the contractual term is based on the U.S. Treasury yield curve in effect at the time of grant.
(3) The expected life is the number of years the Company estimates that the purchase rights will be outstanding prior to exercise.

Note 14 — Retirement Plans

The Company maintains a defined contribution plan for the benefit of its U.S. employees. The plan is intended to be tax qualified and contains a qualified cash or deferred arrangement as described under Section 401(k) of the Internal Revenue Code. Eligible participants may elect to contribute a percentage of their base compensation, and the Company may make matching contributions, generally equal to fifty cents for every dollar employees contribute, up to three percent of the employee's eligible compensation, as limited by current Internal Revenue Code regulations. Generally, the plan calls for vesting in the Company contributions over the initial five years of a participant's employment. The Company provided employer contributions associated with this plan of approximately $2.6 million, $2.4 million, and $2.4 million for the years ended December 31, 2021, 2020, and 2019, respectively.

Note 15 — Dispositions

In the fourth quarter of 2019, the Company determined that one of its non-core product lines (the "disposal group") met the held for sale criteria. During the second quarter of 2020, the Company completed the sale of this product line for approximately $11.4 million, with approximately 85% of the transaction price received upon closing, and 15% held in escrow for a period of 18 months and included within "Prepaid expenses and other current assets" in the Consolidated Balance Sheet as of December 31, 2020 and subsequently collected in 2021. Long-lived assets and definite-lived intangible assets were not depreciated or amortized while classified as held for sale. The sale of this disposal group did not represent a strategic shift that will have a material effect on the Company's operations and financial results, nor is it considered a component of the Company, and as such it did not meet the criteria to be reported as discontinued operations.

For the year ended December 31, 2019, the Company recorded a non-cash impairment charge on these assets held for sale of $4.0 million, included in "Asset impairment" in the Consolidated Statements of

Operations, in order to measure the disposal group at the lower of its carrying value or fair value less costs to sell, which resulted in a corresponding held

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Notes to Consolidated Financial Statements (Continued)

for sale valuation allowance on its assets held for sale in the Consolidated Balance Sheet. During the second quarter of 2020, the Company recorded additional impairment charges of $0.3 million related to the finalization of the sale of this disposal group.

The major classes of assets that were sold are as follows:

Net assets sold:	*(in thousands)*
Inventories	$ 6,311
Property, plant, and equipment, net	372
Intangible assets, net	6,546
Goodwill	2,359
Deferred revenue	(59)
Total net assets sold	$ 15,529
Net proceeds after costs to sell	(11,228)
Total impairment on sale of disposal group	$ 4,301

Note 16 — Income Taxes

The amounts of income (loss) before income taxes attributable to domestic and foreign operations were as follows:

	Year ended December 31,		
	2021	**2020**	**2019**
		(in thousands)	
Domestic	$23,561	$(10,292)	$(78,486)
Foreign	2,119	1,828	530
Total	$25,680	$ (8,464)	$(77,956)

Significant components of the expense (benefit) for income taxes consisted of the following:

	Year ended December 31,		
	2021	**2020**	**2019**
		(in thousands)	
Current:			
Federal	$ —	$ —	$ —
Foreign	183	22	304
State and local	110	204	113
Total current expense (benefit) for income taxes	293	226	417
Deferred:			
Federal	119	136	162
Foreign	(507)	(320)	116
State and local	(263)	(115)	82
Total deferred expense (benefit) for income taxes	(651)	(299)	360
Total expense (benefit) for income taxes	$ (358)	$ (73)	$ 777

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Notes to Consolidated Financial Statements (Continued)

The income tax expense (benefit) was reconciled to the tax expense computed at the U.S. federal statutory tax rate as follows:

	Year ended December 31,		
	2021	2020	2019
		(in thousands)	
Income tax expense (benefit) at U.S. statutory rates	$ 5,393	$(1,777)	$(16,396)
State taxes, net of U.S. federal impact	(607)	(121)	(835)
Effect of international operations	609	(131)	785
Research and development tax credit	(3,964)	726	(1,692)
Net change in valuation allowance	(2,389)	388	15,098
Change in accrual for unrecognized tax benefits	398	(6)	1,232
Share-based compensation	1,208	2,248	1,947
Asset impairment	—	728	495
Partial extinguishment of 2023 Notes	(1,090)	(2,292)	—
Other	84	164	143
Total expense (benefit) for income taxes	$ (358)	$ (73)	$ 777

Deferred income taxes reflect the effect of temporary differences between the carrying amounts of assets and liabilities recognized for financial reporting purposes and the amounts recognized for tax purposes. The tax effects of the temporary differences were as follows:

	December 31,	
	2021	2020
	(in thousands)	
Deferred tax assets:		
Inventory valuation	$ 11,822	$ 10,949
Net operating losses	38,816	51,260
Credit carry forwards	57,810	54,160
Warranty and installation accruals	1,730	1,045
Share-based compensation	4,033	4,587
Customer deposits and deferred revenue	9,908	10,982
Operating leases	8,464	2,281
Other	5,880	4,741
Total deferred tax assets	138,463	140,005
Valuation allowance	(116,054)	(118,443)
Net deferred tax assets	22,409	21,562
Deferred tax liabilities:		
Purchased intangible assets	6,633	7,227
Convertible Senior Notes	10,018	13,674
Operating leases	6,539	2,241
Depreciation	2,372	2,220
Total deferred tax liabilities	25,562	25,362
Net deferred taxes	$ (3,153)	$ (3,800)

The Company is no longer permanently reinvesting future earnings from certain foreign jurisdictions and has accrued for foreign tax withholdings of $0.8 million on its unremitted earnings as of December 31, 2021.

At December 31, 2021, the Company had U.S. federal NOL carryforwards of approximately $165.8 million, of which $6.9 million have an indefinite carryforward period, with the remaining expiring in 2036, if not utilized. At December 31, 2021, the Company had U.S. federal research and development credits of $32.1 million that will expire between 2022 and 2041. The Company also has $9.4 million of foreign tax credits that expire in 2027. Additionally, the Company has state and local NOL carryforwards of approximately $104.7 million (a net deferred tax asset of $6.8 million, net of

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Notes to Consolidated Financial Statements (Continued)

federal tax benefits and before the valuation allowance) that will expire between 2022 and 2040. Finally, the Company has state credits of $30.6 million, some of which are indefinite and others that will expire between 2024 and 2036.

The Company makes assessments to estimate if sufficient taxable income will be generated in the future to use existing deferred tax assets. As of December 31, 2021, the Company continued to have a cumulative loss in recent years with respect to its U.S. operations. Based on this negative objective evidence, the Company continues to maintain a valuation allowance against its U.S. deferred tax assets. During 2021, the Company's valuation allowance decreased by approximately $2.4 million.

A roll-forward of the Company's uncertain tax positions for all U.S. federal, state, and foreign tax jurisdictions was as follows:

	December 31,		
	2021	**2020**	**2019**
		(in thousands)	
Balance at beginning of year	$12,363	$12,369	$11,137
Additions for tax positions related to current year	2,642	1,217	3,075
Additions for tax positions related to prior years	50	47	21
Reductions for tax positions related to prior years	(1,196)	(1,166)	(1,814)
Reductions due to the lapse of the statute of limitations	—	—	—
Settlements	(1,098)	(104)	(50)
Balance at end of year	$12,761	$12,363	$12,369

If the amount of unrecognized tax benefits at December 31, 2021 were recognized, the Company's income tax provision would decrease by $0.4 million. The gross amount of interest and penalties accrued in income tax payable in the Consolidated Balance Sheets was approximately $0.4 million at both December 31, 2021 and 2020.

The Company, or one of its subsidiaries, files income tax returns in the United States federal jurisdiction, and various state, local, and foreign jurisdictions. All material consolidated federal income tax matters have been concluded for years through 2017 subject to subsequent utilization of NOLs generated in such years. All material state and local income tax matters have been reviewed through 2012. The majority of the Company's foreign jurisdictions have been reviewed through 2015. The Company's major foreign jurisdictions' statutes of limitation remain open with respect to the tax years 2015 through 2020 for Germany, 2017 through 2020 for China, and 2020 for Taiwan and Singapore. The Company does not anticipate that its uncertain tax position will change significantly within the next twelve months subject to the completion of the ongoing tax audits and any resultant settlement.

Note 17 — Segment Reporting and Geographic Information

The Company operates and measures its results in one operating segment and therefore has one reportable segment: the development, manufacture, sales, and support of semiconductor and thin film process equipment primarily sold to make electronic devices. The Company's Chief Operating Decision Maker, the Chief Executive Officer, evaluates performance of the Company and makes decisions regarding the allocation of resources based on total Company results.

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Notes to Consolidated Financial Statements (Continued)

Sales by end-market is as follows:

	For the year ended December 31,		
	2021	2020	2019
		(in thousands)	
Sales by end-market			
Semiconductor	$247,051	$165,909	$175,608
Compound Semiconductor	106,972	107,922	85,877
Data Storage	168,760	123,288	84,075
Scientific & Other	60,494	57,044	73,789
Total	$583,277	$454,163	$419,349

The Company's significant operations outside the United States include sales and service offices in China, Europe, and Rest of APAC. For geographic reporting, sales are attributed to the location in which the customer facility is located.

Sales and long-lived tangible assets by geographic region are as follows:

	Net Sales to Unaffiliated Customers			Long-lived Tangible Assets		
	2021	2020	2019	2021	2020	2019
			(in thousands)			
United States	$217,209	$145,353	$126,160	$99,220	$64,967	$75,187
EMEA[1]	55,129	73,124	57,351	94	120	143
China	105,998	57,589	71,078	67	84	130
Rest of APAC	204,633	177,569	164,363	362	100	251
Rest of World	308	528	397	—	—	—
Total	$583,277	$454,163	$419,349	$99,743	$65,271	$75,711

(1) EMEA consists of Europe, the Middle East, and Africa

Schedule II — Valuation and Qualifying Accounts

Deducted from asset accounts:	Balance at Beginning of Period	Additions: Charged (Credited) to Costs and Expenses	Additions: Charged to Other Accounts	Deductions	Balance at End of Period
			(in thousands)		
Year ended December 31, 2021					
Allowance for doubtful accounts	$ 736	$ —	$ —	$ —	$ 736
Valuation allowance in net deferred tax assets	118,443	—	—	(2,389)	116,054
	$119,179	$ —	$ —	$ (2,389)	$116,790
Year ended December 31, 2020					
Allowance for doubtful accounts	$ 602	$ 140	$ —	$ (6)	$ 736
Valuation allowance in net deferred tax assets	130,053	513	—	(12,123)	118,443
	$130,655	$ 653	$ —	$(12,129)	$119,179
Year ended December 31, 2019					
Allowance for doubtful accounts	$ 270	$ 392	$ —	$ (60)	$ 602
Valuation allowance in net deferred tax assets	114,955	15,098	—	—	130,053
	$115,225	$ 15,490	$ —	$ (60)	$130,655